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BUILDING THE BASE FOR GLOBAL FOOD SECURITY—AGRICULTURAL EDUCATION AND TRAINING

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BUILDING THE BASE FOR GLOBAL FOOD SECURITY— AGRICULTURAL EDUCATION AND TRAINING

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FEEDING A CHANGING WORLD: CONCERNS ABOUT FOOD PRODUCTION

In the 1950s and 1960s, fear of a growing world population that would precipitate widespread hunger triggered, for a while, doomsday scenarios and reminders of Malthusian predictions. When the worst case scenarios did not come to pass a sense of complacency concerning the long-term adequacy of food supply prevailed and an era of cheap food, that stretched from the late 1970s to the beginning of the 21st century followed. Yet despite the prevailing complacency concerns were being expressed by agricultural scientists about the leveling off of yields in major staple crops and questions were raised as to whether the production potential of major varieties of cereal crops had peaked.

Added to the research-based questions relating to food production were other worrying phenomena that included natural resource depletion and climate changes with impact on crop yields and animal production. Warnings were issued about the declining availability of water in a number of regions where agriculture is a main consumer.

Globalization was seen to be affecting the ability of developing-country small farmers to compete in the marketplace and the rising cost of energy-based inputs such as fuel, fertilizer and transportation was felt across the rural world. Responses to the rising cost of energy included the production of fuel from bio-mass which distorted the world supply of, in particular, maize and led to higher grain prices around the globe. The contentious issue of developed country government farm subsidies remained unresolved and as the world entered the second decade of this century the potential impact of the end of cheap food linked to the continuing rise in world population came to the fore.

The end of cheap food as forecast by Beddington (2011) and the Economist (2011) has been highlighted by the 2010 -2011 drought in Russia and severe drought followed by devastating floods in Australia that dramatically reduced crop production from these two “bread-basket” nations driving food prices even higher. The importance of food security is once more on the development agenda and the US Government has launched the Feed-the-Future program to address this critical issue. Complacency about feeding a changing world has been replaced by concern.

THE CHALLENGE TO AGRICULTURAL EDUCATION AND TRAINING BECOMES MORE COMPLEX

There are direct links between food supplies, environmental stewardship and agricultural education and training (AET). Finding answers to sustainable food production problems and implementing these, and providing services and opportunities to rural people is the role of graduates of the entire AET system. Graduates serve in organizations in public and private sectors and in civil society, as scientists, technicians, policy-makers, entrepreneurs, regulators, financiers, extension agents, teachers, managers, natural resource managers, and other roles. These graduates face intensified challenges. Factors, such as cereal crop yield stagnation, product storage, climate change, higher energy costs, global health concerns, globalized markets, and declining water resources, present AET demanding, new technological, and social challenges. Balancing these are opportunities that result from global market integration, scientific advances in biotechnology and ICTs, and better educated rural populations.

In facing these challenges, it is important not to lose sight of the imperative that calls for fundamental change in existing AET systems. The fundamental change agenda includes: major organizational reform supported by policies; curriculum change and updating; re-designed and re-organized technician training; and better use of in-service and life-long-learning for boosting the human capacity of agriculture and rural development.

One very practical activity that could increase food production would be to boost the productivity of the 40 percent of farmers who have the capacity to move up from “average” to be top producers – “narrowing the gap between the best and worst producers” (Economist 2011). The education and training implications of pursuing that one goal is itself, enormous. As the World Development Report 2008 (Overview, page 1) notes: “While the worlds of agriculture are vast, varied, and rapidly changing, with the right policies and supportive investments at local, national, and global levels, today’s agriculture offers new opportunities to hundreds of millions of rural poor to move out of poverty”. It would not be an exaggeration to say yes, but not without AET.

INVESTMENT IN AET IS CRITICAL

The long-postponed effort to bring about change in AET has now become even more challenging in light of labor market demands for graduates who possess skill packages that, in addition to technical information and knowledge, should include what are often termed “soft skills” that equip them for effective involvement in the agricultural innovation system (AIS). There is increasing awareness and understanding of the role of the AIS in providing an enabling environment for the adoption of innovations by farmers and others in the agricultural value chain.

Modern AET graduates are expected to use information communications technology (ICT) to enhance communication, show leadership, help farmers and others assess innovations, and be familiar with business plans and proposal writing. In addition to the stresses on AET from climate change, higher input prices, and concerns about yield stagnation there is the added imperative to amend curricula to include the non-technical “soft skills”. While this may not appear to be a difficult issue it does pose two questions that need to be answered: what will be dropped from the present technical curriculum to make space for the soft skills and who provides instruction in or learning opportunities for the acquisition of these skills?

AET institutions are a key part of any strategy to develop sector capacity across institutions, in the public and private sector and civil society. Institutional capacity development is fundamental to a sustainable, productive agricultural sector with dynamic value chains. Institutional capacity development is built on three elements—human capacity, organizational structures, and the enabling environment of policies and infrastructure. A country’s AET system provides the means for providing the essential element.

WHAT IS AET?

The term Agricultural Education and Training covers a broad swath of mostly public sector education and training programs provided to those who work in and benefit from agriculture and rural development activities. While the acronym is short and compact the AET “system” is complex and multi-faceted. The fact that AET spans a range of educational and training activities that includes: graduate degree programs, undergraduate degrees, sub-tertiary diploma

qualifications, certificate (secondary plus one) courses, Agricultural Technical Vocational Education and Training (ATVET), cooperatives training for agriculture, in-service training for public sector service providers, farmer training, and, in some cases, life-long-learning events that are offered to civil society is complex enough. To this complexity must be added the sub-sector specializations that arise from traditional and new agriculture sector enterprises: production agriculture with its variety of crops and livestock species; mixed farming systems that combine crop and livestock production; crop and product storage; farm management; agri-business; services to agriculture such as research, extension, food safety and other regulatory functions provided by the public sector; farm equipment use, repair and maintenance; value-added processing; post harvest technology; and marketing. This canvas is broad, but is further impacted by externalities such as climate change, globalization of markets, the cost of energy, the persistence of rural poverty, looming water shortages, and the continuing growth of world population.

IS AET A TRUE “SYSTEM”?

Traditionally, agricultural education has been largely supplied and supported by the public sector. Although the various elements in the AET delivery chain are often referred to collectively as a “system” (Bawden 1998, 1999; Rivera 2008), in many developing countries it is questionable whether these elements form a robust system in which communications and feedback freely flow between institutions and individuals and allow for adjustments and improvements on a continuous basis. The impact of this imperfect system is reflected in the relevance and quality of degree, diploma, and in-service training programs offered in many countries around the world. The structure of AET and impact of the poorly defined and managed AET system are discussed in the next sections.

THE STRUCTURE OF AET

To meet the information, knowledge and skill needs of sector and subsector stakeholders who participate in general and specialized agricultural activities the AET system has evolved a structure that is designed to meet the needs of each broad client group. At the apex of the system for AET are the tertiary educational institutions such as agricultural universities or faculties and colleges of agriculture within comprehensive universities. Management responsibility for tertiary education is entrusted to ministries of education. The public sector was, traditionally, the main employer of graduates of higher agricultural education with jobs in public agricultural research and extension programs and other technical services offered by ministries of agriculture. Over the years, as these public agencies greatly curtailed hiring, holders of agricultural degrees, diplomas, and certificates have been more likely to seek employment with agribusinesses, farmers’ organizations or with NGOs supporting agricultural programs.

Other institutions in the AET system under ministries of education include polytechnics, institutes, or colleges that prepare technicians at the diploma level (the postsecondary, sub-degree level). This category of education, often termed “agricultural technical–vocational education and training” (ATVET) or “vocational education and training” (VET), prepares technicians in a variety of specializations in agricultural subsectors. Many diploma holders become managers of large crop or animal production units or agribusinesses, entrepreneurs in their own right, or employees in technical units in the public sector. Students who do not aspire to or cannot afford the cost of higher education, or who wish to enter the workforce at an earlier age, can enter

vocational education programs to gain certified expertise in agricultural specializations that include farm machinery sales and maintenance, home economics, agricultural input or product sales, and extension (junior extension workers with certificates, working under subject matter specialists with diplomas).

Some secondary schools offer agriculture as an elective, but in most developing countries these programs have a checkered history, influenced by the qualifications and experience of the teachers assigned to the subject and the motivation of the students who enroll. Probably the most successful secondary agricultural education model is the vocational agriculture program offered in largely rural districts in the United States. The program offers academic and practical subjects in school and, through a supervised youth organization (Future Farmers of America), helps students develop leadership skills and technical prowess by participating in contests and undertaking a supervised project.

Though there are similarities and the two work to the same end goal, there is a clear divide between Agricultural Education and Training and Agricultural Extension. The prior including all of the above mentioned examples that typically connotes more formalized methods of teaching from purposefully designed institutions, while the latter would refer to trainings at the local level for a wider audience and with less structured curriculum.

Agricultural training, frequently delivered in training centers or training institutes is offered to public sector employees as in-service training and/or to farmers as farmer training. Ministries of agriculture are usually responsible for agricultural training programs. Public extension services offer training (largely to farmers) through formal presentations, lecture-demonstrations, field days, crop and animal field trials, farm tours, and various other media. Public agricultural research systems provide educational opportunities to farmers and extension staff, usually in the form of field days combined with lectures. Public sector researchers also act as resource persons in formal, higher-level education programs, work with extension staff to train farmers, or provide in-service training to extension staff.

AET DELIVERY MODES

As outlined in the section, above, AET has evolved a structure to respond to the human capacity needs of the agriculture sector's stakeholder groups. Agricultural education and training delivery is broadly categorized as formal and informal AET.

FORMAL AGRICULTURAL EDUCATION AND TRAINING

Formal AET delivers academic programs, courses, and training activities that are planned and implemented in an organized setting. These activities are frequently classroom based, have a professor, lecturer, teacher, facilitator, or trainer who guides the learning process. Formal AET is driven by curricula that are designed to enable learners to obtain the information, knowledge, and skills required to master the content of the learning activity. In the formal setting student/learner progress is measured through examinations, quizzes, or demonstrated competencies. Formal agricultural education includes university degree programs, vocational technical courses, secondary school courses, and in-service and structured life-long learning training activities.

INFORMAL AGRICULTURAL EDUCATION AND TRAINING

Alongside the formal AET system, a dynamic, informal learning system greatly influences how information, knowledge, and skills are obtained, channeled and used in agriculture. At the heart of this system are farmers, farming families, the services they receive, and the contacts they make on a regular basis. Informal agricultural education involves awareness-raising and training provided to farmers by public extension and research services, by traders who purchase farm products and supply farm inputs, and by the media, which convey a variety of information to rural communities.

Farmer-to-farmer communication is one of the most powerful forces for education within the informal system. Farmers communicate easily with their peers, and observe the techniques and skills used by others, and quickly adopt what they perceive as successful practices.

THE FORMAL AND INFORMAL AET MODES ARE LINKED

The actors in the AET “system,” regardless of how structured or organized it may be in a given setting, are generally linked to one another directly or indirectly. To recapitulate, the formal AET system educates and trains the majority of workers found in public research and extension services. Private input suppliers also hire graduates of the formal system to be spokespersons, technicians, and sales representatives. Traders who purchase crop and animal products from farmers are often graduates of the formal system or come from farm families that had contact with graduates of AET through research and extension programs. Agricultural communications specialists and other media workers, some of whom may have farming backgrounds, obtain technical information from the formal extension or research services. In the informal AET system, the common thread is the ability of suppliers and users of knowledge and skills—the advisory and research services, farmers, the private sector, and the media—to communicate effectively with one another. Before exploring the future of the system, however, it is important to understand something of its recent past.

FIFTY YEARS OF INVESTMENTS IN AET

The 1950s, 1960s, and 1970s saw substantial, dedicated investments in agricultural education and training. (See table 1) One of the largest investments, launched by USAID in the mid-1950s, was a long-term program that supported universities similar to the United States Land Grant universities in Latin America, Asia, and Africa. This ambitious program built some institutions from the ground up and generally provided technical assistance for administrative and academic activities and curriculum development, provided links to overseas advanced degree programs, modernized libraries, and paired the new universities with counterpart Land Grant universities. A number of Land Grant institutions supplied much of the technical assistance, advanced degree training, and continuing support to counterpart universities overseas. These USAID programs established agricultural science programs that changed the way agriculture was taught and learned in many developing countries; enhanced the quality of education, research, and extension;

provided current teaching materials; and created an international network of agricultural education professionals.

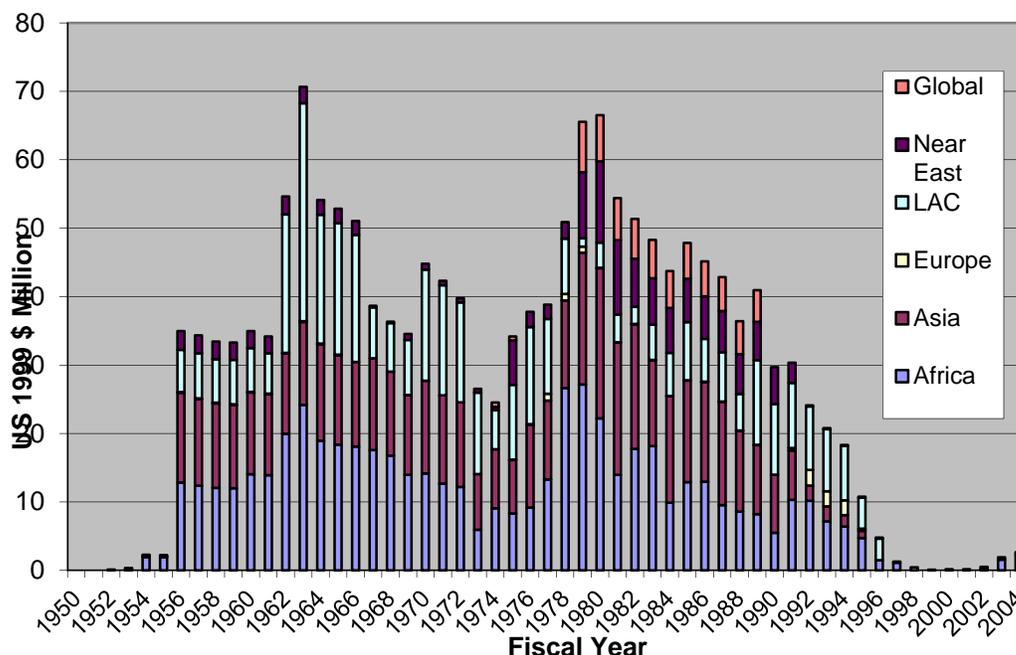
The impact of the investment was impressive but not always sustained. Over time, some universities lost momentum. Institutions failed to adapt to changing conditions and new opportunities. Linkages to in-country stakeholders failed to develop as extensively and strongly as expected. The quality of teaching and learning deteriorated. Changes in leadership, reduced funding, and the winding down of collaboration with individual overseas universities all impacted on performance and on the quality and relevance of education programs. On the other hand, a number of universities established under the program thrived and have continued to provide education leadership long after the investment program closed. In hindsight, many investments in AET by bi-lateral and multi-lateral agencies did not pay enough attention to institutionalizing changes in organization, curriculum, standards, governance, and stakeholder linkages that would have ensured sustainability. Absent such institutionalization, organizations tended to revert to their pre-investment situation.

During the same period, multilateral organizations such as the World Bank, FAO, ILO, and UNESCO and bi-lateral agencies supported AET through freestanding agricultural education projects, training components in agricultural projects, and seminars, workshops, conferences, and in-country and international courses (World Bank 2007). With the exception of free-standing agricultural education projects, most of the other activities were short-term. The impact of the free-standing projects depended heavily on the recipient ministry's or country's commitment to sustaining the new investment; as might be expected, results varied over time. The choice of participants for seminars, workshops, and training courses proved decisive in terms of the usefulness of these activities and the effectiveness with which the participant transferred knowledge and/or technology to the parent organization—a lesson that should not be forgotten in designing AET projects.

A DECLINE IN FUNDING FOR AET

By the end of the 1970s, funding for AET began to decline dramatically (Willett 1998 and Table 1 below), overtaken by other development priorities. Numbers of AET specialists in many international organizations and bilateral donor agencies decreased. Despite pleas by numerous observers and organizations to governments, donors, and universities to rehabilitate and reform deteriorating agricultural education programs and facilities, AET continued to drop even lower on the development agenda. Led by the World Bank policy change, education investments in the 1980s began to favor primary education and funding for secondary, vocational-technical and tertiary education projects declined. A 2005 review of investment in AET in projects supported in Africa by the World Bank found that the same weak level of investment had persisted since the 1998 review by Willett. (Rygnestad, Rajalahti, and Pehu 2005). A review of World Bank Support to Education (all levels) since 2001 notes that from fiscal 2001 – 10, new World Bank commitments to education totaled \$23 billion and commitments on an annual basis had doubled by the end of the period. The Bank's corporate strategy has evolved from a focus on basic education to a dual focus on universal primary completion and post primary "education for the knowledge economy". (World Bank 2011).

TABLE I: ESTIMATED USAID FUNDING FOR AGRICULTURAL EDUCATION INSTITUTIONS 1951-2004 (US\$ MILLION 1999)



PAST INVESTMENTS IN AET BY USAID

USAID has been one of the leading investors in AET over the past half century and its program to establish Land Grant type universities in Asia, Africa, and Latin America during the 60s remains the gold standard for AET institutional investment. AET investment from 1950 to 2004 amounted to \$1.631 billion (1999 \$) (G. Alex, person comm.). Over the same time period, research and extension investments totaled \$5.988 billion and \$2.951 billion respectively (in 1999 \$). USAID, like other donors, reduced its level of investment in AET over the past two decades. During the same time period investment in agricultural research and extension also showed a decline but each of these categories outpaced investment in AET. This investment profile mirrors that of the World Bank in the decade 1987-1997 where the investment in agricultural research and extension amounted to close to \$2 billion each and agricultural education a mere \$ 156 million. It could be argued that USAID investments in research and extension contributed to education and training, but these investments were focused on specific research and extension goals and not on AET system strengthening for networks of universities, colleges, vocational schools and training centers to prepare human resources for the overall agricultural sector and for work in rural development. Perhaps, some investments in research and extension supported programs that were weak because of the less than desirable quality of graduates being produced from all levels of the AET system.

WHAT ARE THE CURRENT WEAKNESSES OF AET?

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It is important to preface a discussion of the weaknesses of AET by stating that not all AET systems are uniformly weak. There are examples of reforms, some successful, others not, and improved curricula, better stakeholder linkages, and the use of public-private partnerships to catalyze AET change. However, these examples are not widespread so the generic weaknesses of AET systems described below apply to a large number of AET institutions world-wide.

Whether it is part of a robust, well-integrated system or not, agricultural education is weakened by the division of responsibilities among ministries, the isolation of individual ministries and their failure to collaborate in designing and delivering education and training in a manner that meets the needs of all AET stakeholders. Under these circumstances, a broad vision for AET is rarely in place. As a result, policies and strategies for modernizing agricultural education are seldom developed.

As a smaller specialized element in the bigger education picture—which includes primary, secondary, and higher education together with vocational and technical education and training, teacher training, and a number of special adult education programs—agricultural education and training tends to lack bargaining power when development investment decisions are made. This relative lack of visibility and clout is all the more critical as, increasingly, pressure for change in AET comes from developments in agriculture that are outside the control of the AET institutions.

Not all of the problems that plague AET in developing countries have resulted from divided ministerial responsibility for managing the AET system. The unfortunate absence of policies to guide the system (or failure to apply those policies), and low levels of investment by governments and donors in the agricultural sector further weaken AET. A number of generic weaknesses in the planning and delivery of agricultural education and training in developing countries have persisted over time. Briefly, these weaknesses include a lack of university autonomy, weak links to stakeholders, lack of accountability for quality or employability of graduates, outdated curricula and teaching approaches, weak training in practical skills, the variable quality of programs, weak adoption of information and communications technology, and low remuneration of faculty and staff.

Diploma-level education and training also exhibits weaknesses, including the absence of supporting policies, weak links to stakeholders, programs that fail to reflect labor market needs, inadequate and inconsistent funding, and a shortage of skilled teachers/instructors. Agricultural training at the secondary level, which is not universally offered, is often chosen as an “easy pass” by students. It also suffers from a lack of qualified teachers and is weakened by poor cooperation between ministries of education and agriculture.

One outcome of the weaknesses and low investment in AET is the reluctance of students to choose agriculture as their preferred academic pursuit (Pratley 2008; Rivera 2009; Mulder 2010). In countries where higher education is at a premium, this reluctance inevitably creates a situation where many of students who enroll in agricultural programs have a greater interest in possessing an academic degree or certificate than in making a career in agriculture.

WHY IS THIS AN APPROPRIATE TIME TO CONTEMPLATE INVESTMENT IN AET?

The needs of a growing world population will need to be satisfied as critical resources such as water, energy and land become increasingly scarce. The food system must become sustainable, whilst adapting to climate change and substantially contributing to climate change mitigation.

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There is also a need to redouble efforts to address hunger, which continues to affect so many. Deciding how to balance the competing pressures and demands on the global food system is a major task facing policy makers.

Why, despite a constant call for reforms and more relevance, did AET fail to respond and that now, in 2011, the case is once more being made? Even though the fear of wide-spread hunger with population outstripping food and other resources had traction in the 60s and early 70s these scenarios did not come to pass. Why not? The answer is that technology came to the rescue and brought the miracle wheat and the green revolution. Countries that were major importers of grain became modest and then substantial exporters. Although world population continued to increase there was an unspoken belief that should another crisis point arrive technology would once again come to the rescue. As the Economist (2011) put it: “Since the green revolution we have muddled along without major food shortages.” An era of cheap food had its beginnings in the late 70s but was strongest during the 1990s and 2000s as food commodity prices continued to fall. Investment in agriculture sector development by national governments and by donor organizations declined. It was not until the publishing of the World Development Report 2008 (World Bank, 2007) that renewed interest in agriculture once more began to gain traction in governments and with donors. While this development is welcomed there is concern that a food crisis could occur. The elements that can contribute to such a scenario are visible and well-known and described earlier in this paper. Action is being taken to find adaptation answers to food production challenges posed by climate change, sustainable land management approaches are again being pursued, attention is being paid to water management, and food safety and nutrition issues are getting attention.

Agricultural education and training has a major role to play in supporting efforts to avert a food crisis. However, AET will have to revitalize and broaden its curricula, embrace change, use modern communications technology, and attract a new generation of young and dedicated scientists, technical specialists, entrepreneurs, and farmers to the sector. Much time and capacity has been lost during the period when investment in agriculture and AET declined and now the complexity of organizational and human capacity required for meeting the needs of agriculture and rural development has broadened. There is no doubt the time for investment in AET is now.

EXPERT OPINION ON THE STATE OF AET

Weidemann Associates organized a Roundtable discussion on January 5, 2011 to explore the state of AET and to identify investment opportunities for USAID. The event was attended by 22 experienced AET specialists with world-wide experience and submissions were made by others who were unable to attend in person. A comprehensive review of AET literature was prepared in advance of the event. A summary of the findings of the Roundtable follow:

General Observations

- AET has suffered from a low level of investment by USAID and other donors over the past 20 years. The paucity of support has probably constrained growth of AET institutions and has weakened those who were assisted in the past
- Academic and technical agricultural staff educated and trained with donor support in the past have retired or are about to retire taking with them institutional memory
- There is still an emphasis on production agriculture in many of the AET institutions in developing countries even though labor market demand has changed

- The unveiling of USAID’s Feed The Future Initiative that addresses food security in an ever changing world exposed the weak state of agriculture and of AET in many countries and the fact that USAID itself was short of staff experienced in AET
- Partner country personnel who would work on food security issues are in short supply and capacity needs go well beyond the need to train scientists and researchers. Agricultural education must prepare policy-makers, analysts, researcher, agribusiness entrepreneurs and staff, technicians, extension agents, agricultural finance officers, natural resource management specialists, and others
- The overseas training option for increasing human resource capacity for agriculture is less likely to be chosen by donors for relevance, cost and sustainability reasons
- AET institutions and programs must transform themselves into demand-driven, responsive and efficient support for commercial production for domestic and international markets.

AET Opportunities

- Work with AET institutions and supporting organizations that have proved resilient despite the shortage of financial and other support for AET
- Create a generation of bright and dedicated practitioners who will bring to agriculture a modern point of view and who can foster innovation
- Think of AET reaching beyond the university to vocational and technical institutions that produce needed technicians and offer learning opportunities to youth and others in society
- Create an interdisciplinary understanding of agriculture that provides technical underpinnings but adds business development, marketing, non-profit management, environmental concerns, bio-engineering and other technologies
- Create and strengthen inter-institutional connections.

Pitfalls to avoid

- Avoid supply-driven investments that frequently lack AET system ownership and prove unsustainable once the investment period ends.
- Insist on practical training. Students and employers identify a lack of practical skills as a major weakness in AET programs. Investments should include support for the development of university or school farms as practical training sites and encourage attachments at commercial farms and agribusiness enterprises.
- Governance of AET, in the past, has largely excluded stakeholder participation. This has led to institutional isolation and a failure to appreciate the human resource needs of the sector. AET investments must address governance issues
- All AET investments should be based on a carefully conducted and analyzed needs assessment because each institution and location presents unique challenges
- Institutionalization of AET changes or reforms is essential. Many previous investments in AET saw successful programs and activities vanish because of a failure to institutionalize gains.

SELECTED ADVICE AND COMMENTS ARISING FROM ROUNDTABLE DISCUSSIONS

- Universities should think interdisciplinary and offer hard science plus ICT and soft skills. They must also think rural development, linkages, policy, and technical education
- Universities need to be networked to share resources and information; exchange visits and workshops enable university leaders to interact and share options for administrative and policy reforms critically needed by many institutions.
- Universities need to be more engaged in policy advice and support (with decision-makers)
- Higher education should seek partnerships (twinning, joint research and teaching) with in-country stakeholders and sector institutions, as well as international programs and institutions.
- Need for AET to be relevant – curriculum updated, and scattered nature of the various parts of AET streamlined
- AET has to be linked with stakeholders
- AET requires sustainable funding
- All investment programs have to be country led or driven
- AET change needs champions/leaders
- AET should focus on youth training/learning
- AET should target producer groups
- AET needs to emphasize the value chain and support innovation with agri-business
- Public-private-partnerships are important
- AET can be a supplier of technical assistance and training of trainers for the private sector
- Donor harmonization is important as is continuity of donor assistance
- Investments in AET have to distinguish between institutional support versus training
- New and private universities need to be competitive to interest students, gain accreditation and attract funding
- Creativity centers and innovation parks are important incubators of ideas for the sector
- Incentives and innovative programming needed to convince women to join AET as faculty and as students
- Gap analysis essential for AET change
- Diaspora important for introducing new ideas to AET
- Good to remember that it is not necessary to start from zero when bringing about change. The advice is to build on what exists.

WHAT INVESTMENTS SHOULD A DONOR AGENCY MAKE IN AET?

Investment in AET programs and institutions is not made solely for building the capacity of these institutions. Indeed, a country's AET institutions are critical to providing knowledge and information services and creating a qualified human resource base. This is a fundamental contribution to long-term sustainable development. But, institutions must look beyond the production of graduates as a measure of the impact of AET investments. Graduates must be able to find employment and use relevant skills to improve sector performance.

Have clear objectives

There is no shortage of AET investment possibilities so identifying a wide range of potential programs, projects, and activities is not difficult. However, before an exploration of the universe of potential investments, a donor agency needs to answer a number of organizational questions that will lead to a narrower focus and better informed choices.

Question 1: Why is the agency interested in AET at this time?

Question 2: Does the agency have focus regions or focus countries in mind?

Question 3: Does the agency have a good understanding of the AET system (s) in the target regions or countries?

Question 4: What type of AET change does the agency wish to support? (For example: is it public sector AET reform, private sector capacity building or Public Private Partnerships (PPP) for the education and training of skilled technical personnel?)

Question 5: Are the desired changes categorized as long- medium- or short-term?

Question 6: Are agency funding horizons such that it can underwrite interventions that go beyond short-term?

Question 7: Does the agency want to get involved in short but visible AET activities or to support a wider and deeper reform process?

Two examples from a recent AET literature review (Rivera 2011) illustrate a menu of potential investments and also give a flavor of the range and complexity of the challenge.

The first example: A Southern Sudan Agricultural and Environmental Sciences Higher Education Needs Assessment summarized the scope of AET weaknesses that needed to be addressed. Among the greatest needs identified were the following:

- Huge deficiency in numbers of current and projected university-trained agriculturalists
- Universally recognized urgent need for practical, field-based training for degree candidates at all levels
- Urgent need for shorter-term certificate and diploma programs
- Shorter-term development needs require many more bachelors degree graduates with broad-based general agriculture training
- Facilities and faculty training needs are acute and general
- Higher education to increase regional food security is priority number one (USAID/Sudan. 2010.)

The Southern Sudan needs assessment indicates that the entire AET system has to be strengthened and expanded. A donor agency would, based on the answers to the internal questions posed above, decide whether it would be useful to invest in one or more of the articulated needs or to support a wide and deep reorganization, reform and expansion of the AET system.

The second review example, a 1997 UK report (Wallace and Nilsson), laid out the potential for improving the design and management of AET. A donor agency interested in investment in this aspect of AET would also have to make choices about some or all of the challenges described in the report and summarized below:

BUILDING THE CASE BASE FOR GLOBAL FOOD SECURITY – AGRICULTURAL EDUCATION AND TRAINING

Research (mainly in sub-Saharan Africa) has indicated a number of successful innovations in agricultural education and training (AET), however AET has generally been unresponsive to changing patterns of demand from trainees, which are influenced by the changing roles of public and private sectors. Much can be done to improve the design and management of AET, and to strengthen the policy framework through which support and direction are channeled. There is also a need to enhance the interactions between AET institutions and the formal schools sector, as well as AET institutions' linkage with local communities, NGOs and other intermediary organizations. The low level of dissemination of the results of research or of successful innovations has meant that too few new ideas have been flowing into AET. (USAID 2010)

What is clear is that no single donor agency can deal with all AET problems in a typical country. Choices have to be made. These may be choices to support broad categories of AET such as building graduate level capacity for agricultural research or for policy work; building AET capacity to partner with the private (agribusiness) sector in increasing the numbers of people with technical/commercial/entrepreneurial skills; supporting hubs or centers of excellence to provide specialized scientific or technical training; focusing on producer organizations or youth organizations; supporting gender balance in AET staff and student intakes; or building ICT capacity. Another choice might be to invest in an aspect of AET such as curriculum change; supporting the establishment of AET-private sector attachment programs; building vocational-technical capacity in the public sector system or public-private partnerships; or strengthening one or more links in the value chain.

The choices and opportunities for engagement for USAID differ according to each country's situation. Using the Foreign Assistance Framework classification, Missions might consider the following:

TABLE 2: COUNTRY SENSITIVE AET APPROACHES

Country Category	Possible approach to engagement
Rebuilding Countries (States in or emerging from and rebuilding after internal or external conflict)	<ul style="list-style-type: none"> • Invest in rebuilding AET institutions, with “full package” of inputs • Consider regional or overseas training programs as an interim measure
Developing Countries (States with low or lower-middle income, not yet meeting MCC performance criteria, and the criterion related to political rights)	<ul style="list-style-type: none"> • Support targeted programs/ curricula development • Support outreach activities to strengthen in-country linkages to stakeholders (e.g., research)
Transforming Countries (States with low or lower-middle income, meeting MCC performance criteria, and the criterion related to political rights)	<ul style="list-style-type: none"> • Contract universities to provide services and implement programs in country • Provide targeted support to key (or weak) programs • Fund university linkage programs
Sustaining Partnership Countries (States with upper-middle income or greater for which U.S. support is provided to sustain partnerships, progress, and peace)	<ul style="list-style-type: none"> • Contract universities to provide services and implement programs in countries in the region • Provide scholarships for training participants from other countries at institutions in these countries
Restrictive Countries (States of concern where there are significant governance	<ul style="list-style-type: none"> • Support targeted faculty linkage arrangements or operational support as appropriate

issues).	
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Embrace new approaches

Regardless of the choice of objective and focus for an AET investment there are some general guidelines that should guide the design and content of projects or programs. These can be seen in Table 3.

TABLE 3: FUTURE DIRECTIONS OF AGRICULTURAL EDUCATION AND TRAINING INVESTMENTS

Higher agricultural education now	Future directions
Weak, unenforced, or absent policies	Clear AET policies with responsibilities defined and enforced
Weak governance	Strong governance inclusive of stakeholders
Little autonomy	Autonomy that enables staff decision-making, financial control, and standards setting
Uncertain funding	Steady and regular funding guaranteed
Isolation	Community and stakeholder connections established and maintained. Links to centers of excellence established and maintained
Curriculum now	Future directions
Outdated. Production focus	Updated , relevant and multidisciplinary
No stakeholder input	Stakeholder consultations; input solicited and incorporated
Teaching	Learning
Theory	Theory and practical application.
No student attachments	Regular, organized, and supervised attachments
Inappropriate pedagogy. Low use of ICT	Effective pedagogy tailored to subject matter and learner needs. Effective use of ICT
Technical training now	Future directions
Heavily supply driven	Mostly demand driven
Managed by the public sector	Managed through public–private partnerships

Poorly qualified and remunerated instructors	Qualified and fairly remunerated instructors
Qualifications not certified by professional bodies	Certification ensured
Employers disappointed with graduates' skills	High level of employer satisfaction with graduates' abilities
Equipment in short supply and outdated	Equipment/practice areas obtained through public-private partnerships
Public sector agriculture human resources now	Future directions
Indifferent management of human resources	Active human resources management
Weak human resources management leadership	Qualified human resources managers
Selection of trainees not based on need	All selection based on need and future tasks
Training needs assessments are not undertaken	Needs assessments are standard procedure
Little supervisor/manager involvement	Supervisors/managers consulted and involved
No evaluation of trainee performance on the job	On-the-job performance measured
Trainers not trained to instruct/teach	Qualified trainers standard
Life-long-learning not supported	Life-long-learning actively promoted and available

Promote strategic partnerships

A quite successful aspect of the large-scale investment undertaken by USAID beginning in the 1950s (pages 6, 7 of this document) was the linking of the new or upgraded universities with established US Land Grant institutions. These linkages that encouraged administrator, faculty and student exchanges helped build human and institutional capacity in developing country universities. Second US-based faculty introduced improved pedagogy that involved staff and students in interactive learning. The old lecture type approach to teaching was enlivened by combining theory with practice. Many younger faculty and graduate students from the developing country universities had the opportunity to study in US Land Grant Universities returning to enhance human resource capacity. Research too benefited from the partnerships with US faculty who brought techniques, tools and collaborative projects to faculty and staff in the partner entities. New or upgraded universities were encouraged to reach out to communities and to engage in extending academic knowledge beyond the university.

While the partnerships during that particular period were successful there was a decline in sustainability at a number of sites once the USAID program wound down. This can be largely attributed to the fact that changes brought about during the partnership were not institutionalized. Policies were not put in place to make the changes “law”. Decision makers needed to see the reforms or changes in terms of being a new and future way of “doing business” in higher agricultural education and continue to provide the guidance and resources needed to maintain the quality of learning achieved during the partnership.

Partnerships can be highly successful, but the term partnership implies that the donor partner does not provide all of the support. The receiving partner has to see the value of the partnership for staff, students, and the institution and commit to tailoring the external inputs to the capacity and resources available. While the beneficiary partner may not be able to match the donor partner in terms of expertise and finances there are contributions that can be made in kind. Investing in dialogue prior to drawing up a partnership agreement should involve decision-makers such as concerned ministries (agriculture, education and finance) thereby setting the scene for institutionalization. If the concerned ministries are party to the changes that can emerge from the partnership agreement they are more likely to endorse these changes and sustain them in the future.

A review of partnerships in USAID projects from 2001-2010 prepared by Jane Gore and HED provides a wealth of experience and describes successes and pitfalls. (Morfit, Gore and Akridge, 2009)

Areas for investment

In assessing and planning AET investment options, it is useful to consider the range of needs for a quality AET program. These fall into the following potential investment areas:

Curricula: Curriculum reform is urgently needed in many institutions. It is not uncommon to find courses being taught using the same materials and course outline developed twenty years earlier. Issues frequently include: need for more practical experience, orientation to markets and the private sector, biotechnology and ICT applications, environmental conservation and natural resource management, and nutrition education to name a few.

Faculty and staff: The looming retirement of faculty trained in the 1970s and 1980s is widely noted. Replacing these leaders is one critical need. But, building staff and faculty to teach reformed curricula is another reason to invest in faculty development. Options for training faculty and staff differ from 20 years ago. With more trained professionals in the job market, recruitment may be a better option – faster and cheaper – than funding training to fill positions. More training will need to be undertaken in-country and within the region, for cost and relevance reasons. US-based training is still an important means to introduce new perspectives on the agricultural sector and institutional development and can be the preferred choice in some circumstances.

Infrastructure: USAID funding is generally inadequate for large-scale infrastructure investments. The core infrastructure investments have usually been made, and there is a nearly insatiable demand for more space to accommodate the large influx of youth seeking education. Still, strategic infrastructure investments are often needed to enable institutions to carry out their mandates or reform programs to meet new needs. Infrastructure for laboratory and field work has been especially neglected.

Outreach and services: AET institutions and programs must improve their outreach and engagement in service to the agricultural sector to stay relevant. Research is an important

function for universities, but many lack policies, strategies, and programs for facilitating faculty involvement in research. Extension or community services linkages can give students exposure to rural communities and practice problems. Sometimes these outreach activities can be funded by stakeholders wishing to draw on AET capacities, a clear win-win situation in attracting funding and engaging in sector outreach.

Student recruitment and support: Recruitment of students who have experience in and commitment to agriculture is critical to the future of the sector. Increasingly, there are large numbers of non-farm and non-urban applicants for agricultural education and training programs many of whom seek the diploma rather than a career in agriculture. Investment in recruitment processes that enable faculty to visit secondary schools, meet with potential recruits, provide orientation to the academic programs and discuss the range of potential job opportunities available to agricultural graduates enhances the likelihood of attracting a student more suited to work in the sector. Student support services are important to the production of well prepared and confident graduates. Among the most important of these are: libraries, ICT access, scholarships, counseling, outplacement, and internship opportunities.

Program quality: AET degree and diploma programs should meet agreed high standards. It is essential that degree and diploma programs are accredited and certified to ensure that quality standards are maintained and that universities and ATVET colleges and their graduates are nationally, regionally and internationally recognized.

Policy and Administration: AET program and institutional policies and administrative arrangements often work to the detriment of an efficient and effective institution. Financial sustainability and appropriate incentives to faculty and staff and students is of prime importance. Government restrictions make change difficult in public institutions. Investment in dialogue prior to committing to change programs or projects can help identify policy and organizational bottlenecks in AET governance and lead to successful reform initiatives.

RECOMMENDATIONS FOR FURTHER WORK TO SUPPORT AET REFORMS

AET system reforms must be based on well defined needs and the implications of change on organizational structures, faculty responsibilities, governance structures, policy formulation, and financial resources clearly understood. Investors need to be equipped with appropriate tools and models for dealing with various aspects of AET reform. Valuable use could be made of:

1. Organizational capacity assessment tools
2. Knowledge and skills gaps assessment instruments
3. Guidance on designing faculty work profiles and responsibilities in 21st century agricultural education and training
4. Governance models that embrace all key stakeholders
5. Guidelines for estimating costs of AET programs
6. Student recruitment models
7. Policy and strategy formulation for AET support and institutionalization

Investment needs to be made in design of models, instruments, tools and guidelines that equip donors with much needed dialogue, design and monitoring resources for the process of AET reform

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