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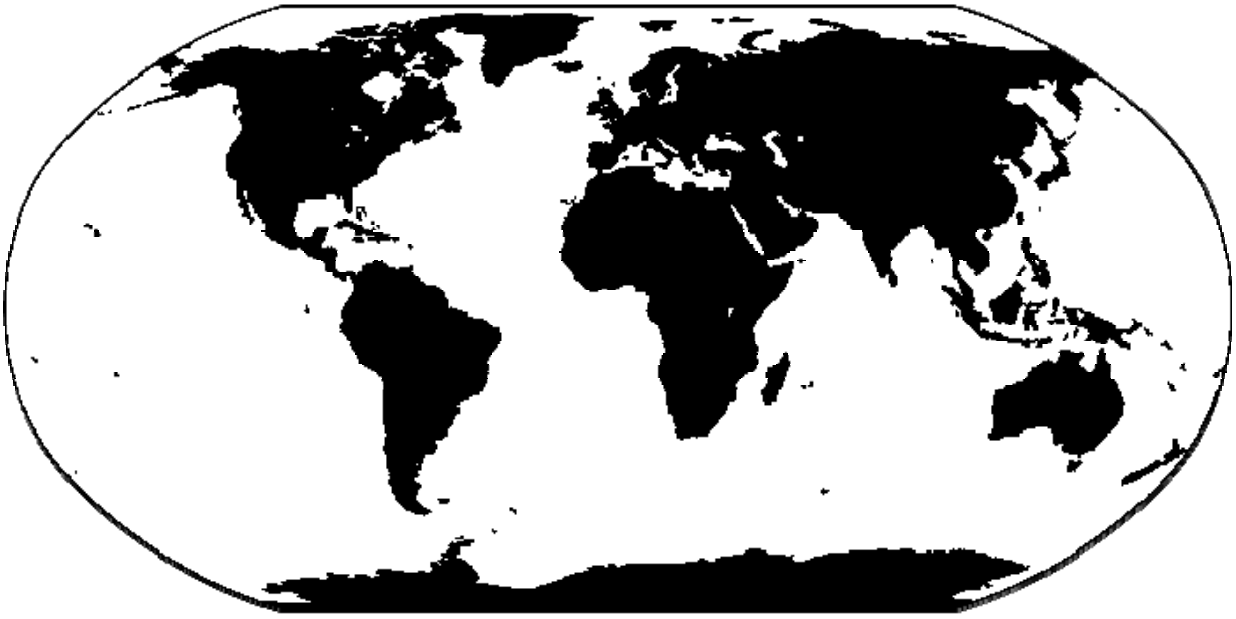

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The *Journal of International Agricultural and Extension Education* (*JIAEE*) is the official refereed publication of the Association for International Agricultural and Extension Education (AIAEE). The purpose of the *JIAEE* is to enhance the research and knowledge base of agricultural and extension education from an international perspective.

Articles intended for publication should focus on international agricultural education and/or international extension education. Articles should relate to current or emerging issues, cite appropriate literature, and develop implications for international agricultural and extension education. **Manuscripts, or portions of manuscripts, must not have been published or be under consideration for publication by another journal**.

Three types of articles are solicited for the *JIAEE*: Feature Articles; Commentary Articles; Tools of the Profession Articles; and Book Reviews.

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Feature articles focus on philosophy, current or emerging issues, and the methodology and practical application of specific research and appropriate technologies, which have implications for developed and developing countries. For publication in the *JIAEE*, feature articles must pass the ***JIAEE's* double blind, referee process**, where peer reviewers evaluate manuscript content and ensure readability. Reviewers are selected from the AIAEE membership. In the double blind, referee process, all references to authors are removed before the manuscript is sent to reviewers. Feature Articles may be submitted for peer review a total of three times before they are no longer acceptable for publication in the *JIAEE*.

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Book reviews summarize new publications relevant to the field and provide a critical assessment.

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From the Editors

Members of AIAEE are agents of change. We espouse the importance of change in knowledge, behaviors, skills, and attitudes through educational programming, project demonstration, community, and international development. But with change comes ambiguity. *JIAEE* has changed leadership and the procedures for managing the Journal are changing as well.

This past year the Board appointed us as co-editors for *JIAEE*. We have a long history of working together and look forward to implementing a "training program" for managing the *Journal*. During our first year we will be collectively carrying out the tasks of *JIAEE* while putting into place a new plan for managing and editing the Journal. Our plans for restructuring *JIAEE* include the creation of an Executive Editor and a Managing Editor.

The Executive Editor would set the overall standards for publication including planning and budgeting and the Managing Editor would manage the manuscript submission and review process. We propose continued use of Associate Editors for Commentary, Tools of the Trade, and Book Review.

The Executive Editor and Managing Editor would serve two years at each position. For Volume 15, we will co-edit. For Volume 16, Lindner would serve as Executive Editor and Dooley would serve as Managing Editor. For Volume 17, Dooley would serve as Executive Editor and we would select a new Managing Editor. For Volume 18, Dooley would serve as Executive Editor. For Volume 19 forward the Managing Editor completing his/her second term would become the Executive Editor and a new Managing Editor would be selected. For Volume 15 and 16 Gary Wingenbach will serve as Past Editor. For Volume 17 and 18, Lindner would serve as Past Executive Editor. For Volume 19 and 20, Dooley would serve as Past Executive Editor.

What we are attempting to do is share the duties and create a plan for sustainability. Your input and discussion will be critical.

This is our first volume under the new management plan. We are pleased to report that for the spring 2008 edition we have one *Commentary*, six *Feature Articles*, and one *Tools of the Trade*. There are 24 different authors from 10 US states (representing 11 US universities) and three universities outside of the US. The manuscripts focus upon six different countries (Costa Rica, Georgia, Egypt, India, Nigeria, and Iran). Authors also represent the Food and Agriculture Organization of the United Nations and a County School. The collaboration not only spans across states and nations, but across roles—with graduate students, faculty, administrators, politicians, and practitioners as co-authors. This is the kind of *change* we can all be proud of!

Sincerely,

James R. Lindner and Kim E. Dooley, Editors
Journal of International Agricultural and Extension Education

Internationalizing Extension: A Case Study Involving Faculty, Students and Stakeholders

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Abstract

A summative evaluation was conducted to determine the benefit and change resulting from a unique Internationalizing Extension Training Program (IETP). The program consisted of two introductory sessions, a ten-day onsite learning experience in Costa Rica and a follow-up reflection and planning session. Program participants included four extension agents, four county commissioners, four graduate students, one state extension specialist, and two program coordinators. The purpose of this evaluation was to determine how participants have changed behavior in their professional life, and; to determine change in attitudes toward international issues and internationalizing extension. In general, participants found the experience to enhance their world-view and influenced many of them to stay internationally engaged at some level. Commissioners also commented that by participating in the IETP, they realized the impact that Cooperative Extension has in Florida and the United States. As a result, they have supported increased funding for local extension and its services. Graduate students gained an understanding of ways to implement international components into their future careers and the importance of international professional involvement. Participants felt strongly that the IETP was very valuable as extension continues to change and adapt to the needs of local citizens, respond to the changing state demographics, and be a part of the national participation in international affairs.

Keywords: Extension, Internationalizing Extension, Impact Evaluation, Personal and Professional Impact, Global Competence, Costa Rica, Florida

Introduction

Latino culture has taken the United States by storm. From the Latin Grammy Awards to the runaway hit *Mind of Mencia* on the Comedy Central Channel, Hispanic culture has made its mark on mainstream media (Salazar, 2006; Deggans, 2006). Nowhere is that more evident than in Florida. Hispanics make up 19% of Florida's population, and in some counties like Miami-Dade more than 60% of the community (US Census Bureau).

While Hispanic groups may appear similar, each community holds its own subtle differences. Mexicans, Puerto Ricans, and Cubans each have their own communication styles and deal with different issues (Nielsen, 2000; Landale, 1997). Extension agents and government officials have a daunting task trying to serve these diverse communities. They are faced with creating educational programs and public policy based on their understanding of their constituents. Studies have shown that increased awareness of diverse cultures can foster better evaluation of complex situations involving different types of people (Mahoney, 2004). One of the best ways to attain cultural awareness is through immersion into a different culture (Nieto, 2006).

This evaluation study explores increasing the cultural sensitivity of extension agents, government officials, college faculty, and students through participation in the Internationalizing Extension Training Project (IETP). The IETP was created by the University of Florida Extension Service and focused on travel to Central America. We partnered with EARTH University, the Costa Rican Extension Service, and local government to create an experience that engages the participants in the culture, introduces them to the nation's governmental structure, and discusses underlying issues facing Costa Ricans.

The participants were chosen based on their impact within their surrounding communities. They represent change agents in their respective fields namely, local politics, community education, and university education. Many of the participants must decide public policy and design educational programming based on their understanding of their minority constituents. A majority of the participants are also opinion leaders and have a motivating affect within their spheres' of influence. Increased cultural sensitivity within the group of participants could eventually impact a much larger group of the population. Studies have shown that increased international awareness and understanding can improve self-esteem in the workplace, reinvigorate careers, and increase involvement in community education (Place, Evans, Andrews & Crago, 2000).

Purpose and Objectives

The purpose of this program was to increase cultural sensitivity as it is expressed in the attitudes and behaviors of the extension faculty, government officials, extension specialist, and graduate students participating in the Internationalizing Extension Training Project. The objectives of this evaluation were: (a) To determine participant behavior change; (b) To determine participant attitude change.

Methods

The IETP project consisted of four face-to-face sessions and a ten-day visit to Costa Rica. The authors of this study were involved as instructors and facilitators throughout the course of this project. The face-to-face sessions began with two introductory sessions held at the University of Florida. The first session held in December 2003 was geared toward learning about the program, teambuilding, and understanding international extension. Session two, held in January 2004, focused

on understanding Costa Rica, EARTH University, Costa Rican Extension and preparing for the on-site visit. Cultural sensitivity content was blended into the first two sessions.

The ten-day onsite visit in March was designed to expose participants to multiple aspects of Costa Rican culture, extension, local government and EARTH University. A final wrap-up session was held in April for participants to reflect upon their experiences with the program and to develop plans on how they intended to incorporate this experience into their plan of work. This study was conducted in October - November 2004 as a summative evaluation and an impact study of the overall program to determine not only what was learned, but practice and behavior changes among the participants.

A questionnaire was given to the participants at the beginning of the project and at its completion. The questionnaire was adapted from one used in previous research (Place et al., 2002) to specifically address the study objectives. The population for this study consisted of all program participants – other than the authors of this study. This consisted of four county commissioners, four extension agents, three graduate students and one state extension specialist. Completed questionnaires were received from all participants.

Results and Conclusions

All the participants had ties to agricultural education or dealt with agricultural issues in the workplace. Prior to participating in the IETP, participants denoted high interests in international activities and in developing foreign language skills, but had little experience in traveling with or chaperoning groups abroad.

All of the graduate students who participated in the program were female, two of whom were Doctoral students and one a Master's student. The state extension specialist (male) was from a mixed (urban/rural) community. Two of the extension faculty worked in rural communities while two considered the communities in which they worked to be urban. Two of the faculty members were county extension directors, in the areas of agriculture and family and consumer sciences (FCS). The other two faculty members consisted of a FCS and an Environmental Horticulture agent. Two extension faculty were female while the other two were male.

The county commissioners who participated in the program were all male, two from rural communities, one from an urban setting, and another from what he considered a mixed (urban/rural) community. The commissioners work mostly in economic development with responsibilities also in urban development, community development, land use planning, and natural resources and the environment.

Objective 1: Changes in Behavior

Overall the major behavior changes related to the interaction between the participants and their clientele and local community, including their increased ability to work well with people. There was also an increase in outreach activities relating to their participation in the project. Many of the participants took available opportunities to share their experiences with other people in formal presentations or in individual meetings.

The primary changes in behavior across the participant groups were in three areas: "Developed skills of working with people" (M = 4.16); "Relationships with their clientele, constituents, departments, or colleagues (M = 4.16); "Position or involvement in professional organizations" (M = 4.0).

Increased Ability to Work with Others; In terms of behavior change in the workplace, extension faculty described an increased ability to relate to Hispanic audiences and promote international awareness; a greater understanding of the

necessity to continue to work locally *and* internationally to solve issues that impact the world; and a greater appreciation for the needs of third world countries. One faculty member stated, "I have always wanted to work internationally but this experience gave me a reality check. It did not dissuade me from my goal, only made me realize how much more is involved in really being internationally engaged versus being a tourist." County commissioners commented on the relevance of understanding the Hispanic culture better in order to better relate to our own large Hispanic population in Florida. As this relates to extension, the commissioners noted how important an experience like this is to extension agents to enable them to reach out to and provide educational programs to Hispanic clientele.

Participants mentioned that the experience enhanced their credibility with others, helped them to become involved in other international projects, and gave them new enthusiasm for travel that they hope to convey to co-workers, students and colleagues. This reinvigoration served as a stimulus for participants to become proactive with their communication channels with colleagues and constituents.

Participants also mentioned that they have "incorporated cultural learning experiences into training for youth and adult audiences," and "received positive responses from Latin Americans because of [their] interest in understanding their culture and specific issues." This first-hand experience has helped to build credibility and interaction with clientele that are sometimes underrepresented in extension programs. County commissioners believe that their "constituents have benefited through [their] increased understanding of Hispanic issues and extension." As a result, these local government officials have been able to better address some of the issues they face with minorities in their own counties, so that they are more responsive. Moreover, because of a greater understanding and appreciation for extension, some commissioners have increased funding for local extension and its many services.

Objective 2: Changes in Attitude

Overall, as a result of participation in the IETP, respondents expressed a significant positive change in participants' perspectives of U.S. extension and their attitudes about Costa Rica as a nation. They also gained an increased interest in international activities and a new appreciation for extension's role in international development.

Increased Awareness of the Impact of Extension; Commissioners commented that the experience provided a realization of the impact that extension has in Florida and the United States; as a result, they report that they are more willing to provide funding and lobby other commissioners to vote for funding. Commissioners also expressed an interest in maintaining stronger contact with EARTH University in Costa Rica. Graduate students expressed a better understanding and appreciation for the role of nonformal education, and especially the U.S. Land-Grant System. Students commented that they made "good contacts within Florida's Extension system and gained an understanding of how to implement international components into [their] future career[s]."

Broader International Perspective; One graduate student, who is now a faculty member at a Land-Grant University, now understands the need for an international perspective and is taking steps to provide international opportunities for students that she works with. The participants in general, expressed that they now possess a more global perspective in their life and work, will look for future opportunities to become internationally involved, and realize the need to continue learning.

Some further comments regarding the impact of the IETP on participants personally were that it "caused [them] to reflect on [their] communication skills and priorities in life;" and "gave [them] a keener

awareness of how people in general, are more alike than different." Moreover, one participant stated that international experiences such as this "provide an opportunity to learn more about the variety of cultures of the world and the need for all to respect and admire the values and morays of others."

Conclusion, Recommendations and Implications

This evaluation has revealed the importance of international involvement for enhancing global knowledge and understanding; and subsequently, positive behavior and attitude changes. Those who have an opportunity to have an active learning experience in another country not only contribute to their own personal and professional development, but they also contribute to numerous spill-over benefits in their workplace and in other spheres' of influence. Most significantly, participants actively counseled others and got them interested and involved with international efforts. This project resulted in globally competent extension professionals, students and local officials that have grown more culturally sensitive and have a greater appreciation for international efforts in Florida and specifically through the Florida Cooperative Extension Service.

Participants have noted many different ways in which they have extended this experience with others through presentations with colleagues and community groups, workshops, conferences and integration into ongoing programs. The IETP was a program that got people excited, and as a result they wanted to tell others. Many people beyond the actual participants were affected by this program through the multiplier-effect that extension has embodied during its existence. Because of this, and extension's grassroots presence, it is well suited to conduct a myriad of locally-based nonformal educational programs related to international extension and global issues. As a result, local constituents will have the opportunity to better understand international issues and how it affects each of us within our own communities.

Furthermore, the IETP was enhanced by including partners of extension, demonstrating the importance of involving extension agents, local officials, and graduate students. The personal contact over an extended period of time in the US as well as another country brought about strong teamwork, rapport and collaborations. They were able to learn from one another by gaining a much greater appreciation for values, beliefs, roles and responsibilities at home and abroad.

Most significantly, this first-hand international experience brought about positive changes and behaviors in how participants interact with diverse people. Participants are more culturally cognizant and comfortable with interacting with people who are different. In order for Cooperative Extension to be most relevant for today's diverse society, this change in perspective and practice is critical.

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Georgian Educators' Perceptions and Outlooks on Education, Agriculture, and Agricultural Education

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Abstract

Recent interest in establishing a formal agricultural education system in Georgia has resulted in assistance from the United States. Several American universities have worked in cooperation with the Georgian Institute of Public Affairs and the United States Department of Agriculture toward achieving that goal. The multi-fold purpose of this study was to describe selected characteristics of selected educators in the country of Georgia, their perceptions concerning the "importance of" and their "ability to" perform instructional practices and activities, and to assess their views about trends and the future of education, agricultural education, and agriculture in Georgia. Both qualitative and quantitative methods were used to collect data. The participants attended a four-day professional development seminar in October 2006. Participating educators perceived that the "Rose Revolution" had a positive impact on the quality of education, the quality of life for teachers, and the economic status of farmers in Georgia. Seminar topics that participants indicated held the greatest importance included "brain-based learning," "experiential learning," "student evaluation," and "effective teaching." Participants also believed they held the highest ability to implement principles related to "effective teaching," "instructional objectives," "day-to-day [learning] strategies," and "measuring student and program success." Analysis of data revealed that the educators were eager about opportunities to further expand agricultural education course offerings and programs in their schools.

Keywords: Agricultural Education, Caucasus Region, Georgia, Professional Development of Teachers

Introduction and Background

Georgia is a Eurasian country that was formerly a part of the Soviet Union. It declared independence in 1991 (Microsoft ®, Encarta® Online Encyclopedia, 2006). It encompasses a significant portion of the Great and Lesser Caucasus Mountains that form a geologic divide between southeastern Europe and Asia Minor; so, Georgia is a part of the South Caucasus region. About 12% of its land is considered arable. Approximately 25% of its total population of just over 4.5 million is concentrated in the capital city of Tbilisi (Central Intelligence Agency, 2006), and its rural population is estimated to be 48% (Lerman, 2006) or about 2.2 million citizens.

Although independence from the Soviet Union came in 1991 and a democratic government was instituted, the newly elected president served only one year before being removed from office by an opposing militia and replaced by a former Soviet Minister, Eduard Shevardnadze (British Broadcasting Corporation [BBC], 2006; Lynch, 2004). Shevardnadze's 11-year presidency ended in a peaceful demonstration in 2003 known as the "Rose Revolution" following a national election that was thought to be corrupt (Microsoft ®, Encarta® Online Encyclopedia, 2006). The result of this demonstration was the election of Mikhail Saakashvili as Georgia's president. It is believed that Saakashvili drew large public support due to his stance against governmental corruption and for proposing a "pure" democratic system for the nation. Saakashvili led the protesters in 2003 with a rose in his mouth, thus the name "Rose Revolution" was popularized (BBC, 2006).

The United States Department of Agriculture (USDA) reported that, "Georgia's economic progress has slowly improved since 2000. However, its economic activity has not reached its full potential . . ." (USDA, 2006, Economic Progress Spurs Investment section, ¶ 5). According to the BBC, "Once a relatively affluent part of the USSR, with independence Georgia lost the cheap energy to which it had access in the Soviet period. The rupturing of trading ties caused the economy to nose-dive" (Post Soviet Years section, 2006, ¶ 3).

Since the end of the Soviet period, Georgia has remained heavily dependent on Russia for fuel and trade. Recent sanctions have limited this trade greatly and placed an increased financial burden on the country (BBC, 2006). Through the Caucasus Agricultural Development Initiative (CADI), efforts have been made by the USDA's Foreign Agricultural Service (FAS) to improve Georgia's trade capacity and economic development in the agricultural sector (USDA, 2006).

Agriculture is a major contributor to the Gross Domestic Product (GDP) of the nation. In 2004, Georgia's GDP was $5.2 billion (Microsoft ®, Encarta® Online Encyclopedia, 2006) with agriculture contributing about one-fifth of that total (Lerman, 2006; Microsoft ®, Encarta® Online Encyclopedia, 2006). So, agriculture is a staple of the Georgian economy. With its diverse climates and terrain, Georgia has suitable conditions for growing a vast number of crops, and it also enjoys a long growing season. Nearly one-half (47%) of Georgia's workforce is employed in the agricultural sector (Lerman, 2006).

Recent interest in establishing a formal agricultural education system in Georgia has resulted in assistance from the United States. Several American universities have worked in cooperation with the Georgian Institute of Public Affairs (GIPA) and the USDA toward achieving the goals of the Georgian Rural Development Program (GRDP), which is administered through GIPA (2006). One of the goals of this program is to establish agricultural education at the secondary school level.

The Georgian education system is currently under reform and has been

structured so that 75% of the school curriculum is "standard" or consistent throughout the country. The remaining 25% is left to the discretion of individual schools. According to the GIPA's education specialist for the GRDP, Nestan Tsitsishvili,

> As for the secondary schools: although they are tasked to implement National Education Plan in schools, but they still have 25% of free time that is to be developed by the school itself based on the school['s] priorities. We think it is important that this 25% is used for agriculture lessons for regional and especially for village schools. Thus[,] the knowledge and experience of students in this area will really increase and will be used by pupils in two cases: 1) if a student continues education in a relevant college or university and 2) if he/she works on a personal or someone else's farm. (GIPA, 2006, pp. 196-197)

A network of institutions specializing in the education of students in agriculture has been developed. This network includes eight K-12 schools that have implemented agricultural education as a part of their curriculum. These schools are referred to as "FFG schools" based on their interest in incorporating the newly-formed Future Farmers of Georgia into the agricultural education curriculum. The institutions serve as "feeder schools" for eight agricultural technical colleges that are similar to two-year, post-secondary institutions in the United States. And, at its center is the Agricultural State University of Georgia (ASUG), which is a four-year post-secondary institution (Figure 1).

University of Georgia (USA) faculty members are assisting FFG schools in the development and implementation of curriculum that would be appropriate for secondary agriculture students. The provision of professional development for Georgian secondary teachers who teach agriculture is a focal point of that effort.

Conceptual Framework

This project represents the researchers' initial efforts toward providing in-service education for teachers of agriculture in the country of Georgia. To that end, data were collected to determine the perceived needs of Georgian teachers of agriculture, especially perceptions about their self-efficacy (Bandura, 1995; DeMoulin, 1993**)** for teaching the proposed agricultural education curriculum and their use of innovative instructional methods. The educators' views about "importance of" and "ability to teach" using methods they learned as a result of the in-service were conceptualized as "proxies" or indicators of their self-efficacy and related "planned behaviors" (Ajzen, 1991).

The gathering of participants' perceptions about their professional development needs to guide the future delivery of in-service education topics is supported by earlier researchers (Connors & Brousseau, 1997; Connors, Swan, & Brousseau, 2004; Edwards, Meaders, & Brousseau, 2002; Edwards & Thuemmel, 2000; Thuemmel, Meaders, Mannebach, & Brousseau, 1998) who worked with secondary agricultural educators in another Former Soviet Republic. The approach used in this study was designed to provide guidance for appropriate planning and implementation of future educational programs for Georgian educators who teach agriculture in secondary schools.

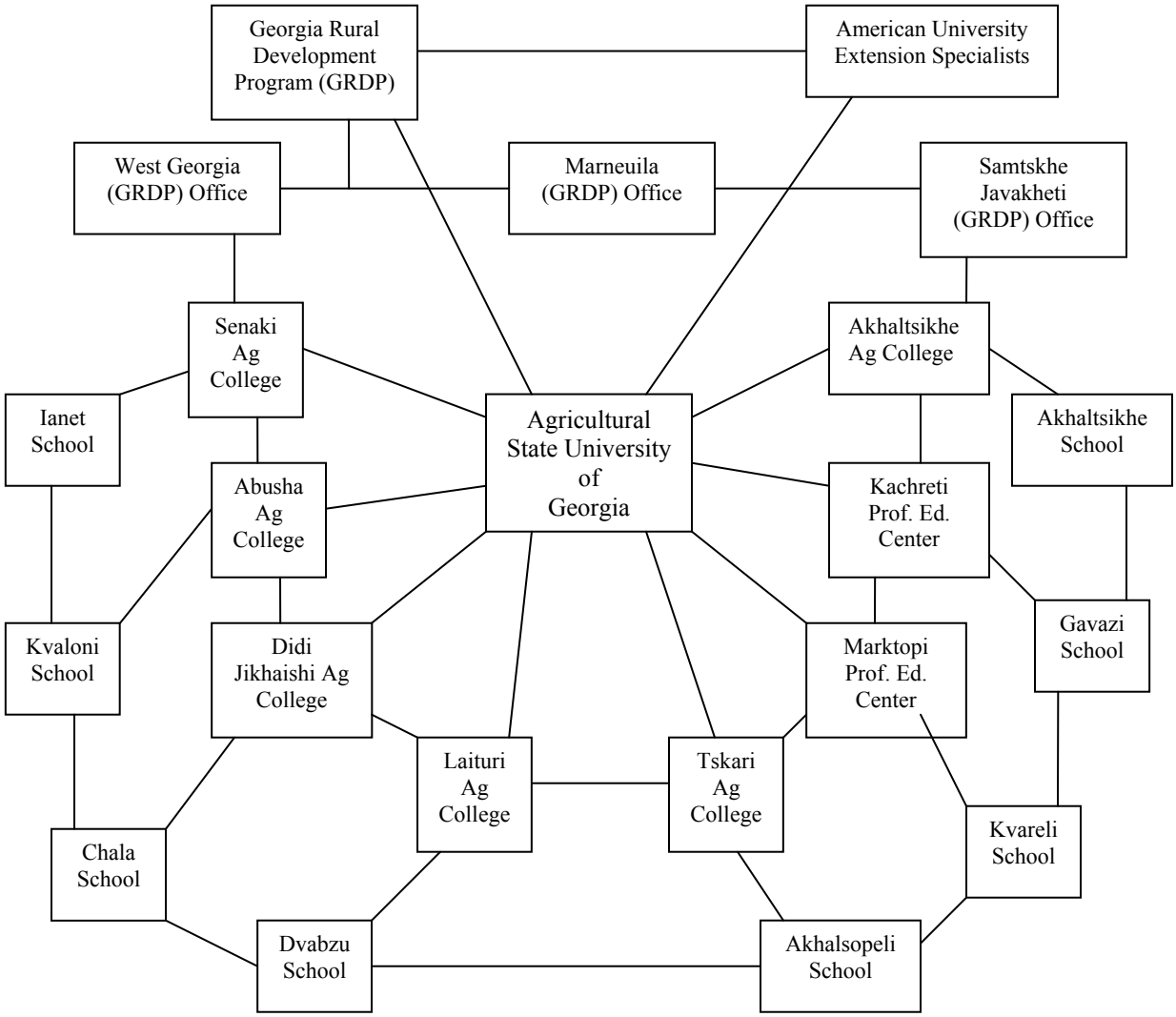

Figure 1. A network of institutions specializing in the education of students for the agricultural sector in Georgia **(**K. Natriashvili, personal communication, September 9, 2006**).**

Purpose of the Study

The multi-fold purpose of this study was to describe selected characteristics of secondary level teachers of agriculture in the country of Georgia, to describe their perceptions concerning the "importance of" and their "ability to" perform the instructional practices and activities that were presented during an October 2006 professional development seminar, and to assess their views about trends and the future of education, agricultural education, and agriculture in Georgia. In addition, findings will be used to better inform providers of professional development regarding the relevance, appropriateness, and anticipated value of future professional development seminar topics and training.

Methods and Data Sources

Both qualitative and quantitative methods were used to collect data from 13 teachers of agriculture (i.e., a purposeful sample) for this descriptive study. The

participants attended a four–day professional development seminar during the fall of 2006. Seminar topics were presented by two faculty members from a four-year land-grant institution in the USA. The seminars were delivered in English and translated into Georgian. The researchers developed a questionnaire that elicited three categories of information: (a) personal/professional data; (b) assessments about the "importance of" and teachers' self-perceived "ability to" perform the seminar's topics (i.e., competencies); and (c) perceptions about trends and the future for education, agricultural education, and agriculture in Georgia. This instrument was modified from a questionnaire used previously by American agricultural educators who served as in-service education providers to Lithuanian agricultural educators (Edwards & Thuemmel, 2000).

The descriptors for the "importance" scale were "5" = "Great Importance," "4" = "Much Importance," "3" = "Average Importance," "2" = "Little Importance," and "1" = "No Importance." The descriptors for the "ability" scale were "5" = "High Ability," "4" = "Much Ability," "3" = "Average Ability," "2" = "Low Ability," and "1" = "Negligible Ability." Cronbach's coefficient alpha reliability estimates for the rating scales were .88 (importance) and .54 (ability), respectively.

The questionnaire items were reviewed and validated by consensus of the researchers and then translated into Georgian by an English language specialist from the GIPA. Data were analyzed using descriptive statistics, including the calculation of frequencies, percentages, means, standard deviations, and rankings. Following the final session of the seminar, participants were also interviewed by the researchers as a group to clarify various issues and questions that surfaced during the training (Patton, 1990). Participants' answers were translated into English by the abovementioned language specialist, and a summary of those translated comments are reported in this manuscript.

Findings/Results

Participants were asked to respond to questions that described selected personal characteristics. The questionnaire revealed that the all female group received their degrees from higher education institutions. Two of the participants held master's degrees. When questioned concerning the number of years each participant had been in the teaching profession, answers varied from seven to 41. Ten of the 13 participants were classroom teachers, and the other three reported that they were administrators. Although most (92.3%) of the educators taught subjects other than agriculture during their school day, all participants were involved in after-school agricultural education projects. The most popular projects were gardening (i.e., flowers and vegetables) and bee keeping.

When questioned about their teaching loads, nine of the 13 participants (69.23%) reported that they taught 100 or fewer students per day; only one teacher indicated that she taught more than 150 students per day. All participants reported that they taught students who ranged from 13 to 17 years of age, and four indicated they also taught pupils who varied in age from six to 12.

Participants were asked to compare descriptively the quality of education in Georgia following the political events which took place in 1991 with those that occurred in 2003. Less that one-third of participants indicated that education improved following the 1991 events but four-fifths perceived it had improved since the "Rose Revolution" of 2003. Fewer than one in five believed that their life as an educator improved following the events of 1991; however, more than four-fifths indicated that their quality of life as an educator had improved since 2003.

Only one educator indicated that the economic status of farmers in Georgia improved following the events of 1991 but seven in ten perceived improvement following 2003 (Table 1).

Table 1
Seminar Participants' Perceptions Concerning Trends for Education, Agricultural Education, and Agriculture in Georgia Following Political Events in 1991 and 2003 (N = 13)

Questions	1991 *f*	1991 %	2003 *f*	2003 %
How has the quality of education improved in Georgia (1991 vs. 2003)?				
Much improved	0	0	0	0
Somewhat improved	4	30.8	11	84.6
No change	2	15.4	2	15.4
Somewhat deteriorated	5	38.5	0	0
Much worse	2	15.4	0	0
How has the quality of your life as an agricultural educator changed (1991 vs. 2003)?[a]				
Much improved	0	0	0	0
Somewhat improved	2	15.4	11	84.6
No change	3	23.1	2	15.4
Somewhat deteriorated	2	15.4	0	0
Much worse	4	30.8	0	0
How has the economic status of farmers in Georgia changed (1991 vs. 2003)?[a]				
Much improved	0	0	2	15.4
Somewhat improved	1	7.7	7	53.8
No change	3	23.1	4	30.8
Somewhat deteriorated	4	30.8	0	0
Much worse	4	30.8	0	0

[a]Not all participants responded to this question.

Regarding the outlook for agricultural education during the next five years, all but one participant predicted improvement. None of the educators perceived that agricultural education would deteriorate over the next five years. Eight of the 11 educators who had children responded that they would encourage their children to pursue a career in agriculture. And, five of the participants indicated that they would encourage their children to pursue careers in agricultural education (Table 2). Nine of the participants reported that they "always" encouraged their students to pursue a career in agriculture, and three said they "sometimes" encouraged their students to pursue agricultural careers. Nine participants reported that they "always" encouraged their students to pursue a career in agricultural education; only one educator indicated that she did not encourage her students to pursue careers in agricultural education (Table 2).

Table 2

Seminar Participants' Views Concerning the Future of Agricultural Education and Their Levels of Encouragement Offered to Youth About Entering the Agricultural Sector in Georgia (N = 13)

Questions		%
How will the quality of agricultural education change during the next five years?		
Much improved	6	46.2
Somewhat improved	6	46.2
No change	1	7.7
Somewhat deteriorated	0	0
Much worse	0	0
Will you encourage your son or daughter to pursue a career in agriculture?		
Yes	8	61.5
No	0	0
Maybe	3	23.1
I do not have children	2	15.4
Will you encourage your son or daughter to pursue a career in agricultural education?		
Yes	5	38.5
No	0	0
Maybe	6	46.2
I do not have children	2	15.4
Do you encourage your students to pursue careers in agriculture?		
Yes, always	9	69.2
Yes, sometimes	3	23.1
Yes, but seldomly	1	7.7
No	0	0
Do you encourage your students to pursue careers in agricultural education?		
Yes, always	9	69.2
Yes, sometimes	2	15.4
Yes, but seldomly	1	7.7
No	1	7.7

As shown in Table 3, the overall mean "importance" rating for all seminar topics was 4.77 or slightly more than two-thirds way between "much importance" and "great importance." The highest rated topics based on importance were "Brain-based learning research: What is it and how can it be used to improve student learning?" and "Evaluating student achievement: How can formative assessment strategies, including the use of rubrics, be employed to modify instruction to improve student performance?" Both topics received a mean importance score of 4.92 (*SD* = *.27*). Topics that followed closely with mean importance scores of 4.77 were "What is effective teaching?" (*SD* = .56), and "What are effective strategies for measuring student and program success?" (*SD* = .42) (Table 3).

Table 3

Seminar Participants' Ratings and Rankings of Importance and Self-Perceived Ability for In-Service Education Topics Provided During the 2006 Seminar for Georgian Agricultural Educators (N = 13)

In-service Education Topics	Importance				Ability			
	N	*M*	*SD*	Rank	*N*	*M*	*SD*	Rank
Brain-based learning research: What is it and how can it be used to improve student learning?	13	4.92	.27	1[a]	13	3.85	.66	11
What is effective teaching?	13	4.77	.56	4[a]	13	4.08	.73	9
Experiential learning: Where and how to begin?	13	4.85	.36	3	11	4.55	.50	1
Why teach the concepts, skills, and competencies included in our courses?	12	4.42	.64	10	13	3.92	.47	10
What is an effective way to develop and organize measurable instructional objectives?	13	4.62	.62	7[a]	13	4.15	.53	4[a]
How are programs, courses, and lessons organized effectively?	13	4.46	.63	9	13	4.31	.61	3
What are day-to-day strategies that help ensure effective instruction?	13	4.69	.46	6	13	4.15	.53	4[a]
How are appropriate course syllabi developed?	13	4.62	.49	10[a]	13	4.15	.53	4[a]
Evaluating student achievement: How can formative assessment strategies, including the use of rubrics, be employed to modify instruction to improve student performance?	13	4.92	.27	1[a]	13	4.15	.86	4[a]
Academic rigor: How to achieve and sustain it?	13	4.38	.62	11	13	4.15	.66	4[a]
What are effective strategies for measuring student and program success?	13	4.77	.42	4[a]	13	4.46	.50	2
Overall Mean		4.77				4.16		

[a]This topic received equal rating with at least one other in the seminar; tied ranks are displayed.

The participants' overall mean "ability" rating for all topics was 4.16 or slightly more than "much ability" to perform or implement the seminar topics (or competencies) into their teaching. The highest rated topic per participants' perceptions of their "ability" to implement was "Experiential learning: Where and how to begin?" ($M = 4.55$, $SD = .50$). The topic rated lowest by participants regarding their "ability" to perform was "Brain-based learning research: What is it and how can it be used to improve student learning?"; however, participants still indicated that their ability to accomplish that topic was well above "average ability" (i.e., $M = 3.85$, $SD = .66$).

Group Exit Interview Results

In a group "exit interview," participants were asked a series of questions concerning their motivation to participate in the newly developed agricultural education system. Responses to the question about motivation included, "genuine interest in children and their future," "building interpersonal skills within my students," "to raise the standard of living for my village," "to develop leaders," and "to distinguish my school." None of the participants reported that they received additional monetary compensation for teaching agriculture classes. One teacher reported that she received a reward in the form of discounted honey that was produced at the school.

Participants also explained that all Supervised Agricultural Experience (SAE) projects were conducted on school property and without financial contribution from the students. Three participants responded that their students benefited financially from the sale of plants grown as an SAE project, and one educator said her students were "paid" in plants for their involvement.

Conclusions

When questioned about the quality of education in Georgia since 1991, participants' answers varied from "much worse" to "somewhat improved." The average response to this question felt between "somewhat deteriorated" and "no change." However, perceived improvements in the quality of education in Georgia were substantially greater when only considering change since 2003 (i.e., following the "Rose Revolution"). An overwhelming majority of participants (12 of 13) reported that the quality of education had "somewhat improved" since 2003. This trend held true throughout the data comparing effects of the political events of 1991 with those that took place in 2003.

Nearly one-half of the participants reported that their professional lives had deteriorated to some extent following the end of the Soviet era in 1991; however, most expressed that their lives had improved following the Rose Revolution of 2003. Similarly, most of the participants indicated that the economic status of farmers declined after 1991 but believed that the events in 2003 had improved the economic status of farmers. What is more, educators perceived that the "Rose Revolution" had a positive impact on the quality of education in their country, the quality of life of teachers, and the economic status of farmers. And, a majority of participants also expressed that the political upheaval and "sea change" of 1991 had little positive effect on these aspects.

The participants were very optimistic about the future of agricultural education in Georgia. Nearly one-half predicted that agricultural education will be "much improved" during the next five years. And, a majority of participants indicated that they encourage their students to enter the agricultural sector and to pursue careers in agricultural education.

Based on the responses from the exit interview, the educators who had volunteered to teach agriculture classes were not motivated monetarily. Their responses showed that a sense of pride and intrinsic motivation to serve the future generations of Georgia were the largest motivational factors in their choices to become teachers of agriculture. Dudwick's (2003) work contradicts their perspective; for example, she reported that teachers "tried to make themselves indispensable by organizing after-school clubs without asking for compensation" (p. 221). However, her work was drawn primarily from qualitative interviews conducted with Georgian teachers in the 1990s, which preceded the Rose Revolution.

Topics that the participants indicated held the greatest importance included "brain-based learning," "experiential learning," "student evaluation," and "effective teaching." Participants also believed they held the highest ability to implement principles related to "effective

teaching," "instructional objectives," "day-to-day [learning] strategies," and "measuring student and program success." Although "brain-based learning" was rated the most important topic/competency of the seminar, teachers also perceived that they were least able to incorporate brain-based learning into their instructional practice. However, participants' summated ratings of their "ability" to implement selected seminar topics may be questionable due to the low reliability estimate found for that construct.

Implications and Recommendations for Future Practice and Research

Lerman (2006) analyzed the impact of land reform in Transcaucasia, including Georgia, after dissolution of the Soviet Union and its relationship to growth in the agricultural sector and the "improved well-being of the rural population" (p. 112). He concluded that policy implications for rural Georgians, many who are impoverished, included "investing in rural infrastructure and services," for example, "farmer-owned service cooperatives" (p. 122), and that these and similar institutions could improve agricultural producers' understanding and implementation of "quality control[s], compliance with international standards, and other marketing difficulties" (p. 122), thus making the sector more competitive. Consistent with Lerman's conclusions is the need for a coherent and articulated approach to educating and training Georgians to staff and lead its agricultural sector. And, requisite to that aim is a significant underlying premise: teachers of agriculture in Georgia, including those at the secondary level, must be highly professionalized both in content knowledge and pedagogy.

Georgia is at an exciting stage of rebirth as it modernizes and improves its secondary agricultural education system as well as the higher education institutions that serve the agricultural sector. The current education system still retains some elements of the influence of centralized-control (Ruffio & Barloy, 1995) as imposed by its former socialist governments. So, new approaches to teaching and learning mark a turning point in the history of Georgian education and for its agricultural and food system. The rural populace may benefit significantly from the diffusion of basic and advanced agricultural knowledge and skills initiated in the FFG schools and then expanded and refined at the post-secondary level. To that end, providers of professional development need to be informed about the value of their efforts, so that future programming is responsive and effective (Waters & Haskell, 1989; Witkin, 1984).

The data collected in this study revealed that Georgian teachers of agriculture at the secondary-level were eager and excited about the opportunity to further expand agricultural education in their schools. However, the data also demonstrated that 12 of the 13 seminar participants were not formally trained in agriculture or agricultural education. To help these teachers develop more fully into effective agricultural educators, more in-service education is recommended.

Moreover, the researchers should review their content and delivery for the topic about "brain-based learning," which the educators considered most important (Table 3) but they perceived themselves having the least ability to use or implement. A review of all items, vis-à-vis participants' perceptions of their abilities to use, also may be warranted because of the relatively low reliability estimate yielded for this domain (i.e., .54). Interestingly, Edwards and Thuemmel (2000), who used a similar but not identical instrument, produced an estimate of .79 with Lithuanian agriculture teachers who, too, required translation. So, did "language," the need for translation, or the role of "context-bound meaning" play a role in the discrepant reliability estimate? Or, was the estimate less than "desirable" due to what Field (2005) attributes to "the diversity of the constructs being measured" (p. 668)? The investigators should consider

these and other possible factors when refining their instrument.

In addition, agricultural education teachers should be provided appropriate curriculum materials that have been translated into Georgian to use in their classes as well as further instruction about how to use these learning resources effectively. To that end, 300 pages of learning resources, ranging from animal science to gardening, were taken from the state of Georgia (USA) agricultural education curriculum library and translated into the Georgian language. It was distributed to teachers who participated in the seminar described. Follow-up consultations were planned to answer educators' questions about these materials and their use. (During the follow-up consult, researchers intend to determine which agricultural textbooks may benefit Georgian agricultural education students most and, subsequently, request that the appropriate textbook[s] be translated into the Georgian language.)

It is the intention of the GRDP to create a seamless system of agricultural education beginning in the secondary schools; then, progressing to various two-year technical colleges and, finally, to the Agricultural State University of Georgia (ASUG) (Figure 1). Formal training in agriculture at post-secondary institutions is growing in popularity. Rusudan Dzidzishvili, Dean of the Agronomy faculty, ASUG, stated,

> As for the incoming contingent of students: it is fascinating, but this year an unimaginable fact happened for the first time in the history of the agrarian university. Namely, none of the universities except the agrarian faculty filled their incoming classes right. The agrarian faculties finished admitting students at the very first cycle of enrollment. We were interested to find out what was the reason, because in general the agrarian university and the agrarian profile have not had enough applications from students for years. The analysis showed that farming is winning back its place in the Georgian mentality and people are starting to understand that their land is the most important thing. (GIPA, 2006, pp. 201-202)

In long term planning for this goal, leaders of the ASUG should consider formally implementing a teacher preparation program for aspiring agricultural education teachers. Although in-service programs, such as the one described here, are beneficial to educators who may teach various courses that contain agricultural topics, more emphasis should be placed on the *systematic* preparation of secondary agricultural education teachers, i.e., creation of a baccalaureate level, pre-service degree program at the ASUG or elsewhere in Georgia.

It is recommended that this newly formed system of agricultural education implement assessment and evaluation measures—formative and summative—to determine programmatic success and to guide future initiatives. A longitudinal study should be established to track students who matriculate from the secondary agricultural education program to determine if it made a significant difference in their career and educational choices, their performance at the post-secondary level, their entry into the agricultural sector, and their early-career job performance.

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Education for Rural People: What have we learned?

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Abstract

This article presents a synthesis of lessons learned since the launch of Education for Rural People (ERP) in 2002 under the leadership of the Food and Agriculture Organization (FAO) of the United Nations as part of the implementation process for the Millennium Development Goals (MDGs). The ERP program originated from the global consensus on the importance of education in reducing poverty and concern over the development challenges presented by approximately 880 million illiterate youth and adults and approximately 130 million out-of-school children, many of whom are rural and female. The most important products of ERP to date have been the knowledge generated and disseminated, innovations identified, and lessons learned by ERP partners related to policy and practice in areas such as education quality and access, gender responsive learning environments, parent and community engagement, and accommodation of non-traditional learners, to name just a few. Tools to strengthen national capacities to advance ERP have been developed. A global repository of the knowledge base on ERP has been established at FAO and is accessible worldwide via the Internet. Partnerships have been forged to expedite and facilitate implementation. ERP is now widely acknowledged as a top priority in the international education agenda. But educating all rural people is a huge challenge, and much is still to be done considering the number of out–of-school children living in rural areas. During this next phase, new investments will be needed at the national level. Preparing rural citizens to engage successfully in knowledge-based economies is central to the achievement of the MDGs.

Keywords: Education for rural people, food security, agriculture, sustainable rural livelihoods, education for all

Introduction

In the fall of 2003, the authors published a commentary in this journal entitled "Launching a New Flagship on Education for Rural People: An Initiative Agricultural and Extension Educators Can Get Behind" (Acker & Gasperini, 2003). The purpose of this follow-up article is to present a global synthesis of lessons learned since the launch of Education for Rural People (ERP) in 2002. This synthesis is based on a review of the rich literature base that has been spawned by the ERP initiative, including 33 books and conference proceedings, 57 virtual publications, 5 published articles, 8 newsletters, 3 theses and a sampling of the 287 books, 93 featured activities, and other resources listed in the toolkit on the ERP Web site.

Short (1985) argues that organizing and critiquing what we have learned from individual studies into a coherent synthesis document can be a useful preliminary step in identifying implications for action. In this synthesis article, we have drawn from experiences reported in the literature from around the world. The presentation is organized along the lines of the framework popularized by Stufflebeam (2007): Context, Input, Process and Product (CIPP).

Context

The ERP program originated from the global consensus on the importance of education in reducing poverty and the concern regarding the development challenges presented by approximately 880 million illiterate youth and adults and approximately 130 million out-of-school children, many of whom are rural and female. Education in this context is defined as including general education, training and extension.

ERP is a partnership launched in Johannesburg in 2002 at the World Summit for Sustainable Development. It is designed to contribute to the achievement of the Millennium Development Goals (MDGs), especially:

MDG1: Eradicating extreme poverty and hunger;
MDG 2: Achieving universal primary education;
MDG 3: Promoting gender equity and empowering women; and
MDG 7: Ensuring environmental sustainability.

ERP builds on the 1996 World Food Summit Plan of Action, which stressed increased access to education for the poor and members of disadvantaged groups, including rural people, as a key to achieving poverty eradication, food security, durable peace and sustainable development. ERP is also one of the flagships of the global movement known as "Education for All," which is committed to provide quality basic education for all children, youth and adults.

The Food and Agriculture Organization of the United Nations (FAO) provides the leadership for the ERP flagship through its ERP Coordinating Unit. FAO works in policy, knowledge management and advocacy with the United Nations Educational, Scientific and Cultural Organization (UNESCO), and with over 300 ERP partnership members, including donor agencies, national governments, nongovernmental organizations (NGOs), the media and academia. Although building partnerships has been essential to expanding the impact beyond the lead agencies, the actual implementation of ERP policy is a national responsibility.

The vision that led to the focus on education for rural people is that people—not institutions or technology—are the driving force of development, as the United Nations Millennium Declaration indicates. The ERP vision is centered on peoples' needs and is pursued through the promotion of interdisciplinary and inter-institutional collaboration between and among national institutions. Research on the role and impact of education in development has led to the conclusion that education is a neglected key to food security. In a recent research study,

Burchi and De Muro (2007) found that the correlation between food insecurity and primary education is very high although it decreases at other educational levels. Research addressing the link between education and agricultural income and productivity has a long tradition. For example, Carnoy (1992) analyzed 18 studies conducted for the World Bank that measured

> the relationship in low-income countries between farmers' education and their agricultural efficiency (as measured by crop production). The review concluded that [the] level of education of farmers was related to [the] level of their farm productivity, with 4 years of education contributing, on average, an 8.7 percent productivity gain over those with no formal education. (Acker & Gasperini, 2003, p. 85)

Education has emerged as "an essential prerequisite for reducing poverty, improving agriculture and living conditions of rural people and building a food secure world" (FAO/UNESCO/IIEP, 2006).

A prevailing development paradigm focuses on a rights-based approach whereby neglected minorities are often targeted with compensatory development strategies. FAO has stressed that rural people are a neglected majority and thus deserve greater assistance (Diouf, 2002). In fact, 70% of the world's poor live in rural areas, and this situation will not change drastically in the near term. Without improvements in education for rural people, there will be a drag on global efforts to reduce poverty and eliminate hunger.

There are two main challenges faced by rural people. The first challenge lies in the intertwined problems of poverty and hunger, which are addressed by MDG1. The problem of poverty and hunger in poor countries is still largely a rural issue given that the majorities of the world's poor live in rural areas and are dependent on agriculture (FAO, 2005).

The second challenge relates to education (MDG 2). The problem includes low access to and retention in education (especially for females) and high levels of illiteracy (typically two to three times higher in rural areas than urban areas). These challenges are compounded by low quality of education and lack of skills training through both school-based education and non-formal education and extension. On top of this, the rural–urban knowledge and education gap is widening. The fact that 82% of out-of-school children live in rural areas (UNESCO, 2005) where the highest rates of hunger exist led to the saying that children, youth and adults cannot learn on an empty stomach and empty minds cannot organize food secure systems. Without significant progress on MDG 1 success on MDG 2 is threatened and vice versa.

In Africa, the challenge is greater than in other regions. A new report from the British Department for International Development (2007) stated that more than $11 billion is needed annually for education if Africa is to have any hope of getting all children into primary school by 2015. Nearly 80 million primary school-aged children remain out of school and over 57% of them are girls.

Inputs

FAO contributed the Coordinating Unit for ERP including the salaries and operating expenses of personnel and of projects. Other contributions came from ERP partners, interns and conference participants. Financial contributions and in-kind contributions came from international, national and local sources. Organizational and intellectual resources were invested in preparing and hosting regional conferences and other capacity-building events, conducting research and producing a variety of documents. Finally, Web site development has evolved as the dominant form of communication among members.

Process

The ERP process simultaneously addressed a number of mutually reinforcing activities. A research base was established. ERP started with an in-depth global study on education and rural development jointly conducted by FAO and UNESCO/International Institute for Educational Planning (IIEP). This early step ensured that ERP would be developed according to a solid research base. An "ERP Series" has been publishing further research.

Partnerships were mobilized worldwide. The strong partnership between FAO and UNESCO/IIEP, The Association for the Development of Education in Africa and the Inter-American Institute for Cooperation on Agriculture are examples of a membership that has grown to about 300 members including international organizations, governments, NGOs, the media and academia. ERP utilized these partnerships to promote the exchange of good practices. Five regional capacity-building workshops, the ERP Web site and the publication of the "ERP series" were some of the activities undertaken for this purpose. ERP also promoted knowledge generation, management and sharing including technical support to countries willing to address ERP objectives.

ERP promoted a holistic approach to serving the educational needs of rural people. Formal and non-formal education delivery modalities were addressed for all age groups. Extension, frequently marginalized by the rigidity of a single sector approach where formal and non-formal education are addressed as separate realities, benefited from the exchange of practices with other delivery modalities. Formal education policy makers and planners learned from agriculture and rural development staff involved in non-formal skills training and extension, and in vocational and higher agricultural education.

ERP worked simultaneously at the policy, capacity-building and grassroots levels. Both normative and pilot fieldwork was undertaken, but with an emphasis on the policy level to ensure the greatest impact, cost effectiveness and a multiplier effect (Gasperini & Atchoarena, 2005). The Kosovo Ministries of Education, Science and Technology, and Agriculture, Forestry and Rural Development (Kosovo, 2004) "Strategy for Education for Rural People in Kosovo," and the preparation of guidelines for planning ERP are examples of national level policy implementation.

Products

Although it is premature to assess impacts of ERP, it is possible to identify a range of intermediate or enabling products at this stage. The most important products to date have been the knowledge generated, innovations identified, and lessons learned by ERP partners related to policy and practice. At the policy level the partnership was able to affirm ERP as a key decision-making policy issue at the Fifth Meeting of High-Level Group on Education for All, held in Beijing, China, on 28–30 November 2005. The following is an illustrative set of innovations and lessons learned from ERP.

Access to Education

Access to education by all age groups in rural areas is considered by ERP practitioners to be the area requiring the greatest change. Senior level government representatives from 11 African countries reiterated the need "to address the gross inequalities that marginalize rural people, and in particular, access to education by girls and women, working children, people in inaccessible and remote areas, nomadic and pastoral communities, ethnic minorities, the disabled, refugees and displaced" persons (FAO/UNESCO/IIEP, 2006, p. 12). Removal or reduction of school fees, free access to learning materials and, to a lesser extent, school construction in rural areas has had a significant impact on school attendance since 1999. According to UNESCO (2007), from 1999 to 2004 primary school enrollments increased by

27% in Sub-Saharan Africa and 19% in South and West Asia.

Quality of Education

The quality of education available in rural areas lags behind that of urban areas. Yet, quality remains a critical foundational aspect of any advance in ERP. Although the quality of education for rural people has many dimensions, one critically important factor is the link between quality and relevance. Educational relevance is vital to increasing the appeal and utility of education for rural people. Contextualized learning allows students to study and solve real-life problems and to acquire life skills (Atchoarena & Gasperini, 2003).

Greater Flexibility and Local Autonomy

National policies that allow enough flexibility to permit some local content to be included in curricula are the foundation for community engagement in curriculum development. Systems that combine national curricular standards with some local content determined through community input processes have proven successful in several tests. In Thailand, for example, as much as 40% of the curriculum was permitted to be based on community and local needs (FAO/UNESCO/IIEP, 2002). Other forms of flexibility play a role in increasing access to education. For example, academic schedules may need to be flexible to accommodate weather, cropping patterns and the movement of nomads.

Parent and Community Involvement

Participatory and community-based approaches have helped to increase educational access and to increase community ownership of schools (FAO/UNESCO/IIEP, 2006). Rural families need to see that the education their children receive is relevant. The development of parent–teacher organizations can have a significant impact on resources available to the school, as well as improved monitoring of quality, relevance and such critically important supporting elements as school lunch programs.

Gender Responsive Learning Environments

To attract and retain primary school-aged female children some accommodations have proven successful. Flexible timetables to accommodate peak labor demand for children have helped to increase attendance in some schools. In situations where the schools are distant from the students' homes, well-supervised boarding facilities have been shown to be critical in safeguarding the well-being of female children and in inspiring confidence among parents. A very effective mechanism for improving participation rates and readiness to learn are the provision of school meals for all children and take-home rations for female children to compensate for the labor lost when they attend school (FAO/UNESCO/IIEP, 2006). Direct fund transfers to families, such as *Bolsa Escola* in Brazil, also demonstrated high returns.

Organizational and Institutional Efficiency

ERP must be approached systemically because no single institution is in the position to provide all of the necessary educational services. Coordination among providers such as extension, schools, non-governmental organizations and the private sector is essential for optimal efficiency. For example, trained agricultural extension agents who are already located in rural areas are a valuable potential resource for making presentations in their subject area at schools, for conducting adult education classes and for organizing farmer field schools that involve both technical and basic education outcomes. With the correct incentives teachers, if trained in the specific technical subjects, can support extension programs during off hours.

Accommodating Non-traditional Learners

Non-traditional learners may include out-of-school youth, including girls and women, retired child soldiers, nomads and

others. The variety of educational needs of these varied groups means that there is a need for multiple educational safety nets to ensure higher participation rates. Functional adult literacy and alternative basic education programs can respond to those who did not have the opportunity to pursue education earlier in life. These can be coordinated with extension in the form of learning in context.

Skills Training for Rural People

Historically, agricultural secondary and postsecondary education and training have had a sharp focus on preparation for on-farm employment and public sector jobs (Avila, Atchoarena, & Gasperini, 2005). Skills training for success in rural areas must include a variety of skills such as life skills, food production skills and self-employment skills. Appropriate non-formal skills training for adults and school drop-outs can permit rural people to diversify their skills for a more secure livelihood and greater resiliency during times of stress (FAO/UNESCO/IIEP, 2006). Innovative models have been developed in Lao PDR, where production-based vocational schools combine learning, earning and doing (FAO/UNESCO/IIEP, 2002). Another example is the Junior Farmer Field and Life Schools in Mozambique that address agricultural, as well as life skills development, among young rural citizens (FAO/UNESCO/IIEP, 2006).

Teachers and Extension Staff Issues

Recruitment and retention of rural teachers and extension staff present significant challenges. One innovation identified by ERP partners is the reform of recruitment practices by attracting prospective teachers and extension workers who are originally from rural areas. Another area identified as ripe for change is the deployment policies that can be adjusted to make rural areas more attractive through bonuses, higher salaries relative to other government employees in rural areas (a step taken by China), loan forgiveness, provision of subsidized housing, access to better health care, posting newly qualified teachers/extension workers in pairs, establishment of career progression options and other similar policies. In Malaysia, for example, a package of incentives including a piece of land and training in agriculture was used to encourage teachers to stay in rural areas. In Lao PDR, profit sharing in school-based income-generating activities is allowed whereby both students and teachers benefit financially (FAO/UNESCO/IIEP, 2002).

Infrastructure

School facilities represent a significant public investment in rural areas. Better utilization of limited school infrastructure can be achieved through such ideas as double shift classes and/or utilization for after-hours adult education. Feeder or satellite schools can accommodate the youngest children in remote areas until they are strong enough to walk longer distances to a full primary school. The creative use of information and computer technology (ICT) is frequently promoted as a method for increasing access and efficiency in education in rural settings for application in both formal and non-formal programs. While ICT has already had an impact in some areas a cautionary note has been raised. As noted at the ERP workshop in Bangkok, "it is far from a foregone conclusion that ICT will increase access to quality education for the poor and other disadvantaged groups" (FAO/UNESCO/IIEP, 2002, p. 92).

Effective Pro-rural Policies

National level policies and strategies that effectively address ERP recognize the diversity of needs of rural people such as agro-ecological differences, geographical differences, and socio-economic and cultural differences (FAO/UNESCO/IIEP, 2006). However, motivating major changes in policy and resource allocation to favor rural citizens is generally very difficult to achieve

due to the absence of powerful political forces that advocate for rural people.

Donor Issues

National governments are finding it quite challenging to build effective ERP programs in the face of decreasing donor investment in education, training and rural development (Gasperini & Maguire, 2002). Events that remind donors of the importance of investing in the educational aspects of agriculture and rural development are needed. Donor coordination at the national level can be improved by agreeing on an overall vision, by coordinating separate funding streams and through regular monitoring and dialog. Finally, leadership from regional and international granting and lending organizations will be essential for those countries committed to elevating the education levels of their rural citizens. Gasperini and Maguire suggested that the donor community and developing countries could orchestrate their efforts for an all out assault on rural poverty. Donor investments in education can help to optimize performance of investments in other sectors in the development process.

Role of Higher Agricultural Education

Higher Agricultural Education has a role to play. The engaged university is one that seeks out opportunities to work directly with communities. In so doing, the community and the university are both strengthened. Universities can play a key role in training teachers and extension staff, assisting with the development of curriculum, and helping with monitoring and evaluation of educational rural programs (FAO/UNESCO/IIEP, 2006).

Conclusions

During the first five years of ERP, FAO had the lead role in advancing the ERP flagship and was ably supported by UNESCO. During this phase the focus was on developing policy options and documenting and sharing innovative ideas and best practices. Progress has been made and ERP is now commonly discussed at national and international policy forums. Tools to strengthen national capacities to advance ERP have been developed. A global repository of the knowledge base on ERP has been established at FAO and is accessible worldwide via the Internet. Partnerships have been forged to expedite and facilitate implementation.

But educating all rural people is a huge challenge, and much is still to be done considering the number of out–of-school children living in rural areas. Although the policy discourse is more or less complete for the present, it is now appropriate to shift to a phase whereby resources must focus on implementation at the national level. During this next phase, new investments will be needed at the national level. FAO, as a knowledge-based organization, will continue to collect, analyze, interpret and disseminate the knowledge required for the world to meet the food and nutrition needs of all its citizens and to provide global governance "with respect to . . . the improvement of education and administration relating to nutrition, food and agriculture and the spread of public knowledge of nutritional and agricultural science and practice" (FAO, 1945, Article 1). UNESCO is uniquely suited for facilitating ERP implementation at the national level given that this role lies within its mandate to support the advancement of education at such a level. National Education for All plans, the Fast Track initiative, Poverty Reduction Strategies and National Rural Development Plans as well as the One UN initiative can yield significant results as the lessons from the ERP first phase are implemented. UNESCO's leadership and technical support to ERP at the country level during this next phase would need to be strengthened, and FAO is in a good position to contribute as a supporting entity to the work of UNESCO in the specific areas of FAO's expertise.

At the national level, the hallmark of the ERP implementation will be a systemic

needs-based approach that fosters education (including extension) by expanding access and improving quality for all children, youth and adults. This can be done only by strengthening multi-sectoral and interdisciplinary institutional linkages and developing new alliances between ministries of agriculture and ministries of education as well as with civil society. Preparing rural citizens to engage in knowledge-based economies that are being buffeted by the forces of globalization is a challenge no single entity can address alone. National people-centered and rights-/justice-oriented strategies and sustainable rural livelihoods approaches will greatly benefit from such new alliances.

At the international level, ERP needs to become a commitment of all UN agencies and plans, bilateral donors, NGOs and others. At the national level, attention needs to be paid to the fact that there is an unequivocal association between primary education for rural people and food security. ERP is a complement to rather than a substitute for food security, poverty alleviation and sustainable natural resources management programs as well as for Education for All programs, and could be combined with such programs to increase efficiency.

The need to move from a traditional agricultural education paradigm to one of education for sustainable rural development designed for strengthening rural communities has been acknowledged during this decade (Atchoarena & Gasperini, 2003). The traditional agricultural education paradigm can benefit from a continuous redefinition that builds on the work of Crowder, Lindley, Bruening and Doron (1999) reflecting changes that have taken place in rural areas including changes in technology, global supply chains, health interventions, on- and off-farm employment and global environmental changes.

Education for rural people is not a headline-grabbing story such as a research breakthrough in crops research, in climate change or in avian influenza. It is not flashy. But it is a critical foundation activity that must be addressed in order to ensure the achievement of several MDGs, especially, MDG 1, MDG 2, MDG 3 and MDG 7. Every day, more children are born. Every year, a new class of students is ready to enter school and the opportunity for these students to do so will mark the difference between them becoming a new generation of illiterate citizens and farmers or a new generation of economically productive rural-based citizens capable of making informed decisions to enhance their lives and those of their fellow community members. It is a process as relentless as it is critical to each society to manage and preserve the planet's natural and human resource base. It is an area in which the UN system needs to take dynamic action on behalf of its poorest members and where national governments need to invest.

The CIPP evaluation model checklist published by Stufflebeam (2007) seeks to assist evaluators in assessing "long-term sustainable improvements" in programs. In the case of ERP, the questions that Stufflebeam poses are those that ultimately will be asked to determine if the ERP flagship succeeded: "Were the right beneficiaries reached? Were their needs met? Were the gains for the beneficiaries sustained? Did the processes that produced the gains prove transportable and adaptable for effective use in other settings?" (Stufflebeam, 2007, p. 1). National policies and corresponding national, regional and international investments should factor these questions into programs designed to educate rural people.

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Developing Active Teaching and Learning Materials for Egyptian Agricultural Technical Secondary Schools

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Abstract

This paper summarizes activities undertaken by teacher-educators from several U.S. Land Grant Universities to introduce active teaching-learning methods and materials into 53 agricultural technical (secondary) schools (ATSs) in Upper Egypt. The goal of the project was to transform the cognitive and psychomotor skills being taught in these schools from knowledge recall and comprehension to practical skill training utilizing problem solving skills combined with critical thinking and decision making. Each of the seven steps taken to implement this pilot project is summarized and discussed. This project is educationally significant because vocational agriculture education programs have been neglected in most developing countries; also, most international donor agencies allocate the majority of their educational resources to strengthening basic education. As a result, this effort to pilot-test and validate how vocational agricultural education programs in these ATSs can be strengthened has considerable educational significance, not only in outlining a methodology for strengthening the remaining 77 ATSs in Egypt, but also in outlining a strategy and approach that could be used to strengthen vocational agricultural education programs in other developing countries.

Keywords: Egypt, vocational agriculture, teaching methods, lesson plans, instructional materials

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Introduction

There are 130 agricultural technical (secondary) schools (ATSs) in Egypt, with an average enrollment of 2,750 students in each school. These vocational agricultural high schools have about 154 teachers per school, with about 42% of these instructors teaching agricultural courses; the remainder teaches general education courses. The 65 or so "agricultural" instructors in each school are organized into technical departments, including field crop production, livestock production and animal health, horticulture, agricultural economics, agricultural mechanics and food processing.

All ATSs in Egypt are required to follow the same basic curriculum, with each of the 33 agricultural courses being organized around a standard textbook. Teachers are required to prepare students for standardized tests at the end of each school year. In addition, most technical agriculture teachers have had no training in teacher education, including different teaching methods and how to prepare lesson plans. As a result, most teachers lecture or teach for the year-end test and settle for rote learning on the part of students. Therefore, little or no attention is given to developing higher-level cognitive skills, as outlined by Bloom (1956). Most ATS graduates are poorly prepared to utilize the knowledge and skills covered in these ATS courses, whether they work on family or commercial farms or in agribusiness firms upon graduation. The unemployment rate of ATS graduates can run as high as 98% (Megahed, 2001).

In addition to lacking any type of training in effective teaching methods, the only tools available to most agriculture teachers are the course textbook and a chalkboard in the classroom. The exception is in laboratories where a limited amount of equipment is available to demonstrate particular techniques. The overwhelming majority of teachers do not have any audio-visual (AV) equipment, such as overhead projectors (OHP's), illustrative transparencies or supplemental teaching aids.

All ATS schools have a school farm averaging about 25 acres (feddans). However, these school farms are primarily used to generate income for the school and are not actively used to train students in practical skills related to field crops, horticulture and livestock production and related agricultural mechanization skills. Also, most of the work on these school farms is carried out by laborers who want to keep their jobs. Engaging students in practical training activities on the school farms has not been a priority at most schools. Finally, many teachers lack the practical training and experience needed to integrate hands-on or psychomotor skill training into their courses, so most practical training is carried out by the field laborers on the school farm, not by the teachers themselves. This arrangement contributes to an educational disconnect between classroom instruction (cognitive skills) and the minimal levels of practical field training (psychomotor skills) made available to students. Despite this dismal state of affairs, improving the teaching methods and available resources in ATSs is a priority in Egypt.

Purpose

The purpose of this study is to describe a strategy currently being introduced into 53 ATSs in Upper Egypt under the auspices of the Agricultural Export and Rural Income (AERI) Institutional Linkage Project being implemented by the Midwest Universities Consortium for International Development (MUCIA), involving a consortium of six Land Grant Universities, with funding being provided by the U.S. Agency for International Development (USAID). The objective of this project component is to enhance the teaching methods and materials being used by agricultural instructors in these ATSs as the first step in transforming

the teaching-learning process in these schools.

The focus of this paper is on the introduction of active teaching-learning methods (including teaching materials and equipment) needed to enhance the development of higher level cognitive skills among students attending the 53 selected ATSs. Shao and Bruening (2005) shared that:

> Curriculum has been considered an essential element for all schooling. Thus, when attempts are made to initiate reforms of the educational system, changes in curriculum have to be a starting point… without curriculum change; modifications to the structure make little sense. (p.34)

Once it has been empirically documented that the use of active teaching-learning methods and materials will directly improve the cognitive skills of students, then the next step will be to transform the overall curricula to enable students to develop cognitive, psychomotor and leadership skills that are directly related to the agricultural economy, both on farms and in agribusiness firms.

Philosophical Framework

The importance of vocational educational reform in developing countries is undisputed in the literature. "Curriculum planning therefore needs to be a continuous, open, and participative process… Attention needs to be given to strategies for content identification as well as curriculum change" (Shao & Bruening, 2005, p. 35). Copra (1992) noted that (as cited in Shao & Bruening, 2005, p. 35), "Reforms of vocational education appeared to be connected with curriculum development, evaluation and assessment, teaching methods, and teacher training." Shao and Bruening (2005) concluded that the Chinese secondary agricultural educators were "particularly interested in improving their knowledge and skills in the most common practices in teaching and learning" (p.39). This concept has international application as well.

Perez-Dlamini, Mbingo, and Dlamini (2003) observed that:

> Africa needs to increase production of some subsistence crops that could boost overall national production, but also needs to diversify production of export crops to generate much needed national revenues. The agriculture curriculum is one of the best tools and the school is the best place to disseminate the concepts of agriculture production, Schools serve as catalysts for change and can be effectively used to transform the society using relevant curriculum. (p. 43)

The authors (Perez-Dlamini et al.) further postulated, "…curriculum is becoming increasingly unmatched with current national, regional and global trends" (p. 38). To counter this trend, some developing countries have put forth efforts to bolster their vocational education.

In Malaysia, the Ministry of Education reformed their school curriculum "in accord with the aspirations of the general public and the economic development of the country" (Nazri, 2003, p. 61). Similar to Egypt, Malaysia divides their secondary system into academic and vocational streams. Students in Malaysia who studied agriculture at the vocational-technical schools had a farm background (Nazri, 2003).

While few would argue with the philosophy that improving agricultural education in developing countries is important, the tools and resources available to reformers are scarce. For example, the agricultural education literature offers little practical advice for specialists trying to transform Egyptian ATSs. Researchers (Radhakrishna, Connors, Elliot, & Verma, 2001) investigated contents of the first seven years (1994-2000) of the *Journal of*

International Agricultural and Extension Education and found that only 30% of the articles were related to Africa (23%) and the Middle East (7%). Only one article within that timeframe was related directly to Egypt and was Extension focused. Radhakrishna et al. also noted that only 19% of the articles were related to agricultural education (9%), curriculum (8%), and student performance (2%), none of which were related to Egyptian ATSs.

While the agricultural extension education literature provides minimal practical support for reformers in Egyptian ATSs, a review of the education literature results in a wealth of ideas for transforming ATSs into effective learning centers. In particular, the literature on *active learning* is relevant. A summary of this philosophical approach follows. As Chickering and Gamson (1987) stated:

> Learning is not a spectator sport. Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, and apply it to their daily lives. They must make what they learn part of themselves. (p. 3)

This statement summarizes the overall educational philosophy that has guided the first phase of our effort to improve the teaching methods being used by over 1,600 agriculture teachers in the 25 selected ATSs. Lesson plans, teaching aids (primarily transparency film) and OHPs are now being installed in every classroom of these 25 ATSs as resources for active learning in the classrooms.

For educators, active learning can be more about understanding/practicing the concept rather than agreeing to a common definition. Often teachers comment learning is inherently active and that students will be actively involved even while listening to formal presentations in the classroom. Chickering and Gamson (1987) suggested that students must do more than just listen. Rather students must be actively engaged in reading, writing and problem solving. Within this context, it is proposed that strategies promoting active learning be defined as instructional activities involving students in doing things and thinking about what they are doing. By understanding Bloom's Taxonomy of Educational Objectives (1956), educators can move from knowledge recall and comprehension toward more advanced cognitive skills, including analysis, synthesis and evaluation of information and knowledge, so they can solve problems and make informed decisions. Simply knowing information is not enough; knowing how to address and solve problems is the desired outcome.

Active learning begins with an interest approach that prepares and connects learners to what they are about to learn. Examples of active learning activities that involve students include: seminars with carousel brainstorming, reviewing case studies, clarification pauses, working with cooperative groups, concept mapping, using the jigsaw procedure, maintaining a daily journal, frequent short quizzes and feedback, learning cycle, muddiest point, presenting one minute papers, moveable magnetic diagrams, field exercise and think/pair/share, etc. The bottom line is that students should be actively engaged in those learning activities that systematically move them toward the desired objectives.

To clarify these educational objectives, Bloom (1956) divided educational objectives into three overlapping domains, the affective, cognitive and psychomotor. The affective domain deals with feeling and emotion, the psychomotor domain addresses motor skills; and the cognitive domain applies to thinking skills. Within the context of agricultural education courses, educational objectives are primarily written in the cognitive and psychomotor domain. The overlapping occurs between the

cognitive and psychomotor domain as students must think through practical, hands-on training exercises to accomplish a task or solve a problem, such as soil testing or tractor maintenance.

Rosenshine and Furst (1971) identified 11 teaching behaviors that effective teachers should display. Of those 11 behaviors, Garton, Miller, and Torres (1992) identified five that could readily improve teacher performance in the classroom. These five teaching behaviors were: 1) being businesslike, 2) being enthusiastic, 3) being clear, 4) providing students with opportunities to learn material, and 5) varying teaching methods to maintain student interest.

Lesson plans guide the actions of teachers and the learning activities they undertake in each class. Lesson plans can incorporate four of these desirable teaching procedures. The enthusiasm demonstrated by the teacher in the classroom comes from within the teacher and cannot be planned out. However, the other four behaviors can be incorporated into each lesson plan. For example, by following the lesson plan and staying on course, teachers can be businesslike. Next, clear directions within each lesson plan will increase the clarity of the subject matter being covered, enhance the teacher's communications with students and enable teachers to assess student understanding before transitioning to the next learning activity. Lesson plans including activities that are closely aligned with desired objectives will directly assist the teacher in being more effective. Finally, lesson plans that outline different teaching methods and learning strategies will help keep students engaged and interested.

When developing lesson plans, the desired outcome must be the guiding force. This outcome is determined by what the students will be expected to do after completing each lesson, unit, course and program that will lead to the improvement of production practices on the student's home farm or in gaining employment in the private sector.

In Egyptian ATSs, the principles of active learning outlined above will be applied in several instances. First, agricultural education courses will help students learn about specific technical knowledge and agricultural applications. Second, students will learn how to solve different types of problems. Practical expertise is the type of educational outcome that effective teachers and schools will seek to carry out. In short, lesson plans are being developed to guide the teachers through the learning process, with a central emphasis on active learning methods and techniques, so that students will be able to achieve the desired educational outcomes upon graduation, i.e., applying these newly acquired skills and knowledge on the job when they enter the workforce.

To conclude the concepts, knowledge, information, and skills that each ATS teacher wants to communicate to students is important. While lecturing is an important method of teaching, it is not the best way of engaging students in the lecturing is but one way to promote the learning process and teaching the higher-level cognitive skills that students will need after graduation. Lecturing can stultify even the best students. Some students are in flying classrooms that roam around the campus so note taking is limited. This does not allow students the time to cogitate on the material presented. As indicated above, the more students become engaged, active learners in the classroom, the more likely they will develop the desired cognitive and psychomotor skills they will need after graduation.

Approach, Activities, and Results

The following section, presented at the 2007 AIAEE Conference in Polson, Montana (Swanson, Cano, Samy, Hynes, & Swan, 2007), describes and analyzes the specific steps taken to transform the teaching methods being used by agriculture

teachers in the selected ATSs as a means of pilot-testing this new approach. If this approach proves successful, the Ministry of Education is interested in applying this method to the remaining 77 ATSs throughout Egypt and, possibly, in transforming the overall curriculum, including updating the textbooks and teaching materials for all 33 courses. The Ministry of Education is also interested in using the ATS school farms to expand practical training. The introduction of leadership training into the ATSs is also being considered, including the establishment of rural youth organizations, such as the FFA or 4-H clubs. The overall goal is to upgrade and strengthen these schools so they can contribute directly to improving the skills and knowledge of rural young people who will model the necessary techniques for the advancement of the agricultural sector in Egypt.

Step 1: Training the ATS Teachers in Active Teaching-Learning Methods. The first step was to train the majority of agriculture teachers in the 53 selected schools on how to utilize active teaching-learning methods and new teaching aids in their respective classrooms. To accomplish this, 45 Egyptian university faculty members from different subject matter areas were trained by two, highly-experienced, teacher-educators from MUCIA partner universities. The focus was on active learning strategies and how to use visual aids to enhance learning. The two MUCIA teacher-educators conducted a 28-hour practical (i.e., learning by doing) workshop on active learning strategies for the Egyptian faculty members who would serve as future trainers. During this workshop, 15 active learning strategies were taught and practiced by the Egyptian faculty members. In order not to overwhelm the trainers and the ATS teachers, the MUCIA team suggested that one active learning strategy be practiced each week, so that these teachers would become fully comfortable and skilled in using each approach.

Next, the most effective Egyptian university teachers who emerged during this "train-the-trainer" workshop were selected to begin conducting similar workshops for ATS teachers. Since the ATS teachers do not speak English, these workshops had to be taught in Arabic. At the beginning of the second, 16-hour workshop, the MUCIA teacher-educators took the lead. But, as the Egyptian faculty members translated the active learning concepts and techniques into Arabic for the ATS teachers, they began to play a central role, and primary responsibility for leading the workshop progressively shifted to the Egyptian faculty members. By the end of the workshop they were leading all of the discussions with the ATS teachers. At the end of each workshop day, the MUCIA teacher-educators and Egyptian workshop leaders met to discuss what went well and which areas needed improvement during the next workshop.

Given the progress made during the second workshop, the MUCIA teacher-educators turned over full responsibility to their Egyptian counterparts during the third workshop, which was conducted for 50 ATS teachers. During this third workshop, the MUCIA teacher-educators provided guidance and support only as needed. The Egyptian and MUCIA teams continued to meet each evening to conduct a qualitative assessment of the workshop activities. At the end of the workshop it was clear that the Egyptian trainers had mastered this approach. They were assigned the task of conducting over 20, two-day workshops over the next nine months, training over 1,600 ATS teachers in active learning methods and techniques.

Step 2: Developing Instructional Materials for Use by ATS Teachers. The second step was to develop and provide ATS teachers with instructional aids for use in the classroom. A four-person, MUCIA instructional materials team worked in

Egypt for approximately two weeks to initiate this second step. In planning this program, it became apparent that most ATS teachers lacked any type of AV equipment or teaching aids. Therefore, the MUCIA team focused on developing low cost transparencies that could be reproduced cheaply and easily and then distributed to ATSs throughout Upper Egypt. Transparencies are useful teaching tools as they can utilize figures, photos and other illustrations to demonstrate the concepts or techniques being discussed. Also, transparencies can be especially beneficial to those agriculture teachers whose backgrounds are not based in farming and production agriculture. These low-cost teaching aids can be easily duplicated and distributed to all ATS schools in Egypt.

Prior to traveling to Egypt, the MUCIA team selected a range of instructional materials developed by the instructional materials centers at the University of Illinois, The Ohio State University, and Texas A&M University. The team brought these materials with them to Egypt. These materials covered all of the major subject matter areas within the ATSs, business management, farm management, livestock production, livestock health, horticulture, and row crops. These instructional materials included teacher's guides, cassette disks of manuals and transparencies, videos and DVDs, as well as textbooks and lab manuals. Upon arrival, the MUCIA team was divided up and paired with Egyptian faculty members in each of the major subject matter areas. These newly-formed teams first reviewed all teaching aids, texts, and videos from the United States; they then reviewed syllabi from the different ATS courses. There was extensive sharing of ideas within and across disciplines to determine the best way to incorporate these new teaching aids and materials into the existing curriculum.

Action plans and outlines were developed for each set of instructional materials. Particular emphasis was put on determining which of the available U.S. instructional materials could be integrated into the ATS curriculum. All teams scanned the U.S. transparencies and other teaching aids to facilitate their modification and eventual translation into Arabic. For example, certain videos were transferred to extract potentially useful clips. Web searches were done to locate additional materials from the U.S. extension services, instructional materials centers and the USDA. Particular attention was given to enhancing the existing curriculum through the use of these visual aids. These visual aids were incorporated into PowerPoint slides, including a range of photos, graphs and other scanned illustrations, so that full color, overhead transparencies could be easily printed on transparency acetates and distributed to all of the 53 selected ATSs.

After the MUCIA team's departure, the format of each transparency was finalized and all the transparencies were translated into Arabic so that the electronic transparencies could be easily duplicated onto transparency acetates. As a result of this joint effort involving both the Egyptian and MUCIA faculty members, about 120 illustrated color transparencies were developed for each of the 33 ATS courses. A total of nearly 4,000 new transparencies were created in electronic format. These transparencies have now been printed on transparency acetates in color with multiple copies being supplied to each school, depending on the number of teachers in each school who teach a particular course. In addition, 1,000 overhead projectors and screens have been purchased and installed in each ATS classroom for use with these new transparencies. All of these teaching aids have been integrated into the newly developed lesson plans for each course as carried out during the third major step of this component.

Step 3: Developing Lesson Plans for Each ATS Course. The third step was to prepare lessons for use by ATS teachers that

both enhanced the use of active teaching-learning methods and were fully integrated with the new teaching aids developed under Step 2 above. It should be noted that none of the ATS teachers had ever seen or used a lesson plan before, so this new addition to their portfolio was expected to be somewhat unfamiliar. First, it was mandatory that these lesson plans followed the basic content of each course, as outlined and presented in each textbook. However, the purpose of these lesson plans was to show and encourage ATS teachers about how they could effectively incorporate active teaching-learning methods and techniques into each chapter of a course to enhance the learning process. These lesson plans will enable teachers to shift their focus from "what to teach" (i.e., the content of each course) to "how to teach." Since these teachers had never seen or prepared a lesson plan before, the impact of these lesson plans was considered to be instrumental in transforming the teaching-learning process. To enable each ATS teacher to understand how to fully utilize these lesson plans, teaching aids and their newly acquired active learning methods, a second round of workshops was planned, as described in Step 6 below.

Step 4: Headmaster Study Tour to the Netherlands. To introduce the headmasters of each ATS to how vocational agricultural programs can be more effectively linked to the private sector, all ATS headmasters and selected Ministry of Education ATS administrators were sent to the Netherlands for a one-week study tour. The ATS administrators were introduced to the Dutch vocational agriculture system and afforded them the opportunity to investigate some new and innovative ideas that might be adopted by the Egyptian ATS system. This was in keeping with the philosophy as outlined by Shao and Bruening (2005) that the teachers have been identified as needing pedagogical knowledge and instructional methodology to improve their instruction.

For example, they visited an Innovation and Practical Training Center specializing in on-the-job training for students who are interested in specialized areas of expertise. Another agricultural school they visited offers a range of courses in agribusiness, rural development, animal production and management, horticulture and arable crop production, while another visit included a school farm that was entirely managed and operated by students. Finally, the group visited a company that provides "accredited agribusiness training" for students. This exposure to the Dutch vocational agricultural education system was a very new and eye-opening experience for all of the ATS headmasters. They could see immediately how this evolving Dutch educational system was tied directly to development in the Dutch agricultural economy, especially in producing a range of crops and products for export.

Step 5: Refocusing ATS School Farms and Utilizing Them for Practical Skill Training. As noted earlier, the ATS school farms are primarily utilized to generate operating funds for the school, rather than concentrating on providing practical skill training for students. Since many of the agriculture teachers have limited or no practical work experience in the agricultural sector, it makes it more difficult for them to integrate classroom instruction with practical field training. The crops grown on these school farms are traditional field crops, rather than the more labor intensive, high-value export crops. Since a major goal of the AERI project is to increase agricultural exports to increase farm income and rural employment, there is an increasing gap between the crops grown on these school farms and the direction the agricultural economy is moving in Upper Egypt. As a result, MUCIA sent the manager of a U.S. university school farm to Egypt to develop a work plan that will both change the focus of these school farms toward the production of high-income,

labor-intensive export crops and re-orient these school farms to give more emphasis to hands-on, practical training for students. The primary goal is to provide practical training and experience (that is, opportunities for *active learning*) for all agricultural students. This program is still in the early implementation stage, but the goal is for many of these new innovations to become operational by the beginning of the 2007–2008 school year.

Step 6: Training ATS Teachers in Using Lesson Plans and Instructional Materials. As noted earlier, prior to this project, most ATS teachers or headmasters had no knowledge of or experience in writing or using lesson plans or in using an OHP, transparencies or other teaching aids. To assist these ATS teachers in utilizing the new teaching tools, a second round of teacher workshops was planned and organized. The same procedures outlined in Step 1 above were followed, since both the lesson plans and instructional materials advanced the use of active learning methods in classrooms. The same Egyptian trainers who had implemented the first set of workshops (Step 1) were asked to conduct the second round of ATS teacher workshops. Since the Egyptian trainers had already mastered the use of active-learning methods and had been directly involved in the preparation of the instructional materials (Step 2) and lesson plans (Step 3), this final step in implementing the first phase of the project was straightforward. The MUCIA team leader for Steps 1 and 3 returned to Egypt to conduct a two-day "train-the-trainer" course for the participating Egyptian faculty members. Then, the Egyptian faculty members conducted a 2-day workshop in Arabic for ATS teachers to refine the workshop procedures and to make modifications as needed. Then the Egyptian trainers conducted two-day workshops at each ATS so that all ATS teachers were properly trained in using these tools and methods. A second goal was to build a common philosophy and commitment among all ATS agriculture instructors about the value of active learning methods and practical skill training.

Step 7: Assessing Progress and Refining the Lesson Plans and Instructional Materials. The next step of this current project is to perform an assessment of the value and impact of the different innovations in improving the teaching-learning process at these 53 ATSs. After reaching a consensus as to what was especially useful and where changes are needed, the final step would require modifications of the lesson plans and/or instructional materials as needed, based on the first hand experience of teachers and students in each subject matter area. In effect, these ATS teachers and students had been engaged in a pilot project during the 2006–07 school year field testing these new methods and tools. It was fully anticipated that some modifications were needed to fine-tune lesson plans and instructional materials that were not fully understood by either the teachers and/or the students. At the conclusion of this assessment, the joint MUCIA-Egyptian team will modify the selected lesson plans and transparencies so that both sets of teaching aids can be reproduced for use during the 2007–2008 school year. The Ministry of Education has expressed interest in having the lesson plans and transparency sets (120/course) for each of the 33 courses reproduced and made available to teachers in all of the other 77 ATSs throughout Egypt. Since the Egyptian trainers have mastered the active-learning methods and have been instrumental in developing these teaching aids, they are fully qualified and prepared to implement workshops for all agriculture instructors in Egypt. These additional workshops emphasize active teaching-learning methods, including how to utilize the lesson plans and instructional materials to fully implement this innovative vocational agricultural education strategy.

Educational Importance, Implications, and Applications

Vocational agricultural education has been neglected in most developing countries as governments and donor agencies have concentrated on expanding primary education. In Egypt, the government had invested in vocational agriculture schools but, until the 2006–2007 school year, ATS teachers concentrated on rote learning and teaching to the test at the end of each school year. These schools were poorly equipped to provide practical training for students and most courses and curricula had not been updated for two decades or longer. As a result, the focus of these ATSs was no longer relevant to the changing employment demands of the agricultural sector, in general, or to the current technical and managerial needs of commercial farms and agribusiness firms in Upper Egypt. As a result of this intervention, teachers are now helping to improve the cognitive skills of the students by enabling them to analyze and solve problems. This relatively low-cost approach to transforming the teaching-learning process is directly applicable to the other ATSs in Egypt and to vocational agricultural programs throughout the developing world.

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Farmers' Perceptions of Quality of Groundnut: Vis-à-vis Farmers' Characteristics

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Abstract

Groundnut is an important oil seed crop of India. In spite of its high nutritive value, 80% of the total production is utilized for oil extraction. It has great potential for diversification to food uses. Maintenance of quality is one of the major concerns for diversification. Apart from visual characters, such as pod shape, size, color, cleanliness, etc., aflatoxin contamination in kernels is considered as an important criterion for judging the quality of groundnut. Aflatoxins are the toxic substances produced by strains of fungi belonging to Aspergillus flavus and A. parasiticus. Aflatoxin contamination has led to human and cattle health concerns, significantly influencing groundnut trade worldwide. Aflatoxin contamination in groundnut pods has been reported to be more prevalent in Junagadh district compared to other groundnut growing districts of India. Hence, the study was undertaken to assess the perceptions of farmers on quality of groundnut in Junagadh district of Gujarat State, India. The results indicated that majority of farmers had low perception of quality and there were significant differences between the perceptions of big farmers and small farmers. The characteristics of farmers: knowledge of aflatoxin management practices, innovativeness, and market orientation significantly influenced the perceptions. Based on the results suggestions are made to formulate strategies to increase the knowledge level of farmers on aflatoxin management practices of groundnut through appropriate extension approaches. Mass awareness campaigns to educate farmers and consumers on the ill effects of consumption of aflatoxin contaminated produce, providing incentive price to farmers, building of consumer demands for aflatoxin free and good quality groundnuts are needed.

Keywords: Aflatoxin Contamination, Diversification, Groundnut Quality, Knowledge, Market Orientation, Perception

Introduction

Groundnut (*Arachis hypogaea L*) is a major oil seed crop grown in about 100 countries covering 26.4 million hectares with a total production of 36.1 million tonnes of nuts in shell. The major groundnut producing countries are China, India, Nigeria, U.S.A., Indonesia and Sudan (ICRISAT, 2007). India has largest groundnut area, comprising 35% of global area and 28% of production (Freeman et al., 1999). Among all groundnut growing States of India, Gujarat stands first in terms of area and production. Groundnut is cultivated in an area of 1.91 million hectares with a production of 1.47 million tonnes in Gujarat. It is grown in almost all the agro-climatic zones of the State irrespective of soil, climate and rainfall pattern. In Junagadh district of Gujarat, groundnut is grown in 0.37 million hectares area with a production of 0.39 million tonnes and with an average yield of 1024 kg/ha (Sahu & Patoliya, 2005). It is cultivated by all types of farmers in different types of soils, mostly during rainy season (June-July to September-October).

Groundnut is important in the diets of rural people, because it is rich in protein (21-30%), fat (41-52%), and carbohydrates (11-27%). It has calcium, potassium, phosphorus, magnesium, and vitamin E. Groundnut haulms are nutritious and widely used for feeding livestock (Waliyar, 2006). Groundnut kernels contain more protein than meat and two and half times more than eggs and ten times more than any other vegetable food except for soybean (Gopalan et al., 1971, ¶ 2).

In most of the developed, as well as developing countries, 70-80% of the total groundnut production is used as food in a variety of forms. The situation is just reverse in India, where 80% of the total production is crushed annually for oil extraction, 11% used as seed, 8% as direct food and 1% for export. There is great potential for direct consumption of groundnut due to its high nutritive value. The development of groundnut-based products will be widely accepted and appreciated by a large section of people, especially by the low-income groups. Moreover, with the rapid urbanization, there will be an ever increasing demand for packaged and processed snack food. Groundnuts are highly suitable for cheap snack food both in the natural state and after processing (Basu, 1997). Further, the diversification of groundnut from oil purpose to food uses will fetch more income to farmers, as the prices are higher for groundnut meant for food. Apart, from increasing local demand for groundnut as food, the demand for export is also increasing.

The major impediment to diversify groundnut from oil extraction to food uses is maintenance of quality of the produce. The characteristics features considered for evaluating the quality of groundnut are: pod shape; size, cleanliness, freedom from damage, absence of blind nuts for in-shell and grading for size or count: shape; ease of blanching; skin color and condition; resistance to splitting, moisture content; cleanliness, oil content and flavor of kernels (Tanna, 2002). Apart from the above characteristics, the aflatoxin contamination is considered as one of the important criterion for judging the quality of groundnut for export purpose.

Aflatoxins are the toxic substances produced by strains of fungi belonging to *Aspergillus flavus* and *A. parasiticus*. Since, early 1960's aflatoxin contamination has led to human and cattle health concerns, which influenced groundnut trade worldwide. Groundnut can be contaminated with aflatoxin at various stages before harvest, during harvesting, field drying, curing and in storage (Freeman et al., 1999). The future of groundnut lies in its use as a food crop by itself and in a variety of food products. This widens the health risks of aflatoxin contamination (Waliyar, 2006).

In general, farmers had low awareness (National Research Centre for Groundnut, 2004; Kumar, Thakur, & Desai,

2001; Kaaya & Harris, 2003) and low knowledge (ANGRAU, 1999) on aflatoxin contamination of groundnut. Kumar et al. (2001) revealed that lack of visual indication on the seed was the major factor for farmers' unawareness about aflatoxin contamination of groundnut seeds. Van, Van der, Subrahmanyam, and Boughton (1999) reported that aflatoxin contamination was a serious problem in Nampula province of Mozambique and the contamination occurred in both pre-harvest and post harvest phases. Aflatoxin contamination in groundnut pods was more prevalent in Junagadh district compared to other groundnut growing districts of India (National Research Centre for Groundnut, 2004).

Perception is mental organization and interpretation of sensory information. May (1969) concluded that people base their perceptions on experience and knowledge. Devi and Hall (2005) reported that farmers perceived fully formed, big, bold, spotless pods with high oil content and high shelling percentage as good quality groundnuts. The perceptions of farmers regarding inferior quality groundnut were pods with fungal growth, bitter to taste, rotten or sprouted and bad odor.

Purpose and Objectives

The present study was conducted during 2005-06 rainy season as part of the doctoral degree work. The purpose of the study was to assess the farmers' perceptions of quality of groundnut. The specific objectives of the study were to:

1. Assess the perceptions of farmers regarding quality of groundnut,
2. Compare perceptions of small and big farmers on quality of groundnut, and to
3. Determine relationship between farmers' characteristics and their perceptions on quality of groundnut.

Methodology

The study used a descriptive survey design. The population of the study included all the groundnut farmers of Junagadh district. Multi-stage random sampling was used for the study. In the first stage, out of fourteen talukas of Junagadh, three were selected based on highest area, production and aflatoxin contamination of groundnut. In the second stage, from each selected taluka, three villages were selected by random sampling. Separate village-wise lists of groundnut farmers were prepared with the help of village level worker and gram panchayat staff. In the third stage, twenty groundnut farmers were selected from each village by random sampling, making a sample size of 180 farmers, giving equal representation to big (>3 hectares farm size) and small farmers (up to 3 hectares farm size).

A research instrument was designed to fulfill the objectives of the study, which was divided into the following two sections.

Farmers' Characteristics

The characteristics, which may influence the perception of farmers, were selected based on review of literature, discussions with experts and extension staff. The characteristics considered were knowledge of aflatoxin management practices of groundnut (AMPG), adoption of AMPG, socio-economic status (Trivedi & Pareekh, 1963), age, farming experience (Bora, 1986), extension participation (Siddaramaiah & Jalihal, 1983), market orientation (Samantha, 1977), economic motivation (Moulik & Rao, 1965) and innovativeness (Nandapurkar, 1982). Suitable scales were developed for measuring knowledge and adoption of AMPG. For other characteristics, scales developed by other researchers given in parenthesis above were used with suitable modifications.

Perceptions of Farmers on Quality of Groundnut

To measure the farmers' perceptions on quality of groundnut, a scale was developed based on the guidelines of Likert (1932), Edward (1957) and Patil, Swamy, and Patil (1996). The final scale consisted of 22 statements, grouped into three categories with responses on a five point continuum ranging from *strongly agree* = 5, *agree* = 4, *undecided* = 3, *disagree* = 2, and *strongly disagree* = 1. The content validity of the scale was established by the experts from Junagadh Agricultural University, National Research Centre for Groundnut, and State department of agriculture, Junagadh, Gujarat. The instrument was translated to Gujarati language taking care not to loose any information. The reliability of the scale was determined by calculating Cronbach's alpha coefficient based on pilot survey data. The reliability of the scale was 0.76.

Data were collected by personal interview of the respondents by the researcher. Data collection was carried out during 7.00 a.m. to 11.00 a.m. and 4.00 p.m. to 8.00 p.m. for a period of six months. Descriptive statistics, such as means and percentages were used. Wilcoxon's signed-rank test for big samples (Siegal, 1956) was used for testing the differences between the perceptions of big and small farmers, as the measurement of each perception statement was at ordinal level. Wilcoxon's *W* was converted to *Z* statistic for interpretation. The over all perception score for each farmer was computed by summing up the responses on each statement, which was at interval scale level. Spearman's product moment correlation, Frish's confluence analysis (bunch-map analysis) and step-wise regression were performed. Davis (1971) conventions were used to ascertain the magnitude of relationship of correlation and Cohen (1988) descriptors were used to ascertain the effect size for R^2.

Results

Objective 1. Assess the perceptions of farmers regarding quality of groundnut. The farmers were more sensible to visual quality characters compared to pre and post-harvest aflatoxin contamination (Table 1). They agreed that high shelling percent and uniform seed size indicate good quality groundnuts. They were unaware that grading improves the quality, spotless and bold pods indicate good quality groundnut. Farmers disagreed that presence of pods of other varieties, extraneous matter, discolored seeds, splits, immature, shriveled pods and pods with fungal growth indicate inferior quality groundnuts.

The farmers were unaware of the important ways and means of pre-harvest and post harvest aflatoxin contamination of groundnut. They disagree that the end of the season drought for more than 20 days leads to aflatoxin contamination. However, in practice this is an important reason for aflatoxin contamination. The farmers' ignorance of this fact was due to the lack of visual symptoms of aflatoxin contamination. The similar finding was reported by Kumar et al. (2001). The delayed harvesting was one of the major reasons for post harvest aflatoxin contamination of groundnut. But, the farmers disagree with this aspect because delayed harvesting was a routine practice due to shortage of labour during peak season for small and big farmers equally. Hence, there were no significant differences in their perceptions on this aspect.

Table 1
Comparison of Small and Big Farmers' Perceptions on Quality of Groundnut

Quality items/statements	Overall (n = 180)	Big (n = 90)	Small (n = 90)	z	p
I. Visual characters	2.61	2.94	2.22		0.01
a. Good quality groundnut are:					
Spotless pods	2.42	2.89	1.96	4.22*	
High shelling percentage	3.42	3.62	3.23	1.84	
Big bold pods	2.55	2.73	2.37	1.70	
Uniform seed size	3.40	3.70	3.09	2.57*	
Grading improves the quality of groundnut	2.26	2.67	1.73	4.56*	
b. Inferior quality groundnut are:					
Presence of high percentage of pods with fungal growth	2.80	3.33	2.22	4.88*	
Presence of high percentage of damaged pods	3.04	3.58	2.46	3.80*	
Presence of immature and shriveled pods	2.58	2.95	2.16	3.07*	
Presence of discolored seeds	2.20	2.43	1.90	3.18*	
Presence of high percent of splits in the produce	2.39	2.65	2.06	3.67*	
Presence of high percent of extraneous matter	2.14	2.38	1.80	4.73*	
Presence of high percent of pods of other varieties	2.08	2.41	1.64	4.95*	
II. Pre-harvest aflatoxin contamination (AC)	2.47	2.86	1.92		
The quality of groundnut is affected badly due to AC	2.61	3.01	2.08	4.09*	
AC of groundnut occurs at any time during pre-harvest stage of groundnut	2.85	3.48	2.07	6.02*	
Mechanical injury to pods during inter-cultural operation leads to AC	2.40	2.74	1.91	4.05*	
End of season drought for more than 20 days leads to AC	2.01	2.23	1.62	3.19*	
III. Post harvest AC	2.45	2.57	2.13		
AC occurs at any time during post harvest operations	2.57	2.84	2.14	3.32*	
Delayed harvesting is one of the major reason for AC	2.18	2.31	1.87	2.53	
Mechanical damage to pods during harvest leads to AC	2.54	2.86	2.02	4.12*	
Stacking the harvested plants before proper drying leads to AC	2.56	2.91	2.01	4.40*	
Improper drying of pods before storage leads to AC	2.48	1.79	1.88	4.83*	
Improper storage of groundnut pods leads to AC	2.38	2.74	2.87	4.66*	

Note. Interpretive scales: 4.26-5.00 = *strongly agree*; 3.26-4.25 = *agree*; 2.26-3.25 = *undecided*; 1.26-2.25 = *disagree*; 1.25 or less = *strongly disagree*.

Objective 2. Compare perceptions of small and big farmers on quality of groundnut. The perceptions of big and small farmers revealed significant differences, except in high shelling percent, big bold pods and delayed harvesting is one of the major reasons for aflatoxin contamination (Table 1). The big farmers agreed that good quality groundnuts were mainly uniform seed size and high shelling percent, and poor quality groundnut were presence of damaged and broken pods, presence of pods with fungal growth and presence of immature and shriveled pods. The big farmers agree that the quality of groundnut was deteriorated due to aflatoxin contamination, and contamination can occur at pre-harvest stages of groundnut crop. They disagree that improper drying of pods before storage leads to aflatoxin contamination.

The small farmers agreed that good quality groundnuts means high shelling percent and uniform seed size. They disagree that good quality groundnut were spotless and grading improves quality of groundnut. They opined that even the pods with spots and without grading were sold at the same price, hence they feel that presence of spots and grading does not make any difference to quality. They disagreed that pre and post harvest operations may lead to aflatoxin contamination of groundnut, as they were not aware that contamination occurs in groundnut due to these operations. They also disagreed that presence of discolored seeds, extraneous matter and pods of other varieties deteriorate the quality of groundnuts. They disagreed that mechanical injury to pods and end-of-season drought lead to aflatoxin contamination.

Over all, farmers had low awareness on aflatoxin contamination of groundnut. This was due to lack of awareness on the potential ill effects of consumption of aflatoxin contaminated groundnut, groundnut based products, and groundnut haulm to human and cattle respectively. The markets were not concerned with contaminated produce, as the market neither rejected contaminated produce, nor provided incentives to contamination free produce. There were no restrictions for the sale of contaminated groundnut in the local markets, since there was no resistance from the consumers. Aflatoxin management demands additional resources of farmers in terms of inputs, labor, and time. Even if the farmers were ready for this additional investment, his produce was treated at par with the contaminated produce in the local market. These results were in congruence with the results of Devi and Hall (2005).

Objective 3. Determine the relationship between the farmers' characteristics and their perceptions on quality of groundnut. The correlation between the farmers' characteristics and their perception on quality of groundnut (Y) were calculated (Table 2). Based on Davis conventions, the association between perceptions of farmers with their characteristics, knowledge on AMPG was very strong ($\rho = 0.78$), whereas innovativeness ($\rho = 0.68$), adoption of AMPG ($\rho = 0.59$), extension participation ($\rho = 0.56$), and economic motivation ($\rho = 0.54$) were substantial. The moderate associations were seen with market orientation ($\rho = 0.48$) and socio-economic status ($\rho = 0.42$) whereas, low and negative associations were seen with age ($\rho = -0.26$) and farming experience ($\rho = -0.15$). Further, the correlation between the characteristics indicated a very strong association between knowledge and adoption ($\rho = 0.75$), innovativeness ($\rho = 0.75$), market orientation and socio-economic status ($\rho = 0.75$). Whereas, substantial associations were observed between innovativeness and extension participation ($\rho = 0.67$), market orientation ($\rho = 0.67$), adoption of AMPG ($\rho = 0.66$), economic motivation ($\rho = 0.65$), and socio-economic status ($\rho = 0.61$). The associations were also substantial between

knowledge and extension participation (ρ = 0.62), market orientation (ρ = 0.58) and economic motivation (ρ = 0.56), between adoption and extension participation (ρ = 0.55), market orientation (ρ = 0.53), between extension participation and socio-economic status (ρ = 0.64), between market orientation and extension participation (ρ = 0.60), and between economic motivation and market orientation (ρ = 0.60). The results clearly indicated that knowledge and innovativeness have strong influence on farmers' perceptions.

Table 2

Correlation between Farmers' Perceptions on Quality of Groundnut and Their Characteristics

Farmers characteristics	Y	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
X_1 = Knowledge	0.78								
X_2 = Adoption	0.59	0.75							
X_3 = socio-economic status	0.42	0.43	0.38						
X_4 = Age	-0.26	-0.26	-0.14	-0.10					
X_5 = Farming experience	-0.15	-0.20	-0.09	-0.08	0.53				
X_6 = Extension participation	0.56	0.62	0.55	0.64	-0.30	-0.30			
X_7 = Market orientation	0.48	0.58	0.53	0.75	-0.16	-0.14	0.60		
X_8 = Economic motivation	0.54	0.56	0.45	0.46	-0.23	-0.14	0.49	0.60	
X_9 = Innovativeness	0.68	0.75	0.66	0.61	-0.30	-0.17	0.67	0.67	0.65

Prior to regression analysis, inter-correlations were calculated to check for multicollinearity among the characteristics. The multicollinearity is shown by very strong correlations between characteristics indicated by coefficients of 0.80 or above (David, 1970). None of the characteristics showed multicollinearity based on the above criterion. Hence, it was further tested by the method of Frisch's confluence analysis (Koutsoyiannis, 1977). The dependent variable, perception was regressed on each one of the characteristics separately and obtained all the elementary regressions; the results were examined based on *a priori* and statistical criteria (R^2, standard error and regression coefficients). Accordingly, out of nine characteristics, except farming experience, all others were selected as explanatory variables to estimate the relationship using stepwise regression analysis procedures. The squared multiple correlation (R^2) values were calculated to determine the amount of cumulative variance these characteristics accounted for in the perception. Findings for the regression analysis of perceptions of farmers were presented in Table 3.

Table 3

Stepwise Regression of Farmers' Perceptions on Quality of Groundnut with Their Characteristics

Farmers characteristics	*B*	Beta	F	Sig.
Knowledge	1.57 (0.20)	0.24	58.60	0.000
Market orientation	0.42 (0.30)	0.01	1.93	0.165
Innovativeness	3.31 (0.85)	0.07	14.85	0.000

Note. Figures in the parenthesis are the standard errors of regression coefficients; adjusted $R^2 = 0.59$; Constant = 24.51; Standard error of estimate = 14.04.

Three characteristics were found to explain perceptions of farmers on quality of groundnut. The characteristics explained 60% of the cumulative variance, R^2, in perception. Knowledge on AMPG explained the greatest variance (56%), while innovativeness explained 3%, and market orientation explained 1%. Adjusted R^2 was found to be 59%. Based on Cohen's descriptors the large effect size was observed. Hence, perception of farmers on quality was explained by knowledge of management practices, innovativeness and market orientation of farmers.

Conclusions and Recommendations

The farmers were indifferent to quality aspects of groundnut due to various factors such as low knowledge, low socio-economic status, low extension participation and low economic motivation. The knowledge on AMPG has evolved as an important characteristic of farmers, which significantly influenced the perception. Hence, efforts are to be made to increase the knowledge of farmers on AMPG through various extension approaches such as individual contacts, group contacts, discussions and farmers trainings.

The state department of agriculture had to conduct training programmes for farmers on post harvest management of groundnut, as it is very critical to avoid aflatoxin contamination. Identifying the innovative farmers and involving them in quality groundnut production by reducing aflatoxin contamination is very important as it is significantly influencing the perception.

Stakeholders such as farmers, traders, processors, and consumers had to be educated through mass awareness programmes by the department of agriculture about the ill effects of consumption of aflatoxin contaminated products. In order to prevent the trade in aflatoxin contaminated products specific policies especially legislative measures for the maintenance of minimum quality standards of groundnut produce are to be formulated. Mechanization has to be encouraged by providing soft loans for the purchase of groundnut diggers and threshers as the labour shortage resulted in delayed harvesting, which increased the chances of aflatoxin problem. Incentive price has to be provided for aflatoxin free groundnuts compared to contaminated groundnuts on the part of the government, so that farmers are encouraged to produce contamination free produce. Consumer demand has to be created to aflatoxin free and good quality groundnut through educational programs and effective marketing by the traders and processing groups.

The problem of aflatoxin contamination has to be viewed in a holistic context and necessary partnerships had to be forged between research institutions, State department of agriculture, marketing agencies, NGOs, farmers groups, consumers groups and other stake holders to evolve the strategies to address the aflatoxin problem.

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Comparative Analysis of Use of Videos versus Traditional Extension Agent and Techniques in Dissemination of Rice Cultivation Practices in Ogun State, Nigeria

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Abstract

A comparative analysis of the use of videos versus traditional extension agent techniques (in dissemination of rice cultivation practices in Ogun State, Nigeria) was conducted during the growing season of 2006. A multi-stage sampling procedure, a quasi-experimental pre and post test, and control design was applied. The first group was exposed to training on rice cultivation practices on a one hour video presented in the local language. The second group was taught by an extension agent. Primary data were generated between March and June 2006 through an interview with individual farmers based on a four-page structured questionnaire. The data were analyzed using frequency counts, percentages, t-test and one-way analysis of variance. The results showed that video was preferred to the traditional extension agent. A significant difference existed in the knowledge gained after training between video and agent-taught groups ($t = 1.95$, df_{71} $p < 0.05$). One-way analysis of variance showed that there was a significant difference in the knowledge gained after the three exposures to video training ($F = 5.78$, $p < 0.05$). The author recommends that video be used to disseminate agricultural information as a supplement to agent contact, in order to alleviate the problems of low extension agent-farmers' ratios and to promote beneficiary funding of extension services as farmers buy the videotapes.

Keywords: Video, Extension agent, Training techniques, Information dissemination, Rice cultivation practices, Quasi experimental design, Nigeria

Introduction

"In many parts of the developing world it is noted that many farmers have not been properly reached by agricultural extension services" (Ehien, Oladele & Ogunfiditimi, 2004, p. 276). The usefulness of research results is generally achieved through an efficient mechanism of information transfer to appropriate targets which is usually seen as the function of agricultural extension. Clients of agricultural research organizations are more aware of the importance of information than ever before. In most developing countries, farmers are realizing the impact information has in decreasing the knowledge gap between the farmer and researcher and increasing knowledge about crop and animal performance. Increased yield and production and better economic returns are the main reasons why agricultural practitioners are constantly searching for information. With more and improved technology, access to information has become much easier and faster however there are still constraints limiting access to information in many developing countries.

Olowu (1991) reported that farmers' productivity was affected by technical efficiency (how and what to plan) allocative efficiency (how to manage farm resources optimally) and innovative efficiency (how to obtain and use information). It is glaringly obvious that farmers require information for effective production practices. These informational prerequisites to farmers' productivity have been met through a multidimensional flow of information via diverse channels. Adams (1982) reported that learning is made easier when ideas are expressed in pictures and that 70% of communication to individuals is non-verbal such that visual presentation helps to overcome illiteracy and language barriers. According to Barkman (1991) the percentage of learning proportion was 1, 1.5, 3.5, 11 and 83% through taste, touch, smell, hearing and sight respectively. Similarly, the proportion of remembrance was 19% of what is read, 20% of what is heard, 30% of what is seen, 55% of what is seen and heard and 90% of what is said as a thing is done. The use of technology in support of learning has been studied extensively over the years and interest has moved to the use of multimedia in support of learning (Wilcockson, 1995).

Barkman (1991) noted that the methods of instruction determine the extent of recall at different intervals. After three hours, 70% is recalled when telling is used alone, 72% when showing is used alone and 85% when a blend of telling and showing is used. However, after three days, 10% is recalled when telling is used alone, 20% when showing is used alone, and 65% when a blend of telling and showing is used. Video provides a means of bringing a complementary well organized presentation to the learners. Hiel and Herrington (1997) reported that instructional video cannot only improve short range recall but can also aid in retention.

Extension information services remains the pivot of development of agriculture in Nigeria such that the quality of these services is largely dependent on the quality of instruction provided by extension services, hence the need to pay proper attention to improvement of instructional strategies. To improve communication with farmers, extension agents have incorporated traditional method of teaching approaches such as inquiry, discovery, and expository, deductive and inductive methods. None of these however take cognizance of the individual differences among farmers. The traditional system of instruction in particular is already out model and out of tune with the modern system of instruction although still in use by Agricultural Development Programmes (ADP) in Nigeria. There has been a realization that traditional approaches are not in line with the principles of modern learning theory which stresses the role of active involvement and feedback. They do not account for individual differences in

cognitive style, prior learning and the rate of acquisition (van den Ban & Hawkins, 1996).

Theoretical Framework

Moore (1986) noted that

> self-directed learning is described in some detail in terms of its relevance for adult education. Adults are especially interested in learning that arises from the roles they play as they pass through the stages of human development Such learning is described as being particularly well-supported by distance teaching, and by a proposed learning advisory network. (p. 24)

Ramirez and Stuart (1994) reported that farmers are the ones who must control the learning and be able to access information according to specific needs, times and means as most of adult learning in rural settings falls under the rubric of "non-formal education which can be defined as any organized, systematic educational activity carried on outside the framework of the formal system to provide selected types of learning to particular subgroups in the population" (p. 6). Non-formal education is flexible and open, with content dedicated to concrete issues for application in day-to-day life.

Presently, in Nigeria the Presidential Initiative on Rice (PRI) seeks to improve rice production through information supply. This is based on the fact that rice production in Nigeria is dominated by small holder farmers with 0.5–1.5 hectare per farmer using manual labour for virtually all its operations. Presently, over 52 rice varieties with yield potentials of 2–8 tonnes of paddy per hectare and maturity periods of between 95–140 days had been developed by both National and International Research Institutions, yet, a yield gap exists between farmers' actual and expected yield (Oladele & Sakagami, 2004).

The Agricultural Development Programme (ADP) constitutes the single largest agency charged with the responsibilities of agricultural extension in Nigeria which was tri-partitely funded by The World Bank, Federal and State Governments. Ehien et al. (2004) reported that the activities and job performance of ADP and extension agents respectively have decreased after the final withdrawal of the World Bank loan in 1999. The extension agents-farmer ratio has gone back to the pre-ADP periods. A ratio of 1 to 2000, 1 to 3000 and 1 to 3500 were reported for Oyo, Lagos and Ogun states respectively (Adebowale, Ogunbodede, Adesehinwa, & Salawu, 2001). Similarly, the economic reforms program is attempting to cut public funds for extension services and the concept of beneficiary funding and privatization of extension is considered. With the above scenario, there is need for alternative methods of dissemination because farmers are still dependent on timely and appropriate information in order to increase their production.

Omotayo and Isiaka (2006) reported that video as a medium of disseminating agricultural information for the purpose of training, entertaining, educating, situation analysis and advertising has been practiced in many developing countries in Latin America, Asia and Africa. The video self-training method is an innovative and cost effective method of training many farmers quickly with minimal distortion of facts. This method involves packaging agricultural information in videotapes in a culture-specific, farmer-participatory and farmer-friendly way. Agricultural information could be presented in varying styles such as demonstration, interviews, documentary, discussion, or real-life events. The video cassette is sent to the farmer groups that watch the farm practice on the television or in a video viewing center. In the absence of the extension agent, farmers (who have been trained) operate the video cassette player and television, and generate discussion about the subject matter they had watched. Feedback is received by the extension

organization via audio cassette or by personal contact when the extension agent pays his regular visit. The effectiveness of multimedia aids, including videos, as extension teaching tools, is a settled matter in the literature; video can be use as supplement in Nigerian situation.

Polson (1999) noted that 69% of the producers who borrowed video specifically named one or more practice changes they adopted as a result of watching it. Several weeks after watching the video, 75% of the producers identified additional specific practices they were still considering adopting. Israel and Ingram (1991) reported that the

> use of videotapes and workbooks would be influenced by a number of factors, including access to the educational materials and availability of alternatives. Farmers who own or have access to a video cassette recorder (VCR) would be more likely to participate in a self-study program than those who do not. (p. 2)

Video is an ideal medium for use with individual learners, particularly now that most homes contain video players. With video, extension is easily made. An individual can derive the same benefits from an expository video sequence as could a large group–with the additional advantages of being able to stop and start the sequence at will, and replay parts whenever this is found necessary or useful.

Self-study educational programs are not new to extension, but what is new is using videotapes to deliver extension messages in Nigeria. However, little is known about the potential of video use on farmers' knowledge and the impact of multiple exposures to video on knowledge.

Purpose and Objectives

The purpose of the study was to compare the effect of video and traditional extension agent techniques as means of information dissemination on farmers' knowledge of agricultural innovation in Ogun State, Nigeria. Specific objectives include to:

1. Compare knowledge gained by farmers through video and extension agent training method
2. Determine the impact of multiple exposures to video on farmers' knowledge.

Methods

The study was carried out among rice farmers in Ogun State, Nigeria. The state was selected because it is the leading rice producing state in south western Nigeria (PCU/FMARD, 2001). Ogun State has a total land area of 17, 084.3 km^2 extending between latitudes 6^0 $30^{'}$ and 7^0 $95^{'}$ N and longitudes 2^0 $80^{'}$ and 4^0 $60^{'}$E with annual rainfall ranging from 1000mm to 2000mm. The state has a bimodal rainfall pattern which allows two cropping seasons for most annual arable crops especially when the rainfall extend beyond August. Farming is a major occupation of the majority in the state with sole cropping of rice as a common practice among the farmers. Sole cropped rice is usually followed by other crops after harvest.

The study population includes all rice farmers in Ogun state. Farmers were selected using a multi-stage sampling procedure. The state is divided into four agricultural zones by the Agricultural Development Programme (ADP): Abeokuta, Ikenne Ilaro and Ijebu zones. Abeokuta and Ikenne zones were purposively selected due to their prominence in rice production in the state. The two zones have 10 blocks out of which seven blocks are prominent in rice production. There are 19 cells from the seven blocks. A list of rice growers was obtained from the growers' association which is inclusive of all farmers due to service providers' arrangement of farmers grouping and two groups of 36 rice growers were drawn independently from the same population. The sampled growers were

exposed to a quasi-experimental pre and post test and control design. Cohen, Manion, and Morrison (2003) noted that quasi-experimental designs are compromise designs where a near true experimental design in which total/maximum control over the variables of study is not possible. Quasi-experimental designs have been in use to determine the effectiveness of extension teaching methods, learning and retention. Cohen et al. (2003) stated that

> The most common quasi-experimental design is the comparison group pre-test/post-test design. This design is the same as the classic controlled experimental design except that the subjects cannot be randomly assigned to either the experimental or the control group, or the researcher cannot control which group will get the treatment. In other words, participants do not all have the same chance of being in the control or the experimental groups, or of receiving or not receiving the treatment. (p. 276)

A quasi-experimental design was selected for this study. Cook and Campbell (1979) stated that

> The task confronting persons who try to interpret the results from quasi-experiments is basically one of separating the effects of the treatment from those due to the initial non-comparability between the average units in each treatment group; only the effects of treatment are of research interest. (p. 6)

Dougal and Gonterman (1999) compared the effect of three teaching methods on learning, and retention using quantitative, quasi-experimental design examined relationships and/or differences between variables or groups. Cognitive learning and learning retention outcomes were measured by pre-, post- and one-week post-tests which were later subjected to statistically significant difference tests

The first group was exposed to training on rice cultivation practices on video which lasted for one hour on issues of land preparation, weeding, farm hygiene, weed control, type of herbicides, herbicide handling and application rates presented in local language, while the second group was taught by an extension agent on the same subject. Two groups sampled from the same population was subjected to different treatment using the video and agent teaching methods but the same training subject. Primary data were generated for the study between March and June 2006, through an interview schedule conducted by the author on individual farmers, based on a four-page structured questionnaire covering knowledge gained, adequacy of training method and selected socio-economic characteristics. The questionnaire was subjected to face validity among experts in the Department of Agricultural Extension and Rural Development, and Educational Technologists. The instrument gave a reliability coefficient of 0.90 using the test–retest method with an interval of 21 days.

Knowledge was measured at interval level through a knowledge test covering every aspect of the training on rice cultivation as contained in the video and extension agent curriculum. Twenty-five questions covering different aspects of rice cultivation as presented in the training. Right responses were scored 1 and wrong responses 0. The socio-economic characteristics include sex and marital status, measured at nominal level while age, educational level, labour sources, farming experience, total rice farm size, income, and household size were measured at interval level. The adequacy of training methods was measured at ordinal level on a three point scale. Frequency counts and percentages were used to describe the data while a *t*-test was used to ascertain the differences in knowledge between video-taught and agent-taught farmers and one–way analysis of

variance was used to determine differences in knowledge after several exposures to the video message.

Findings/Results

Table 1 presents the socio-economic characteristics of video-taught and agent taught rice farmers in Ogun state. The majority of the farmers in the two groups are male. It implies that rice production is dominated by male farmers in the state. The age distribution shows that a greater proportion of the farmers in the two groups are between 40 and 50 years and this is also in relationship with the marital status of the farmers whereby the majority are found to be married. Educationally, the majority of farmers in the groups did not pass through any formal training or school. This may be an indicator of why many of them find it difficult to understand message from agents easily. The use of hired labor predominates among the video-taught farmers while family labor is commonly used among the agent-taught farmers.

In both cases, however, their labor sources were supplemented with exchange labor. The majority of farmers from the two categories have farming experience between 10 and 30 years. This will enhance sufficient familiarity with rice cultivation practices they have been earlier exposed and also serve as a premise to compare the different information dissemination methods. Farm sizes that are not up to 10 acres are the most common among the two groups of farmers. This may be due to the subsistence nature of production among farmers. Similarly, the majority of farmers in the two groups have income less than ₦ 50,000 ($1 = ₦130). Video player ownership is very prominent among the two categories of farmers; this may be due to the prevalence of the use of home video as a reflection of the increase of rural electrification project in the study area and expansion of the film industry that present different theatre performance on videotapes at low prices.

Table 1

Selected Socio-economic Characteristics of Farmers in Ogun State, Nigeria (2006)

Socio-economic characteristics	Video taught (*n* = 36)	Agent taught (*n* = 36)
Sex		
Female	8 (22.2)	12(33.3)
Male	28(77.8)	24(66.7)
Age		
Less than 40 years	13(36.1)	12(33.3)
40-50 years	16(44.5)	13(36.1)
Above 50 years	7(19.4)	11(30.6)
Education level		
Non-formal	20(55.6)	23(63.9)
Secondary	11(30.6)	10(27.8)
Tertiary	5(13.8)	3(8.3)
Labour Sources		
Family	12(33.3)	18(50.0)
Hired	14(38.9)	10(27.8)
Exchange	10(27.8)	8(6.2)
Farming Experience		
Less than 10 years	5(13.9)	17(47.2)
10-30 years	20(55.6)	17(47.2)
More than 30 years	11(30.5)	2(5.6)
Rice Farm Size		
Less than 10acres	31 (86.1)	23(63.9)
Above 10 acres	5(13.9)	13(36.1)
Income		
Less than N50,000	25(69.4)	25(69.4)
Above N50,000	11(30.6)	11(30.6)
Video player ownership		
Yes	27(75.0)	23(63.9)
No	9(25.0)	13(36.1)
Note. Figures in parentheses are percentages.		

In Table 2, out of all the indicators used to rate the adequacy of the two methods of message dissemination, only time for training, content of training materials and relevance of training materials are accepted to be adequate by the extension agent-taught group. Some other indicators such as clarity of message from training, adequacy of training, duration of training, ease of retrieval of information from training and method of training delivery are rated to be inadequate. Conversely, the video-taught group rated the entire indicators as adequate except feedback provision on training. The results in Table 2 show that the use of video to disseminate new technologies to farmers will be more effective and preferred by farmers to the use of extension agent.

Table 2

Farmers' Rating of the Adequacy of Training Methods in Ogun State, Nigeria (2006)

	Video (*n* = 36) Adequate	Extension Agent (*n* = 36) Adequate
Duration of training	24(66.7)	13(36.1)
Access to training materials	33(91.7)	3(8.3)
Method of training delivery	35(97.2)	16(44.4)
Availability of time for training	24(66.7)	19(52.8)
Retrieval of training information	34(94.9)	4(11.1)
Listenership effect	34(94.4)	22(61.1)
Content of training materials	35(97.2)	13(36.1)
Relevance of training materials	27(75.0)	19(52.8)
Participatory funding in training	27((75.0)	23(63.9)
Adequacy of training	27(75.0)	12(33.3)
Feedback provision on training	1(2.8)	14(38.9)
Timeliness of training	27(75.0)	14(38.9)
Clarity of training message	34(94.4)	19(52.8)
Flexibility of training	29(80.6)	5(13.9)
Group influence on training	35(97.2)	23(63.9)

Note. Figures in parentheses are percentages.

Table 3 shows that greater percentage of the farmers in the video taught group got all the constructed items right while few farmers got the items right in the agent taught group. This is a general trend in land preparation, weed prevention and control and the use of herbicides sections. This might be due to the features of video as a medium of information dissemination that is being explored. On the item (recommended spacing for weed precaution) where only one farmer got it wrong under the video-taught group, a greater percentage (52.8) of farmers in the agent -taught group got it wrong. This can be adduced to the training at learner's pace, adequacy of training and clarity of message from training as characteristics of a message in a video type medium.

From the result, it could be observed that message transferred on the use of herbicide in rice farm was understood better by farmers in the video-taught group than the farmers in the agent-taught group. This could be seen glaringly from the table where greater percentage of the farmers in the video-taught group got all the constructed items for the herbicide knowledge test right. The questions on the types of rice farm herbicide, sources of herbicides, time to apply herbicide, mixing ratio were obtained right by the farmers in this group showing that the message was adequately sent across to the farmers.

Table 3

Farmers' Knowledge of rice cultivation practices after training in Ogun State, Nigeria (2006)

Cultivation practices	Video taught (*n* = 36) Right responses	Agent taught (*n* = 36) Right responses
Land Preparation		
Use of tractor	33(91.6)	19(52.)
Manual clearing	21(58.3)	17(47.2)
Bush burning during land preparation	35(97.2)	13(36.1)
Weed prevention and control		
Flooding method for weed prevention	31(86.2)	9(25.0)
Recommended spacing for prevention	35(97.2)	17(47.2)
Rice varieties for prevention	35(97.2)	18(50.0)
Weed categories	23(63.9)	26(72.2)
Weeding methods	29(80.6)	9(25.0)
Control of weed to start from land preparation.	17(47.2)	17(47.2)
Number of weeding period	22(61.1)	12(33.3)
Time of first weeding	21(58.3)	11(30.6)
Time of second weeding	21(58.3)	16(44.4)
Weeding benefits	28(77.8)	11(30.6)
Use of herbicides		
Types of rice farm herbicide	23(63.9)	6(16.7)
Sources of herbicides	35(97.2)	16(44.4)
Time to apply pre-emergence	35(97.2)	16(44.4)
Time to apply post-emergence	34(94.4)	17(47.2)
Usage of herbicide	35(97.2)	16(44.4)
Combination of herbicides	34(94.5)	17(47.2)
Use of ozadiazone singly	23(63.9)	11(30.6)
Use of Butacol alone	35(97.2)	17(47.2)
What type of herbicide is Rota 25DC	23(63.9)	16(44.4)
Importance of sprayer nozzle	21(58.3)	17(47.2)
Time to spray	35(97.2)	16(44.4)
Herbicide mixing ratio	22(61.1)	15(41.7)

Note. Figures in parentheses are percentages

Table 4 presents the results of t-test statistics on selected socio-economic characteristics of video and agent-taught farmers groups in Ogun state (2006). There is no significant difference for all the variables subjected to the test. It implies that the two groups of farmers are not significantly different in terms of their socioeconomic characteristics before they are subjected to treatment–training on rice cultivation technologies.

Table 4

Analysis of differences in selected socio-economic characteristics of video and agent-taught farmers groups in Ogun State, Nigeria (2006)

Variables	*M*	*N*	*SD*	SEM	MD	*t*	*df*	*p*
Age								
Video-taught	42.0	36	2.43	1.06	-1.00	1.10	35	0.15
Agent-taught	43.0	36	2.90	1.24				
Educational level								
Video-taught	25.10	36	3.11	1.29	-2.20	1.50	35	0.12
Agent-taught	27.30	36	2.07	0.88				
Farming experience								
Video-taught	27.50	36	0.18	1.18	2.10	1.26	35	0.30
Agent-taught	25.40	36	0.14	0.88				
Farm size								
Video-taught	9.80	36	4.51	0.94	0.40	0.12	35	0.90
Agent-taught	10.20	36	4.59	0.94				
Income								
Video-taught	42000	36	5.10	0.97	3.00	0.18	35	0.21
Agent-taught	45000	36	3.69	0.88				

Table 5 presents the results of t-test statistics on the pre and post test of knowledge among video and agent-taught farmers. There was no significant difference in the knowledge of farmers in the video and agent-taught groups before the training (t = 1.82, df_{71} p >0.05). However, a significant difference existed in farmers' knowledge after training by extension agent (t = 41.38, df_{35} p < 0.05). The knowledge mean score after training (43.22) by extension agent was higher than before training (38.91). Similarly, farmers' knowledge after training with video (54.63) was greater than knowledge before training (41.58) leading to a significant difference in the knowledge before and after training with video (t = 20.44, df_{35} p < 0.05). This is an indication that video tape if used adequately can be used to disseminate information on farming technologies to farmers. The comparison between farmers' knowledge after training with video and extension agent shows that knowledge gained by video-taught group (54.63) is higher than the knowledge gained by the agent-taught group (43.22), thus a significant difference exist (t = 1.95, df_{71} p < 0.05). The results imply that farmers are receptive to the use of video as a mean of disseminating agricultural information. The mode of presentation, ease of retrieval of information from training, training at learners' pace, and flexibility of training might as well be responsible for the results.

Table 5
Pre- and Post-test of Knowledge among Video- and Agent-taught Farmers on Rice Technologies in Ogun State, Nigeria 2006

	Agent –taught group		Video-taught group		Pre-treatment video versus agent		Post-treatment video versus agent	
	KBT	KAT	KBT	KAT*	KBT_V	KBT_A	KAT_V	KAT_A
M	38.91	43.22	41.58	54.63	41.58	38.91	54.63	43.22
N	36	36	36	36	36	36	36	36
SD	31.67	31.95	32.35	30.92	32.35	31.67	26.08	32.35
SEM	5.27	5.32	5.39	5.15	5.39	5.27	4.34	5.39
MD	4.30		13.05		13.55		0.12	
t	41.38		20.44		1.95		1.82	
df	35		35		71		71	
p	0.00		0.00		0.054		0.32	
Remarks	Significant		Significant		Significant		Not significant	
Note. *KBT –knowledge before training, KAT –knowledge after training, KBT_V– knowledge before training by video, KBT_A–knowledge before training by agent.								

Table 6 presents the results of one-way analysis of variance on farmers' knowledge after three exposures to video training. The results show that there is a significant difference in the knowledge gained after the three exposures to video training ($F = 5.78$, $p < 0.05$). The Duncan Multiple range test further differentiates the groups based on the number of exposures. Knowledge gained after first and third exposures are not significantly different while after second exposure, there is a significant difference. This might be due to the fact that farmers assumed familiarity with the items of the training after second exposure only to discover that they had a wrong response on the items.

The fact that the highest mean score was recorded after third exposure emphasizes the importance of the ease of retrieval of video messages as farmers can always play back to reinforce their knowledge which is particularly important due to the low literacy level among farmers in the study area. This might not be possible with the extension agent as different messages are scheduled for different meetings. Also, there is a greater flexibility to the learning time and pace with video than with extension agent. Farmers can choose to watch the video any time of the day and as well reduce the speed to the actual pace desired.

Table 6
One– way Analysis of Variance on Farmers' Knowledge after Three Exposures to Video Training in Ogun State, Nigeria (2006)

	Sum of square	*df*	Mean square	*F*	*p*	Duncan Multiple Range Test	
Between groups	7226.07	2	3613.03	5.78	0.004	Groups	Means
Within groups	65625.36	105	625.00			First exposure	55.13[a]
Total	72851.43	107				Second exposure	41.58[b]
						Third exposure	61.13[a]

Conclusion, Recommendations and Implications

The paper has clearly shown that video can be used for dissemination of agricultural information in the face of dwindling funds for extension services in Nigeria, low extension agent-farmers ratios and the other advantages it has over the traditional face-to-face medium. The results should remind extension personnel of the importance of repeated contacts and follow up with the same information to help secure adoption that the farmers were able to get through repeated viewing or reviewing of the video. It also shows that farmers rated video higher in terms of adequacy for training than extension agent and thus their preference for video as means of dissemination. Knowledge gained on the same subject of training was higher among the video-taught group than the agent – taught group. It further revealed that farmers had a thorough mastery of the subject after the third exposure to the training on video. The implications of the findings are that

1. Video can be used to alleviate the problems of low extension agent - farmers' ratio,
2. Video can be used to promote beneficiary funding of extension services as farmers buy the videotapes,
3. Video can be used to disseminate agricultural information,
4. The use of video will allow farmers to learn at their pace,
5. The ease of training information retrieval will be enhanced through video after several exposures, and
6. Information dissemination through video can be supplemented by extension agent visits for feedback purposes.

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General Perceived Self-Efficacy of Iranian College of Agriculture Students

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Abstract

This exploratory descriptive study examined the utility of the social cognitive theory in assessing generalized perceived self-efficacy of agricultural students at Razi University. Two hundred college students majoring in agricultural extension, plant science, animal science, water engineering, and crop science participated in the descriptive survey. Agricultural students were efficacious in handling challenging tasks in diverse situations. Male students were more efficacious than the female students. There were no significant differences in general self-efficacy scores across student classifications and majors. Implications of gender differences are discussed.

Keywords: Domain-specific Self-efficacy, Global Competency, Social-cognitive Career Theory, Social Cognitive Theory, Problem-Solving

Introduction

Agricultural colleges in Iran develop human capital by preparing students for challenging careers in the food, production, and natural resources industries. Technical knowledge and professional skills are critical to adequately prepare agricultural college students to be effective employees for the workforce in a knowledge economy (Rad, Nasrabadi, & Bruening, 2005). However, the vast amount of information, knowledge, and skills needed by Iranian agricultural students to be effective in career and life planning decisions can be overwhelming. Although students need to know a wide range of information to succeed in their career goals, they must also feel capable enough to manage and cope with everyday tasks.

College students need a high sense of self-efficacy if they are going to be successful in preparing themselves for challenging professional careers in the food, agriculture, and natural resources industries. Self-efficacy is an "I can do it" belief that reflects one's accurate self-assessment in his or her ability to effectively adapt and perform necessary tasks in the face of challenging environments (Bandura, 1997). Self-efficacy is an important motivation for people to be successful in their careers. General perceived self-efficacy is related to academic achievement, career choice, career development, job performance and coping abilities when confronting obstacles (Multon, Brown, & Lent, 1991). People with higher general self-efficacy are more committed to their job and consequently have a lower intention to turnover (Luthans, Zhu, & Avolio, 2006). Moreover, an attractive aspect of general perceived self-efficacy theory for practitioners such as college instructors is the notion that it is malleable and can be enhanced through teaching and learning experiences.

In the last 25 years, Iran has experienced population growth (now over 60 million), and significant changes in its economy and society. One of these changes has been burgeoning growth in higher education, especially in the number of women pursuing college education. There are over 100 higher education institutions comprising of 30 universities, 14 colleges, 5 private colleges, and 36 higher education centers for in-service training of government employees (The Higher Education Advisory of the Islamic Republic of Iran, 2003). In 1979, a total of 175,675 students were engaged in higher education. Enrollment in higher education increased to more than 344,045 in 1991-1992. Of this, 96,969 students (28%) were women. More specifically, the number of women graduates in agricultural related fields has risen dramatically since 1996 (Bakhshi-Jahromi, 2006). According to Esfandiari (2005), 60% of qualified freshmen entering university were women.

The growth in Iran's higher education is also reflected in its expanding comprehensive curricula. At present, universities throughout Iran are offering courses in arts and literature, humanities, basic and natural sciences, agriculture, engineering, and health and medical sciences. Contrary to the growth in enrollment for higher education, unemployment of university graduates has been increasing in Iran (Sharifzadeh, & Zamani, 2005). The country is suffering from national unemployment at a rate of 13.2% (The Human Development Report of the Islamic Republic of Iran, 1999), and 28% of agriculture and natural resources college graduates (Jalali, 2003, as cited in Sharifzadeh, & Zamani, 2005) to 41% of vocational and technical higher education institute graduates in the North Western Provinces in Iran were unemployed (Rad, Nasrabadi, & Bruening, 2005). Despite the high unemployment in the agricultural sector due to limited job opportunities, career preparation for the agricultural sector is one of the most important responsibilities of vocational and technical higher education in Iran (Rad, Nasrabadi, & Bruening, 2005).

This study was conducted because of four needs. First, the Higher Council for Cultural Revolution (HCCR) has developed certain indicators for higher education to be followed by colleges and universities. General self-efficacy beliefs are among those indicators that are recommended to be enhanced among college students. Knowing how self-efficacious students in college of agriculture are could provide faculty and academic advisors with the necessary information to assist students in career planning and decision making. Knowledge of general perceived self-efficacy among students helps instructors to understand how students think about themselves in both positive and negative ways, how motivated they are to overcome challenges, and the degree of anxiety and mental stress they may experience when faced with adversities. Second, there is a need to know the general self-efficacy beliefs of agricultural students in Iran because agriculture is a considered a key component of economic development and self-efficacy motivation is critical to helping college students pursue careers in the food, agriculture, and natural resources industries. Third, educational researchers have studied self-efficacy in the context of science, technical, engineering, and math (STEM). Self-efficacy research in the STEM fields is of particular interest because it aligns closely with the applied nature of science, technology, engineering, and math in the agricultural disciplines. Educational experiences in life science, engineering, and technology context can potentially expand career options for students in an increasingly competitive knowledge-based society (Betz & Hackett, 1983). Finally, self-efficacy can vary across cultures because of culturally-informed self-assessments of one's abilities (Scholz, Dona, Sud, & Schwarzer, 2002). Therefore, the purpose of the present study was to examine general self-efficacy belief among students in the college of agriculture at Razi University in the western province of Iran.

Theoretical Framework

Self-efficacy originated from Bandura's (1986) theory of social cognition. Self-efficacy is a belief "in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). People make judgments of their own capabilities and act on their beliefs based on personal and environmental factors (Bandura). Self-efficacy is "both a personal and a social construct because individuals operate individually and collectively" (Knobloch, 2002, p. 33). Representing the personal dimension, knowledge and skills influence how students reflect on their own capacities to perform specific tasks in challenging situations. A variety of environmental factors, such as family, education, social and economic conditions, can influence self-efficacy (Bandura, 1986). Self-efficacy is important because it influences students' decision-making, problem-solving, motivation, commitment, resiliency, cognition, emotions, behaviors, and outcomes ultimately achieved (Bandura). Self-efficacy is a good predictor of academic and career motivation and performances (Schunk & Pajares, 2004; Stajkovic & Luthans, 1998).

Lent, Brown, and Hackett (1994) have extended self-efficacy into career development known as the social-cognitive career theory (SCCT). Rooted in Bandura's (1986, 1997) social cognitive theory, and SCCT helps inform one's interests, choices, and performances regarding education and careers. According to the social-cognitive career theory, people with high self-efficacy are more likely to be engaged in academic and career choice goals and actions. Social factors such as gender, culture, and race influence career self-efficacy, which is believed to influence career interests, goals, and behavior (Lent, Brown, & Hackett, 2002).

Most of the research on self-efficacy has been primarily context-specific. As such, people inform their sense of self-

efficacy based on the specific environment where they would perform expected tasks (Multon, et al., 1991; Pajares, 1996) or work-related tasks (Luthans et al., 2006; Stajkovic & Luthans, 1998). For example, students may have high self-efficacy in a mathematics course, but have low self-efficacy in solving complex problems at a large mathematics competition. Most research studies are informed with the prevailing theoretical view that an "efficacy belief is not a decontextualized trait" (Bandura, 1997, p. 42). Yet there is increasing empirical support that context-specific self-efficacy is positively related to a generalized self-efficacy (Judge et al., 2003; Schunk & Pajares, 2004; Smith, 1989) and general self-efficacy is a trait-like construct of a set of expectations people use to determine how successful they believe they can be or perform in a wide range of new and challenging situations (Luthans et al., 2006).

General self-efficacy is "one's estimate of one's fundamental ability to cope, perform, and be successful" (Judge & Bono, 2001, p. 80). A person with high general self-efficacy would have a global and stable sense of confidence in his or her ability to handle and effectively manage the necessary tasks in a wide range of demanding and stressful situations (Luthans, Zhu, & Avolio, 2006). General self-efficacy has three components: initiative, effort and persistence. Luthans et al. (2006) explains that "these components help determine how much effort people will expend on an activity, how long they will persevere when confronting obstacles, and how resilient they will be in the face of adverse situations" (p. 122).

The researchers were particularly interested in looking at gender differences because agricultural careers have been traditionally male-dominated, and women have an important role in Iranian agriculture (Khezerloo & Breazeale, 2005). Further, a number of researchers have documented gender differences in domain specific self-efficacy in the areas of science, technology, engineering, mathematics, and agriculture. Boys and men have higher self-effficacy than girls and women in academic achievement in science, technology, and math (Pajares & Miller, 1994), yet Lent et al. (2005) found male and female engineering students had similar levels of academic self-efficacy. Moreover, Johnson and Wardlow (2004) found no significant differences in computer self-efficacy between male and female students in a college of agriculture. In contrast, Whitley (1997) found American and Canadian men and boys had higher computer self-efficacy than women and girls in his meta-analysis of studies on gender differences.

Research in the context of agricultural education showed that self-efficacy is related to career choice and career commitment. Student teachers who planned to pursue a teaching career in public education were more efficacious than their peers who did plan to become an agriculture teacher (Harms & Knobloch, 2005). Moreover, novice teachers with higher career commitment were more efficacious after the first 10 weeks of the school year compared to their peers with lower career commitment (Knobloch & Whittington, 2003). Although some of this research has resulted in predicting students' career interests, goals, persistence, and performance (Lent et al., 2005), there remains a need to study generalized perceived self-efficacy in general, and agricultural science majors in particular because of the shortage of human capital in the agricultural disciplines.

To date, more domain-specific self-efficacy has been the center of attention among researchers with limited attention to general self-efficacy. As for general perceived self-efficacy, the authors found limited studies that looked at a general self-efficacy of students. Lindner et al., (2003) in a cross-national study on academic abilities of agricultural and extension education graduate students in Iran found that students

ranked their abilities in following order: (1) perceptual and spatial, (2) idea generation and reasoning, (3) attentiveness and quantitative, and (4) communication. Schwarzer and Born (1997) examined mean differences in the general perceived self-efficacy scores among college students of 13 cultures, and found a significant main effect for culture and gender. This study revealed that culture and gender influenced how students perceived their abilities to succeed in general contexts. Male and female Japanese students had the lowest general self-efficacy, followed by Hong Kong, Chinese and South Korean students. Costa Rican, Peruvian, and Russian students had the highest general self-efficacy. Culture-specific personality dispositions and cultural norms and expectations may explain the differences in self-efficacy among the students in these countries. According to Eden and Zuk (1995) and Judge and Bono (2001), general perceived self-efficacy is predictive of work-related performance. Moreover, general perceived self-efficacy is also expected to be related to job satisfaction and turnover (Judge & Bono, 2001) because researchers have reported a significant positive relationship between job satisfaction and performance (Harter, Schmidt, & Hayes, 2002; Judge, et al., 2001). Thus, it is expected that agricultural students with a high sense of self-efficacy will overcome challenges, be more resilient, and persevere when faced with failure.

Employability is a major obstacle among college of agriculture and natural resources graduates in Iran (Sharifzadeh, & Zamani, 2005). Employers expect college graduates to be proficient in communication, management, and computer skills (Vreyens & Shaker, 2005), and education is the key to developing human resources for the workforce. Researchers have also generated strong support for the influence of general self-efficacy on the career decision-making process of individuals. Given the positive relationship between work performance, career decision-making, and persistence, a need clearly exists to explore the general perceived self-efficacy among students in colleges of agriculture. Such research would add to the knowledge base in student advising, as well as provide important information for local decision-making.

Purpose and Objectives

The purpose of the study was to describe the level of general self-efficacy among a sample of Iranian students in the college of agriculture entering Razi University in Fall, 2005 semester. The objectives of the study were to: (a) describe the overall general self-efficacy beliefs among students in a college of agriculture, and (b) describe differences in general self-efficacy beliefs among traditional and non-traditional, male and female students enrolled in different majors.

Methods and Procedures

The study was a descriptive survey design. This type of research was grounded in the need to describe and interpret the current status of college of agriculture students' general self-efficacy at Razi University. A survey design was selected because descriptive data can be utilized to produce information about various aspects of education (Gall et al., 2003) which, in turn, leads to empirically-based decision-making to improve education. The population for this study consisted of 750 traditional and non-traditional undergraduate students enrolled in the College of Agriculture. Traditional students were those exempt from tuition, and non-traditional students are those who pay tuition. Independent random samples were generated following the formula set up by Krejcie and Morgan (1970) with a 5% margin of error. A total stratified random sample of 200 students was drawn based on majors in the College of Agriculture. There were 61 students in the Agricultural Extension and Education major, 37 in the Plant Science major, 39 in the Animal Husbandry major, 29 in the Water

Engineering major, and 34 in the Crop Science major. There were more students in the Agricultural Extension and Education major because this department has a longer history in the College of Agriculture.

Generalized perceived self-efficacy was assessed with an existing instrument (Schwarzer & Jerusalem, 1995) with established validity and reliability (internal consistency coefficients have ranged from 0.75 to 0.91; retest-reliability coefficient has been 0.55; Schwarzer & Jerusalem, 1999). The questionnaire was pilot-tested with 40 undergraduate students in the College of Humanities at Razi University who were not in the sample. Cronbach's alpha of reliability coefficient from the pilot test was 0.86. For the purpose of this study, a 10-item version of the questionnaire (see Table 1) was back translated. Students were asked to complete the questionnaire during their short break from classes. The 4-point scale for the questionnaire was: 1 = *not at all true*, 2 = *hardly true*, 3 = *moderately true*, 4 = *exactly true*. The ten-item sum score had a theoretical range from 10 to 40, due to the 4-point summated rating scaled items. Individuals scoring closer to 40 were considered self-efficacious. A confirmatory factor analysis was used to confirm the single factor model (Tabachnick & Fidell, 2007). The data were analyzed using principal components analysis and were rotated orthogonally. The single factor of ten items explained 40% of the variance in general self-efficacy. The limited size of sample may account for the variance explained.

Categorical data were reported as frequencies. Metric data were reported as means and standard deviations. Differences in general self-efficacy based on three independent variables (i.e., sex, classification, major) were determined using *t*-tests and Analysis of Variance (ANOVA). The alpha level was established *a priori* at 0.05. Cohen's (1988) *d* coefficient and indices were computed and reported for effect sizes. The effect size decision criterion was established *a priori* ($d = .50$; $R^2 = .09$) for medium effect sizes.

Results

A majority of the college agricultural students at Razi University were male (57%), and were classified as traditional (69%). Moreover, five undergraduate curricula were represented in the sample: Agricultural Extension and Education with 61 respondents (30.5%), Plant Science with 37 respondents (18.5%), Animal Husbandry with 39 respondents (19.5%), Water Engineering with 29 respondents (14.5%), and Crop Science with 34 respondents (17%). All agriculture majors were represented and the percentages closely approximated the distribution of majors for all students entering the College of Agriculture.

For the first objective, the researchers sought to determine the overall general self-efficacy among students in the College of Agriculture. Results indicated that students were efficacious in handling challenging tasks in diverse situations. The overall mean score on the 10-item general self-efficacy scale ranged from 14 to 40 with a grand mean of 29.82 ($SD = 5.09$). Schwarzer and Born (1997) found a mean score of 29.65, 29.87, and 20.17 among German, Canadian, and Japanese students, respectively. Students felt more efficacious in items "I can solve most problems if I invest the necessary efforts," "I can always manage to solve difficult problems if try hard enough," and "If someone opposes me, I can find the means and ways to get what I want" (Table 1). However, students felt least efficacious in items "Thanks to my resourcefulness, I know how to handle unforeseen situations," "I can usually handle whatever comes my way," and "I am confident that I could deal efficiently with unexpected events."

Table 1

Frequency (%) of Students Who Responded to 10 Self-Efficacy Items (n = 200)

General Self-Efficacy Items	Not at all true	Hardly true	Moderately true	Exactly true
I can solve most problems if invest the necessary efforts.	2	11	42	45
I can always manage to solve difficult problems if try hard enough.	3	18	51	29
If someone opposes me, I can find the means and ways to get what I want.	6	21	47	26
If I am in trouble, I can usually think of a solution.	8	26	47	19
It is easy for me to stick to my aims and accomplish my goals.	5	26	48	21
I can remain calm when facing difficulties because I can rely on my coping abilities.	2	14	35	49
When I am confronted with a problem, I can usually find several solutions.	6	28	33	32
Thanks to my resourcefulness, I know how to handle unforeseen situations.	5	25	48	22
I can usually handle whatever comes in my way.	2	21	48	28
I am confident that I could deal efficiently with unexpected events.	7	28	47	18

Note. Totals may exceed 100% due to rounding.

The second objective was to determine general self-efficacy belief among students across gender, traditional/non-traditional status, and major. The general self-efficacy mean score for males ranged from 15 to 40 with overall mean of 30.72 (*SD* = 4.75; *n* = 114). However, female students' self-efficacy mean score ranged from 14 to 40 with overall mean of 29.18 (*SD* = 5.26; *n* = 86). Non-traditional students scored 30.30 (*SD* = 4.99; *n* = 63) while traditional students scored 29.6 (*SD* = 5.13; *n* = 137) on the general self-efficacy scale. The researchers were particularly interested in knowing if students in the various college majors were different in general self-efficacy. Students majoring in crop science felt most efficacious with a mean score of 30.76 (*SD* = 5.19; *n* = 34) while students in plant science felt least efficacious with a mean score of 28.05 (*SD* = 5.57; *n* = 37; Table 2).

Table 2

General Self-Efficacy by Gender, University Classification, and Major (n = 200)

Variable	Category	*M*	*SD*
Gender	Male	30.73	4.75
	Female	29.18	5.26
University Classification	Non-traditional	30.30	4.99
	Traditional	29.60	5.13
College Major	Crop Science	30.76	5.19
	Animal Husbandry	30.62	5.29
	Water Engineering	30.24	4.92
	Agricultural Extension and Education	29.86	4.41
	Plant Science	28.05	5.57

Note. Scale: 1 = *not at all true*; 2 = *hardly true*; 3 = *moderately true*; 4 = *exactly true*. Maximum score on self-efficacy = 40.

Using a separate variance *t*-test with a level of $p < 0.05$, significant differences were found between male and female students on general self-efficacy scores. Males were slightly more efficacious than their female counterparts ($d = 0.31$, $p = 0.03$). The difference was significant with a small effect size (Cohen, 1988). The finding is not in agreement with Hyde's (2005) gender similarities hypothesis. Hyde posits that men and women are similar on many psychological variables. However, this was not the case in this study. The male students were more efficacious than female students, which is likely attributed to the sources of self-efficacy. Self-efficacy is shaped by how students perform course assignments and pre-career experiences, by observing their peers and instructors perform expected tasks, from mentoring and positive feedback, and how they handle their anxieties in challenging situations (Bandura, 1997). Faculty members in college of agriculture at Razi University are mostly male professors and thus they play an active role model for male students. Female students may not see themselves being as successful in food, agricultural, and natural resources careers because these disciplines and industries have been dominated by men and masculine ways of knowing. Moreover, there were no significant differences between traditional and non-traditional students in terms of general self-efficacy score ($d = 0.14$, $p = 0.38$). Analysis of variance (ANOVA) showed that general self-efficacy scores were not significantly different across different college majors ($F = 1.731$; $p = .14$; $\eta^2 = .38$).

Conclusions, Recommendations, and Implications

Students in the College of Agriculture at Razi University were efficacious as indicated by the range in scores collected using generalized perceived self-efficacy instrument. The Iranian students in this study were similarly efficacious to German and Canadian students (Schwarzer & Born, 1997). Overall, male students were more efficacious than their female peers. Although the gender difference was statistically significant, practical significance should be considered. That is, are the effects found large enough to have practical importance? Although the effect size was small, experts should be able to observe a difference in female general self-efficacy among the Iranian students at Razi University. The difference in generalized sense of self-efficacy among male and female students suggests female students may be experiencing their career

preparation in less effective ways than their male peers. Administrative policies should be reviewed to address ways to be more gender-inclusive and faculty development seminars on how to effectively advise students using the social cognitive career model should be conducted.

There were no significant differences in general efficacy beliefs by university classification (traditional/non-traditional) or college majors. Students were similarly efficacious in a general sense regardless if they paid their own tuition or were in different majors in the college of agriculture. General perceived self-efficacy touches at least to some extent most everything people do to perform tasks in their careers and lives (Bandura, 1984). Agricultural students in this study felt efficacious in general terms such as performing difficult tasks, confronting obstacles, and coping in the face of adverse situations. Although academics and disciplinary experts stress the importance of field-specific competencies among agricultural students (Kang & Bishop, 1989; Mane, 1999), agricultural employers prefer generic skills (Andelt, Barrett & Bosshamer, 1997; Berrie, 2004; Biesma et al., 2006; Bowers-Brown & Harvey, 2004; Crebert et al., 2004; Foster, 1988; Harvey, 2003; Jang & Kim, 2004; Long et al., 1992; Marciel, 1994; Nunan, 1999; Radhakrishna & Bruening, 1994; Stasz, 2001).

Generic skills include analytical and problem-solving abilities which are applicable in various domains and are considered to be a part of general self-efficacy. However, field-specific competencies include knowledge of technical agriculture, which could be reflected as context-specific self-efficacy. In the context of Iranian agriculture, Alibeigi and Zarafshani (2006) concluded that Iranian agricultural employers valued generic competencies relatively higher than field-specific competencies for agricultural graduates entering the agricultural fields. If students in a college of agriculture at Razi University are efficacious in generic skills, they will be better equipped with fundamental workplace skills, thus contributing to their achievement of short and long-term career goals. Students in all five majors were generally efficacious, which supports that students in specific field of studies can develop general self-efficacy for their future careers. This finding corroborated with another study of Iranian agricultural college students. Rad, Nasrabadi, and Bruening (2005) found Iranian agriculture college graduate felt they had strong scientific and practical skills to perform tasks in their careers. Further, Rad et al. found that only four percent of the graduates felt they had insufficient occupational knowledge and skills.

Professors should consider self-efficacy when developing essential employability skills, such as communication, interpersonal, and problem-solving skills, necessary for the agricultural industry (Zekeri, 2004) for a globalized society (Stewart, 2007). People with high self-efficacy are more likely to function successfully in a global, interdependent society. Developing generalized self-efficacy can help students adapt and succeed in many different situations, both in a general sense as well context-specific. Although self-efficacy is usually domain-specific, self-efficacy beliefs can "form more global and general self-perceptions" (Schunk & Pajares, 2004, p. 119). As agricultural students develop their general career skills, they are simultaneously increasing their confidence in their abilities to perform field-specific competencies required by most agricultural employers. Further studies should investigate the nature and relationship between general and context-specific self-efficacy. Further investigation should determine if general self-efficacy precedes the development of context-specific self-efficacy, and if context-specific self-efficacy affects general self-efficacy. We would argue that students experience specific events that affect their

general self-efficacy, but further investigation is needed to determine if this proposition would be supported.

One implication of this study is that agricultural students with higher general self-efficacy are more confident in their coping ability across a wide range of demanding or difficult situations that results in greater student success. A central emphasis in teaching students should be on developing students' awareness of their self-efficacy through modeling. Structured authentic assignments can help students develop career skills and their self-efficacy when they are guided and supported to successful performances. When students exclaim, "I can do," or "I'll have a go at that," they should be affirmed or coached in order to help develop their sense of self-efficacy. As students increase their self-efficacy, agricultural faculty should integrate more self-directed learning strategies in order to encourage problem-solving techniques, which is a pedagogical cornerstone in agricultural education (Knobloch, 2003). As a result, students will become more self-efficacious in their autonomous learning (Ponton & Carr, 2000).

General self-efficacy should be considered when selecting and preparing student for international experiences. Students with a high level of general self-efficacy are more likely to be equipped with global competency they will have the motivation to solve difficult problems, remain calm when faced with difficulties, be resourceful to handle unforeseen situations, and deal efficiently with unexpected events. High self-efficacious learners tend to survive study abroad programs better than low self-efficacious students (Zhai & Scheer, 2002). Colleges of agriculture in Iran should provide opportunities for students to gain international experience. This is an important implication because global competency is becoming increasingly more important in the competitive global market, and university and colleges are addressing the need for global competency by adding international learning experiences to their curricula (King & Martin, 1995; Hossain, et al., 1995; Bruening & Frick, 2004; Wingenbach, et al., 2003).

Finally, testing a general perceived self-efficacy in the context of Iranian students permitted cross-cultural validation and generalizability of theoretical links. However, this exploratory study was the starting point for further studies on college student motivation and career development. A major limitation of the current study was measuring general self-efficacy with 10 summated rating items. More items should be identified and developed as a more comprehensive measure of this construct, including context-specific self-efficacy. Future research should focus on differences and relationship between general self-efficacy and context-specific self-efficacy to see if those with higher general self-efficacy would score higher on context-specific self-efficacy. Further investigation is need to understand the influences of social and cultural variables on student learning and self-efficacy (Schunk & Pajares, 2004). Relationships with collective efficacy and other social cognitive career motivation variables such as outcome expectancy, career interest, career intention, career placement, and job satisfaction should be studied. To our knowledge, this is the first time for general self-efficacy construct to be used among Iranian population at Razi University. Further measurements should be conducted among other colleges and universities in Iran to estimate a national norm. Comparisons across colleges of agriculture and majors across universities should be made to determine if gender differences exist, and if the causes are due to cultural expectations, educational practices, or personal epistemologies (Zeldin & Pajares, 2000). Interventions should be considered and implemented to address the gender difference in college of agriculture students' general self-efficacy. Moreover, comparisons should be made among college students and high school students to

determine if there are differences between the two populations.

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Lessons Learned From Conducting Workshops with University Agricultural Faculty and Secondary School Agricultural Teachers in Egypt

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Introduction

The global economy of the 21st century provides considerable opportunities for professional agriculturalists to engage with people beyond the borders of their own country. This trend has led many agricultural universities to implement programs that provide international experiences for students and faculty. Additionally, faculty from the United States have opportunities to conduct teaching, research, and outreach projects in international settings. Although considerable opportunities exist, faculty and students face numerous barriers to international activities. Wingenbach, Chmielewski, Smith, Piña, and Hamilton (2006) reported that barriers to students included stereotypes, language, and concerns of personal safety. Hand, Ricketts, and Bruening (2007) reported that barriers to faculty included costs, limited resources, and time commitment. Andreasen (2003) identified many of the same barriers and classified barriers as either external or internal factors. Although numerous barriers exist, as Hand et al. noted, faculty also benefit from international activities through personal and professional development.

Purpose

The purpose of this paper was to document the experiences of a team of faculty that conducted workshops in the Arab Republic of Egypt. This inquiry can provide guidance for future activities that include: (1) delivering workshops in a foreign country and/or (2) working with people from Egypt. Lessons learned from this team can provide a starting point for faculty planning similar activities.

Methods

In July of 2007, a three–member team from the U.S. conducted a series of

workshops in the Arab Republic of Egypt as part of the Capacity Building component of the Agricultural Export for Rural Income (AERI) Linkage Project, conducted by Midwest Universities Consortium for International Activities (MUCIA) and the University of Illinois, and funded by USAID. The purpose of the workshops was to provide secondary agricultural teachers with the skills to implement internship experiences with their students. For the workshops, a train–the–trainer approach was taken. During the first workshop, the team presented to university faculty. During the second workshop, the team presented to secondary teachers and had one set of university faculty translate. During the third workshop, a different set of university faculty presented, assisted by the first set of faculty. A similar approach had been taken by an earlier team from the U.S. (Swanson, Cano, Samy, Hynes, & Swan, 2007).

Throughout each workshop, each team member carefully observed and noted responses and reactions to each activity (Lincoln & Guba, 1985). Each evening, the three–member team met to debrief and reflect on the experiences of the day, identifying themes that emerged. One team member served as the recorder and captured the collective reflections. Upon return to the U.S., one team member transcribed the reflections and provided the other team members opportunities to critique the data (i.e. member–checking).

Observations and Reflections

Lessons Learned About Conducting Workshops in a Foreign Country

- *Background Information* – Understanding the background and situation for the country in which the workshops is being conducted, the overall project, and the participants of the workshops was important.
- *Planning* – Having a clear vision for workshop goals and objectives was critical in planning the workshops.
- *Flexibility* – Although goals were identified in advance and content was outlined, it was important to remain flexible and make adjustments as needed to address immediate needs identified during the workshops.
- *Language* – Effectively translating the true meaning of an idea from one language goes beyond simply translating words, particularly when using oral communication.
- *Translation* – When using translators, it was helpful to have people that are familiar with the content being presented.
- *Selection of Presenters* – For the second and third workshops, it was critical to select faculty that clearly understood the content, were good teachers, and were able to quickly and effectively translate.
- *Interpersonal Connections* – Making personal connections with the workshop participants aided in the overall effectiveness of the workshops.

Lessons Learned About Working with Egyptians

- *Social Learners* – When given the opportunity for discussion, participants enjoyed opportunities to interact with each other and team members.
- *Inquisitiveness* – When given the opportunity, participants liked to ask questions.
- *Innovativeness* – Participants were open to new ideas, hungry for new materials, and welcomed our assistance.
- *Conservative/Traditional* – Although participants were open to new ideas, it was difficult for them to shift their mindsets to new ways of doing things. In other words, it was difficult for them to "think outside the box."
- *Rewards* – Both the university faculty and secondary teachers seemed excited about implementing new educational activities without obvious extrinsic rewards for doing so.

Recommendations, Implications, and Application

The international activities conducted during this project were rewarding for all team members. We strongly encourage all faculty to consider engaging in international development activities and programs. Based on the observations and experiences, two primary recommendations are offered.

Know the potential audience, learn the culture, and understand the local situation.

Prior to working in an international setting, immerse yourself in the culture of the country in which the work will occur. The temptation is always to "Americanize" others, imposing the values and structures that are common in the United States upon them. Learn to appreciate that educators in other countries typically have few incentives to create change, but they may be more intrinsically motivated than American educators. Remember that people are people, regardless of any animosity or differences between governments. These recommendations are supported by Andreasen's (2003) work, which gave similar recommendations, including understanding the purpose of the project; learning about the culture and people; starting with an open mind; and have an appreciation for interaction with people.

Plan well, and be prepared to alter plans as the activity or program progresses.

Communication can be difficult at times, so concepts are more important than words. Be prepared to have multiple ways of explaining concepts. When facilitating workshops, specific instructions and time allotments can help control time in cultures that are less time–dependent. These suggestions are also supported by Finley and Price's (1994) text *International Agriculture* and principles of adult learning (Knowles, 1984).

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