Transforming Higher Agricultural Education in Egypt: Strategy, Approach and Results

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Abstract

Faculties of Agriculture in many developing countries face serious challenges in keeping their academic programs up-to-date and linked to the human resource needs of the agricultural sector. In many cases, faculty members have limited opportunities to conduct research, and linkages with the private sector may be weak, so academic programs are not effective in preparing students for technical and managerial jobs within agribusiness firms. This paper describes a strategy being implemented in collaboration with five universities in Upper Egypt to transform their academic programs and to bring specific institutional changes that would strengthen linkage between these universities and private sector firms and commercial farms.

The project began with a skill-gap analysis to identify the specific needs of private sector employers and weaknesses in current academic programs. Based on this analysis, the first step was to introduce active teaching-learning methods to faculty members to enhance the development of higher level cognitive skills needed by private sector employers, including critical thinking, problem-solving and decision-making skills. Through specific course and faculty development activities, it was possible to update the content of “core” courses being taken by all agriculture students. Next, based on a strategic planning exercise carried out by academic and private sector leaders, universities organized external advisory committees and internship programs, as well as career resource and extension-outreach centers. Two independent reviews verified that these activities had successfully transformed these academic programs and that most faculty members had updated their courses and were now using active teaching-learning methods.

Keywords: Higher agricultural education, teaching methods, capacity building, institutional change, private sector linkages
Introduction
Higher agricultural education institutions in developing nations face major challenges. First, there are more than 100 million students currently enrolled in universities worldwide (Altbach, 2000), and demand for higher agricultural education is growing. As Holm-Nielsen (2001) has documented, “knowledge makes the difference between poverty and wealth.” At the same time, most developing country universities are confronted with many problems, including courses that are “taught by poorly-qualified, poorly motivated and poorly compensated faculty, struggling with inadequate facilities and outmoded curricula” (Bloom & Rosovsky, 2001). If Faculties of Agriculture (FOAs) are to play a strategic role in helping develop the agricultural sector in their respective countries, then it is essential that university faculty members and administrators be aware of the “convergent impacts of globalization, the increasing importance of knowledge as a main driver of growth, and the information and communications revolution” (Holm-Nielsen, 2001). The approach to be outlined and assessed in this paper addresses each of these challenges. The model of institutional change being implemented through the Agricultural Export and Rural Income (AERI) Linkage Project contains important lessons that can help transform agricultural universities in different developing countries into viable institutions for agricultural and rural development.

The focus of this paper is on five Faculties of Agriculture (FOAs) at five universities in Upper Egypt, including: Assiut, Cairo, Fayoum, Minia and South Valley Universities. These universities continue to be under funded by the national government and face many of the same problems identified above. Therefore, starting in September 2003, the AERI Linkage Project, funded by the U.S. Agency for International Development (USAID), became operational. This project is implemented by the Midwest Universities Consortium for International Activities, Inc. (MUCIA), in collaboration with six U.S. Land Grant Universities, and seeks to strengthen specific academic departments within each FOA (agricultural economics, livestock production and horticulture), plus the Faculty of Veterinary Medicine at Assiut University. This paper summarizes the activities carried out to date under the Capacity Building Component of the AERI Linkage Project, including an independent evaluation of the results achieved.

Problem
At the beginning of this project, the Faculties of Agriculture (FOAs) at these five Egyptian universities were experiencing dramatic declines in enrollment. Much of this decline was due to the fact that these institutions were not producing agricultural graduates with skills and training needed by the private sector. As a result, agricultural graduates could not get jobs and remained unemployed. Due to a lack of resources, few faculty members were able to engage in professional development activities to update their skills and knowledge. Most university faculty members were unable to maintain an active research program due to the lack of funds. As a result of these factors, the course content and teaching methods at each university had become sorely outdated. Another major problem was the lack of contact with the private sector, including commercial farms and agribusiness firms. Consequently, both individual faculty members as well as the FOAs as a whole were unaware of the types of skills and knowledge needed by graduates to be successfully employed in technical and managerial positions in the private sector. These were the major challenges to be addressed through the Linkage Project.
Purpose
The purpose of this paper is to outline the strategy and specific activities implemented under the Linkage Project to address the more serious constraints faced by the five FOAs and one FVM at these participating universities in Upper Egypt. The paper first outlines how this strategy was developed and then describes the steps taken to implement this approach. Included in this analysis is a summary of the results achieved, including changes in institutional structure, courses and curricula, teaching-learning methods, reward systems for faculty and so forth. It should be noted that most of these activities have been independently evaluated by outside agencies, including a Client Satisfaction Review (CSR) carried out during the fall of 2005 by Development Alternatives and an internal Mid-Term Evaluation of the AERI project carried out by a four-person review team during February–March 2006.

Strategy, Approach, Results and Findings
The Capacity Building Component of the AERI Linkage project was planned and implemented under the guidance of a Steering Committee composed of Egyptian academic and private sector leaders. This Steering Committee helped build a bridge of understanding and cooperation between the private sector and the participating academic institutions. This Committee meets periodically to review and approve all major project activities and to select and/or approve nominees for major project activities, such as overseas study tours.

Skill-gap analysis
Implementation of the Capacity Building Component began with a Skill-Gap Analysis (SGA) involving 254 private sector employers and 1,000 university graduates who had been on-the-job (or out of school) for at least one year. The results of this skill-gap analysis has been reported elsewhere (Vreyens & Shaker, 2005) and are summarized here to validate the strategy that was developed and implemented. First, a common problem, which is faced by students at all five universities, is that most faculty members use the lecture method of teaching with very little student engagement. The emphasis is on knowledge recall rather than the higher level cognitive skills of analysis, synthesis and evaluation as originally outlined by Bloom (1956). Both private sector employers and recent graduates agreed that university students need to develop critical thinking, problem-solving and decision-making skills, as well as effective communications and teamwork skills. Some of the other skill gaps or learning deficiencies identified by Vreyens and Shaker (2005) through the SGA are as follows:

Perceptions of Recent University Graduates
• Able to analyze information
• Speak effectively to a target audience
• Time management skills
• Able to develop a basic budget
• Comprehensive computer skills
• Able to evaluate the competition and identify new opportunities
• Able to conduct situational analysis
• Maintain and manage financial records

Perceptions of Private Sector Employers
• Ability to analyze information
• Time management skills
• Able to develop a basic budget
• Able to access the Internet for resources and information
• Calculate rates of return on investments
• Write a (farm) business plan
• Conduct a cost-benefit analysis of an agricultural project

**Improving teaching-learning methods**

One of the most significant findings of the SGA was that students needed to learn higher level cognitive skills including critical thinking, problem solving and decision-making skills. Therefore, the first step was to transform the teaching-learning methods being used by university faculty members in the classroom. This problem was addressed by involving most of the teaching faculty members in in-service workshops on “active teaching-learning methods.” A total of 239 university faculty members participated in seven of these “Teaching for Learning” workshops. These two-day workshops focused on the science, mechanics and art of teaching, as well as how to assess both teaching and learning. Considerable emphasis was given to active and problem-based learning strategies. The Client Satisfaction Review (CSR) that was carried out during November 2005 found that 67% of all professors who had participated in these workshops had already implemented all of the teaching-learning methods and techniques that had been covered during these workshops; and the remaining 33% indicated that they had adopted some of these recommended practices (Dale and Sidibe, p. 51). The other significant outcome is that adoption of these new teaching methods had redefined the relationship between students and professors. “As one professor noted, ‘the most important point I received from the workshop was learning that the closer the relationship between the professor and the students, the higher the students’ absorption and understanding of the material. I no longer base my teaching style on punishment as a form of control.’” (Dale and Sidibe, p. 52)

Two approaches were used to reinforce these active teaching-learning methods. First, MUCIA teacher-educators held follow-up workshops for faculty members who had participated in the first round of workshops. Three follow-up workshops were conducted involving 139 faculty members. Second, outstanding Egyptian teachers who emerged from these workshops who took the lead in organizing additional in-service workshops for non-English speaking faculty members so they, too, could improve their teaching methods and techniques. During the past year, 9 of these in-service workshops were held for an additional 234 faculty members from the 5 participating universities.

Due to the success of these “Teaching for Learning” workshops, the Ministry of Higher Education asked MUCIA to conduct additional workshops for professors from other Faculties at the participating universities. Three more workshops were held for an additional 120 faculty members. These workshops were well received by the participants, and many of the recommended changes in teaching methods have been adopted. Also, the involvement of Egyptian faculty in conducting these workshops helps assure the continuing impact of the project beyond the funded grant.

**Leadership study tour: initiating a public-private partnership**

In March 2005, to begin developing a working relationship between university and private sector leaders, a Leadership Study Tour was organized to orient Egyptian academic and private sector leaders to the U.S. university system. This study tour involved 19 deans, associate deans and
department heads from the five participating universities, including selected private sector leaders who were interested in strengthening these higher education institutions. The participants visited four major U.S. Land Grant Universities (Illinois, Purdue, Florida and Ohio State) and were given a comprehensive overview of how these universities work closely with the private sector in modifying their curricula, establishing internship programs, operating career centers, and in incorporating practical skill training into their respective academic programs. At the end of this study tour, the participants engaged in a two-day strategic planning workshop where they discussed and developed the elements of a strategic plan about how they would incorporate these types of institutional changes into their respective Faculties of Agriculture (FOAs). As described below, these strategic plans have been implemented during the past two years, incorporating most of these institutional changes into each of the participating FOAs.

In assessing the effectiveness of the Leadership Study Tour, the CSR found that the “participants were convinced of the importance of forming external advisory committees involving the private sector, and, in general, promoting public-private partnerships in Egypt’s university system….Deans also noted that they plan to institute internship programs in their universities, and to establish career centers to assist recent graduates to find jobs in the private sector” (Dale and Sidibe, 2005, p. 54). In short, this Leadership Study Tour formed the basis for significant institutional changes in the participating universities, as documented later in this paper.

Conducting course development workshops
One of the issues confronted early in this project was the need to update the overall curriculum for each participating department within the five partner universities. After conducting two separate Curriculum Development workshops at each of the five universities, it became clear to the MUCIA curriculum specialists that modifying the different curricula at each university would be difficult, given the time and effort required to seek and gain approval from the Supreme Council for Higher Education for these proposed modifications. As a result, a different strategy was pursued. First, it was recognized that the basic structure of the curriculum did not need to be changed, but only that the individual courses needed to be updated and modified to reflect the current knowledge base in each field of study. Therefore, the focus was shifted to up-dating basic course content and teaching methods.

Second, very early in the project, after the MUCIA curriculum specialists had conducted a needs assessment at each of the five participating universities, there was an obvious need to achieve common academic standards across all participating universities, especially for core courses taken by all students within each Faculty of Agriculture. To achieve this goal, course development workshops were organized for many of the core courses attended by agriculture students within each university. Next, all the teaching faculty members and teaching assistants who taught these core courses at their respective university were invited to attend these specific course development workshops. As a result, the entire teaching faculty who taught these core courses achieved more consistency in terms of course content and academic standards.

In implementing this particular strategy, MUCIA selected outstanding teachers from its U.S. partner universities to conduct these workshops. In most cases, the workshop leaders had been recognized with teaching awards at their respective university. In organizing these workshops, each MUCIA faculty member brought along 25 copies of their recommended textbook for that particular course, or one copy for each Egyptian faculty member and teaching assistant who attended this workshop. They also brought copies of all teaching materials, in both
hard copy and electronic format, including: their current course outline or syllabus; copies of all teaching materials, including all PowerPoint presentations, videos and other course materials; and copies of all classroom exercises, quizzes, examinations, etc. During these five-day workshops, the workshop leader would carefully discuss the educational objectives and content associated with each course segment, as well as how the professor assessed and evaluated student performance. At the end of each workshop, all of the participants could return to their own campus with the entire portfolio of course materials that they could then adapt and use in their respective courses.

The following course development workshops have been conducted; the numbers in parentheses indicate the number of Egyptian faculty members and teaching assistants who participated in each workshop. Not counting the capstone course development workshops to be held in March 2007, approximately 384 faculty members and teaching assistants from the five participating universities have attended these course development workshops.

- **Agricultural Economics**: Introduction to Agricultural Marketing (19); Introduction to Farm Management (24); Introduction to Agribusiness Management (23); Small Business Development (11); March 2007, Capstone Course in Agricultural Economics.
- **Animal Science**: Introduction to Animal Sciences (29); Introduction to Animal Nutrition (25); Reproductive Physiology and Management (20); Dairy Production and Management (25); March 2007, Capstone Course in Livestock Production.
- **Horticulture**: Fundamentals of Horticulture Production (33); Introduction to Plant Propagation (25); Introduction to Floriculture (20); Fruit Tree Production (31); March 2007, Capstone Course in Horticulture.
- **Veterinary Medicine**: Introduction to Parasitology (20); Using Educational Videos to Teach Specific Veterinary and Surgical Techniques (21); Epidemiologic Tools and Practices (18); Delivery of Ambulatory Medicine (15); and Hoof Care: Diagnosis, Plus Medical and Surgical Treatment (25).

In evaluating these course development workshops, the CSR team determined that 100% of the participants considered these workshops directly relevant to the particular courses that they teach, and that 53% of all workshop participants had adopted all of the recommended modifications to their respective courses. The remaining 47% of participants adopted some of these materials and/or recommendation. “The changes most frequently implemented include increasing the practical (versus theoretical) portions of each class, and incorporating new research into the curriculum…. In developing their syllabi, professors are also consulting both with private sector industry representatives in order to determine market needs and with their students to identify gaps in their knowledge.” Ninety-five percent of the participants reported that they were satisfied with what they had learned, and the same 95% indicated that they would recommend curriculum development workshops to other faculty members (Dale and Sidibe, 2005, p. 51).

**Conducting English language training courses**

One finding from the Skill Gap Analysis was that some agribusiness firms, especially exporters, wanted new management level employees who can read, write and speak English as they seek to increase their exports. The problem is that a majority of Egyptian faculty members speak limited English and generally teach in Arabic. For Egyptian faculty members to participate in the Faculty Development Program (FDP) in the U.S., they had to be able to speak sufficient English
to communicate with U.S. faculty members, especially the mentors to whom they would be assigned. To address this concern, the Linkage Project initiated an English language training program to increase English language capability among interested faculty members. During a two-year period, starting in February 2004, approximately 226 faculty members participated in different levels of intensive English training courses to improve their English language proficiency. In the process, many achieved a TOEFL score of 500 or higher so they would meet the minimum language competency required to participate in the FDP.

Implementing faculty development programs at U.S. universities

The Faculty Development Program (FDP) began as a six-week program split between two U.S. universities that were part of the MUCIA project. However, based on feedback from the first group of participants, the next three FDPs were shortened to four-weeks and conducted on only one university campus. Also, by involving each participant in a “Teaching for Learning” workshop in Egypt prior to their departure, this reduced the time needed in the U.S. and allowed them to concentrate on specific course development activities with their designated faculty mentor on the host university campus.

Four FDPs, involving a total of 60 participants, were carried out at U.S. universities, including: University of Florida, The Ohio State University, University of Illinois and the University of Minnesota. The goal of each FDP was to develop one new course or update two existing courses by working closely with their assigned faculty mentor in carrying out the following activities:

- To develop educational objectives for one new course, or revise and update the objectives for one or two existing courses.
- Next, to review and update the reading list(s) for the selected course(s).
- To observe active teaching-learning methods being used by host university faculty members, especially their faculty mentors.
- To obtain copies of all teaching materials, plus classroom and/or laboratory exercises, from their respective faculty mentor and then to adapt these materials so they could be utilized in teaching these new and/or updated courses after returning home.
- To obtain copies of recent exams and other student evaluation materials to review how their faculty mentors objectively assessed and evaluated student performance, based on the stated educational objectives for each course.

The expected outputs of this FDP was that participants would teach the new or revised course(s) upon their return to their home university, utilizing the course outlines, reading lists and teaching materials which they obtained from their faculty mentors.

In assessing the effectiveness of the FDP, the CSR team found that 93% of the participants planned to modify their teaching methods by promoting greater student-teacher interaction, encouraging the use of the Internet, making courses more market-driven, incorporating more guest lecturers into their teaching program, putting more emphasis on practical applications, increasing the number of field visits, and promoting more team-based learning. Since returning home, several participants have formally requested private sector representatives to attend departmental meetings to interact with professors, so that the needs of the private sector are more effectively integrated into university course work (Dale and Sidibe, 2005, p. 53).
Establishing academies of teaching excellence (ATE)
In order to reinforce and recognize outstanding teaching performance within each participating FOA, university administrators were encouraged to establish an Academy of Teaching Excellence, or a similar type of institutional mechanism, to recognize and reward outstanding teaching, especially instruction using active teaching methods. Cairo University was the first to establish a Teaching Excellency Club (TEC), which was designed to recognize outstanding teachers within the Faculty of Agriculture. The faculty members who were elected into this Club were encouraged to train other faculty members in active teaching-learning methods and the need for each faculty member to increase their interaction with students. Fayoum University formed a similar Center for Teaching Excellence to institutionalize active teaching-learning methods within its FOA.

Developing external advisory committees
As mentioned above, one of the major recommendations emerging from the strategic planning session held at the conclusion of the Leadership Study Tour during March 2005 was that all FOAs needed to establish External Advisory Committees to form the basis for building public-private partnerships. Academic leaders for each of the participating universities, as well as private sector leaders, participated in several workshops led by MUCIA specialists to assist them in organizing this new institutional innovation. The first workshop was held during July 2005 and focused on the functions of these external advisory committees and who should be represented on these committees. A follow-up workshop was held on three campuses during early January 2006, whereby the academic and private sector leaders for each university discussed their progress in organizing these committees and in discussing the next steps needed to ensure the success of these external advisory committees. Finally, a one-day workshop was held in April 2006 during which all of the academic leaders from each university and the private sector members of their respective committees met to compare experiences to date and to outline future plans for building these public-private partnerships. Sixty academic and private sector leaders participated in this workshop to formally launch these External Advisory Committees on each campus.

During the mid-term review of the AERI project in February 2006, the evaluation team stated: “For the first time in the history of Egyptian higher education, private sector advisory committees have been institutionalized in the Faculties of Agriculture at four of the five partner universities” (Fritsch, et. al., 2006, p. 3). Currently, all participating universities have formally established these External Advisory Committees within the institutional structure of each FOA, and these committees are now functioning effectively and meeting regularly.

Organizing internship programs
Establishing an External Advisory Committee at each participating university was a logical entree to creating internship programs in collaboration with private sector firms for current agricultural students. In fact, in many cases, these two institutional innovations were created simultaneously by these academic and private sector leaders. The procedures for organizing these planned internship programs were discussed during the Leadership Study Tour, and then the steps needed to establish internship program were addressed during the three workshops on establishing External Advisory Committees. Currently, all of the participating universities have formally established internship programs within their respective FOAs, with Fayoum University
having the largest program to date with 60 students participating in internships during the summer of 2006.

**Establishing career resource centers**

Another institutional mechanism needed to assist students in securing private sector jobs were the creation of Career Resource Centers on each campus. In many cases, these career centers and internship programs are organized out of the same office within the participating FOA. To help these universities establish these Career Centers, two MUCIA specialists met individually with the academic leaders from each participating university and then conducted a two-day workshop to compare approaches used to organize these centers. In addition, the project is providing the necessary resources to establish these centers, including the provision of computers, with Internet access, for use by students in searching for jobs after graduation and in communicating electronically by e-mail with prospective employers. It is anticipated that by the summer of 2007, all participating universities will have functioning Career Resource Centers for use by students and private sector employers in conducting on-campus interviews for internships and job opportunities.

**Establishing extension-outreach centers**

A final institutional innovation that was identified and considered important by both academic and private sector leaders during the Leadership Study Tour was the development of Extension-Outreach Centers. The idea of linking the university faculty to the needs of the agricultural sector was viewed as an essential linkage. First, these leaders recognized the need and importance of faculty members providing direct assistance to the farming community (and other institutions that serve the farming community). Second, in the process of providing these services, it would also alert these faculty members to the current problems facing the farming community that might be addressed, either through on-farm research and/or by conducting training programs for farmers, farmer associations, extension workers and teachers at the agricultural technical (secondary) schools. As a result, MUCIA sent a two-person team of Extension specialists to meet with the Deans and other academic leaders at each university to discuss how they might set up these Extension-Outreach Centers. Currently, each university is in the process of establishing these Centers, and the Linkage Project is providing some start-up grant funds to help each FOA develop these extension and outreach programs.

**Enhancing classroom teaching resources**

As Egyptian faculty members gained access to up-to-date teaching materials, most in electronic format (e.g., PowerPoint presentations, etc.), the demand for computers and LCD projectors in the classroom became a major concern. Initially, three portable LCD projectors were supplied to each FOA for use by those faculty members who had participated in the Faculty Development Program. However, given the number of faculty members who also participated in the in-country, course development workshops, the demand of this equipment quickly outpaced supply; therefore, the decision was made to install permanent computers (built into a locked podium), ceiling mounted LCD projectors and drop-down projection screens in each of the main classrooms being used for the core and other courses being taught within each FOA. This approach greatly simplified faculty member access to electronic teaching aids, in that a professor could bring his teaching materials to the classroom on a flash-drive, CD ROM or DVD, in the case of a short video presentation. Also, this approach dispensed with the need to set up and
disassemble this equipment before and after each class, thereby reducing the security risk and the chance of equipment being dropped or damaged.

**Conclusions and Educational Importance**

To remain competitive in the global economy, developing nations will need to strengthen their existing universities as well as to establish new institutions of higher education. Yet, as Holm Nielsen points out, “While there are exceptions, the quality and relevance of research, teaching and learning has continued to decline in public tertiary education institutions. Many universities operate with overcrowded and deteriorating physical facilities, limited and obsolete library resources, insufficient equipment and instructional materials, outdated curricula, unqualified teaching staff, poorly prepared secondary students, and an absence of academic rigor and systematic evaluation of performance (Holm-Nielsen, 2001, p. 9). These are the specific problems that MUCIA attempted to address through the Capacity Building Component of the AERI Linkage Project. As demonstrated through this AERI Linkage Project, with a relatively modest USAID investment: “…faculty members at all five partner universities have successfully revised and implemented course content changes that provide more practical, employment-oriented subject matter skills to improve the employability of students completing undergraduate degrees in the agricultural sciences (Fritsch, et. al., 2006, p. 3).

Also, the CSR team concluded that “Ninety-six percent of the professors surveyed are satisfied or very satisfied with AERI Linkages services. Satisfied faculty members noted that Partner assistance has helped them to develop new courses, improve their teaching methods, and see the importance of promoting public-private partnerships in education in Egypt.” “…following Partner assistance, professors are redefining the teacher-student relationship, promoting critical thinking skills in the classroom, and incorporating the latest research into their curricula. University deans, in turn, are now in the process of forming external advisory committees, developing internship programs, and establishing career centers to assist recent graduates find employment in the private sector” (Dale and Sidibe, 2005, p. 50). As a result of these changes, “Cooperating business leaders have expressed their satisfaction by already donating more than 50,000 LE toward improving University equipment supportive of improved English language training and use of IT and AV teaching in this component” (Fritsch, et. al., 2006, p. 3).

In conclusion, the strategy and approach used by MUCIA in implementing the Capacity Building Component of the AERI Linkage Project did prove to be highly successful in addressing the teaching, curriculum and resource constraints faced by the FOA at each of the five participating universities in Upper Egypt. Given modest resources, this institution building strategy and approach could be easily replicated in other Egyptian universities as well as in other developing country universities. Bringing about these types of institutional changes will be essential if developing nations are to become competitive in the rapidly changing global economy.

**References**


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i. The authors have dedicated this paper to the memory of Mr. Adly Osman, Agricultural Officer at the USAID Mission in Cairo, who passed away unexpectedly on January 1, 2007. Mr. Osman was the Cognitive Technical Office for the AERI Linkage project for 2 ½ years and played an instrumental role in ensuring the success of these Capacity Building activities. Mr. Osman dedicated his entire career to the development of the agricultural sector in Egypt. He will be sorely missed by all of us.

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iii. The U.S. universities that are helping MUCIA implement this project include: University of Illinois at Urbana-Champaign (lead university), Lincoln University, Purdue University, The Ohio State University, University of Florida and University of Minnesota.