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.

**Feature Articles**

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*.

**Commentary Articles**

Commentary articles state an opinion, offer a challenge, or present a thought-provoking idea on an issue of concern to international agricultural and extension education, including a published article in the *JIAEE*. Commentary articles are reviewed by two members of the Editorial Board for appropriateness, readability, and relevance to the *JIAEE*.

**Tools of the Profession Articles**

Tools of the Profession articles report specific techniques, materials, books and technologies that can be useful for agricultural and extension educators in a global context and/or in a country/region. Tools of the Profession articles are reviewed by two members of the Editorial Board for appropriateness, readability, and relevance to the *JIAEE*.

**Book Reviews**

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

**Subscriptions**

Subscriptions may be acquired online at http://www.aiaee.org/jiaee/journalsub.asp, or by filling out the form located at the end of this journal.

Individual member rates are $110/year for a printed copy or $70/year for electronic version. Individual memberships and subscriptions are payable to **J. Mark Erbaugh, AIAEE Treasurer, The Ohio State University, 113 Ag. Admin. Bldg., 2120 Fyffe Rd., Columbus, OH 43210**.

Library/subscription agency rates are $150/year (printed copies only). All library subscriptions must be made payable to **JIAEE** and mailed to **JIAEE Editor, 2116 TAMU, Department of Agricultural Leadership, Education, and Communications, Texas A&M University, College Station, TX, 77843-2116**. Please visit the **JIAEE** Web site at http://www.aiaee.org/journal.html and the AIAEE Web site at http://www.aiaee.org/index.html.
# Journal of International Agricultural and Extension Education

**Volume 16**

**Number 1**

**SPRING 2009**

**Editors**

- Glen C. Shinn, Texas A&M University
- Matt Baker, Texas Tech University
- Carl G. Igo, Montana State University
- Martin J. Frick, Montana State University

## Commentary Article

**Learning from our Experience in the Field: Using Participatory Development Methods in the Higher Education Classroom**

*Maria Navarro, University of Georgia*

## Feature Articles

1. **Impact of Yearlong 4-H Japanese Internship Experience on United States Participants**
   *Patreece D. Ingram, The Pennsylvania State University*
   *CherRhonda Smith-Hollins, The Pennsylvania State University*
   *Rama Radhakrishna, The Pennsylvania State University*

2. **The Discontinuance of Environmental Technologies in the Humid Tropics of Costa Rica: Results from a Qualitative Survey**
   *Melanie Miller, The Ohio State University*
   *Matthew J. Mariola, The Ohio State University*

3. **Testing the Market Potential for a New Value-Added Cowpea Product to Improve the Well-Being of Women Entrepreneurs in Niger**
   *Germaine Ibro, Ramatou Seydou, & Kaka Saley*
   *National de Recherche Agronomique du Niger*
   *Kira Everhart-Valentin, Joan Fulton, James Lowenberg-DeBoer, & Miram Otoo*
   *Purdue University*

4. **Forecasting Doctoral-Level Content in International Agricultural and Extension Education–2010: Viewpoint of Fifteen Engaged International Scholars**
   *Glen C. Shinn, Gary J. Wingenbach, Gary E. Briers, & James R. Lindner*
   *Texas A&M University*
   *Matt Baker, Texas Tech University*

5. **Redefining Agricultural and Extension Education as a Field of Study: Consensus of Fifteen Engaged International Scholars**
   *Glen C. Shinn, Gary J. Wingenbach, James R. Lindner, & Gary E. Briers*
   *Texas A&M University*
   *Matt Baker, Texas Tech University*

   *Glenn D. Israel, University of Florida*
   *S. Galindo-Gonzalez, University of Florida*

7. **Enhancing Effectiveness of Extension Efforts: A Case Study of Malian Shea Butter Producers**
   *Assa Kante, Oklahoma State University*
   *Carl G. Igo, Montana State University*
   *Martin J. Frick, Montana State University*
Editorial Board

The editorial board consists of the editors, the past editor and other members representing regions of the world.

Editors

James R. Lindner, Editor
Agricultural Leadership, Education & Communications
Texas A&M University
2116 TAMU, 228 Scoates Hall
College Station, TX 77843-2116
Ph. 979-458-2701
Fax 979-845-6292
j-lindner@tamu.edu

Kim E. Dooley, Editor
Agricultural Leadership, Education & Communications
Texas A&M University
2116 TAMU, 107 Scoates Hall
College Station, TX 77843-2116
Ph. 979-862-7180
k-dooley@tamu.edu

Gary J. Wingenbach, Past Editor
Agricultural Leadership, Education & Communications
Texas A&M University
2116 TAMU, 218 Scoates Hall
College Station, TX 77843-2116
Ph. 979-862-1507
g-wingenbach@tamu.edu

James Hynes, Associate Editor
(Book Review)
Curriculum and Instruction
Sam Houston State University
228 Teacher Education Center
Huntsville, TX 77341-2119
Ph. 936-294-3576
Jwh009@shsu.edu

Traci Irani, Associate Editor (Tools)
Agricultural Education and Communications
University of Florida
220 Rolfs Hall
Gainesville, FL 32611-0502
Ph. 392-0502 ext. 225
irani@ufl.edu

Maria Navarro, Associate Editor
(Commentary)
The University of Georgia
105 Four Towers
Athens, GA 30602-4355
Ph. 706-542-0262
mnavarro@uga.edu

Mohamed M. Yacoub, Associate Editor
(French)
Higher Institute for Agricultural Cooperation
P.O. Box 198 Hadayek Shoubra
Cairo, Egypt
mmyacoub@yahoo.com
U.S./World Representatives

Adewale Johnson Alonge, Ph.D.  
Miami-Dade Public School System  
9034 SW 163 Terrace  
Miami, FL 33157  
alongeaj@yahoo.com

Mike McGirr  
USDA-CSREES  
800 9th Street  
Waterfront Centre  
Washington, DC 20024  
Ph. 202-205-3739  
mmcgirr@csrees.usda.gov

Margaret Brown-New Zealand  
AgResearch Ltd  
Grasslands Research Centre  
Tennent Drive, Private Bag 11008  
Palmerston North 4474, New Zealand  
Ph. 64-6-356-8064  
margaret.brown@agresearch.co.nz

Wade Miller  
Department of Agricultural Education & Studies  
Iowa State University  
217E Curtiss Hall  
Ames, Iowa 50011  
Ph. 515-294-0895  
wwmiller@iastate.edu

Barnabas Dlamini  
Agricultural Education and Extension  
University of Swaziland  
PO Luyengo, Swaziland  
Ph. 268-527-4021  
bmd@africaonline.co.sz

Michelle Owens  
Institute of International Agriculture  
Michigan State University  
319 Agriculture Hall  
Ph. 517-355-0174  
owens@msu.edu

David Dolly  
University of West Indies  
Agricultural Economics and Extension  
St. Augustine, Trinidad and Tobago  
Ph. 868-662-2002 Ext 3206  
farmdavid42@hotmail.com

Jim Phelan  
School of Biology and Environmental Science  
UCD Agriculture and Food Science Centre  
University College Dublin  
Belfield, Dubine 4, Ireland  
Ph. 353-1-716-7793  
James.phelan@ucd.ie

N. R. Gangadaharappa  
Agricultural Extension  
University of Agricultural Sciences  
GKVK Campus, Bangalore- 560 065  
Karnataka, India  
Ph. 91-80-23330153 Ext. 367  
nrganga@yahoo.co.in

Anita Zavodska  
Barry University  
12860 SW 15th Manor  
Davie, FL 33325  
Ph. 305-981-5224  
azavodska@mail.barry.edu
Association for International Agricultural and Extension Education Officers

Pete Vergot III, President
University of Florida IFAS Extension
155 Research Road
Quincy, FL 32351

Gary J. Wingenbach, President Elect
Texas A&M University
2116 TAMU
College Station, TX 77843

John R. Vreyens, Past President
International Programs and MAST
International
University of Minnesota
135 Skok Hall
St. Paul, MN 55108

Katie Leigh, Graduate Student Rep
Texas Tech University
MS 42131, 15th & Detroit
Lubbock, TX 79409

Billy Jivetti, Graduate Student Rep
University of Missouri
121 Gentry Hall
Columbia, MO 65211

Kristin Davis, Secretary
International Food Policy Research Institute
2033 K St. NW
Washington, DC 20006

J. Mark Erbaugh, Treasurer
The Ohio State University
113 Ag. Admin. Bldg., 2120 Fyffe Rd.
Columbus, OH 43210

Dr. Dermot J. Ruane,
Board Member-at-Large
UCD School of Agriculture, Food Science
and Veterinary Medicine
College of Life Sciences
UCD Agri. and Food Science Centre #G19
University College Dublin
Belfield
Dublin 4
Ireland
From the Editors

Happy 25th Anniversary, AIAEE! As we celebrate 25 years as an organization it is important to reflect back on our past. Don Meaders and Ray Ostos contributed an insightful historical perspective of the organization in the 2001 Conference Proceedings. Their questions are just as important today: (a) what is the purpose of the Association? (b) who has been our leaders and what are their affiliations? (c) what are our key “moments” and evolving patterns? (d) what operational and contextual changes have we made over time? (Meaders & Ostos, 2001, p. 240).

In the summer of 1983 there was a seminar on Agricultural Education in Africa hosted by the agency for international development. This was the impetus for the creation of the Association of Agricultural Education (AIAE) on April 6, 1984. On the program for the organizational development meeting were Bill Thuemmel, Fred Hutchinson, Maurice Fleming, Edna McBreen, Don Meaders, Carl Martin, Wayne Nilsistuen, Douglas Pickett, George Miller, Jean Weideman, Terrence Thomas, Frank Bobbitt, Karl Sandlin, and Burt Swanson. David Riley from Sam Houston State University was the organizer. The officers were (a) Chairperson, Burt Swanson, (b) Vice Chairperson, William Thuemmel, and (c) Secretary-Treasurer, Lennie Gamage. The Executive Board included Robert Julian, Don Meaders, David Riley, and Hugh Rou. Additional attendees were: James Albracht, Ronald Brown, Frank Byrnes, Jeane Dorette, Eddie Dye, Frank Fender, Ryland Holmes, Richard Jensen, Larry Jewell, Vern Johnson, Harold Jones, James McGuire, Robert Maxwell, Larry Miller, Cynthia Perry, Douglas Pickett, and William Richardson. These individuals were the founders of AIAEE and we sincerely thank them and celebrate their forethought and dedication.

The initial constitution had the purpose of providing a medium for exchange of ideas related to international agricultural education and to provide a liaison between higher education and a diverse array of international entities. Today our objectives include continuing dialogue and scholarly communication of our collective global knowledge. We’ve stayed true to our original charge.

The Journal of International Agricultural and Extension Education began 10 years later. Jack Elliot was the first editor followed by Satish Verma, James Connors, and Gary Wingenbach. These leaders have moved us to the point of now having a preeminent journal that is managed entirely online. Our scholarship continues.

Sincerely,

James R. Lindner, Executive Editor and Kim E. Dooley, Managing Editor
Journal of International Agricultural and Extension Education
Learning from our Experience in the Field:
Using Participatory Development Methods in the Higher Education Classroom

Maria Navarro
The University of Georgia
Department of Agricultural Leadership, Education, and Communication
E-mail: mnavarro@uga.edu

Abstract
Participatory development methods are used in international development work to assure local and grass-roots initiation, design, implementation, evaluation, and ownership of development programs. A tacit assumption is that a participatory process is more likely to yield a successful and sustainable program, for such a process starts with the people’s needs, mobilizes local resources, and strengthens local capacity. Thus, participatory processes have been designed to bring out the best of each individual, facilitate exchange of ideas and collaboration, and result in a much better product than any one team member could have produced alone. In turn, adult educators and other teaching and learning scholars are empirically demonstrating that college education can be improved by further involving students in the planning and evaluation of their learning. The purpose of this paper is to discuss the potential of participatory development methods in supporting the shift from a teacher-centered to a student-centered learning environment in higher education. In particular, one method, the problem/solution tree, is analyzed in-depth. Some of the contributions to teaching of the problem tree, as emphasized in the paper, include: 1) enhances group processes and cooperative learning, 2) promotes active learning, 3) nurtures multidisciplinary analysis, 4) improves student motivation, initiative, and individual work prior to class meetings, 5) promotes student development of higher order thinking skills, and 6) addresses the needs of particular students who would typically not participate in traditionally-designed group exercises.

Keywords: Participatory methods, student-centered education, student participation, problem/solution tree, collaboration, higher education.
Introduction

Many college educators are shifting from teacher-centered to student-centered instruction in an effort to increase higher-order thinking and help students to acquire problem-solving and life-long learning skills. Some strategies used by instructors in college agricultural and extension education to enhance student-centered learning are inquiry-based activities and laboratories, “multidisciplinary information search” (Koulaouzides, Acker, Vergos, & Crunkilton, 2003, p. 73), problem-solving, case studies, small group discussions, project evaluations, role playing, peer learning, and multi-media learning environments (Murphrey & Christiansen, 2002). The success of these strategies depends on institutional, instructor, content, group dynamics, and individual student factors.

Active student participation is key for student-centered instruction success. “Students learn better [not only] when their learning is active . . . [but also when it] involves talking and interacting . . . and when they have more opportunities for feedback” (Smith, 1992, p. 337). In addition, active participation of students is also “particularly important if one of the objectives of the class is to affect changes in attitudes” (Onken & Eastwood, n.d., p. 2).

Finding ways to encourage student participation is one of the recurring challenges faced by instructors seeking a more student-centered environment. There are many “student” factors that influence the willingness or ability of a student to participate in class, including: 1) Student personal characteristics, background, academic preparation, and self-perception (Armstrong & Boud, 1983); 2) Student attitude toward the course, other students, and the instructor (Myers, 2004); and 3) Situational factors: Course difficulty and level (Fritschner, 2000), type of class (content, size, dynamics), and systems for tracking and rewarding participation (Smith, 1992).

Nurturing collaboration among students is another challenge of college educators but invaluable to foster interdisciplinarity, higher order thinking, and holistic knowledge (Mu & Gnyawali, 2003). According to Johnson, Johnson, and Smith (1998), there is “little doubt that cooperative learning is appropriate to higher education: it works. While it is never easy to implement, when all the critical elements are in place, it is very powerful” (p. 27). Cooperative learning is not often used by college instructors in part because of its complexity for both instructors and students.

Purpose of the Paper

The purpose of this paper is to discuss the potential of participatory development methods in supporting the shift from a teacher-centered to a student-centered learning environment in higher education. In particular, one method, the problem/solution tree, is analyzed in-depth.

Philosophical Themes

Participatory methods have proven to be invaluable tools for agricultural and extension educators in development programs “through the step-by-step process of assisting a community to identify its problems, find and implement appropriate solutions and to monitor and evaluate performance and results” (Harvey & Appleton, n.d., p. 3). A key feature of a participatory process is that it facilitates the connection between diverse stakeholders with the purpose of collective reflection, co-creation of knowledge, and action-oriented efforts to solve their shared problems (Röling, 2004, p. 10). A tacit assumption is that a participatory process is more likely to yield a successful and sustainable program, for it starts with the people’s needs: Stakeholders that have been involved in a participatory needs assessment and program design, are more likely to “own” the
program and therefore have more interest in investing in program implementation, evaluation, and continuation. The value of participatory methods is both as an invaluable tool to achieve successful and sustainable programs, and in the synergistic benefits of the participatory process itself. The process connects people, mobilizes local resources, strengthens local capacity, and empowers participants through enhanced understanding, knowledge, connections, tools, and vision.

Participatory methods engage people with different perspectives, needs, knowledge, and opinions, in interdisciplinary and collaborative brainstorming processes. These methods seek to bring out the best of each individual, facilitate exchange of ideas and collaborative learning, enhance individual and collective knowledge and creativity, empower all participants, and result in a much better product than any one could have produced alone. Thus, these methods seem to be perfect candidates to help college instructors shift from teacher-centered education to student-centered learning.

Using participatory methods, however, will require new attitudes and skills from instructors, including a “dual competency: the ability to manage content and process,” and the ability to help the students “evolve from a collection of individuals into a learning community with shared values and common goals” (Christensen, 1991, p. 16). One difficult task for college professors is to relinquish control of the classroom. Similarly, students may not easily transition from an individual and passive presence in class to a group-oriented and active role in the learning process. There are strategies that instructors can use for effective cooperative learning. Figure 1 illustrates the elements presented by Johnson, Johnson, and Smith (1998) as critical to cooperation, and explains what they mean from a practical standpoint.

![Critical elements to cooperation](image)

*Figure 1. Elements presented by Johnson, Johnson, and Smith (1998) as critical to cooperation, and explanation of what they mean from a practical standpoint for classroom instructors.*

Examples of a participatory development methods that can be used in college education are: Community mapping (could be used to identify topics and to establish a common vision for all class participants), question boxes (could be used as a team-building activity and as an introduction to new topics), story with a gap...
(before and after), three-pile sorting (good, bad, and in-between), problem and solution trees (to analyze causes, effects, and solutions to specific problems), option ladders, and pocket charts or matrix scoring (to analyze and evaluate situations and solutions to a problem) (Harvey & Appleton, n.d., p. 21-33; see also International Fund for Agricultural Development, 2002).

An example: Problem and solution tree diagrams

“The problem tree is a visual problem-analysis tool that can be effectively used . . . to specify and investigate the causes and effects of a problem and to highlight the relationships between them” (Anyaegbunam, Mefalopulos, & Moetsabi, 2004, p. 23). In this visual representation, the tree roots are a net of causes of the problem, and each cause can be analyzed as a problem in itself. The trunk is the main problem studied, and the branches and leaves are the consequences of the problem. The problem tree is then used as the basis for discussion to analyze and prioritize causes of a critical problem, and to work to formulate solutions. The graphic nature of the tool helps participants to visualize relationships between ideas, and discuss whether a proposed solution will address causes or effects of the problem, as well as to evaluate the long-term effect and sustainability of each solution.

In the higher education classroom, a problem tree can be used to introduce and study a wide variety of science and social topics. Some possible examples are: Soil erosion; Animal disease; Low levels of student achievement; Hunger; Program failure; or Teacher burnout. The specific contributions and advantages that using a problem tree could provide to teaching and learning in higher education are presented in the following paragraphs.

1. Support building a class community: In constructing a problem tree, individuals understand the value of building it in cooperation with others, and the power of positive interdependence of members of a team (Johnson, Johnson, & Smith, 1998).

2. Foster participation of all students and support teaching that is responsive to a diversity of learning styles (Budd, 2004; Mento, Martinelli, & Jones, 1999): To contribute to the construction of a problem tree, a student does not necessarily need to verbalize and explain in-depth his/her ideas. Sometimes, a word can be enough. The ability to communicate an idea in such a simple manner will encourage shy, quiet, and reflective students to be participants in the process, especially if they can add to the tree (causes, effects, or solutions) at any time. Visual learners also notably benefit from the tool.

3. Nurture analytical depth and breadth: In constructing a problem tree, many branches and types of branches are possible: Breadth of the analysis will be apparent through the number of roots (causes), branches (effects), and solutions, flowing from the center of the tree (problem). In-depth analysis will result in multiple, diverse, and intricate secondary branches (details of solutions, causes of causes, in-depth analysis of a specific cause).

4. Facilitate interdisciplinary teaching and learning by demonstrating “richer and broader associations” (Budd, 2004, p. 41). Cooperatively constructing a problem tree helps participants realize the wide variety of causes affecting the problem under study, causes that often are revealed only thanks to the integration of ideas from people from different disciplines, perspectives, and interests. Students will see the associations between concepts and ideas, causes and solutions, which will help them relate their contributions or ideas to those of others.

5. Channel holistic and global thinking: ‘Visual presentation of ideas helps one think about a subject in a global, holistic sense and increases flexibility. . . . Structures of the subject can be seen in a way that it is not possible with linear outlines” (Mento, Martinelli, & Jones, 1999, p. 391).
particularly helpful in including in the learning process both holistic thinkers (Nisbett, Peng, Choi, & Norenzayan, 2001) and global learners (Felder, 2006).

6. Promote student development of higher order thinking skills because they help ask WHY (in searching for causes) and WHAT now? (in proposing solutions) (Anyaegbunam, Mefalopulos, & Moetsabi, 2004, p. 23). In the words of a University of Georgia student who used a problem tree to analyze international agriculture problems: “It’s like upgrading brainstorming” (personal communication).

7. Help students “gather, interpret, and communicate large quantities of complex information” (Mento, Martinelli, & Jones, 1999, p. 391), engage students and promote active learning: When students are building the trees, exploring causes, and justifying solutions, they will not focus merely in studying the information presented by the professor, but will look and propose their own explanations, and will search and read additional materials that will help them support their ideas (Budd, 2004).

8. Nurture individual and team work: While students may work individually to gather and interpret information relative to their disciplines, the problem tree can only be completed through the participation of all members of the team (demonstrate positive interdependence and foster communication) (Johnson, Johnson, & Smith, 1998). Working individually on the trees first and then working with the rest of team members can be very valuable for individual students because the exercise can help them identify areas of (personal) weakness (Garforth, 2001).

Conclusions, Educational Importance, and Implications

Participatory development methods can be excellent tools to help enhance student-centered learning in college teaching if they are carefully planned and appropriately adapted to the specific teaching environment. The problem tree and other participatory methods can help college instructors to: 1) Encourage and enhance student individual work and reflection prior, during, and after class meetings; 2) Promote active learning, enhance group processes, improve the depth and breadth of student contributions to group work, increase student interactivity, and foster cooperative learning (Johnson, Johnson, & Smith, 1998); 3) Promote student development of higher order (Anyaegbunam, Mefalopulos, & Moetsabi, 2004, p. 23) global, and holistic thinking skills (Budd, 2004; Mento, Martinelli, & Jones, 1999), 4) Guide student teams through multidisciplinary and interdisciplinary analysis, and 5) Be responsive to a diversity of learning styles (Budd, 2004; Mento, Martinelli, & Jones, 1999)

Having ample participatory experience in the field, agricultural and extension educators are in the best position to transform higher education for sustainable education: By using more participatory methods in teaching and learning processes, in addition to offering a better education to students in any field, educators can equip graduates with the necessary tools to better serve and work with their communities in the future, breaking the cycle top-down approaches to knowledge, communication, business, and politics. In addition, agricultural and extension educators working with college students should consider further analyzing, researching, assessing, and demonstrating how participatory development methods can enhance student-centered education, student participation, student learning, and student achievement.
References


Impact of Yearlong 4-H Japanese Internship Experience on United States Participants

Patreese D. Ingram  
The Pennsylvania State University  
Department of Agricultural & Extension Education  
E-mail: pdi1@psu.edu

CherRhonda Smith-Hollins  
The Pennsylvania State University  
Department of Agricultural & Extension Education  
E-mail: cmh345@psu.edu

Rama Radhakrishna  
The Pennsylvania State University  
Department of Agricultural & Extension Education  
E-mail: brr100@psu.edu

Abstract

The importance of cultural understanding, intercultural communication skills, and foreign language ability is being echoed from a variety of different platforms including the business, governmental, and educational arenas. For the past 15 years, the States’ 4-H International Programs Committee has collaborated with Japanese youth development organizations to provide year-long internship experiences for young adults who have previously participated in the 4-H Program. Using survey research, this descriptive study was conducted to explore the benefits of the internship program on the lives and career choices of the former interns. Among the many benefits described by the former interns, gains in personal growth were clearly expressed. Increased self-confidence, flexibility, tolerance and adaptability were evident. Values learned by the interns are being passed on to their children. Recommendations to strengthen the internship program included a more strategic use of former interns in preparing new interns for their positions.

Keywords: International internship, Study Abroad, Intercultural communication, 4-H, Young adults
**Introduction**

For more than 30 years, the 4-H/youth development program has provided an opportunity for American youth and Japanese youth to learn about each other’s culture through a cultural homestay experience. 4-H youth have traveled to Japan to stay in the homes of Japanese families and Japanese youth have traveled to the United States to stay in the homes of American families. The goals of this program have been to help youth from both countries increase their global and cultural competence. 4-H has worked with three Japanese youth development organizations: Labo, Lex and Utrek.

Since 1987, an internship component has been added to the program. Each Japanese organization hires between one and three college-aged young adults from the United States to work in their organization for one year. These young adults are former 4-H members and have participated in the month long exchange programs.

The interns live with host families during their stay. They assist the organization with responsibilities related to the exchange program and they work with youth groups in Japan. In addition, they engage in a cultural project of their choosing, and have some opportunity to engage in cultural experiences in Japan. To date, no study has been conducted to explore the benefits of the internship program on the lives and career choices of the interns. Information gained from this study may be used to help inform and improve the program for future interns, as well as, provide insights useful in the development of other agricultural and extension education international experiences.

**Conceptual Framework**

The importance of cultural understanding, intercultural communication skills, and foreign language ability is being echoed from a variety of different platforms including the business, governmental, and educational arenas (Dienhart, 2004; Nahavandi, 2003; Williams, 2005).

Over the next 40 years, the average five-year growth rates in the U.S. gross domestic product (GDP) are expected to be below 2% while the GDP in many other countries around the globe is predicted to grow in the range of 4% to more than 11% (Crain Communications, 2007). “Opportunities for entrepreneurial growth abound in the global market. In a global economy, our national well-being hinges on future CEO’s, managers, professionals, and entrepreneurs who are competent to conduct business in a global environment” (Kaufman & Johnson, 2005, p.3).

Douglass H. Daft, former Chairman and Chief Executive Officer of The Coca Cola Company stresses that understanding other people and their perspectives is essential to success in our increasingly diverse world (Center for Global Education, 2006). On the other hand, the lack of awareness of other countries’ customs, culture or manners, and etiquette can offend foreign associates and jeopardize business deals (Stoller, 2007).

The importance of global education is recognized at both the secondary and higher education levels. According to the American Association of State Colleges and Universities, “If today’s educated people are to be able to move comfortably in many different cultures, they must have the advantage of a global education.” (Final Report, 2006, p. 6). Acker and Scanes (1998) argue that an international experience is part of a quality education.

Educational institutions at both the secondary and college levels provide important opportunities for students to gain valuable experiences and skills while studying in foreign countries. Although there is a dearth of research which focuses on the benefits of study abroad programs (Langley & Breese, 2005), a number of studies report important benefits. A study conducted by Dwyer and Peters (2004) of alumni of the International Education of
Students Study Abroad Programs found that high school students gained a number of important benefits from the experience. Responses from more than 3,400 alumni who studied in a variety of countries all over the world between 1950 and 1999, indicated that their experience helped them better understand their own cultural values and biases, enabled them to tolerate ambiguity, gave them the ability to view the world and its issues from several perspectives, and impacted their career paths, among other benefits. An impact assessment of the International 4-H Youth Exchange Program (IFYE) found that participants in study abroad programs perceived they were more sensitive to other cultures, more aware of global events, and more involved in community activities than prior to their participation (Boyd et al., 2001). Students in a yearlong study abroad program to Ireland reported a more critical, yet more appreciative view of their own culture (Langley & Breese, 2005). Additionally, as reported by Radhakrishna and Ingram (2005), other researchers have found that study abroad students have increased their awareness and appreciation of cultural diversity, experienced personal growth, and developed skills and attitudes that will allow them to function successfully in an interdependent world.

Living and working in a foreign country places the student in an environment surrounded by models and opportunities to observe behavior considered appropriate for that environment. The process of knowledge acquisition or learning directly correlated to the observation of models is supported by social cognitive theory. According to social cognitive theory, a person’s experiences, environments and behaviors affect how they learn. Effective modeling teaches general rules and strategies for dealing with different situations (Bandura, 1988). As the student evaluates the new experiences through his or her past experiences, new knowledge is acquired which guides his or her behavior in the new setting. The study described here attempted to assess the impact of the 4-H Japanese Internship Program on its participants.

**Purpose and Objectives**

The overall purpose of this study was to assess the impact of the 4-H Japanese Intern Program on United States college students who served in the States’ 4-H Japanese Internship Program. The study sought to address the following objectives:

1. To determine the source of motivation for participation in the internship program.
2. To determine how helpful the pre-departure activities were in preparing former interns for the internship experience.
3. To determine the perceived benefits and impact of the internship program on the lives and career choices of former interns.
4. To offer recommendations that may be useful in improving the program for future interns.

**Methodology and Procedures**

**Population, Selection of Sample, and Data Collection**

This descriptive study utilized purposive sampling (Henry, 1990). The target population was former interns in the States’ 4-H International Exchange Programs. The accessible population was identified by the three Japanese partner organizations that hired the young adults as interns. The names of current and former interns were requested from Labo, Lex, and Utrek organizations.

Each of the three partner organizations was asked to provide a list of the names and contact information of all interns who had served in their organization since 1987 when the internship program first began. Lists were forwarded to the researcher electronically. One hundred (100) names were received, however all names did
not include contact information. An attempt was made to locate missing contact information by contacting the 4-H Youth Development Educator in each participating state for contact information. In six cases, current contact information was obtained. In total, contact information was obtained for 71 former interns.

Correspondence was sent to each intern with available contact information. Due to the fact that some of the available contact information was likely to be outdated, the following procedure was used. The correspondence was addressed to the “Name of the Former Intern or Parent of.” If the correspondence went to the home of the intern’s parent, it was hoped that the parent would deliver the letter to the intern at their current address. The correspondence included a letter briefly describing the research study and a Former 4-H Japanese Intern Interest Form to be completed and returned to indicate interest in participating in the study. Those who agreed to participate were asked to provide their current address and contact information.

Thirty (30) forms were returned indicating a desire to participate in the study. An informed consent form and a copy of the survey questionnaire were then mailed to the participant with a self-addressed stamped return envelope. Returned questionnaires did not request names or other identifying information. Three weeks after the initial mailing, an email reminder was sent to those who had not yet returned the questionnaire. Twenty five questionnaires were returned. An attempt was made to reach the remaining non-responders by phone. After numerous attempts, responses to key questions from the questionnaire were answered by phone by two additional non-responders. When phone responses were compared to those received by mail survey, the responses were very similar.

Instrumentation

The Marist Abroad Program Evaluation (Marist College, 2007) was adapted for use in this study. The 27 item questionnaire contained a variety of items measured using: rank-order, forced choice, 5-point Likert-type scale, and open-ended questions. Items and questions related to the following topics: motivation and preparation for participation in the internship program, positive and difficult experiences of the internship, benefits of the internship, advice to others, and demographic items (gender, age, academic major and minor, state of residence during internship, employment status and position).

The instrument was assessed for content and face validity by a panel of 10 experts consisting of two faculty members with expertise in research methods, one faculty member with expertise in diversity and multiculturalism, one faculty member with expertise in youth development, one graduate student in the department of agricultural and extension education, and five representatives from the three Japanese partner organizations. Minor changes were made to the instrument to increase clarity. The reliability for the Likert-type scale portion of the instrument on potential benefits from the internship experience was .60. An intraclass correlation coefficient .60 to .79 reflects moderate reliability (Richman, Makrides, & Prince, 1980).

Data Analysis

Both quantitative and qualitative methods were used to analyze the data. SPSS (version 14.0) was used to provide descriptive statistics for the quantitative data including frequencies, percentages, means, and standard deviations.

Responses to open-ended questions were analyzed using an open coding content analysis technique. “Content analysis is a “qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings.” (Patton, 2002, p. 453). The unit of analysis was words, phrases, sentences, and paragraphs written in response to the open – ended
questions. Each open-ended response was carefully read to determine the concepts and themes that emerged. Every assertion made in the analysis was documented with no fewer than three examples. The codes that appeared in only one response were eliminated from consideration. To increase consistency in results, three independent reviewers coded the data. Coding among the three reviewers were compared for consistency. The inter-rater reliability rate was approximately 90%.

**Findings**

**Demographics**

A total of twenty-five (25) completed questionnaires were returned for a response rate of 83% of respondents who returned the Former 4-H Japanese Intern Interest Form. The majority (64%) of respondents had internships with the Labo organization, 20% worked with Utrek, and 16% worked with Lex. Most (80%) were male, 20% were female, and the majority (60%) had completed their internship experience more than 8 years ago. Thirty-two percent (32%) served as an intern between three and eight years prior to this study, while eight percent (8%) were interns within the last three years. The age of interns ranged from 16 to 25 years old. The majority were 19, 20 or 21 years old. Interns represented 12 different states covering all regions of the United States.

**Objective 1. Motivation to Participate in the Internship Experience**

Respondents were presented with a list of 13 reasons for going abroad. They were asked to rank up to five objectives from 1 to 5 (1 = highest). The reasons which were ranked highest were: “learn about the host country and culture,” “master a foreign language,” “know myself better/personal growth,” and “adventure.” “Getting away from campus,” “pleasing my parents/relatives,” and “improving my self-confidence” were ranked least important as reasons for traveling abroad. See Table 1.

**Table 1**

**Intern Rankings of Objectives for Going Abroad (N=25)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Number Ranked 1st, 2nd, 3rd, 4th, or 5th in Importance</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learn about host country/culture</td>
<td>R#1 7 R#2 6 R#3 4 R#4 4 R#5 1 Total 22</td>
<td>4.4</td>
</tr>
<tr>
<td>Master a foreign language</td>
<td>R#1 2 R#2 5 R#3 3 R#4 3 R#5 1 Total 14</td>
<td>2.8</td>
</tr>
<tr>
<td>Know myself better/personal growth</td>
<td>R#1 3 R#2 1 R#3 7 R#4 0 R#5 3 Total 14</td>
<td>2.8</td>
</tr>
<tr>
<td>Adventure</td>
<td>R#1 4 R#2 3 R#3 1 R#4 2 R#5 1 Total 11</td>
<td>2.2</td>
</tr>
<tr>
<td>Have a work/intern experience</td>
<td>R#1 3 R#2 2 R#3 1 R#4 3 R#5 9 Total 9</td>
<td>1.8</td>
</tr>
<tr>
<td>Travel</td>
<td>R#1 1 R#2 2 R#3 0 R#4 6 R#5 0 Total 9</td>
<td>1.8</td>
</tr>
<tr>
<td>Enhance my resume/transcript</td>
<td>R#1 0 R#2 2 R#3 1 R#4 2 R#5 3 Total 8</td>
<td>1.6</td>
</tr>
<tr>
<td>Make new friends</td>
<td>R#1 0 R#2 0 R#3 2 R#4 2 R#5 4 Total 8</td>
<td>1.6</td>
</tr>
<tr>
<td>Become multicultural</td>
<td>R#1 0 R#2 2 R#3 1 R#4 1 R#5 3 Total 7</td>
<td>1.4</td>
</tr>
<tr>
<td>Be an ambassador for my country</td>
<td>R#1 1 R#2 1 R#3 1 R#4 1 R#5 5 Total 5</td>
<td>1.0</td>
</tr>
<tr>
<td>Improve self-confidence</td>
<td>R#1 0 R#2 0 R#3 2 R#4 1 R#5 0 Total 3</td>
<td>0.6</td>
</tr>
<tr>
<td>Please my parents/relatives</td>
<td>R#1 1 R#2 0 R#3 0 R#4 0 R#5 1 Total 1</td>
<td>0.4</td>
</tr>
<tr>
<td>Get away from campus</td>
<td>R#1 0 R#2 0 R#3 0 R#4 1 R#5 1 Total 1</td>
<td>0.4</td>
</tr>
</tbody>
</table>
When asked whether or not their objectives changed while they were abroad, nearly one-half (48%) said their objectives changed “a little.” Several specifically stated that their objectives changed to include learning more about themselves and experiencing personal growth. Others stated they gained more interest in helping others while abroad.

Interns were most likely to learn about the internship program through the 4-H Educator in their state or a previous travel abroad experience. However, when asked who or what most encouraged them to participate in the internships, the most frequent response was “self-motivation/curiosity.” Eighty percent (80%) selected this response. Previous travel abroad (48%), parents (36%), and 4-H Educator (32%) were also mentioned frequently. “Other” responses (3) included a college major in Japanese, and a requirement for an international college program. See Table 2.

### Table 2

**Factors Related to Learning about and Participating in the Internship**

<table>
<thead>
<tr>
<th>Ways intern learned about internship</th>
<th>Who or what most encouraged intern to participate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>4-H Educator</td>
<td>17</td>
</tr>
<tr>
<td>Previous travel abroad experience</td>
<td>16</td>
</tr>
<tr>
<td>Program brochures</td>
<td>8</td>
</tr>
<tr>
<td>Self-motivation/curiosity</td>
<td>8</td>
</tr>
<tr>
<td>Returned interns</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
<tr>
<td>Parent/Sibling/Relative</td>
<td>2</td>
</tr>
<tr>
<td>Friends</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note: N = 25. Percentages do not all add to 100% because of multiple responses*

**Objective 2. Preparation for Internship**

Most interns felt the pre-departure phone meetings and information handouts were either “moderately helpful” (36%) or “very helpful” (28%) (See Table 3). However, more than one-quarter rated these forms of preparation as “slightly helpful” (16%) or “not helpful” (12%). Several open-ended comments were offered to explain the ratings. Several interns indicated that they did not have or remember a pre-departure orientation. It should be noted that the pre-departure orientation was very informal and less structured when the internship program first began. Therefore, early interns may not remember having a “formal” orientation.

A few responses suggested that “it is difficult to learn about the program until you are in Japan experiencing it.” While some respondents stated that they were very prepared, others felt the orientation facilitated by 4-H ended too close to departure, allowing too little time to prepare anything differently.

Labo and Utrek interns received an in-person orientation upon arrival in Japan. The in-person orientation was held in Boston, prior to arrival in Japan for Lex interns. The in-person orientations were rated as “very helpful” by most (56%) and “moderately helpful” by an additional 20%. Fewer (16%) rated the in-person orientation as “slightly helpful” and no one felt it was “not helpful.”
Table 3

Degree of Helpfulness of Pre-Departure and In-Person Orientations

<table>
<thead>
<tr>
<th>Item</th>
<th>Helpfulness of pre-departure meetings and info handouts</th>
<th>Helpfulness of in-person orientation in Japan or Boston</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Helpful</td>
<td>7 28</td>
<td>14 56</td>
</tr>
<tr>
<td>Moderately Helpful</td>
<td>9 36</td>
<td>5 20</td>
</tr>
<tr>
<td>Slightly Helpful</td>
<td>4 16</td>
<td>4 16</td>
</tr>
<tr>
<td>Not helpful</td>
<td>3 12</td>
<td>0 0</td>
</tr>
<tr>
<td>Did Not Respond</td>
<td>2 8</td>
<td>2 8</td>
</tr>
</tbody>
</table>

Note: N = 25

When asked what improvements/changes interns would suggest for the orientation/preparation program, the most frequent responses suggested incorporating the previous interns in the orientation process.

I appreciated the ‘mentor’ the current intern was to me. We were together for about a month before she returned to the U.S. Her experience was good support, and very educational for me.

Have past interns from each program at pre-departure orientation so you can get advice/answers from someone who has been there.

A number of other recommendations were offered by respondents. These included: providing the intern with the handbook prior to leaving the states, providing the interns with a typical day’s schedule, additional in-Japan orientation, holding the orientation at least three weeks before departure, and helping to prepare interns for dealing with culture shock. Additionally, one respondent suggested that interns be given more information on the type of dress they would be expected to wear while working in the office.

Respondents selected the following items most frequently as personal planning activities in preparation for the internship experience: asking questions (60%), studying guidebooks (56%), and speaking to returned interns (32%). Additional beneficial planning activities are listed in Table 4. Those who selected “Other,” listed Japanese language and culture classes, and consultation with university professors as personal planning activities.

Interns were asked for suggestions to help future interns prepare for the internship experience. Three themes emerged from the open-ended responses. The most frequently mentioned suggestions related to learning from the experience of previous and current interns. Typical statements included:

Match them with a previous intern for a mentoring relationship.
Have orientation with previous interns. Have current interns write about their job descriptions.

Two other themes surfaced as popular suggestions for future interns. These included learning the Japanese language and coming with an open mind, prepared to be flexible. Recommendations on the level of Japanese language study varied among respondents. Specific comments ranged from “study Japanese before going (it’s ok not to know much)” to “learn as much of the language as possible” to “study Japanese intensely prior to leaving!”
Table 4

**Personal Planning Activities in Preparation for Internship**

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I asked questions</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>I studied guidebooks</td>
<td>14</td>
<td>56</td>
</tr>
<tr>
<td>I spoke to returned interns</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>I did suggested readings</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>I used the internet for research</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>I used library resources</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>I contacted interns abroad</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

*Note: Percentages do not add to 100% because of multiple responses.*

The words “open minded,” “flexible,” and “go with the flow” were mentioned many times. Some of the reasons for these suggestions included: “plans can change quickly and unexpectedly,” and “know that you will be surprised by many things (culture and job-related).” A few respondents advised future interns to learn as much as possible about the Japanese culture before going to Japan.

**Program Length and Internship Experience**

Most interns were satisfied with the length of the program. Eighty percent (80%) said it was “just right.” No one felt the program was “too long,” however, 20% felt it was “too short.” Three respondents (12%) returned home early from their internship. The reasons given were to start classes on time, family problems, and one intern was home sick.

Respondents were asked to describe both the part of the internship that stood out as most positive and as most difficult. Several themes emerged.

**Most positive part of the internship**

Overwhelmingly, interns felt that the “people experience” was the most positive part of the internship. “People” included host families, new friends, office staff, and the youth they worked with. Relationships and friendships with host families were themes mentioned most often.

- *My time with my host families. I became really close to them over the year. Becoming a member of a new family made me feel a part of the community and country.*
- *My host family! I loved being part of a family and I still keep in touch with them 14 years later.*

Other comments mentioned Japanese people in general.

- *Great people! I will never forget the specific individuals who impacted my life or the general acceptance or tolerance I felt from the Japanese people.*

Part of the internship responsibilities included working with youth groups. Several interns specifically mentioned working with the youth as being a positive experience.

- *In addition to enjoying the people, the personal growth gained during the internship was another theme that emerged. “Personal growth,” “self-confidence,” and “learning about myself” were some of the*
words used to answer this question. The following is a statement from one respondent:

*It is truly amazing how much you change during the year. You see everything from a different perspective, you learn about your own culture, and your values, beliefs, and opinions are tested. You have time to think about things you never thought about before.*

Other aspects mentioned by fewer respondents as the best part of the internship were the ability to travel, explore, and see so much of the country, and the relationships they built with the office staffs.

**Most difficult part of the internship**

The work schedule was a theme that emerged as a most difficult part of the internship. Changing schedules and frequent moves were difficult for some interns. Additional difficulties included: longer work days than many interns were accustomed to; more lengthy work schedules between days off; and frequent changes of host families.

It should be noted that intern schedules vary between the three Japanese partner organizations, and within various districts in the same organization. Therefore, experiences with schedules and changes of host families are not the same for all interns. Some of the comments below do not apply in every situation. However comments similar to the ones below were made by several respondents.

*Weekly overnight stays with various host families. For instance, for almost one month I was moving around traveling everyday to a new location for my next [assignment]. That means – no breaks from work 24/7 for 30 days at a time.*

*Once in a while having a completely full schedule for weeks was tough.* One respondent added however, *I grew a lot from those trying schedules!*

**Meeting Expectations**

Respondents were asked if the internship met their expectations. Overwhelmingly the answer was “yes.” Of the twenty-three (23) respondents who answered this question, 91% gave an affirmative response. Of these 21, 11 (55%) said the internship had exceeded their expectations. Several specifically mentioned that the internship had a significant impact on their lives.

*It met and exceeded my expectations.*

*It impacted every aspect of my life.*

*It was more than I could ever imagine.*

Several comments stressed the personal growth gained from the experience.

*The confidence and self-insight I gained was priceless.*

*I couldn’t have anticipated that I would grow so much during that year.*

The number of comments about improved Japanese language skills closely matched the number of comments about personal growth. Additionally, several respondents mentioned the rewarding experience of learning about the Japanese culture.

Finally, respondents were asked to indicate how their internship could have been of more value. Several respondents said there was nothing that could have made the experience more valuable, *“It already was one of the most important things I have ever done.”* Learning the Japanese language was another theme which emerged. Several interns would like to have spent more time, or worked harder, at developing their language skills while in Japan. This finding was similar to the findings of Tritz & Martin (1997) who reported on a Slovak Student Exchange.
Benefits of the Internship

Choice of College Major and Career. The internship experience had a direct or indirect impact on the college major or career choice of many of the respondents. For some, the impact was very large. The following responses reflect that impact:

*It had a 100% impact! When I returned I wanted to continue practicing Japanese and help international travelers. So, I went to work as a hotel concierge which evolved into an international travel sales position.*

*I am currently pursuing my Master’s in Counseling because of the opportunity I had to counsel year-long exchange students in Japan.*

*By working with so many students preparing to study abroad as well as those in schools, I realized I wanted to work in education.*

Current employment reported by former interns includes the following: After-School Coordinator for at-risk immigrant youth, 4-H Youth Development Coordinator, High School Japanese teacher, Manager for a Tokyo business, and Event/Program Coordinator. For some respondents, the impact was more indirect such as: working with people of diverse backgrounds, a major in Diplomacy and World Affairs, and a degree in International Marketing.

Long Term Impact and Benefit From Internship Experience. Respondents were asked to think back over the years since they were interns and describe the ways the internship has impacted their life and the life of their family. Additionally, they were asked to explain how they most benefited from their internship experience. Themes related to personal growth emerged. A frequent response was the gain in self-confidence. Descriptors such as “far more confident and adventuresome,” “not afraid of anything,” “no goal or challenge seems too difficult anymore,” “to be independent!” were offered.

Another area of personal growth was in increased sensitivity, awareness and acceptance of differences. Some phrases included: “broader perspective,” “more open to the world and new ideas,” “improved my awareness and sensitivity towards others,” “it made me more compassionate to different cultures,” “more aware and empathetic to visitors to the U.S.”

Additionally, the internship experience helped interns learn more about themselves. Typical comments were: “I have benefited from learning whom I want to be instead of what American society has pre-selected for my future.” “...knowing/realizing who I am and my innate worth.”

Several respondents discussed ways that the internship has had a continuing impact on their families. The children of these interns are now hosting Japanese youth in their homes. Others host Japanese chaperones. Values that were learned by the interns are being passed on to their children and other family members. “My family is more culturally aware than most families around and we believe in reaching towards world peace.” “I teach my children that there are many differences in language and culture, but there is not just one right way.”

Respondents were asked to rate a series of statements regarding the benefits of their internship experience using a Likert-type scale ranging from 1 = Strongly Disagree to 6 = Strongly Agree. The statements that received the highest percentages of “strongly agree” included: know myself better, am more independent, am more self-confident, am more adaptable to new situations, and have greater respect for other cultures. Responses for all statements are included in Table 5.

Additionally, due to the extended time period between the internship
experience and data collection for some of the respondents, an attempt was made to disaggregate data on this key survey item based on the number of years since the respondent served as an intern, less than 8 years ago or greater than 8 years ago. Items in Table 5 were categorized into three groups based on content of the question: items that related to self, items that related to cultural awareness, and items that related to career plans. An anova was conducted to determine differences in responses based on length of time since the respondent served as an intern. No significant differences were found at the .05 alpha level.

Interns were asked to rate their overall internship experience. Possible response choices included: “no value,” “very little value,” “some value,” “much value” and “of great value.” All (100%) of respondents rated their overall internship experience as being “of great value.”

Table 5

*Rating of Potential Benefits From Internship Experience By Interns (N = 25)*

<table>
<thead>
<tr>
<th>As a result of my internship experience</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am more independent</td>
<td>5.80</td>
<td>0.50</td>
</tr>
<tr>
<td>I have greater respect for other cultures</td>
<td>5.80</td>
<td>0.50</td>
</tr>
<tr>
<td>I know myself better</td>
<td>5.76</td>
<td>0.59</td>
</tr>
<tr>
<td>I am more self-confident</td>
<td>5.68</td>
<td>0.56</td>
</tr>
<tr>
<td>I am more adaptable to new situations</td>
<td>5.60</td>
<td>0.70</td>
</tr>
<tr>
<td>I have improved my public speaking skills</td>
<td>5.48</td>
<td>0.71</td>
</tr>
<tr>
<td>I am more accepting of other’s ideas</td>
<td>5.36</td>
<td>0.91</td>
</tr>
<tr>
<td>I have improved foreign language proficiency in Japanese</td>
<td>5.32</td>
<td>1.31</td>
</tr>
<tr>
<td>I am more interested in social issues</td>
<td>5.24</td>
<td>0.78</td>
</tr>
<tr>
<td>I was better prepared to enter the world of work</td>
<td>5.16</td>
<td>1.03</td>
</tr>
<tr>
<td>I am/was more confident about my career plans</td>
<td>4.88</td>
<td>1.09</td>
</tr>
<tr>
<td>I have changed priorities</td>
<td>4.76</td>
<td>1.01</td>
</tr>
<tr>
<td>I had a better relationship with my family</td>
<td>4.68</td>
<td>1.03</td>
</tr>
<tr>
<td>I am more interested in the Arts (1=NR)</td>
<td>4.33</td>
<td>1.01</td>
</tr>
<tr>
<td>I have improved foreign language proficiency in languages other than Jap (1=NR)</td>
<td>3.38</td>
<td>1.93</td>
</tr>
</tbody>
</table>

*Note: NR = No Response; Scale: 1 = Strongly Disagree; 6 = Strongly Agree*

**Cultural Project**

As a part of the internship experience, interns were expected to complete a major independent study project or other structured learning experience involving one or more areas of Japanese culture. Examples of cultural project topics include the study of: anime and manga styles of drawing and animation, the Shamisen and Taiko musical instruments, Japanese cooking, Buddhism and Shinto religions, judo and other martial arts, Japanese literature, and Japanese art forms including pottery.

Several interns stated that the cultural project played a valuable role in increasing their understanding of the Japanese culture and values. “Without understanding more of sport and entertainment aspects, I could not understand Japanese culture as a whole.” “I was able to develop an in-depth knowledge of a particular part of the culture, which in turn helped me understand other parts as well.” Others spoke to the importance of the cultural project in helping them to reflect on their experiences and to share them with others.
In addition to their cultural project, interns were asked to rate the extent to which other activities contributed to their new understanding. Of the choices provided, program activities, informal settings in home stays and social life, and independent travel were rated as having the biggest contributions to their understanding about new cultures, countries, regions, and global issues. The cultural project and organized travel made a smaller contribution to their learning. It should be noted that the requirement of a cultural project was not in place during the early years of the internship program, therefore several interns indicated that they had not completed a cultural project. See Table 6.

Table 6

<table>
<thead>
<tr>
<th>Activity</th>
<th>Not At all</th>
<th>Limited Extent</th>
<th>Some Extent</th>
<th>Moderate Extent</th>
<th>Great Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>In informal settings, home stays, and social life</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>Through independent travel</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Through program activities</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Through cultural project</td>
<td>8</td>
<td>32</td>
<td>3</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Organized travel</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

Advice to Future Interns

Advice to future interns encouraged candidates to prepare for both the joys and the stresses of the experience. Be prepared for hard work was one type of advice. “This is a hard job...not just 9-5 each day. Plus, it’s a one-year contract – No Christmas vacation since you will be working.” Other suggestions included finding someone to confide in and building a network to help you during the “challenging times.” “Have another intern on speed dial.”

The majority of suggestions however, encouraged future interns to be open, flexible and willing to “try everything”. Further they were encouraged to “have fun, relax, and enjoy the experience. “Don’t sit at home on weekends! Get a really good subway/train map and learn your way around. ” Finally, future interns were advised to immerse themselves in the culture, try to understand the values of the host culture, and to try to “see things from other people’s perspectives.”

When asked if they would recommend this internship to other students, 100% of respondents said “yes.” “Life changing,” “amazing,” and “enhancing experience” were some of the terms used to support their response.

Discussion

The results of this study provide evidence that the 4-H Internship Program with Japanese youth development organizations (Labo, Lex, and Utrek) has important benefits for young adults who participate in the year-long experience. One area of benefits expressed by participants was in the area of personal growth gained while immersed in a different culture.

Most of the time culture is like the air we breathe. We typically take it for granted and rarely think about it consciously. However, immersion in a different culture forces one to consider the
values and beliefs one holds when they come into conflict with the values and beliefs of a different culture. Immersion in a different culture provided interns an opportunity to learn and gain insights about themselves.

Researchers have found several dimensions known to be associated with cross-cultural success and effectiveness. These include among others, flexibility, open-mindedness, self-confidence, tolerance, and adaptability (Kealey, D. J., 1996; Kelly & Meyers, 1995; Williams, 2005). The interns in this study reported benefits in each of these areas as a result of their internship experience. Interestingly, “improving self-confidence” was ranked low as a motivator for participation in the program. However, it clearly was a benefit recognized after the internship experience.

Other skills such as self-reliance, problem-solving, and coping with stress were evident in the experiences shared by interns. Traveling to locations that were new to the interns, across a foreign country, and maintaining demanding schedules all contributed to their personal growth. Additionally, the ability to develop friendships and communicate across cultural differences may benefit former interns as they interact with various cultural groups here in the United States.

This internship program provides young adults with an opportunity to be truly immersed in another culture. A study conducted by Williams (2005) confirmed that “the experience of being abroad in and of itself is not enough – students must interact in the culture to receive the gain of increased intercultural communication skills” (p. 369). Bruening and Frick (2004) also support the importance of experiences in which students have direct contact with different cultures. The interns in this program lived with host families from a different culture and worked in organizations of a different culture for an entire year. This type of program provides the greatest opportunity for interaction with a different culture.

The internship experience has had a continuing impact on the lives of these former interns. For many, it had a direct or indirect impact on their choice of a major and career. And for others, they continue to engage in intercultural activities and share values of tolerance and “appreciation of differences” with their children and other family members.

**Recommendations/Conclusion**

Based on the findings of the present study, the following recommendations are offered for the States’ 4-H Japanese Internship Program:

1. Take advantage of the experiences and expertise of former interns in preparing and transitioning new interns into their positions. Include former interns during the pre-departure orientation. Encourage communication between the current interns and incoming interns. Provide contact information. If possible, bring new interns into their positions a few weeks prior to the return of the current interns to the United States.

2. Hold pre-departure orientation meetings earlier, allowing more time for new interns to make preparations based on the information they receive during the orientation.

3. Incorporate a language skills training/workshop for interns at the beginning of the internship experience to strengthen language skills and prepare interns for immersion into the Japanese – speaking environment. The length of the training could vary from one day to one week, depending on the language skill level of the interns.

4. Research should be conducted with the host families in Japan to determine the benefits these families gain from the hosting experience.
comparison of results from this study and a study of host families can strengthen understanding between the two cultures and help to foster increased positive relationships across the ocean.

5. Recently, the States’ 4-H International Programs Committee has expanded its exchange program to include other countries in addition to Japan. In the future, there may be internship opportunities for these other countries. Results from this study may be useful in the development of future potential internships with other countries.

With the growing demand for cross cultural adaptability in employees in a world where our interests in global issues continues to grow, the 4-H Japanese Internship Program is a valuable opportunity to strengthen the skills of young adults for success in today and tomorrow’s increasingly interdependent world.

The findings of this study support the conceptual value of incorporating international experiences in the educational program of today’s students. These findings are relevant not only for international 4-H programs. The importance of international experiences are applicable to the broader field of agricultural and extension education. Connors (2004) states that as the food, fiber and natural resources system becomes increasingly international, it becomes more vital that future agriculture leaders have the necessary experiences to compete in the global marketplace. In a study by Bruening and Shao (2005), members of the Association for International Agriculture and Extension Education rated internships as one of the most effective teaching methods to enhance learning in international settings. Colleges of agricultural and extension education should explore the feasibility of incorporating internship experiences into the educational program for agricultural and extension education students and faculty. Incorporating international experiences such as these into the classes we teach and curriculum we develop is of paramount importance to make progress toward internationalizing agricultural and extension education.

References


The Discontinuance of Environmental Technologies in the Humid Tropics of Costa Rica: Results from a Qualitative Survey

Melanie Miller
The Ohio State University
Department of Human and Community Resource Development
E-mail: miller.3800@osu.edu

Matthew J. Mariola
The Ohio State University
Department of Human and Community Resource Development
E-mail: mariola.1@osu.edu

Abstract

Previous studies in the Parismina watershed, Costa Rica, have revealed a high rate of discontinuance by one-time adopters of a suite of conservation farm technologies currently promoted by EARTH University. In the case of such technologies, the environmental benefits only accrue as long as the technology is in use. Most diffusion-adoption research is concerned with the process of initial adoption or rejection of particular innovations, with very few studies concentrating on the post-adoption stage which includes the continuance or discontinuance of the innovation. The objective of this study is to investigate why some farmers discontinue previously adopted environmental technologies while others continue to use them. Our results identify two general categories of factors influencing discontinuance: 1) factors related to specific characteristics of each technology and the additional labor required to maintain them; 2) factors springing from the wider socioeconomic context such as a change in farming practices or the devolution of responsibility for maintenance to a sole individual. We conclude by offering specific suggestions to extension agencies hoping to reduce levels of innovation discontinuance.

Keywords: adoption, Costa Rica, diffusion, discontinuance, technology
Introduction

Environmental farming technologies are vital tools for lessening the impact of agriculture on the surrounding environment. Some of the most pressing agro-environmental problems are located in the developing world, and particularly in sensitive areas such as the humid tropics. Tropical agriculture is often unsustainable because the production capacity of the land is rapidly exhausted owing to nutrient leaching after deforestation (Weinberg, 1991). This problem is compounded with the demand for food in these often impoverished areas (National Research Council, 1993). But the benefits of an environmental technology only accrue as long as the technology is in use, making it vital to understand not only the adoption but the continued use of these technologies.

Some institutions, such as the Escuela Regional de los Trópicos Húmedos (EARTH University), in Guácimo, Costa Rica, have taken up the challenge to find sustainable solutions that balance agricultural production and environmental preservation. Through research at EARTH, new technologies and conservation practices are developed to help farmers in the humid tropics preserve the delicate environment that they live in as well as their quality of life. In addition to a strong science orientation, EARTH features an extension component in which both faculty and students work in neighboring communities to disseminate information among farmer groups, organizations, and schools.

A distinct strain of literature from the field of extension studies has demonstrated the importance of extension agents’ perceptions and attitudes towards conservation technologies in spurring their adoption among farmers (e.g., Wallace, 1999; Chizari, Lindner, and Zoghie, 1999; Jayaratne, Gaskin, Lee, Reeves, & Hawkins, 2007). A second and even larger literature has focused on the other half of the equation – the socioeconomic context and decision-making behavior of farmers. Typical constraints to adoption include lack of financial resources, little knowledge of the conservation technologies, and low education levels (Chizari, Lashkarara, and Lindner, 2001). Studies such as these have added much to our knowledge about factors pertaining to the initial adoption decision; we know far less, however, about the post-adoption process, and specifically the phenomenon of discontinuance.

With past diffusion research being oriented toward problems with the initial adoption decision, little is known about the post-adoption process and, specifically, discontinuance. Innovation discontinuance is conceptually very different from that of innovation adoption because adoption is concerned with the initial decision, whereas continuation or discontinuance refers to ongoing commitment and the availability of the resources necessary to sustain use (Mascarenhas, 1991). Although researchers have recognized that discontinuance occurs, existing theories of diffusion have generally assumed that adopters will continue the use of the innovation indefinitely. The bulk of past studies have concentrated on initial adoption decisions, with only a handful of research directed towards decisions made later in the life of the innovation (Parthasarathy, 1995).

Survey work carried out in 2006 revealed much about the initial diffusion of environmental technologies in this region of Costa Rica (Miller, Mariola & Hansen, in press). The present study was designed to follow up previous research by specifically investigating the high rates of discontinuance uncovered for certain environmental technologies.

Review of Literature

Diffusion research has attracted a tremendous amount of attention since the paradigm became popular in the 1940s. Researchers have tended to favor the diffusion model made famous by Everett Rogers, in which the diffusion of innovations is explained as the spread of
some new product, idea, or behavior over time through a social system (Rogers, 2003). Rogers’ model features five sequential stages in which the process of innovation decision making takes place: knowledge, persuasion, decision, implementation, and confirmation (p. 169).

There is empirical evidence that individuals continue to seek information about a given innovation even after adoption. Mason (1962) found that the decision to adopt or reject a new idea is often not the terminal stage in the innovation-decision process, and that individuals continue to seek information about an innovation after they have adopted it. Rogers’ model features a post-adoption stage, the confirmation stage, in which an individual seeks reinforcement of the innovation decision already made. It is at this point that the individual may choose to reverse their previous adoption decision and discontinue the use of the innovation. There is a proliferation of research on Rogers’ first four stages, but much less on this fifth stage of confirmation, or what we may also call continuance (Black, 1983, Parthasarathy, 1995).

Discontinuance is defined as a decision to reject an innovation after having previously adopted it (Rogers, 2003). Rogers classifies discontinuance into two categories: replacement and disenchantment. He describes replacement discontinuance as a decision to reject an innovation in order to adopt another innovation that supersedes it. This type of discontinuance refers to the adoption of new innovations that replace existing innovations, such as the replacement of VHS videos with DVDs. A related category is what Kielmeyer (2003) refers to as completion discontinuance, which occurs when an innovation has served its purpose and is no longer needed.

Rogers’ second category of discontinuance is of greater concern to the present study. Disenchantment discontinuance is a decision to reject an innovation due to dissatisfaction with its performance (Rogers, 2003). An individual may become disenchanted with an innovation because the innovation has a flaw, turns out to be inappropriate for its original purpose, or does not have a perceived relative advantage over alternative innovations. In addition, disenchantment discontinuance may result from the misuse of an innovation by the adopter (Rogers, 2003).

Parthasarathy (1995) elaborates further on the idea of disenchantment when he discusses underutilization discontinuance. This type occurs when adopters gradually lose interest in or motivation to use an innovation. Underutilization is closely related to disenchantment because adopters react negatively to unpleasant consequences of using the innovation. Many innovations are used directly after adoption but then fade from use as other technologies are adopted or the individual’s priorities shift. Fashions, fads, and impulse buys are likely to suffer from underutilization discontinuance (Parthasarathy, 1995).

While there are few researchers that have devoted their attention wholeheartedly to discontinuance, several studies allude to the topic. Black (1983) notes that the characteristics of the innovation that facilitate its adoption also influence its continued use. Thus, innovations which are less complex and easy to try out tend to be more readily adopted and also have a higher level of continuance. Likewise, innovations that are easily substitutable or occur in rapidly changing environments may suffer from unusually high rates of discontinuance because of rapid obsolescence (Parthasarathy, 1995).

In his assessment of agricultural development interventions in Guatemala, Van Tongeren (2003) investigated the discontinuance of farming innovations and found that the end of subsidies and educational programming explained the majority of discontinuance. Additional social and economic factors that played a lesser role included the time demands of
new technologies compared to traditional farming techniques and barriers faced by farmers in obtaining the supplies needed to continue to use the technologies. Van Tongeren also found that when farmers were able to see clear economic benefits they tended to continue using the technology even after subsidies were unavailable.

Kremer et al. (2001) studied the diffusion, adoption, and discontinuance of soil nitrogen test kits in Iowa. Most users tried the kits primarily from an economic rather than an environmental motivation, and farmers found them to be incompatible with their needs for three primary reasons: 1) they required labor and capital expenditures that the farmers were not able or willing to commit in the spring season; 2) they were not compatible with their other farming practices; 3) those who did want to test for nitrogen levels found that other testing options met their needs better than the kits.

Bunch and Lopez (1995) studied dozens of technologies promoted in Guatemala and Honduras and found only a handful to have proven sustainable. The half-life of even very suitable technologies for local farmers was about six years. The research found that for farmers to accept environmental technologies and become involved in a sustainable process, the environmental technologies must be combined with another technology that enhances yields.

Other research has been devoted to the wider social context and the sustainable use of farming technologies. In a study of Jamaican farmers, results suggest that the farmer’s community and social context are more important than the farm and personal characteristics in influencing the long term sustainability of a farming innovation (Moxley & Lang, 2006). Likewise, Keilmeyer (2003) found that social networks are an important determinant of continuance and discontinuance of an innovation. In fact, he recommends that innovation disseminators should actively attempt to influence social networks by creating connections among current adopters. Conversely, Parthasarathy (1995) found that individuals who discontinue because of disenchantment are more likely to initiate negative word-of-mouth contact with other adopters or potential adopters, which could affect future diffusion patterns.

One aspect of adoption and discontinuance scarcely made explicit in the literature is candidly brought up by Keilmeyer (2003), who identifies what he terms the “hassle factor”: a “more than petty annoyance” that single-handedly causes individuals to discontinue the use of an innovation. The hassle factor occurs when technical problems associated with the innovation are not adequately addressed, when installation is difficult, and when help is unavailable or offered by unhelpful staff. The idea of a “hassle” spurring discontinuance seems self-evident, but it is difficult to overstate its importance. If it is indeed technical or behavioral “hassles” associated with a new technology that are cause for its discontinuance, then extension agencies have a very discrete factor to work with and target in their attempt to motivate ongoing use of environmental technologies. As we will shortly see, it is the hassles associated with environmental innovations that largely account for the cessation of their use in tropical Costa Rica.

**Purpose and Objectives**

The present study was designed as a preliminary, qualitative investigation of the discontinuance of conservation technologies currently promoted by EARTH University in the communities immediately surrounding the school. The two primary objectives of the project were: a) to identify specific factors that contribute to the discontinuance of environmental technologies, whether related to the technologies themselves or the wider social context; and b) to identify ways that EARTH can contribute to the continuing use of the technologies that it promotes.
Methods

During a previous research project in 2006, data were collected via semi-structured interviews with 185 individuals in eight communities in the area surrounding EARTH University. Respondents provided data on demographic, household, and farm characteristics as well as their use of a specific suite of environmental technologies actively promoted by EARTH. In the present study the 2006 data were supplemented with additional survey and interview responses in order to investigate discontinuance of the same technologies, a topic not broached in the first study.

A snowball sampling procedure was used, with key informants and other farmers in the community identifying current adopters and possible discontinuers of the specific conservation technologies. Individuals were primarily smallholder part-time or full-time farmers living in rural settings and growing a variety of tropical crops in a humid setting close to the Caribbean coast of Costa Rica. Space limitations prevent a more detailed description of the study site; more information is available in Miller et al. (in press).

Interviews were conducted with a total of 69 individuals, of whom 33 had discontinued one or more of the four technologies promoted by EARTH: biodigestors, worm compost systems, bokashi, or E.M. (Efficient Microorganisms). Because so little has been written on discontinuance, our intent was not to conduct a full sociological survey of farmers but to carry out more in-depth qualitative research for the purpose of sketching an initial picture of discontinuance and some of its contributing factors in the geographic area in question. Our desire is that the qualitative narrative that follows begins to sketch in this picture and can serve as the baseline for future studies of discontinuance as well as more concerted extension efforts aimed at dissatisfied adopters or outright discontinuers.

Results

Findings from the 2006 survey indicate that there is a high rate of discontinuance of all of the conservation technologies originally studied in the Parismina watershed. Among adopters: 28% discontinued the use of biodigestors, 40% discontinued the use of E.M., 50% stopped producing worm compost, and 67% discontinued the use of bokashi. The two primary questions motivating the follow-up study were: (1) What were the major factors leading to discontinuance; and (2) is there a role that EARTH extension can play in the post-adoption process to decrease such high rates of discontinuance? Before we discuss the discontinuance of the use of these technologies, however, it is worth discussing what particular advantages they offer that make them attractive to ongoing users. The following section utilizes data from both the 2006 and the follow-up 2007 survey.

Benefits of Environmental Technologies

Respondents were questioned on whether a given technology fulfilled their expectations and what advantages and disadvantages they saw in its use. Relative advantage is a vital part of any study on discontinuance, because it is noted as an excellent predictor of post-adoption behavior (Keilmeyer, 2003). A look at the responses given by surveyed individuals reveals a wide range of advantages offered by the four technologies in question, differing from technology to technology. The three broad advantages which stand out the most are economic advantages, health benefits, and the technology’s unanticipated ability to solve certain secondary problems on the farm.

Not surprisingly, the ongoing use of any given technology could be attributed in large part to economic reasons. The use of the technologies saved respondents money via the substitution of a homemade product for a purchased one, whether it be chemical inputs replaced by homemade organic products or biogas from a biodigestor.
replacing purchased cylinders of propane. Additionally, several ongoing users of worm compost and bokashi noted that they sold any surplus product that they could not use on the farm, thus providing an extra source of income.

Respondents also noted the health advantages associated with the use of some environmental technologies. Health benefits were noted when farmers consumed their own organically grown produce (aided by bokashi and worm compost) or ceased to use chemicals on the farm (Ibid.), thereby decreasing their own exposure. Additionally, cooking with biogas resolved the health risk of inhaling the smoke from a wood fire.

Perhaps one of the most interesting reasons given for the relative advantage of a technology is that they solve secondary technical problems on the farm. Biodigestors in particular provided manure treatment solutions, resolved the logistical difficulty of transporting cooking gas, and relieved the need to find dry firewood. Some representative quotes along these lines include: “Without a biodigester to treat the manure that my animals produce, where would I put it?” (Current user, biodigester), and “To buy a cylinder of gas and bring it here in a car is expensive. You are taking your life in your hands if you put it on your back and try to ride your bike with it” (Current user, biodigester). Users of E.M. and biodigestors also noted the twin advantages of odor and pest control provided by these technologies, which additionally aided in the maintenance of good relations with close neighbors.

Another secondary advantage provided perhaps inadvertently by the technologies in question was their potential to attract agro-ecotourism visitors, an important economic sideline in this part of Costa Rica. This advantage was multiplied for those individuals utilizing more than one environmental technology. As one user of both E.M. and worm compost put it, “Tourists want to visit integrated farms, so that’s why I maintain all these technologies.” Agro-ecotourism was viewed as an excellent manner in which to supplement the farm income, and thus worth the effort of maintaining the technologies. This was particularly important to several respondents who noted that agro-ecotourism was their primary business and source of income: “Without agro-ecotourism we don’t have much to support ourselves with. Tourists bring in the dollars.” (Current user, biodigester and worm compost).

Factors Leading to Discontinuance

Not all producers agreed on the merits of the technologies, of course, and the specific intent of this research was to concentrate on the negative experiences that led respondents to cease the use of any of the four technologies. Comments such as “it never worked” and “it didn’t work like I thought it would” were prevalent. Some farmers who found that the technology did not meet their expectations were continuing to use the technology in the hopes that their experience would improve with time, while others had already discontinued use.

Each technology was associated with specific characteristics that led to discontinuance, and one of our findings relevant to extension agents is that attempts to improve producers’ experiences with these technologies must be targeted specifically by technology. That is, there were no technical issues that were consistent across all of the technologies in question.

Biodigestors and worm compost systems came the closest to sharing the same technical complaint, which was simply that they are difficult to maintain. For biodigestors, holes appearing in the plastic bag were the most common complaint. Such ruptures come about in a variety of ways: degradation under the tropical sun; farm animals (most commonly cows) falling on top of the biodigester; animal pests such as rodents or insects eating through the plastic; tree limbs falling on the bag; and rocks in the underlying trough poking a hole in the bag. One patient farmer took the time to
count the holes in his biodigester as he repaired it and found twenty-two tiny holes he presumed to be made by insects. A separate headache was when heavy rains and flash flooding caused the troughs that the biodigesters rest in to fill with water and in some instances caused the walls of the trough to cave in.

Another technical problem unique to biodigestors has to do with the manner in which they are fed. Raw materials can be added to biodigestors in one of two main ways: either by washing the manure directly from the animal stalls into the biodigestors, or by mixing buckets of manure with water and manually pouring them in. Farmers who use the latter method of manure entry featured a higher rate of discontinuance of the biodigestors. In some of these cases the main source of manure is from cattle, and collected from the pasture. There were also several ambitious respondents who collect manure from their neighbors in order to feed their biodigestors. Finally, there was a class of respondents that washes animal stalls with water, but does not drain the manure slurry directly into the biodigester, thus necessitating an extra step of collecting the slurry and manually feeding it into the biodigester. These water and manure issues are essential to biodigester success because additional problems can present themselves as a result of an improper balance between manure and water.

This issue of biodigester alimentation relates to a theme that we will see again below, that of labor requirements. For example, the chief biodigester expert on the EARTH campus recommends that five buckets of water need to be fed into the biodigester for each bucket of manure in order for the device to function correctly. He then notes, “Well, it’s easy for me to say. I’m not there to carry five buckets of water every day.”

Worm compost systems were also reported by many producers to be a problematic technology to maintain. The single most common complaint was that the worms are eaten by other farm animals or insects. Other challenges stem from a lack of basic knowledge: ongoing maintenance proves difficult because producers are unsure how to properly feed the worms, what temperature to keep them at, or how to extract the castings that they produce. Finally, the process of making worm compost is long and requires constant vigilance. The ratio between the amount of labor involved in the production of the compost and the value of the final product was too high for many discontinuers.

Bokashi (a kind of manufactured compost with high biological activity) featured the highest rate of discontinuance – fully two-thirds of adopters had discontinued its manufacture or use – and suffered from two major kinds of complaints. First, similarly to making worm compost, several respondents noted that its creation was a highly labor-intensive process. With ongoing structural changes in Costa Rican agriculture forcing more farmers to take off-farm work to make ends meet, the question of labor time becomes an increasingly crucial issue.

The second reason for discontinuing was peculiar to bokashi – a lack of raw materials. The creation of bokashi requires a select number of ingredients mixed in certain proportions, and several respondents noted that they could not continuously make the compost because they lacked the necessary resources on the farm. One interviewee, for example, noted that she utilized bokashi in a semi-continuous fashion: she made the product when she had enough resources on the farm, then discontinued use when she ran out of materials, but planned to make it again when she obtained the necessary ingredients. Her experience points to an important methodological consideration of research into discontinuance: discontinuance of a technology is often not a discrete phenomenon captured by a simple “yes” or “no,” but rather a state of use that a farmer...
goes into and out of as resources, labor, and time become more or less available.

E.M. featured a discontinuance rate of 40%, and the reason for its discontinuance proved fairly unique among the four technologies studied. E.M. is a liquid product containing large numbers of biodegrading microorganisms which help to more quickly process wastes into compost or fertilizer. It is also frequently used for its sanitary effects – applying the liquid solution to areas that contained animals or animals wastes helps to keep those areas looking and smelling clean and relatively free of insects. Because it is an innovative product virtually unknown to the producers in the area, EARTH extension workers and students distributed free samples to many farmers in the outlying communities, hoping that its beneficial effects would spur continued use of the product. However, many producers ceased use after they finished their free sample. One respondent’s statement was typical:

[An extension worker] brought EM to me many times, trying very hard to get us to use it and get the project off the ground. Maybe it is carelessness, but I never started buying it for myself or using it regularly.

After the initial free sample, producers did not begin to purchase the product for themselves because they thought it was either too expensive or they did not know where they could buy it. Interestingly, of all respondents surveyed, none reported that they were actually dissatisfied with the product – cost and availability were the only two barriers to continued use.

All of the factors discussed so far generally correspond to Keilmeyer’s (2003) “hassle factor.” These problems related to technical issues or labor shortages create a barrier to continued use due to the sheer headache that they cause adopters, and they account for the most common category of reasons for discontinuance. Discontinuance also results for reasons unrelated to the specific characteristics of the technology.

For example, a change in farming activities can result in the discontinuance of a previously adopted technology. Respondents noted that they changed their farming activities in response to markets and no longer required the use of the technologies. This resulted in several instances when farmers turned their full attention to crops and did not maintain animals on the farm any longer. Bokashi, E.M., and biodigestors were discontinued in these cases. This touches on an issue of great importance that our survey did not delve into in depth – the role of socioeconomic factors and structural changes in the agricultural industry in making certain technologies more or less attractive to farmers.

Another event that can trigger discontinuance is when EARTH students stop coming to help on the farm. Part of the curriculum at EARTH is a field experience module where students go into the community to work with local producers to help improve their farms. Often the students bring with them technologies and ideas from EARTH and help the farmer implement them. Discontinuance of these technologies was seen when the work experience module was over and the students were not on the farm on a regular basis to help the farmer maintain the technologies and answer questions about their use. Farmers often noted that they did not have adequate information or labor to maintain the technology after students left.

A third characteristic of the wider social context that contributes to discontinuance is when only a single person in a family, business, or community knows how to operate a technology and is strongly committed to the goals and benefits associated with its use. When the burden of maintaining the technology falls to one individual, discontinuance results at a higher rate. This form of discontinuance may occur when the individual grows too old to maintain the technology, leaves the region for a time, or finds the demands of maintenance to be too great to take on alone.
Some representative quotes follow: “I feel more tired as I’ve gotten older, so I’ve let some of the technologies go.” (Biodigestor, worm compost, bokashi discontinuer); “If I don’t feed it, no one will. If there were two or three other parents who would help me feed it we could get it working again. We could alternate days. But no one else is interested”. (Biodigestor discontinuer); and, “I went out of town for a couple of months and my employees did not bother to maintain the biodigester. Now it is in such bad condition that I cannot repair it”. (Biodigestor discontinuer)

A final social variable emerging from the surveys was that cooking with biogas is seen as dirty or unsanitary by some members of the community. A biogas user noted, “There are a lot of people who won’t eat food cooked with biogas. They think the food is contaminated.” Another, mimicking her neighbor’s reaction, stated, “That’s disgusting! To eat food that was cooked with gas from manure!” Given that some of these communities are isolated, the effects of this kind of social opinion can be more than minor.

Discontinuance and Extension Efforts: Implications of the Study

The final objective of the study was to identify ways that EARTH research and extension can contribute to the continuing use of the technologies that they promote. First, levels of connectivity to an extension resource will be discussed, followed by suggestions for improvement as supplied by both innovation continuers and discontinuers.

Varying levels of connectivity to an extension resource were noted in the community. Several respondents reported that they had close connections with the university and knew of a specific person they could call if they had trouble. “I’ve had excellent support from EARTH. I know I can call EARTH anytime and they will come running to lend a hand” (Biodigestor, EM, worm compost, and bokashi, current user). Other respondents feel less connected to the university: “EARTH installed the biodigester and we didn’t hear from them again until now” (Biodigestor, worm compost, and bokashi discontinuer).

Respondents with a closer relationship to an extension resource were continuing users in many cases. Continuing users who had questions about the technology were more likely to identify at least one individual (extension agent, professor, or student) who they could ask for help if a question arose.

Both current users and discontinuers were asked how they could be better supported by extension services in their endeavors to use the technologies. Many respondents noted a need for follow-up instructions on how to maintain the technology after they had been working with it for some time. “The university could provide more information because we know little how to operate these technologies. It is only damaging to ourselves [the producers] when we don’t know what to do” (Biodigestor and worm compost discontinuer). “The biodigester project needs to have a component to help people to continue to use their biodigester. It is an excellent project. But someone needs to visit them and put a little heat on them to keep their biodigestors working” (Biodigestor discontinuer). Additionally, respondents requested information on how to repair the technology if it breaks. Printed materials and workshops on technology maintenance were their principal suggestions. This corresponds with the data discussed earlier about technical problems occurring some time after adoption and causing the cessation of use because of a lack of knowledge about how to resolve them.

Beyond turning to extension resources, continuing adopters also used their interpersonal networks in order to obtain information and advice about their technologies. For example, in the upper watershed there is a cohesive agro-ecotourism group, with many of the members maintaining the same
environmental technologies. The group meets regularly, which provides an opportunity for members to discuss problems or issues that arise with their technologies. As Keilmeyer (2003) found, diffusers of innovations should actively attempt to influence social networks of adopters by creating connections among current users. This is true not only because of the higher likelihood that a producer may adopt a given technology when hearing about it from a friend or peer, but also because, as in the case of the agro-ecotourism group, a rich social network can also create a safety net to fill in with advice and technical support when these are lacking from officials.

Conclusions

Among smallholders in the humid tropics of Costa Rica, the discontinuance of once adopted environmental farm technologies can be attributed to two broad classes of factors: 1) those characteristics of the technology itself, including its labor demands, that create a “hassle” for the farmer which, if unresolved, cause its eventual discontinuance; and (2) factors related to the larger socioeconomic context in which adoption takes place, which may include a major change in farming activities in response to shifting markets or the reduction of a farm workforce to only one individual.

These factors make for discrete problems towards which extension educators can tailor their work. Technical snags in particular are a major issue for producers in this region, and they need to be adequately addressed in a timely fashion in order to limit the hassle factor associated with the maintenance of the technologies. Holding ongoing maintenance workshops for technologies such as biodigestors or worm compost systems or sending extension agents to the homes of known recent adopters are two strategies that an extension agency might consider. In addition, extension educators could attempt to aid the formation of active social networks among producers that meet regularly, following the example of the agro-ecotourism group mentioned in the discussion above.

We should not close without acknowledging that in some cases discontinuance may be an entirely reasonable and even desirable choice on the part of the farmer. A major criticism of the traditional Rogers innovation diffusion model is its pro-innovation bias (see Vanclay and Lawrence, 1994). The assumption that an innovation should be used by all potential adopters has been critiqued by numerous scholars as being inappropriate to the socioeconomic context many smallholders in developing countries find themselves in. A producer may adopt and eventually discontinue an innovation because it simply does not fit his farm context or he lacks the proper capital, labor, or technical knowledge to continue its use. Bunch and Lopez (1995) echo the point that discontinuance is not always negative. They believe that many farming technologies fall by the wayside because of changing circumstances that alter the producers’ need for technologies. Even if a technology is not sustainably used, they suggest that using the technology in the first place opens the individual’s mind to innovation and inventiveness.

Future research could fruitfully address this area further: once a person has adopted and then discontinued a given innovation, does this trigger further innovativeness or signal a reversion to the status quo? A second line of future research that would tap into very current scholarship within the social sciences would be to expand our understanding of the role of social networks in the diffusion of environmental technologies. There is ample anecdotal evidence that a farmer’s “connectivity” to other innovative peers plays an important role in ultimate patterns
of adoption (and continuation), but we are in need of more rigorous and substantive empirical research. Finally, we contend that a particularly interesting expansion of the present study would be to change the geographic locale, from the smallholding context in the developing world to that of the developed world. Specifically, the United States presents a fascinating case study of the adoption and diffusion of environmental technology because of the large number of small, part-time, or “hobby” farmers attempting to farm ecologically. The juxtaposition of, on one hand, this large network of individuals with the intent to practice environmental land use practices and, on the other hand, a socioeconomic situation in which nearly all agricultural activity is subsidized by off-farm work, creates an interesting research question: what form will patterns of adoption of environmental technologies in the U.S. take when their use typically requires an additional output of labor, time, and money that may go uncompensated?

References


Proceedings of the 23rd Annual Meeting of the Association of International Agricultural Education & Extension. Polson, Montana, USA.


Testing the Market Potential for a New Value-Added Cowpea Product to Improve the Well-Being of Women Entrepreneurs in Niger

Germaine Ibro  
Institut National de Recherche Agronomique du Niger  
E-mail: geribro@yahoo.fr

Ramatou Seydou  
Institut National de Recherche Agronomique du Niger  
E-mail: boubarahma@yahoo.fr

Kaka Saley  
Institut National de Recherche Agronomique du Niger  
E-mail: inran@intnet.ne

Kira Everhart-Valentin  
International Programs in Agriculture  
Purdue University  
E-mail: kevalentin@purdue.edu

Joan Fulton  
Department of Agricultural Economics  
Purdue University  
E-mail: fultonj@purdue.edu

James Lowenberg-DeBoer  
International Programs in Agriculture  
Purdue University  
E-mail: lowenbj@purdue.edu

Miram Otoo  
Department of Agricultural Economics  
Purdue University  
E-mail: motoo@purdue.edu

Abstract

Women street vendors are an integral part of the economy of Niger. They prepare and sell inexpensive food for passersbys and use the money they make to support their families. A common product these women have traditionally made is kossai, a nutritious, high-protein product that has been a customary food for generations. An important challenge for women street vendors is preparing the kossai batter from whole cowpeas, as it is a highly labor-intensive and physically-demanding process. In this study, researchers conducted a direct market test in which 100 women in the city of Niamey, Niger, were given two kilograms of coarse textured cowpea flour to use in their daily kossai production. Research indicates that finely ground cowpea flour produces dense, unpalatable kossai, while coarser flour results in a lighter, more palatable product. The women were then surveyed to determine the quality of the kossai produced from the flour and overall client satisfaction. The women found the flour to be highly advantageous, saving them time, energy and inputs, and 79% reported that they would use the flour for their kossai production if it were made available to them. The adoption of this new technology would have numerous effects, including enhanced economic development of Nigerien communities, positive health and nutritional impacts, and the creation of a new sector in the value chain.

Keywords: Women in development, Economic development, Entrepreneurship
Introduction

Women street vendors are a familiar part of the marketplace throughout West Africa and in Niger, particularly. They prepare and sell inexpensive food for passersbys and use the money they make to support their families. A common product these women have traditionally made is a deep-fat fried fritter comprised almost entirely of cowpeas - commonly known in the U.S. as black-eyed peas - with pepper or garlic added for flavor. This fritter is referred to by a number of names, including “kossai” in Haussa, “kékéna” in Dgerma, “akara” in languages along the Nigerian, Senegalese and Ghanaian coasts, and “samsa” in Burkina Faso. For the purposes of this article, the word “kossai” will be used. Kossai is a nutritious, high-protein product that has been a customary food for generations. It is eaten by virtually everyone in Niger, from small children to the elderly. It may serve as a breakfast food for children or adults on their way to school or work, or as a late afternoon snack as individuals return home. Regardless of how commonly kossai is consumed, in Niger it is most often not produced at home, instead being purchased from street vendors. The production and sale of kossai is an important business activity for women street vendors (Ibro, Fulton, Lowenberg-DeBoer, Moussa, & Otoo, 2007a).

The role of cowpeas in Niger

Niger is a very poor country located in West Africa. It is landlocked and bordered by Nigeria, Benin, Burkina Faso, Mali, Algeria, Libya and Chad. Of the nearly 13 million people living in Niger, only 28.7% of those over the age of 15 years are literate (42.9% of men and 15.1% of women). The average age is 16.4 years and life expectancy is 44 years. The GDP per capita was only $244 US per year in 2005, and the country is ranked 174 out of 177 total countries on the Human Development Index (United Nations Development Programme, 2008). Agriculture employs 90% of the labor force and represents 39% of the Gross Domestic Product (GDP). However, only 11.43% of the land is arable and reoccurring droughts, soil erosion and desertification pose significant challenges (CIA, 2008).

Cowpeas are one of the few crops that can grow well in the harsh conditions in the semi-arid areas of West Africa. Niger is the number one exporter of cowpeas worldwide, and according to official statistics, nearly 300,000 metric tons of cowpeas were traded in West Africa in the 1990s (Langyintuo et al., 2003). Because of this, they are an important cash crop for small-scale farmers in Niger. As a legume, cowpeas are an important source of protein for the entire population, both rural and urban. This nutritious food is prepared in a variety of dishes, some of which are prepared at home, and others that are purchased on the street either for immediate consumption or to take home for family consumption, such as kossai (Ibro, Fulton, Lowenberg-DeBoer, Moussa, & Otoo, 2007b). Value-added processing of cowpea for use in street food uses a significant amount of the input, with the three main urban areas of Niger (Niamey, Maradi, and Zinder), having an average daily use of cowpea of more than 3,500 kg for the production of kossai alone (Ibro et al., 2007a).

Women and kossai: The informal sector and economy

Women street vendors are an important part of what is known as the informal sector that plays a vital role in the economies of the developing world. Charmes (2000) notes that in 1995 over 25% of the population was employed in the informal sector with the contribution to GDP being over 37%. The informal sector in Niger has seen steady growth over the past decades, and in fact, in recent years, the
income gained from the small informal businesses has surpassed that of the formal sector in the city of Niamey, Niger (Charmes, 1998). Women constitute more than 75% of the participants in the informal sector (Canet & N’Diaye, 2006). The preparing and selling of food items, such as kossai, is one of the primary business types in the informal sector (Ibro et al., 2007a).

The value-added processing of cowpea into kossai is performed almost entirely by women. The cultural and economic realities faced by Nigerien women present them with significant challenges to income generation. This “feminization of poverty” is often manifested through more restrictions on women’s choices and opportunities, as well as lower incomes, than men (Fukuda-Parr, 1999), making kossai production and sales a particularly important business activity for them. Women are responsible for the care of children and the household (Kevane, 2004), and have been shown to spend the income they earn from their kossai business on their families for food, clothing, medical expenses, school, and savings, thus contributing directly to economic development and poverty alleviation (Ibro et al., 2006).

The challenge for women: Preparing the kossai

An important challenge for women street vendors is preparing the kossai batter. The process is highly labor intensive and physically demanding. It involves soaking then dehulling the cowpeas, taking the cowpeas to the grinder for wet grinding to make a paste, creating a batter from the paste and finally deep-fat frying the batter to make kossai. Fulton (2006) found that this process is so time and labor intensive that in some regions in West Africa, where the opportunity cost of women’s time is greater, women have abandoned the tradition of producing kossai, instead choosing to produce and sell deep-fat fried wheat-flour beignets. Since the wheat-flour beignets are made from imported wheat flour, there is no longer the use of a locally-produced input (Otoo, Ibro, Fulton, & Lowenberg-DeBoer, 2008). In addition, this new product has significantly less nutritional value for the consumers.

Previous research in Niger explored the challenges that these women street vendors face in order to determine ways to improve the well-being of this important informal sector of the economy. After concluding that the preparation of the batter was an important constraint, multi-disciplinary research (involving economists and food scientists) was conducted to determine the potential to use a dry cowpea flour product that could be mixed with water to make kossai. Research revealed that a dry cowpea flour that is course in texture and where the particle size is large (resulting in a texture similar to cornmeal) is effective in producing good quality kossai (i.e. kossai with the same quality characteristics as kossai prepared traditionally) (Fulton, 2006; Singh et al., 2005; McWatters, Hung, Chinnan, & Phillips, 2001).

Currently, it is difficult to produce cowpea flour with the coarse texture in the marketplace in West Africa. More finely textured, homogeneous cowpea flour can be produced with available grinders (small mills). The mills commonly available in the marketplace in Niger are plate mills where the product is ground by being forced between two metal plates. Since fine adjustments are not possible with plate mills it is not possible to get the coarse-textured flour product. The fine-textured flour from the plate mills results in kossai that is not even-textured, but rather has larger air holes in some places and is dense in other areas and, perhaps most importantly, is not desired by consumers. Work carried out as part of the Bean/Cowpea Collaborative Research Support Program (CRSP) in the summer of 2006 revealed that flour of the appropriate coarse texture could be produced with a hammer mill. With a hammer mill, the screen size can be selected for the desired large particle size for the flour. Since
hammer mills are not regularly found in the marketplace in West Africa, it is not currently possible to produce the coarse-textured cowpea flour in the private sector (Fulton, 2006).

Producing the cowpea flour for kossai vendors using a hammer mill represents the potential for improved quality of life for kossai vendors and their families, as well as an important new entrepreneurial activity. African women are often expected to work longer hours than men (Africa Recovery, 1999), and the time and energy saved by the women through the utilization of the cowpea flour would allow them to focus on other activities, rest or even undertake other income-generating enterprises. In addition, the development of a successful cowpea flour would likely result in a new stage in the value chain with the production of cowpea flour that would be sold to the women street vendors. This new business activity has potential if the women street vendors are willing to purchase the flour at a price that would be profitable for the entrepreneur owning the mill.

*Adoption theory as related to cowpea flour for kossai*

The market potential of a new cowpea flour by women street vendors will be dependent on several factors, not the least of which is women’s willingness to adopt this new technology. Literature on adoption provides important insight. Rogers (1995) identifies that relative advantage, compatibility and complexity are important in determining whether any new technology is adopted. In particular, the new technology must represent an advantage for the user relative to the alternative. Second, the new technology must be compatible with the way the users of the technology function, including being consistent with tastes, preferences and cultures. Third, the new technology must not be so complex as to make it impossible for the user to adopt. In relation to the proposed cowpea flour, this means that for the women street vendors to adopt the new technology, it must offer a greater benefit and advantage than preparing kossai through the traditional method. In addition, the implementation of that technology must be compatible with not only the women’s enterprises, but also within the structure of their lives as a whole. As Rogers (1995) explains, if the proposed technology is found to be outside or contrary to the societal norms within which the women exist, the chances that it will be adopted are greatly reduced. The complexity of the proposed cowpea flour is also important to take into account, as if it is too complex or difficult to utilize, hopes for adoption will quickly be replaced with the reality of rejection by the women vendors. Education level has also been shown as having a positive effect on adoption rates of new technologies (Agwu, 2004). In the case of the kossai vendors in Niger, the education level of the women vendors is very low, a factor which could be a challenge. In particular, formal communications with the user group (in this case, the women vendors) that require literacy will not be effective. Ajayi (2001) found that adequate follow up with the adopters can be an important factor in adoption. This practice could be of particular importance when working with individuals with lower levels of formal education and limited access to information resources, such as the women kossai vendors. A final factor in adoption is the availability of the technology (Rogers, 1995). For the cowpea flour, this is reflected by the need to make the proposed cowpea flour easily accessible and available to interested vendors. It is necessary to consider these various elements of adoption when determining the market potential of proposed cowpea flour.

**Purpose and Objectives**

The objective of this paper is to report the results of a research and extension project involving women entrepreneurs in Niger selling street food from cowpeas. The
results of the combined research and extension effort will allow us to determine the potential for a value-added cowpea product (cowpea flour with coarse particle size) in the marketplace and the potential to increase the well-being of an important group of entrepreneurs in Niger, as well as in many other areas of West Africa, through the adoption of this new technology.

This particular research is one component of a multi-disciplinary research project on consumer acceptance involving women selling cowpea-based street foods in Niger. The objectives of this project include the following:

1. Measure the perceptions of both kossai vendors and consumers in regards to kossai prepared with the proposed cowpea flour.
2. Identify the advantages and disadvantages for kossai vendors of utilizing the proposed cowpea flour.
3. Measure vendors’ willingness to purchase the proposed cowpea flour and at what price.

**Methods**

This project combined research and outreach (extension) from a multi-disciplinary approach to collect primary data from a target population of women kossai vendors regarding a newly developed cowpea flour and the proposed flour’s market potential. Researchers from food science and agricultural economics pooled knowledge and experience in conducting a direct market test in which 100 women in the city of Niamey, Niger, were given two kilograms of cowpea flour (of the coarse texture that makes high quality kossai) to use in their daily kossai production. This quantity was enough to produce a full day’s supply for most vendors. These women were selected using a stratified random sample approach from the 1,300 women who had already been identified as the kossai producers in the city. The researchers met with each of the women when the flour was distributed, giving directions on how to use the flour and asking them observe the quality of the prepared kossai and the reaction of their customers. The researchers returned the following week and through one-on-one interviews obtained data on how the vendors liked the flour, how cooking with the flour compared with traditional methods, the quality of the kossai they were able to make, vendors’ perceptions of customer preferences regarding the kossai, and their willingness to purchase the flour.

**Findings/Results**

**Characteristics of the women vendors**

Of the 100 women who participated in this study, ages ranged from 16 years to 73 years with the average age being 40.7 years and 50% of respondents falling between the ages of 35 and 50 (Table 1).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Range</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>16-73</td>
<td>40.7</td>
<td>12.15</td>
</tr>
<tr>
<td>Experience (years)</td>
<td>1-30</td>
<td>10.2</td>
<td>7.202</td>
</tr>
<tr>
<td>Quantity of cowpeas used per day (kilograms)</td>
<td>1.25-7.5</td>
<td>2.5</td>
<td>1.29</td>
</tr>
</tbody>
</table>

The respondents reported very diverse levels of experience in selling kossai (Table 1), ranging from one to 30 years, with an average of 10.2 years. Thirty-three percent of the women surveyed had five years of experience or less, 22% had between five and ten years, 17% had between ten and 15 years, 10% had between 15 and 20 years and
7% had more than 20 years experience. Eleven percent of the women did not respond to this question. In preparing their kossai batter, respondents reported using an average of 2.5 kilograms of cowpeas per day. Responses showed a daily usage of anywhere between 1.25 to 7.5 kilograms, with 76% of the respondents using between one and 2.5 kilograms.

More than 35% of the women surveyed had completed no education, while 41% had some Koranic education and less than 20% had formal primary or secondary education or some basic literacy training (Figure 1). Kossai production and sales is an important activity for a segment of the population with very little formal education.

![Figure 1: Education Level of Women Vendors.](image)

While all women surveyed sold kossai, 66% sold one additional product, 11% sold two additional products, and 4% sold at least three additional products, with virtually all of these being a deep-fat fried food product of some kind (Figure 2). In addition to kossai, 82% of the women also sold fari massa, a wheat-flour fried fritter, 8% sold fried sweet potatoes (patate douce), 7% sold igname (yam) fries, 5% sold tsala, a millet-based fried flat cake, and 2% sold bouillie, a thick, millet-based beverage. In fact, of the women who sold at least one additional product, all but one identified fari massa as being one of those products.

![Figure 2: Products Sold by Women Vendors in Addition to Kossai.](image)
The respondents represented a relatively wide spread of daily income (Figure 3), ranging from less than 250 CFA francs (FCFA) per day to more than 2,000 FCFA per day. However, the greatest number of women (43%) reported daily earnings of 500-1000 FCFA per day and 27% reported 1000-2000 FCFA per day. With current exchange rates ($1US = 416 FCFA), these income levels range from less than $0.60 to approximately $4.80 per day. The daily income earned by kossai vendors is substantial in a country where 60.6% of the population lives on less than US$1/day (World Bank, 2007).

![Daily income](image)

**Figure 3:** Daily Income Reported by Women Vendors.

**Perceptions of the cowpea flour**

When the women vendors were later surveyed on their experience with the flour and the kossai that resulted from using the flour, several questions were asked regarding the culinary qualities of the flour. In general, women were pleased with the flour quality (Table 2). The characteristics of color, texture and taste of the resulting kossai were seen as satisfactory, with 81%, 82% and 80% of respondents, respectively, describing them as “acceptable” or “better.” Similarly satisfied, 72% of respondents found the moisture level of the prepared product to be “sufficient,” and 70% found that the kossai required less oil than the traditional product, an important cost-saving benefit. Regarding cooking time, 87% of respondents reported that the batter from the flour took less or equal time to cook into the kossai, showing that the batter appears to be time-saving for many. However, for a number of characteristics, the responses collected were somewhat inconclusive regarding the flour’s quality. For the characteristics of mixing/preparation ease, mixing/preparation time and yield after cooking, responses were split nearly equally between all three options, with only yield after cooking seeing a slightly higher percentage of women (40%) responding “less.” These inconclusive responses may indicate a lack of understanding by the respondents in the preparation process, demonstrating the need for more thorough explanation and training in batter preparation for future distribution.
Table 2:

<table>
<thead>
<tr>
<th>Respondent Reactions to the Culinary and Sensory Qualities of the Provided Cowpea Flour</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydration rate (moisture level) 1=Sufficient, 2=Insufficient, 3=Too much</td>
<td>72%</td>
<td>18%</td>
<td>6%</td>
<td>1.26</td>
</tr>
<tr>
<td>Mixing/preparation ease 1=Easier, 2=Identical, 3=More difficult</td>
<td>37%</td>
<td>30%</td>
<td>33%</td>
<td>1.96</td>
</tr>
<tr>
<td>Mixing/preparation time 1=Shorter, 2=Equal, 3=Longer</td>
<td>32%</td>
<td>36%</td>
<td>32%</td>
<td>2.00</td>
</tr>
<tr>
<td>Amount of oil required 1=Less, 2=Equal, 3=More</td>
<td>70%</td>
<td>16%</td>
<td>14%</td>
<td>1.44</td>
</tr>
<tr>
<td>Cooking time 1=Shorter, 2=Equal, 3=Longer</td>
<td>40%</td>
<td>47%</td>
<td>9%</td>
<td>1.61</td>
</tr>
<tr>
<td>Yield after cooking 1=Less, 2=Equal, 3=More</td>
<td>40%</td>
<td>24%</td>
<td>32%</td>
<td>1.84</td>
</tr>
<tr>
<td>Color 1=Not good, 2=Acceptable, 3=Better</td>
<td>10%</td>
<td>63%</td>
<td>18%</td>
<td>1.90</td>
</tr>
<tr>
<td>Texture 1=Not good, 2=Acceptable, 3=Better</td>
<td>11%</td>
<td>71%</td>
<td>11%</td>
<td>1.86</td>
</tr>
<tr>
<td>Taste 1=Not good, 2=Acceptable, 3=Better</td>
<td>13%</td>
<td>58%</td>
<td>22%</td>
<td>1.95</td>
</tr>
</tbody>
</table>

Potential impacts of cowpea flour on respondents’ businesses

During the one-on-one interviews, the women were asked a number of open-ended questions regarding their impressions of the cowpea flour. When asked to identify the advantages that the cowpea flour provided, 93% of respondents identified at least one advantage (Table 3): 56% noted that the flour saved them time and energy by offering faster preparation, increased time for rest and/or eliminating the need to go to a mill for traditional processing. Twenty-nine percent were pleased to see that the flour consumed less oil than traditional methods of preparing kossai, and 28% noted improved conservation, meaning that they could store the cowpea flour (once kossai batter is prepared the traditional way it is very perishable). Other advantages that were mentioned included a good taste to the kossai, the ability to make kossai even when it rains and an increase in income when selling kossai made from the flour.
Table 3

Advantages and Disadvantages of Provided Cowpea Flour as Identified by Respondents

<table>
<thead>
<tr>
<th>Advantages</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saves time and energy (faster preparation,</td>
<td>56%</td>
</tr>
<tr>
<td>increased time for rest, no need to</td>
<td></td>
</tr>
<tr>
<td>go to the mill)</td>
<td></td>
</tr>
<tr>
<td>Consumes less oil</td>
<td>29%</td>
</tr>
<tr>
<td>Improved conservation</td>
<td>28%</td>
</tr>
<tr>
<td>Disadvantages</td>
<td></td>
</tr>
<tr>
<td>Kossai becomes hard after cooling</td>
<td>15%</td>
</tr>
<tr>
<td>Kossai not white enough</td>
<td>10%</td>
</tr>
<tr>
<td>Consumes too much oil</td>
<td>7%</td>
</tr>
</tbody>
</table>

In addition to advantages, the women were requested to identify the disadvantages of the cowpea flour (Table 3). It is important to note that 44% did not identify any disadvantages at all. However, there were some disadvantages that were identified by multiple respondents. One of these was that the kossai becomes hard after cooling, with 15% of respondents noting this concern. It was not determined how this characteristic compared to the kossai prepared in the traditional way, as that kossai, too, tends to harden after cooling. Ten percent of respondents found that the internal color of the kossai was not white enough, and 7% found that preparing the kossai consumed too much oil. This final disadvantage is particularly interesting in light of the fact that one of the main advantages identified by the respondents was that the kossai consumed less oil. There is a strong possibility that the individuals who had problems with too much consumption of oil may not have clearly understood the preparation techniques needed in utilizing the flour. Other disadvantages reported included the flour not being milled well, difficulty in mixing/preparing the batter and that their clients did not like the kossai prepared with the cowpea flour.

When asked about how difficult or easy it was for the women to sell the kossai prepared from the provided flour, 79% indicated that selling was “easy” and 11% indicated it was “moderate.” In addition, 86% of the respondents reported that the cowpea flour saved them time in the kossai preparation process as compared with the traditional methods. In response to an open-ended question regarding how the women used the time saved, 82% of respondents said that they used the time to rest, and a number also mentioned that their children were able to get more rest, as they no longer needed the same assistance from their children as with the traditional methods. Other activities included taking care of household chores and visiting or assisting family members.

Willingness to purchase the cowpea flour

The women were very positive in their responses regarding the cowpea flour. Seventy-nine percent of the respondents stated that they would utilize the flour to prepare their kossai if it were made available to them. Only 19% stated that they would not. For those that indicated that they would utilize the flour, the women offered a number of reasons justifying this decision. These included not having to go to the mill to process whole cowpeas, better conservation, saving time and energy as well as having more time to rest. There were also several women who reported that while they would be willing to purchase the flour, it
would serve more as a back-up plan in case they find they have more demand than expected of their traditional kossai or if they are not able to get their cowpeas processed at the mill one day. The primary reason for those who said they would not purchase the flour if it was made available was that their clients did not like the kossai prepared with the flour. Other reasons included the kossai becoming too hard after cooling, the kossai consuming too much oil and the mixing/preparation being too difficult.

Positive responses when asked in a general question do not tell the entire story. In order to determine the potential for the cowpea flour it was necessary to obtain information from the women concerning the amount of money that they would be willing to pay for the cowpea flour and at what prices they would purchase cowpea flour compared to purchasing cowpea grain and preparing kossai the traditional way. During the in-person interviews each woman was asked a series of questions to determine the different prices that she would be willing to pay for cowpea flour. During this portion of the interview each vendor was presented with different pairs of prices. Each pair included the price of one of the one kilogram packages of cowpea flour and the price of one tia of cowpea grain (one tia of cowpea grain is a common unit equal to two kilograms). For each pair of prices the vendor was asked whether she would purchase the cowpea flour or the cowpea grain. In the analysis of the data the ratio of the price of one kilogram of cowpea flour to one kilogram of cowpea grain was calculated. Then the percentage of women vendors who indicated they would purchase flour and grain was calculated. The results are reported in Table 4. More than three-quarters of the women were willing to purchase the cowpea flour over the cowpea grain when the price of one kilogram of cowpea flour was twice the price of one kilogram of cowpea grain. When the price of one kilogram of cowpea flour was between two and three times the price of one kilogram of cowpea grain, the percentage of women willing to purchase the cowpea flour decreased to the range of 30 – 40%. Once the price of one kilogram of cowpea flour was three times the price of one kilogram of cowpea grain, the percentage of women willing to purchase the cowpea flour was significantly lower at 12% or less.

Table 4

<table>
<thead>
<tr>
<th>Ratio of Price of Cowpea Flour to Price of Cowpea Grain</th>
<th>% of Women Kossai Vendors Who Indicated They Would Purchase Flour</th>
<th>% of Women Kossai Vendors Who Indicated They Would Purchase Cowpea Grain</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1.6</td>
<td>78.0</td>
<td>22.0</td>
</tr>
<tr>
<td>1.6 – 2.2</td>
<td>76.1</td>
<td>23.9</td>
</tr>
<tr>
<td>2.2 – 2.6</td>
<td>29.8</td>
<td>70.2</td>
</tr>
<tr>
<td>2.6 – 3.0</td>
<td>41.3</td>
<td>58.7</td>
</tr>
<tr>
<td>3.0 – 3.4</td>
<td>8.5</td>
<td>91.5</td>
</tr>
<tr>
<td>3.4 – 4.0</td>
<td>12.1</td>
<td>87.9</td>
</tr>
<tr>
<td>&gt; 4.0</td>
<td>7.6</td>
<td>92.4</td>
</tr>
</tbody>
</table>

Summary of Results

The results suggest that the women were very pleased with the product and would purchase it if it was available in the market. In the area of relative advantage, the cowpea flour performed positively, saving women time, energy and even resources, while still allowing them to
participate in a traditional income-generating enterprise. The women generally found that preparing the kossai batter with the cowpea flour was compatible with their other activities and was not inconsistent with any cultural practices. Finally, evidence from the women was that the flour was not overly complex to use. There were some women who reported that kossai made from the flour used more oil for cooking, a sign that they may not have understood the best way to prepare kossai with the flour. This would suggest that an education program for the women on how to use the flour would be beneficial. One of the greatest challenges associated with the traditional production of kossai is the time and energy required for the batter preparation (particularly in taking the soaked and dehulled cowpeas to a local mill for grinding). These mills can often be multiple kilometers away. According to the women, the cowpea flour provided to them removed this constraint and provided them with much needed time, which many used to rest or catch up on household duties. They also noted that, in addition to the convenience of not having to travel to a mill, the preparation of the batter as a whole was less time-consuming when using the flour.

The flour was also reported as having better conservation properties than the traditional method, as the women were able to mix batter based on the demand they encountered throughout the day, as opposed to having to estimate what a day’s particular demand would be, only to find that they did not sell all their kossai and then being forced to throw away the remaining batter, representing a significant loss for these businesses. Another positive attribute identified by the women was that the batter made from the cowpea flour requires less oil to make kossai than the batter from a traditional method. Since oil is one of the most expensive inputs for kossai production, this translates into cost-savings for the women.

It is also important to note that the women are willing to pay a premium for the value-added cowpea flour, with more than three-quarters of them willing to purchase the cowpea flour when the price of one kilogram of cowpea flour is twice the price of one kilogram of cowpea grain. Thus, there is potential for the development of a new sector of the cowpea value chain involving the production of cowpea flour for the women street vendors producing kossai. Further study is needed to determine the complete costs of production for the cowpea flour and the level of profitability for entrepreneurs who would take on the business of cowpea flour production.

Conclusion, Recommendations, and Implications

The feedback gathered from the kossai street vendors regarding the proposed cowpea flour shows important market potential and a willingness to adopt a new technology that the women feel would offer improvements to their business and lifestyle. The flour’s relative advantage, compatibility with their lifestyles and complexity of use all appear to be within a range that is acceptable for the women, making them inclined to take the next step of implementing the flour in their enterprises when it becomes available.

To ensure continued adoption and implementation, researchers must make the flour accessible to the vendors, both in price and quantity. A promising way of doing this would likely be through the establishment of hammer mills as new entrepreneurial activities. In addition, in-person follow-up with the women will be key to sustained implementation to train the women in the preparation of the kossai batter as well as assisting with any difficulties associated with its use.

The potential impact of an affordable and available source of the course cowpea flour is significant. The women involved in kossai production contribute directly to poverty alleviation in some of the poorest regions of the world. Their improved ability to be successful will enhance the economic
development of the communities around them. In addition, by providing these women with a time-saving cowpea flour, they will have additional time to rest and care for themselves and their family. This could contribute to greater health and well-being for the women, as well as the children they care and provide for. In addition to improving the quality of life for women and their families, growth in kossai production and sale in Nigerien cities will result in an increased consumption of this highly-nutritious food. It will also support the existence, and even resurgence, of a traditional street food in many parts of Niger, and potentially in other areas of West Africa, where research has shown kossai production is being replaced with other easier-to-produce products, such as wheat flour beignets, which are much less nutritious. This has important implications for Nigerien and African health. In addition, this new technology offers the promise of creating a new stage in the value chain, as the demand for such a flour will open doors to entrepreneurial activities involving the utilization of hammer mills to grind the course cowpea flour.

This research presents numerous other possibilities, including testing the cowpea flour in other Nigerien cities, as well as observing the impacts of such a flour on the overall kossai markets in these cities. Another important area for future study would be on the best way to develop the new sector of the value chain that is likely to arise as a result of this new technology. It will be necessary to determine what it will take to establish the new enterprises that would undertake the processing of course cowpea flour with hammer mills, all of the fixed and variable costs of production, and the best way to manage these new entrepreneurial opportunities to ensure the greatest benefit for all.

References


Forecasting Doctoral-Level Content in International Agricultural and Extension Education–2010: Viewpoint of Fifteen Engaged International Scholars

Glen C. Shinn  
Texas A&M University  
Department of Agricultural Leadership, Education, and Communications  
E-mail: g-shinn@tamu.edu

Gary J. Wingenbach  
Texas A&M University  
Department of Agricultural Leadership, Education, and Communications  
E-mail: g-wingenbach@tamu.edu

Gary E. Briers  
Texas A&M University  
Department of Agricultural Leadership, Education, and Communications  
E-mail: g-briers@tamu.edu

James R. Lindner  
Texas A&M University  
Department of Agricultural Leadership, Education, and Communications  
E-mail: j-lindner@tamu.edu

Matt Baker  
Texas Tech University  
Department of Agricultural Education & Communications  
E-mail: matt.baker@ttu.edu

Abstract

Given an increasingly interconnected world with an expanding knowledge base, this research engaged 15 international scholars to resolve two research questions: (a) what are the knowledge objects that are essential for the doctoral-level professional working in international agricultural and extension education in 2010, and (b) what are the knowledge domains that coalesce and organize knowledge objects by general principles? Using the Delphi method, scholars engaged in three rounds to identify, rate, and confirm consensus on knowledge objects (KO’s) and knowledge domains (KD’s) for agricultural and extension education—2010. KO’s consisted of fundamental and powerful concepts, knowledge, paradigms, skills, and/or theories. From a submission of 335 KO’s, 240 distinct KO’s were rated; the number was reduced to 173 KO’s as agreed to by the expert panel. Researchers merged the 173 statements into 126 unique KO’s and assigned them to one of 12 knowledge domains. Knowledge domains were defined as related KO’s organized by general principle. The expert panel reached agreement on the 12 KD categories and the placement of 126 KO’s that delineate the field of study.

Keywords: Competency, Delphi, Doctoral-level Professionals, Experts, Knowledge Domains, Knowledge Objects
**Introduction**

Drucker (1968) coined the idea of a knowledge worker and predicted that major changes in society would be brought about by information. Drucker reasoned that knowledge had become the central key resource that knows no geography. Clark (2004) wrote “Peter Drucker predicted that the major changes in society would be brought about by information. . .” and that “. . . the defining characteristic of these knowledge workers is the level of their formal education. Thus education and development, and to some degree training, will be the central concern of a knowledge society” (p. 1). Almost four decades after Drucker’s original work, Altbach (2006) concluded that “globalization in the 21st century is truly worldwide in reach—few places can elude contemporary trends, and innovations and practices seem to spread even faster due to modern technology” (p. 122). Merrill (2000) posited, “a knowledge object is a precise way to describe the subject matter content or knowledge to be taught” (p. 1). Further, Merrill noted that “a knowledge object is a framework for identifying necessary knowledge components” (p. 1). Extrapolating the trends of knowledge and globalization begs the question, “What knowledge is essential for professionals who work in international agricultural and extension education in 2010?”

Lindner, Dooley, and Wingenbach (2003) identified competencies as important and desired by graduates in three primary areas: (a) Knowledge of teaching strategies, foundations, and applications and international knowledge; (b) Skills in content, process, social, complex problem-solving, technical, systems, and resource management; and (c) Abilities in communications, idea generation and reasoning, perceptual and spatial, attentiveness, and quantitative. In their cross-national study of agricultural and extension education graduate students, Lindner et al. found that “most perceived competency rankings varied by country” (p. 51). Based on this finding, Lindner et al. recommended that additional research be conducted to understand better the global applicability of findings from single country studies. Research conducted in the United States to define doctoral study in agricultural education led to a recommendation that similar research needed to be conducted involving a more global perspective (Baker, Shinn, & Briers, 2007; Shinn, Baker, & Briers, 2008). The research presented in this paper is an attempt to understand better what knowledge should constitute doctoral study in agricultural and extension education from a global context.

Mulder and Kupper (2006) contended that the position of agricultural education is threatened in many countries throughout the world; admittedly, agricultural and extension education is a small enterprise. It is essential for continued growth that all in agricultural and extension education work together to understand our knowledge base and educational needs so that we may develop knowledge in agricultural and extension education and disseminate that knowledge beyond our field of study.

**Conceptual Framework**

All advanced civilizations have recognized the need for higher education. Perkins (2006) provided a synthesis of the history of universities and concluded that most were “. . . taught in high culture, received doctrine, literary and/or mathematical skills of their political or religious masters, with little room for questioning or analysis” (p. 159). Certainly oversimplified, higher education was an unchanging autocracy. Enders (2006) noted that today’s university is a European invention of the 12th and 13th centuries with roots “. . . in Bologna, Salerno, and Paris”
The conceptual framework evolved to a more pragmatic academy during the 18th and 19th centuries. Again oversimplified, European and American universities embraced pragmatism and behavioralism. Doolittle and Camp (1999) recognized this underlying foundation throughout the 20th century but argued that the 21st century will evolve toward a framework of constructivism. Doolittle and Camp posited, “Of the three basic types of constructivism discussed, cognitive constructivism is most compatible with [U.S.] career and technical education” (p. 1). Recognizing the global changes that were occurring, the ministers of education of 29 European countries convened in Bologna and on June 19, 1999, signed a joint Bologna Declaration that moved toward cognitive constructivism (Umeå University, 2007). Golde and Walker (2006) concluded that “disciplines continue to change . . .” (p. 4).

The conceptual model for this study is a constructivist approach to grounded theory. Mills, Bonner, and Francis (2006) noted that “constructivist grounded theory has its foundations in relativism and an appreciation of the multiple truths and realities of subjectivism” (p. 8). Further, Mills et al. noted that “key issues for constructivist grounded theorist[s] to consider in designing their research studies are discussed in relation to developing a partnership with participants that enables a mutual construction of meaning . . .” (p. 8).

It appears that this is an appropriate environment in which professionals in agricultural and extension education should examine doctoral education; there are numerous international scholars to guide such efforts. The conceptual framework of this study hangs on the experiences and reflections of a purposefully selected panel of international scholars. We, as authors, value experience, particularly when coupled with praxis and reflection.

**Purpose and Objectives**

As part of a larger study, the authors re-examined the history, trends, and issues in agricultural and extension education from an international perspective and extracted the implications for doctoral-level content from an international agricultural and extension education context. Two research questions framed this study:

1. What are the essential knowledge objects for doctoral-level professionals working in international agricultural and extension education in 2010?
2. What are the knowledge domains that coalesce and organize knowledge objects by general principles?

**Methods**

The Delphi method (Dalkey, 2002; Linstone & Turoff, 2002; Weaver, 1971) was congruent with the purpose of this research. The Institutional Review Boards from Texas A&M University and Texas Tech University approved the research protocol. Dalkey (2002) concluded that the Delphi method is reliable when a panel is truly representative of the expert community and that an engaged group of 13 would provide a 0.9 coefficient of reliability.

On July 6, 2006, the researchers solicited nominations of engaged scholars from the broad field of agricultural and extension education by individually e-mailing 120 authors who published during 2003-2006 in one of four international journals—the Journal of Agricultural Education and Extension (formerly, the European Journal of Agricultural and Extension Education), the Journal of Extension Systems, the Journal of International Agricultural and Extension Education, and the South African Journal of Agricultural Extension.

On October 8, 2006, the researchers invited 21 most frequently nominated engaged experts as Delphi panel members.
In addition to confirming their acceptance, panelists were given the parameters of the research and a planning calendar. Seventeen engaged scholars accepted invitations to participate in the three-round design from March to October 2007. Because of other commitments, two of the 17 panelists did not engage in any of the rounds; however, 13 panelists responded to all rounds. All correspondence between the researchers and expert panel members was by individual e-mail, and panelists responded using a confidential web form. Feedback was provided in the form of the distribution of ratings among the expert panel. The Delphi panel members represented specialties in international agricultural and extension education from five United Nations regions: Africa, Europe, Latin America, North America, and Oceania. The absence of scholars from Asia and non-response by scholars from Oceania are limitations of this study.

Round 1 asked panelists to identify content (i.e., knowledge objects) for doctoral-level programs in agricultural and extension education—2010. Round 1 was sent on March 29, 2007, and concluded on April 9. Responses to Round 1 led to Round 2, seeking agreement on knowledge objects. Round 2 was sent on April 20 and concluded on May 10. Consensus among the Delphi panel members was set a priori as two-thirds of the expert panel members rating a statement “agreed” (5) or “strongly agreed” (6) using a six-point Likert scale. Fourteen panel members responded to round two.

Following round two, 172 knowledge objects that reached consensus were analyzed again by the researchers and, based on comments and feedback from the panelists, analogous knowledge objects were combined, resulting in 126 unique knowledge objects. These knowledge objects represented fundamental and powerful concepts, paradigms, skills, and/or theories needed by doctoral-level professionals in agricultural and extension education—2010.

Prior to round three, researchers sorted the 126 knowledge objects into 12 unique knowledge domains. The knowledge domains were described using accepted reference materials and organized by general principles; the knowledge domains and descriptions of those knowledge domains used to categorize knowledge objects are described as follows:

*Agricultural/Rural Development.* Processes for improving lives of individuals, families, and communities—meeting basic
human needs, improving economic well-being, and allowing hope, promoting peace, and sustaining their environment (see Snapp & Pound, 2008; Wals & Bawden, 2004).

Agricultural/Biophysical Systems. “. . . the integrity of biophysical systems, in particular, are dependent upon their context, both spatially (across landscapes) and temporally (multi-generational). Thus, a landscape would have integrity if its ecosystems retain their complexity and capacity for self-organization, and sufficient diversity, within their structures and functions, to maintain the systems’ self-organizing complexity . . . through time” (Iverson & Cornett, 1994, p. 1).

Change and Technology Adoption. Processes by which individuals and social systems accept or reject an innovation. Roles of the change agent in influencing acceptance or rejection (see Rogers, 2003).

Delivery Strategies. Processes by which information is transferred (or transfer is influenced) to a learner by a teacher/facilitator/coach (see Tuttle, Lindner, & Dooley, 2007).

Human Resource Development. HRD is concerned with providing learning and personal development opportunities and conducting training programs. According to Rao (2004), “HRD is a continuous planned process by which employees are helped” (p. 291).

Instructional Design/Curriculum Development. Processes by which information for learning is packaged, arranged, presented for the learner (see Berger, 1996; Bruner, 1966; Rothwell & Kazanas, 2004).

Learning Theory. An attempt to describe how people learn, thus providing an understanding of this complex cognitive, emotional, and social process of change (see Bandura, 1977; Dewey, 1938; Knowles, Holton, & Swanson, 2005; Vygotsky, 1978).

Organizational Development. Organizational development is the process through which an organization develops the internal capacity to be the most effective it can be in its mission work and to sustain itself over the long term. This definition highlights the explicit connection between organizational development work and the achievement of organizational mission (see McLean, 2006).

Philosophy, History, and Policy. The epistemology, ontology, axiology, and universal science framed in past, present, and future contexts and that is integrated into a course of action designed to influence and determine decisions, actions, and other consistent patterns of activity (see Durant, 1961).

Planning, Needs Assessment, and Evaluation. A comprehensive, systematic, and flexible approach to charting direction, determining the strengths, weaknesses, opportunities, threats, and resources of an educational program, and determining the extent to which the purposes are being accomplished (see Witkin & Altschuld, 1995).

Research Methods and Tools. Processes of unusual persistence and systemacy whereby new knowledge is discovered (see Hamlin, 1966).

Scholarship and Communications. Processes of preparing, packaging, verbalizing, depicting, and displaying information for new consumers of that information (see Boyer, 1990; Weiser, 1996).

In round three, the panel of scholars examined each knowledge object and either agreed that the knowledge object was correctly placed within the appropriate knowledge domain or disagreed that the knowledge object was placed within the appropriate knowledge domain. If panel members disagreed, they were given the option of reassigning the knowledge object to a different knowledge domain or recommending that the knowledge object be removed. By panel consensus (two-thirds), no further reduction in knowledge objects was required and no reassignment of knowledge objects to different knowledge domains was needed. Thirteen members of
the expert panel reached consensus on 12 knowledge domain categories and the placement of 126 knowledge objects that connect and describe the content for doctoral-level professionals in agricultural and extension education—2010. The 12 knowledge domains and 126 knowledge objects are shown in Table 1.

Table 1

Knowledge Domains and Objectives for Doctoral Professionals

**Agricultural/Rural Development Knowledge Domain:**
1. farming systems approach to research and extension (i.e., water catchment management, marketing chain management, agro-biodiversity management, poverty reduction)
2. community leadership organization and development (e.g., theories, principles, practices, culture, people, environment)
3. extension’s role in building social capital, then organizing small-scale farmers to achieve economies of scale and market access issues
4. roles of extension in disseminating technical, marketing, management, and policy information to farmers
5. environmental and sustainable development issues, including agricultural production systems
6. global dimensions (internationalization) of agriculture (i.e., global perspectives and skills to understand the global nature of agriculture)
7. roles and management of rural youth programmes
8. strategies for stakeholder participation in extension planning
9. social consciousness and commitment to managing and conserving rural life/communities
10. agricultural development (e.g., concepts, models, and theories)
11. integrated community economic development (e.g., business organization, entrepreneurship)
12. roles of extension in reducing rural poverty
13. roles of information technology in extension systems in developing countries

**Agricultural/Biophysical Systems Knowledge Domain:**
1. basic agricultural subject matter (e.g., animal science, crop science, engineering, economics, and agribusiness, agricultural education, and extension)
2. farming systems approaches (i.e., water catchment management, marketing chain management, agro-biodiversity management, poverty reduction strategies)
3. roles of agriculture in environmental conservation and sustainable agricultural development (i.e., how food systems can function in harmony with natural environments to ensure sustainable development)
4. a systems perspective of agriculture (e.g., connections among larger interdisciplinary nature of agriculture that cuts across issues of production, processing, marketing, nutrition, policy, food security, health, HIV/AIDS)
Table 1 (continued).

**Change and Technology Adoption Knowledge Domain:**
1. roles of change agents with clientele who possess different cultural, societal, environmental, developmental, and technological needs
2. approaches and strategies for facilitating farmer-extension-research linkages
3. teaching theory, principles, and strategies pertaining to the adoption and diffusion of planned, purposeful technological, educational, and social change
4. need for adaptability (i.e., graduate can “move” among people in the discipline and related disciplines and retain credibility)

**Delivery Strategies Knowledge Domain:**
1. strategies to acquire knowledge, skill, and understanding among selected knowledge bases
2. teaching problem solving and engaging people in successful problem-solving activities
3. methods to transfer skills to peers and students
4. organizing and evaluating experiential methods (e.g., internships, field experience, student exchange)
5. the role of distance education in agricultural education programs
6. teaching skills in individual, team-teaching, face-to-face classroom, and at-a-distance settings
7. preparing lesson plans and instructional materials to enhance active learning and the development of higher-level cognitive skills
8. teaching and advising on the basis of individual needs, skills, abilities, and age groups
9. teaching on the basis of institutional, community, regional, national, or international contexts and resources
10. teaching on the basis of group and individual planning, thinking, and evaluation processes
11. adult education methods and strategies (e.g., andragogy, gerontology)
12. collaborative teaching and learning processes
13. methods of teaching practical or psychomotor skills to rural young people
14. teaching students to develop the seven apperceptive levels of learning (i.e., knowledge, skills, interests, understandings, appreciations, values, and ideals)
15. applying flexible and innovative techniques in crossing traditional boundaries between secondary level and post-secondary level institutional settings whether developing formal or non-formal educational programmes
16. computer applications and use of Internet (e.g., searching, on-line learning systems)
Table 1 (continued).

**Human Resource Development Knowledge Domain:**

1. youth issues (e.g., agricultural production, post-production, leadership development)
2. people orientation when working as an agricultural/extension educator
3. leadership theory and practice, and team-building skills
4. supervising skills in agricultural education institutions
5. competence development (i.e., performance improvement)
6. goal setting and rewards (i.e., theories, principles, and practices)
7. leadership and administration in agricultural and extension education
8. management skills (i.e., skills to coordinate and supervise personnel/staff, especially subordinates; and to foster partnerships with other stakeholders, both within the private sector and public sector)
9. time management and priority development
10. vocational and technical education necessary to achieve long-term agricultural development
11. facilitation skills (e.g., helping people work together more effectively to achieve common goals)

**Instructional Design/Curriculum Development Knowledge Domain:**

1. curriculum development
2. internationalizing undergraduate and graduate curricula
3. guiding others in collaborative problem solving using original and innovative approaches
4. non-formal education concepts (i.e., types and its role in development)
5. teaching on the basis of appropriate instructional materials and technological applications
6. approaches to teaching and learning
7. behavioral measurements and methodology
8. strategies to create and manage inspiring learning environments
9. group behaviour and management among different types of learners
10. extension education approaches (i.e., principles and practices)

**Learning Theory Knowledge Domain:**

1. theory and practice of teaching—principles, processes, applications, and operations
2. adult development and learning theory
3. taxonomies of educational objectives (e.g., Anderson et al., 2001)
4. critical thinking skills
5. elements of the psychology of learning
6. learning theories (e.g., self-directed learning, critical reflection, experiential learning, learning to learn, Kolb)
7. motivation as it applies to participation and engagement
8. transformative learning theories (i.e., enable and empower graduates to think and make judgment as autonomous individuals, and yet be able to receive ideas and collaborate with others)
9. youth development and learning theory
10. educational concept, theories, types and role in rural/agricultural development
Table 1 (continued).

**Organizational Development Knowledge Domain:**
1. agricultural knowledge systems
2. extension’s role in natural resource management, sustainable agriculture, and a global economy
3. market-driven extension (e.g., farm income, rural employment, value-crop and livestock systems)
4. public and private extension systems (i.e., missions, roles, procedures, impacts, outcomes, stakeholders)
5. agricultural social systems
6. gender equity issues (e.g., agricultural production, post-production, leadership development)
7. effective strategies for working in different cultures (e.g., culture theories)
8. developing and building educational institutions and marketing programs
9. organisational behaviour (e.g., theories, principles, practices)
10. leadership theory and practice (e.g., principles, learning styles, paradigms and grounded theories—great man, traits, contingency, situational, behavioral, participative, management and relationship theories)
11. agricultural education programme management (e.g., logistic control, fiscal, human management)
12. mechanisms and the context in which agricultural education and extension operates (e.g., Cochrane)
13. extension management and supervision

**Philosophy, History, and Policy Knowledge Domain:**
1. contextual applications related to selected knowledge bases (e.g., agricultural communications, distance education and technology-enhanced instruction, extension education, leadership and community education, teacher education, international agricultural development education, technological change)
2. comparative agricultural education (e.g., developed and developing countries)
3. Stiglitz’s work on globalisation
4. ethical and positive values
5. ethical standards (e.g., trustworthiness, honesty, integrity)
6. models of agricultural and extension education (e.g., Land grant system, extension in developing world)
7. philosophies of agricultural extension
8. philosophies of education and their applications (e.g., behaviorism, humanism, pragmatism, social reconstructionism)
9. agricultural and extension education policies, processes, and impacts among different countries (e.g., farming, agriculture, agri-industry, agribusiness, rural regional development)
10. principles of agricultural extension as an organization
11. perspectives on defining and redefining extension
Table 1 (continued).

Planning, Needs Assessment, and Evaluation Knowledge Domain:
1. technical and practical knowledge that demonstrates proof of occupational competency
2. methods of assessing achievement (i.e., command of testing principles and evaluation models)
3. educational measurement and testing
4. evaluating educational models
5. evaluating effectiveness of programs and institutions (e.g., Stufflebeam’s CIPP model)
6. evaluating effectiveness of teaching and/or the application of practice
7. principles of evaluation (e.g., monitoring and evaluation skills for projects and programmes)
8. methods to identify knowledge gaps and propose education and training strategies to overcome them (i.e., to enhance the knowledge base, secure jobs, advance in occupations/careers)
9. identifying educational needs of learners
10. extension programme planning and evaluation
11. models used to identify educational needs (e.g. Borich’s Model)
12. planning, consensus building, and conflict resolution
13. programme development and evaluation model for agriculture, food, environment
14. project preparation and methodologies

Research Methods and Tools Knowledge Domain:
1. multi-disciplinary science methods (e.g., new issues in math and statistics with application in research methodology and statistical analysis)
2. participatory methodologies (e.g., PRA, PTD, community-based natural resource management, participatory communication)
3. ways to clearly and succinctly state the aims and objectives of research
4. statistical analytical methods for research in education and extension to extract, synthesize, analyze, and communicate quantitative and qualitative information (e.g., Excel, SPSS, SAS statistical packages)
5. collecting quality data and analyze according to established and atypical procedures (i.e., instrumentation, procedures for data collection, analyses)
6. creation, innovation, searching for answers and solutions, critical thinking, independent and responsible reporting
7. designing an experimental program to resolve researchable problems (e.g., biophysical sciences, social sciences, socio-economic)
8. identifying and prioritizing research needs that have current and future programmatic implications
9. statistics (e.g., introductory, descriptive and inferential, parametric and non-parametric)
10. qualitative and quantitative research methods in social sciences
11. research paradigms and processes to solve practical problems
Table 1 (continued).

Scholarship and Communications Knowledge Domain:
1. open-mindedness (i.e., considers alternative explanations and is willing to investigate them)
2. synthesizing, analyzing, and communicating basic information
3. ways to participate in science (research and extension) activities in the wider community (i.e., beyond the home research institute and/or as part of a larger research team)
4. one’s research in the context of appropriate literature, including reporting and publishing findings
5. agricultural communications (e.g., concepts, models, theories, functions, listening, speaking, interviewing, debating, and writing skills appropriate for various audiences and stakeholders)
6. methods for critical review and analysis of literature
7. developing research and grant proposals
8. international scientific and extension dialogue and research activities
9. value of originality in thinking

Conclusions, Implications, and Recommendations
A Delphi panel of engaged international scholars, representing the expert international agricultural and extension education community, reached consensus on 126 knowledge objects that coalesce into 12 knowledge domains. Fifteen panel members generated 335 knowledge objects—statements that were offered by one or more scholars as being important to doctoral-level professionals in agricultural and extension education—2010. The Delphi panel concurred on 126 knowledge objects that fit within 12 knowledge domains. The domain categories were (a) agricultural/rural development; (b) agricultural/biophysical systems; (c) change and technology adoption; (d) delivery strategies; (e) human resource development; (f) instructional design/curriculum development; (g) learning theory; (h) organizational development; (i) philosophy, history, and policy; (j) planning, needs assessment, and evaluation; (k) research methods and tools; and (l) scholarship and communications.

The consensus knowledge domains from international agricultural and extension scholars were congruent with previous research (Lindner & Dooley, 2002; Radhakrishna & Xu, 1997; Shinn, Briers, & Baker, 2008; Williams, 1991) on the importance of the following domains: (a) change and technology adoption; (b) delivery strategies; (c) instructional design and curriculum development; (d) learning theory; (e) philosophy, history, and policy; (f) planning, needs assessment, and evaluation; (g) research methods and tools; and (h) scholarship and communications. However, the international panel of scholars recognized and embraced four domains beyond previous findings: (a) agricultural and rural development; (b) agricultural and biophysical systems; (c) human resource development, and (d) organizational development.

These findings have implications for the redesign of curriculum, courses, self-directed study, professional development, and collaboration among professionals in agricultural and extension education. Concurrently, the knowledge objects have implications for doctoral-level content, professional development, and certification.

Drucker, Dyson, Handy, Saffo, and Senge (1997) warned, “Knowledge is different from all other kinds of resources. It constantly makes itself obsolete, with the result that today's advanced knowledge is tomorrow's ignorance. And the knowledge
that matters is subject to rapid and abrupt shifts. . .” (p. 20). Professionals in agricultural and extension education, along with peer universities, should carefully examine the 126 knowledge objects. Faculties of doctoral-granting universities should compare, contrast, and debate these knowledge objects against current doctoral courses of study.

Similarly, graduate students planning to pursue doctoral-level education should examine the knowledge base as a guide for their preparation (course work) and research. This examination should encourage public and persistent dialogue.

The 15 international scholars submitted a total of 335 statements. The 209 statements that failed to reach consensus may reveal important content for specialties, emergent knowledge, or unique contextual settings within the field of study.

Given an increasingly connected world faced with disequilibrium in food, environmental, and human systems, the authors encourage increased collaboration, cooperation, and coalitions among international universities and professional societies which have a commitment to international development and agricultural and extension education.

In research focused on agricultural education in the United States, Shinn, Briers, and Baker (2008) identified 10 knowledge domains and 67 knowledge objects essential for professional practice at the doctoral level. A cross-examination of the content and structure, logic, ontology, and epistemology of the two studies would be instructive.

This knowledge base is not prescriptive, rather descriptive and comparative as described by Carlile and Christensen (2005). The knowledge base is intended to be useful in planning, organizing, delivering, and evaluating doctoral-level content in international agricultural and extension in the near term. In a call to action, Walker, Golde, Jones, Conklin-Bueschel, and Huchings (2008) challenged, “there is no shortage of ideas about what we need to change. We have to decide whether or not we want to change” (p. 144). If we choose to change, Golde and Walker (2006) offer a four-step process:

Step 1. Look ahead at the discipline.
Step 2. Identify what a Ph.D. in the discipline must know and be able to do” (p. 424). These first two steps are what this research sought to accomplish. To continue the change, faculties must
Step 3. Construct the goals of the program.
Step 4. Design the program” (p. 424).

“As ‘stewards of our disciplines’ (and of the commonality of human learning), we can do no less” (p. 428).

References
Hamlin, H. M. (1966). What is research? Not only to count, but to be willing to judge. American Vocational Journal, 41(6), 14-16.


Redefining Agricultural and Extension Education as a Field of Study: 
Consensus of Fifteen Engaged International Scholars 

Glen C. Shinn 
Texas A&M University 
Department of Agricultural Leadership, Education, and Communications 
E-mail: g-shinn@tamu.edu 

Gary J. Wingenbach 
Texas A&M University 
Department of Agricultural Leadership, Education, and Communications 
E-mail: g-wingenbach@tamu.edu 

James R. Lindner 
Texas A&M University 
Department of Agricultural Leadership, Education, and Communications 
E-mail: j-lindner@tamu.edu 

Gary E. Briers 
Texas A&M University 
Department of Agricultural Leadership, Education, and Communications 
E-mail: g-briers@tamu.edu 

Matt Baker 
Texas Tech University 
Department of Agricultural Education & Communications 
E-mail: matt.baker@ttu.edu 

Abstract 

Definitions are in tension between historical and future meaning. Definitions also differ depending on the purpose and audience. This research engaged international scholars to develop a consensus definition forecasting international agricultural and extension education in the year 2010 and beyond with the intended purpose for guiding scholarship. Using the classic Delphi method, experts engaged in four rounds to develop and agree on a preferred definition for agricultural and extension education in an international context. From a submission of fifteen personal definitions, 95 stem statements were winnowed to 51 consensus statements agreed to by the expert panel. Researchers sorted the 51 statements by context, content, and condition; then, they crafted four prototype definitions of international agricultural and extension education. Provided with the prototypes, the expert panel members agreed on a professional definition that redefines the field of study based on constructs representing a sound conceptual foundation, while anticipating societal, technical, and client/learner needs. 

Keywords: Competence, Constructs, Delphi, Definition, Experts, Knowledge Domains, Knowledge Objects
Introduction

Accelerating economic, political, social and technological change characterizes our world (Barnett, 2005; Drucker, 2003; FAO Newsroom, 2007; Freidman, 2005; Golde & Walker, 2006; Qamar, 2000). Agricultural and extension education and doctoral study are no exceptions (Golde & Walker; Ludwig, 2007; Qamar, 2002). While agriculture and the field of agricultural and extension education have ancient roots (Bar-Yosef & Meadow, 1995; Othman & Martin, 2001), the field of study has an important role in current and future world development, security, and prosperity. Agricultural and extension education directly affects four of the UN Millennium Development Goals: (a) eradicating extreme poverty and hunger, (b) promoting gender equality and empowering women, (c) ensuring environmental sustainability, and (d) building global partnerships for development (Sachs, 2005).

During epochs of change, it is important to re-examine the field of study and to validate and communicate the evolving definition and knowledge boundaries. During a decade of expanding knowledge and changing contexts, Welch (2005) observed that many disciplines have faced challenges to re-define and reinvent themselves. Welch concluded that disciplines such as agricultural and extension education that are reluctant to change substantially reduce the probability for academic sustainability. Doctoral study must be at the forefront of acquiring, absorbing, and communicating knowledge, and scholars must be proponents of relevant theory building (Camp, 2001; Carlile & Christensen, 2005; Doolittle & Camp, 1999; The World Bank, 1999; Warmbrod, 1986). This study sought to re-define the boundaries of agricultural and extension education, thereby developing a new definition from an expert panel of engaged international scholars. This new definition positions the field for a changing environment; an understanding of history is a precursor of change. Agricultural and Extension Education: A Brief History

Rasmussen (1989) and van den Ban and Hawkins (1996) provide historical descriptions of American and European agricultural extension. Jones and Garforth (1997) noted, “agricultural extension work has a venerable, albeit largely unrecorded, history. It is a significant social innovation, an important force in agricultural change, which has been created and recreated, adapted and developed over the centuries” (p. 1). Farming practice—agricultural knowledge—was largely disseminated using cultural traditions and expansion diffusion methods described by Rogers (2003) and Weinert (2002). The history of agricultural and extension education predates American activities and was derived largely from work in the United Kingdom. Jones and Garforth (1997) concluded that:

The use of the word “extension” derives from an educational development in England during the second half of the nineteenth century. Around 1850, discussions began in the two ancient universities of Oxford and Cambridge about how they could serve the educational needs, near to their homes, of the rapidly growing populations in the industrial, urban area. It was not until 1867 that a first practical attempt was made in what was designated “university extension,” but the activity developed quickly to become a well-established movement before the end of the century. (p. 1)

Percy (2000) noted that during the late nineteenth century in both the UK and the USA, “...extension has three components: adult education, technology transfer and advisory services. Time, political context and the development
approaches pursued are some of the factors which influence the extent to which any one of these components is emphasized” (p. 2). FAO (1984), Rasmussen (1989), and Röling and Pretty (1997) noted that traditional extension programs assist farm people through educational procedures. These included improving farming methods and techniques, increasing production efficiency and income, adopting sustainable practices, improving levels of living, and lifting the social and educational standards of rural life. Kistler and Briers (2003) concluded that “since its establishment in 1914 through the Smith-Lever Act, the Cooperative Extension System (CES) has grown to become the largest youth and adult education organization in the United States, if not the world” (p. 213).

Hillison (1996), Sutphin and Hillison (1999), and True (1929) provided comparative historical views of cooperative extension and agricultural education vis-à-vis the U.S. Smith-Lever and Smith-Hughes Acts. Hillison (1996) examined a memorandum of understanding between the Federal Board for Vocational Education and United States Department of Agriculture and concluded that the two entities held several goals in common—perhaps more alike than different. As a result, Hillison encouraged communication and periodic review of formal and informal agreements and interpretations.

Disciplines may share core knowledge and skills, yet demonstrate many shapes reflecting the contextual application of the time. Barrick (1989) noted, “agricultural education is not multi-disciplinary . . . but it is multi-faceted” (p. 27). Barrick further noted, “Agricultural Education must recognize its heritage in science as it pertains to society and science as applied to agriculture. Then the profession must turn to the mission as a discipline: to further the scientific study of the methods and principles of teaching and learning as they are appropriate for teaching subjects in agriculture” (p. 28). Shinn and Cheek (1981) concluded that “leaders in agricultural education must be able to synthesize technical agriculture information and plan programs to help solve the problems associated with energy, productivity, and world trends in the agricultural industry” (p. 9) and that agricultural education and extension education are complementary and can best be delivered as a joint program. Fundamental principles are ageless, but Friedman (2005, 2007) argued that global changes have flattened the world in which we work.

Global Changes Affecting Agricultural and Extension Education

A consistent theme running through innovative approaches is a fundamental change in the respective roles of agricultural and extension education professionals. Rivera and Gustafson (1991) concluded that the forces for change come from four main directions: (a) economic and policy climate, (b) social context in rural areas, (c) systems knowledge, and (d) information technology. More than a decade ago, Jones and Garforth (1997) predicted, “the future will call for more able, more independent, more client-oriented extension workers. The emphasis will be on the quality of interaction between agent and client rather than on the movement of ‘messages’ through a hierarchical system” (p. 12).

Qamar (2002) affirmed, “Asia and the Pacific Region have made recorded progress in developing agricultural technologies. The green revolution brought wide prosperity to the Region” (p. 2). Qamar argued, “strong national extension systems, with a broader mandate beyond technology transfer, are needed to develop the human capabilities and capacities of men and women farmers” (p. 2). Qamar predicted, “a clearly defined role of government and suitable coordination and quality control mechanism will be needed for any pluralistic extension pattern to safeguard the interests of farmers” (p. 1). The Neuchatel Group (1999) noted, “the environment of
agricultural extension is changing. The aims of official development are becoming more focused . . . [and] changes are afoot in the sub-Saharan States: decentralization, liberalization, privatization and democratization” (p. 7). There is a need to reexamine the context of the environment and how engaged scholars define their work.

Current Working Definitions
As a prelude to the future, Swanson and Samy (2002a) concluded that “. . . public extension systems in developing countries are under increasing pressure to prove their relevance and importance. These public extension systems will need to deal with specific policy and institutional issues that: currently hinder their contribution to rural development” (p. 1). Jones and Garforth (1997) predicted that

The need for agricultural and rural information and advisory services is likely to intensify in the foreseeable future. In much of the world, agriculture faces the challenge of keeping pace with rapidly increasing population with few reserves of potentially cultivable land. Farmers will have to become more efficient and specialized. (p. 11)

Leeuwis and van den Ban (2004) described extension in a more condensed form as “a series of embedded communicative interventions that are meant, among others, to develop and/or induce innovations which supposedly help to resolve (usually multi-actor) problematic situations” (p. 27). Mulder (2005) provided a European perspective on agricultural education as a diverse field marked by three dimensions: (a) agriculture, (b) the level of education, and (c) the targeted groups for agricultural education. And, even within a dimension, there are numerous specializations; for example, Mulder wrote that agricultural education is specialized into environmental education, sustainability in education, and rural development. Further, Mulder provided a definition of agricultural education:

Despite all this diversity, agricultural education is defined here as that part of education that is aimed at preparing students for a profession, either as an employee in a public or private organization or as an entrepreneur in a micro-company, in small, medium-size or large enterprises, in the agri-food complex that contributes to the secure supply of safe food and a healthy and attractive environment, by sustainable methods of production, processing, packaging, logistics and delivering services. (p. 5)

As an antecedent to redefining the field of study, Shinn, Baker, and Briers (2008) examined American-based graduate agricultural education and its knowledge base, concluding that:

Agricultural education–2010, as a field of study, integrates social and behavioral sciences with the natural and applied science of agriculture, renewable natural resources, and environment. The knowledge base for agricultural education–2010 includes planning and needs assessment; curriculum development; learning theory; instructional design; delivery strategies; evaluation; research methods and tools; scholarship and writing; history, philosophy, and ethics; and contextual applications, culture, and diversity—all effecting continual improvement. Agricultural education empowers people to think more critically, to perform more skillfully, to communicate more clearly, to plan and affect change more efficiently, to solve problems more creatively, and to act based on
principles—all of which involves vital choices and consequences in a global society. (pp. 35-36)

Conceptual Framework
Early practitioners of agricultural and extension education drew from foundational theories of learning and teaching (Dewey, 1938; James, 1907; Lancelot, 1944). During the early evolution, knowledge was grounded in observation and experience and passed to others through direct engagement methods. Over time, agricultural and extension education integrated the principles of learning and teaching, applied research, and extension outreach. Today’s field of study draws from educational psychology and the works of Bandura (1977), Bruner (1966), Gagné (1985), Knowles (1975), Piaget (1970), Thorndike (1932), Vygotsky (1978), and others. Perspectives of learning rise from the educational theories of behaviorism and constructivism, while the perspectives of teaching are drawn from the works of Freire (1972), Habermas (1988), Kolb (1984), Lewin (1951), and others who advanced problem solving, critical thinking, and communicative reason. The present research framework is largely quantitative and applied, and it typically uses survey methods. The present extension education framework is drawn from experiential learning of Rogers (1969), the humanistic education movement, and the philosophy of Dewey (1938) who insisted “…there is an intimate and necessary relation between the processes of actual experience and education” (p. 7). The knowledge base of agricultural and extension education continued to evolve. Alternatively, the experiences and reflections of a purposefully selected panel of international experts formed the scaffolding for the conceptual framework. We, as authors, value experience, particularly when coupled with reflection and praxis.

The continuous transformation of agricultural and extension education begs the question, “How do we define our field of study?”

Purpose
As part of a larger study to examine doctoral study in agricultural and extension education and its knowledge base, the research presented in this article focuses on redefining agricultural and extension education as a field of study and in an international context as viewed by international scholars.

Methods
The Delphi method as a forecasting tool (Dalkey, 2002; Linstone & Turoff, 2002; Weaver, 1971) was congruent with the purpose of this research. The Institutional Review Boards from Texas A&M University and Texas Tech University approved the research protocol. Dalkey, Rourke, Lewis, and Snyder (1972) concluded that the Delphi method is reliable when a panel is truly representative of the expert community and that an engaged group of 13 would provide a 0.9 coefficient of reliability. The etymology of the Delphi method is grounded on the axioms that this inquiry is “a pooled judgment that will have a ‘validity’ believed to be greater than that of any individual” (Scheele, 2002, p. 54), coupled with harnessing expert knowledge that Drucker (1997) deduced would be an approach to effective knowledge management.

On July 6, 2006, the researchers solicited nominations of engaged experts from the broad field of agricultural and extension education by individually e-mailing 120 authors who published during 2003–2006 in one of four international journals: (a) The Journal of Agricultural Education and Extension (formerly the European Journal of Agricultural Education and Extension), (b) Journal of Extension Systems, (c) Journal of International Agricultural and Extension Education, and (d) the South African Journal of Agricultural Extension.
On October 9, 2006, the researchers invited 21 most frequently nominated experts, as recognized by active scholars, as Delphi panel members; four persons chose not to participate. Brockhoff (2002) concluded, “The group size is determined by the number of members of a group. This measure refers solely to formal criteria. Thus a person who does not contribute to the activity of the group, either because of his own reticence or because of a formal system of communication which does not accept his contributions, is still considered a member of the group” (p. 286). Seventeen panelists accepted an invitation to participate in the four-round design from December 2006 to October 2007. In addition to confirming their acceptance, expert panel members were given the parameters of the research and a planning calendar, and they were asked to provide their personal definition of agricultural and extension education for 2010 and beyond. This future horizon encouraged the experts to project beyond present conditions. All correspondence between the researchers and expert panel members was by individual e-mail, and responses were made using a confidential Web form. The Delphi panelists represented specialties in international agricultural and extension education from five United Nation regions (Africa, Europe, Latin America, North America, and Oceania).

Round 1 requested confirmation as an expert panel member and a personal definition of agricultural and extension education. Round 1 began on December 23, 2006, and concluded on January 21 with 15 working definitions. The personal definitions were separated into stem statements—action attributes embedded within the definition—clustered around circumstance, situation, framework, environment, or background. Responses to Round 1 produced the Round 2 instrument; in Round 2 panel members were asked to rate their level of agreement with each of the 62 definition stems and to suggest additional stem statements. Consensus among the Delphi panelists was defined a priori as two-thirds of the expert panel rating on a six-point agree/disagree scale a statement as “agree” (5) or “strongly agree” (6). The expert panel received Round 2 on February 2, 2007; the round concluded on February 18, 2007. Round 3 sought consensus on each stem statement. Round 3 was e-mailed to the expert panel on March 1 and concluded on March 13. Given panel agreement, the researchers crafted four prototype definition statements based on context, content, and condition. Round 4 sought agreement with and ranking of definitions for agricultural education. Expert panel members rated five definitions “unacceptable” or “acceptable” and rank-ordered the “acceptable” definitions. Round 4 was sent to the expert panel on September 25 and concluded on October 11, 2007.

Results

Table 1 reports experts’ participation by Delphi round. In Round 1 of the study to define agricultural and extension education from a global perspective, a panel of 15 of the 17 international experts provided their own working definitions of international agricultural and extension education. From these fifteen working definitions, the researchers extracted 62 definition stems. In Round 2, panelists were asked to rate their level of agreement with each of the definition stem statements on a six-point scale (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, 6 = strongly agree). Those definition stems to which two-thirds of the expert panel agreed or strongly agreed were kept for further analysis; in Round 2, 37 items were kept for further analysis. The expert panel was also given the opportunity to add definition stem statements; 33 new statements were added in Round 2.
Table 1

*Participation of Experts by Round*

<table>
<thead>
<tr>
<th>Round</th>
<th>Number in Panel</th>
<th>Number Participating in Round</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>13</td>
</tr>
</tbody>
</table>

In Round 3, panelists were again asked to rate their level of agreement with 70 definition stem statements and comment on specific statements of interest. Definition stem statements to which two-thirds of the expert panel agreed or strongly agreed were kept for inclusion in the definition. Using the 51 definition stem statements agreed to by the expert panel, the researchers sorted statements by context, content, and condition and merged similar statements into four definitions of international agricultural and extension education. Retained stem statements are shown in Table 2; deleted stem statements, in Table 3.

Table 2

*Retained Stem Statements for Inclusion in the Definition*

<table>
<thead>
<tr>
<th>Stem Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. adopts the philosophies and principles of social sciences including communication and management</td>
</tr>
<tr>
<td>2. applies useful information to the analysis of practical problems</td>
</tr>
<tr>
<td>3. are part of one knowledge system; its impact depends on the strength of each part and their mutual articulation</td>
</tr>
<tr>
<td>4. assists people to be knowledgeable about natural and applied sciences</td>
</tr>
<tr>
<td>5. conducts research to improve the national agricultural extension system</td>
</tr>
<tr>
<td>6. conducts research to improve vocational and technical agricultural education</td>
</tr>
<tr>
<td>7. depends on a socio-economic context</td>
</tr>
<tr>
<td>8. disseminates useful information</td>
</tr>
<tr>
<td>9. encourages innovation</td>
</tr>
<tr>
<td>10. helps people to use useful information to help themselves</td>
</tr>
<tr>
<td>11. identifies and builds on the critical role of agriculture in food production and in the provision of sustainable livelihoods</td>
</tr>
<tr>
<td>12. improves decision making skills</td>
</tr>
<tr>
<td>13. includes social and behavioral sciences that are integrated with natural and applied sciences pertaining to agriculture, food, renewable natural resources, and the environment</td>
</tr>
<tr>
<td>14. includes the instruction and acquisition of knowledge and skills</td>
</tr>
<tr>
<td>15. includes the science fields necessary to support sustainable development, amongst which life sciences, natural sciences and social sciences</td>
</tr>
<tr>
<td>16. incorporates issues related to the interrelatedness of globalization</td>
</tr>
<tr>
<td>17. incorporates issues related to the interrelatedness of natural and social sciences</td>
</tr>
<tr>
<td>18. is a field of study</td>
</tr>
<tr>
<td>19. is a participatory persuasive process of educating all stakeholders involved in agricultural development</td>
</tr>
</tbody>
</table>
Table 2  (continued).

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20.</td>
<td>is a systematic instructional collection of knowledge, attitude and skills regarding a complete understanding of the global agricultural industry in the 21st century</td>
</tr>
<tr>
<td>21.</td>
<td>is an educational tool for promotion of dietary services</td>
</tr>
<tr>
<td>22.</td>
<td>is an educational tool for promotion of integrated natural resource management</td>
</tr>
<tr>
<td>23.</td>
<td>is an educational tool for reduction of poverty</td>
</tr>
<tr>
<td>24.</td>
<td>is an educational tool for sustainable management of ecosystem services</td>
</tr>
<tr>
<td>25.</td>
<td>is based on sound principle of teaching and learning</td>
</tr>
<tr>
<td>26.</td>
<td>is designed to affect recipients' attitude, knowledge, and ability to perform</td>
</tr>
<tr>
<td>27.</td>
<td>is essential to training future generations of farmers, agricultural specialists and agribusiness leaders</td>
</tr>
<tr>
<td>28.</td>
<td>is intension in developing human capital for leadership in agriculture</td>
</tr>
<tr>
<td>29.</td>
<td>is to help to bring about adoption of best practice</td>
</tr>
<tr>
<td>30.</td>
<td>is vital to agricultural leadership that is needed in all countries, especially in developing countries</td>
</tr>
<tr>
<td>31.</td>
<td>is vital to sustainable development</td>
</tr>
<tr>
<td>32.</td>
<td>makes recommendations to improve the national agricultural extension system</td>
</tr>
<tr>
<td>33.</td>
<td>makes recommendations to improve vocational and technical agricultural education</td>
</tr>
<tr>
<td>34.</td>
<td>outcomes should periodically be updated as new innovations develop</td>
</tr>
<tr>
<td>35.</td>
<td>pertains to agricultural development and the environment worldwide</td>
</tr>
<tr>
<td>36.</td>
<td>prepares people to be agents of change</td>
</tr>
<tr>
<td>37.</td>
<td>prepares people to be aware of the consequences of their actions and recommendations</td>
</tr>
<tr>
<td>38.</td>
<td>prepares people to make better decisions</td>
</tr>
<tr>
<td>39.</td>
<td>produces graduates who are open-minded, responsive and utilize advanced technology for system adaptation, operational and economic efficiency, social responsibility and environmental stewardship</td>
</tr>
<tr>
<td>40.</td>
<td>promotes global knowledge exchange in agricultural and extension education programs and systems</td>
</tr>
<tr>
<td>41.</td>
<td>provides education about social factors</td>
</tr>
<tr>
<td>42.</td>
<td>provides education about the natural resource management</td>
</tr>
<tr>
<td>43.</td>
<td>provides for the initial and continuing development of professionals at various levels such as leaders, managers, technical specialists and researchers</td>
</tr>
<tr>
<td>44.</td>
<td>provides in-service training for agriculture teachers and headmasters</td>
</tr>
<tr>
<td>45.</td>
<td>provides in-service training for extension workers, supervisors, and directors</td>
</tr>
<tr>
<td>46.</td>
<td>provides pre-service education for extension workers, supervisors, and directors</td>
</tr>
<tr>
<td>47.</td>
<td>provides professional development training at the international level for agricultural and extension education professionals</td>
</tr>
<tr>
<td>48.</td>
<td>provides professional development training at the national level for agricultural and extension education professionals</td>
</tr>
<tr>
<td>49.</td>
<td>refers to all teaching and learning activities that help meet the challenge of producing healthy, socially responsible, ecologically sound and fair food</td>
</tr>
<tr>
<td>50.</td>
<td>serves a role as 'third coordination mechanism', i.e. networking, social capital development, interactive emergence</td>
</tr>
<tr>
<td>51.</td>
<td>teaches scientific and socioeconomic disciplines in a systems framework</td>
</tr>
</tbody>
</table>
Table 3

Deleted Stem Statements

<table>
<thead>
<tr>
<th>Stem Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. teaches about and through agricultural contents</td>
</tr>
<tr>
<td>2. agricultural educators teach for and through rural society</td>
</tr>
<tr>
<td>3. aims to improve human well-being</td>
</tr>
<tr>
<td>4. captures relevant technologies that are environmentally and socially centered</td>
</tr>
<tr>
<td>5. encompasses instruction in various disciplines of agriculture</td>
</tr>
<tr>
<td>6. encourages exchange of peoples and ideas</td>
</tr>
<tr>
<td>7. encourages progressive growth through local leadership, self-help, and civil pride</td>
</tr>
<tr>
<td>8. facilitates conflict resolution</td>
</tr>
<tr>
<td>9. facilitates multi-stakeholder processes</td>
</tr>
<tr>
<td>10. focuses on improving the standard of living of farmers</td>
</tr>
<tr>
<td>11. harnesses leadership potential</td>
</tr>
<tr>
<td>12. has as an aim to teach rural people how to raise their standards of living</td>
</tr>
<tr>
<td>13. has as an aim to teach rural people using their own resources and efforts</td>
</tr>
<tr>
<td>14. has as an aim to teach rural people with minimum assistance from government</td>
</tr>
<tr>
<td>15. improves economic growth</td>
</tr>
<tr>
<td>16. improves human performance in natural and applied sciences</td>
</tr>
<tr>
<td>17. improves institutional development</td>
</tr>
<tr>
<td>18. includes sustainable natural resource use, conservation, and management</td>
</tr>
<tr>
<td>19. incorporates issues related to the interrelatedness of entrepreneurship</td>
</tr>
<tr>
<td>20. incorporates issues related to the interrelatedness of information technology</td>
</tr>
<tr>
<td>21. involves world-wide efforts for enlarging mankind welfare in food, fiber, and other useful goods</td>
</tr>
<tr>
<td>22. is a partnership</td>
</tr>
<tr>
<td>23. is a series of practical training related to each specific discipline (within agricultural sciences)</td>
</tr>
<tr>
<td>24. is a series of theoretical training related to each specific discipline (within agricultural sciences)</td>
</tr>
<tr>
<td>25. is a voluntary, adult education program</td>
</tr>
<tr>
<td>26. is an educational tool for promotion of human health</td>
</tr>
<tr>
<td>27. is an international operating environment</td>
</tr>
<tr>
<td>28. is carried on thoughtfully and systematically in an atmosphere of mutual trust and respect</td>
</tr>
<tr>
<td>29. is concerned with the livelihood of rural dwellers</td>
</tr>
<tr>
<td>30. is for sustainable utilization of natural resources to produce plants and animals and corollary services for the benefit of humankind</td>
</tr>
<tr>
<td>31. is in the field of sustainable food production worldwide</td>
</tr>
<tr>
<td>32. is to disseminate technical innovation</td>
</tr>
<tr>
<td>33. is vital to economic security</td>
</tr>
<tr>
<td>34. is vital to food security</td>
</tr>
<tr>
<td>35. makes agricultural practices fit into local agro-climatic conditions and farmers’ socio-economic and cultural conditions</td>
</tr>
<tr>
<td>36. prepares people to work in natural and applied sciences</td>
</tr>
<tr>
<td>37. produces graduates who understand resource availability and utilization, production, marketing, environmental and socioeconomic dimensions of agricultural systems</td>
</tr>
<tr>
<td>38. provides collaboration; part of a bundle of policy instruments</td>
</tr>
</tbody>
</table>
Table 3 (continued).

<table>
<thead>
<tr>
<th>Definition</th>
<th>Level of Agreement*</th>
<th>Rank by Option**</th>
</tr>
</thead>
<tbody>
<tr>
<td>39. provides education about agricultural commodity and service as a good consumer, producer, and/or citizen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40. provides education about the environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41. provides pre-service education for agriculture teachers and headmasters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. refers to all teaching and learning activities that help make consumers aware and critical of the choices they make in their everyday life with regards to the use of agricultural products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. succeeds from a single country environment and facilitates the continued development of agriculture throughout the world</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44. uses agreed-upon principles and innovative methods of teaching and learning</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In Round 4, expert panel members were asked to rate their level of agreement with each of the four proposed definitions on a four point scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). Then, expert panel members were asked to rank those definitions with which they strongly agreed or agreed. All four proposed definitions received two-thirds agreement by the expert panel, but one option emerged as the preferred definition. The mean levels of agreement by option and mean rank by option are shown in Table 4. The expert panel tended to agree strongly with definition four and assigned it the highest mean value among the four options.

Table 4

*Level of Agreement scale was (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree).

**Rank by Option scale was (1=most preferred, to 4=least preferred).
Conclusions
A panel of experts reached consensus on a new definition for international agricultural and extension education. The consensus definition was:

International Agricultural and Extension Education (IAEE) is a field of study in the social sciences, behavioral sciences, and natural and life sciences that is based on sound principles of teaching and learning and integrates the sciences relevant for the development of human capital and for the sustainability of agriculture, food, renewable natural resources, and the environment. International agricultural and extension education is a knowledge exchange system that engages change agents in a participatory persuasive process of educating global stakeholders and preparing future farmers, agricultural specialists, and agribusiness leaders in a changing world.

International agricultural and extension education professionals conduct research, teaching, and outreach activities to improve the national agricultural extension system, the vocational and technical agricultural education system, and the people who work in the field of study. International agricultural and extension education includes the instruction in and acquisition of knowledge, attitudes, and skills related to natural and social sciences, globalization, and cultural diversity that produce healthy, socially responsible, ecologically-sound citizens relevant in the 21st century. International agricultural and extension education prepares people as global citizens to make better decisions and to be aware of the consequences of their actions and recommendations.

International agricultural and extension education encourages innovation, seeks to bring about dissemination and adoption of best practices among stakeholders, and produces graduates who are open-minded, responsive, and who use advanced technology for system adaptation, operational and economic efficiency, social responsibility, and environmental stewardship. International agricultural and extension education is intended to develop agricultural leadership and to help people to identify and use knowledge to help themselves.

As a professional society, international agricultural and extension education provides continuing education at the international level for agricultural and extension education professionals. The professional society serves a role in networking, social capital development, and the interactive emergence of a knowledge society.

Implications
The engaged panel of scholars lived in diverse locations and worked primarily in their home countries. Consequently, the indigenous cultures and philosophies of their experiences shaped this study. The resulting definition of international agricultural and extension education was an amalgamation of their views forecasting functions, organizational forms, and professional roles in 2010 and beyond.

Drucker (2003) described discontinuities that are “transforming the economic landscape and creating tomorrow’s society” (p. ii). Agricultural and extension education, as a field of study, continues to change as society, subject matter, and learners change. Barrick (1989), Mulder (2005), and Shinn, Briers and Baker (2008) concluded that agricultural education is a multi-faceted field of study that empowers people through lifelong education. FAO (2008) noted, “current trends in reform focus on decentralized, demand-led, participatory, pluralistically delivered, outsourced or contracted, privatized and cost-shared aspects of research and extension services and programs” (p. 5). Swanson and Samy (2002b) posited that in “strengthening national extension systems for the 21st century, policies and resources should reflect the comparative strengths of public extension, private firms and NGO’s” (p. 5).
International agricultural and extension education is a dynamic knowledge exchange system that engages change agents in a participatory persuasive process and benefits from “. . . a tight alignment and efficient organization of research, education and extension” (p. 13, Mulder, 2005). Heeding the admonition of Welch (2005), scholars in agricultural and extension education must continue to re-define and reinvent the field of study based on contemporary societal, technical, and client/learner needs.

Recommendaions

The inscription (γνῶθι σεαυτόν) at the ancient Temple of Apollo at Delphi admonishes the reader to “know yourself.” By knowing ourselves—international agricultural and extension education—we may come to know the dimensions of our work and how to serve best the needs of others. Administrators must reflect the new dimensions in organizational policy and procedures. Academic programs must accommodate these changing dimensions in the curriculum. Further research is needed to identify knowledge domains and knowledge objects that redefine best practice.

A second recommendation comes from leverage through joint collaboration with other international scholars who complement our strengths and ameliorate our limitation. This extension of our context gives us leverage to accomplish mutual goals, often with different means for similar ends.

A third recommendation is to form coalitions to advance a common agenda larger than any of the parent groups. These temporary alliances will further the financial, political, and intellectual resources of all parties. These coalitions will champion a common agenda advancing agricultural and extension education and higher education’s evolving civic, social, and cultural roles in society (National Forum on Higher Education for the Public Good, 2004). Each affiliate must continue to focus on its primary mission while, at the same time, creating synergy within the coalition. Together, we can achieve greater success as we redefine our future and our future redefines us.

Abu-Ghazaleh (2008) advised that “we can never be certain about the future and therefore we must continue to be flexible and adaptable so that we can react quickly to the needs of our clients [learners] and our market place” (p. 1). Thus, the continuous transformation of agricultural and extension education now begs the question—What are the essential knowledge, attitudes, and skills that define the doctoral level professional in international agricultural and extension education?

References


Diverse Market Segments and Customer Satisfaction: Does Extension Serve All Clients Well?

Glenn D. Israel
University of Florida
Department of Agricultural Education and Communication
Email: gdi@ifas.ufl.edu

S. Galindo-Gonzalez
University of Florida
Department of Agricultural Education and Communication
Email: sgalindo@ufl.edu

Abstract

Extensionists face increasing requirements for documenting the relevance, quality, and impact of services provided. From a Total Quality Management perspective, it also is important to determine if the level of quality is uniform across Extension’s delivery system. Customer satisfaction surveys are a useful tool for obtaining a perspective on the quality of services and outcomes. This study explored whether audience diversity had an effect on the perceptions of clients regarding the quality of Extension’s services. Using survey data collected from 2003 through 2007, clients’ race-ethnicity and gender were found to be associated with small, but significant differences in satisfaction. Blacks and other minorities perceived having a somewhat lower quality experience with the services provided by Extension than did Whites and Hispanics. Men also had slightly lower levels of satisfaction with the quality of service received and outcomes experienced than did women. Given these findings, action is needed to implement improvements, including using more participatory approaches to promote equal involvement of the diverse clientele during the planning process, developing skills for the delivery of information that are suitable for use with culturally diverse audiences, and getting a better understanding of the cultural characteristics of the different market segments in the community.

Keywords: Customer satisfaction, Market segments, Diversity, Gender, Race-ethnicity
Introduction

Extensionists everywhere face increasing expectations and requirements for documenting the relevance, quality, and impact of services provided to clients (Radhakrishna, 2002; Richardson, 2001; Rivera & Alex, 2004). Though accountability requirements may lead to efforts to collect data, this information also can be used to maintain or enhance the quality of educational programs. Customer satisfaction surveys (CSS) are an important tool for measuring program quality (Hatry, 1999; Ladewig, 1999; Rossi, Lipsey & Freeman 2007). On the one hand, feedback from Extension clients can identify gaps in the delivery processes used by Extension. On the other hand, very satisfied clients mean that the organization is “on track” and likely to enjoy high levels of loyalty (Terry & Israel, 2004).

The Florida Cooperative Extension Service (FCES), for example, annually measures the quality of the services provided across its many educational programs, including agriculture and natural resources, residential horticulture, family and consumer sciences, and community development, using a customer satisfaction survey. The state’s standard is that 92% of clients will be “satisfied” or “very satisfied” with the quality of the service received. Clients’ perceptions of quality have remained high in recent years, increasing slightly from 92.3% in 2003 to 95.3% in 2007. To maintain high levels of satisfaction, FCES strives constantly to identify, prioritize, and provide solutions that meet the needs and expectations of the different market segments that it serves.

One challenge facing Extension is meeting the needs of increasingly diverse populations, not only in the U.S., but in Europe and other regions of the world. Continuing with Florida as an example, the U.S. Census Bureau (2005) reports that the proportions of Hispanic/Latino and Black people in Florida are greater than those at the national level (19.5 vs. 14.4% and 15.7 vs. 12.8%, for Hispanic/Latino and Black, respectively). The same report shows that women account for 51% of the population in Florida, a percentage slightly greater than the national average. The importance of the population’s diversity for planning and marketing Extension programs in Florida has been widely documented and explored (Brennan, 2005; Guion, 2005a; Guion & Kent, 2005; Place & Toro, 2006).

Even though the overall Extension customer satisfaction in Florida is high (Haile & Israel, 2005) and meets the performance target, it is important to determine whether the quality of the experience with Extension remains equally high across different market segments, particularly those characterized by race-ethnicity (hereafter, referred to as race) and gender. From an equal opportunity perspective, involving diverse audiences in Extension programs meets the minimum criteria for quality. Exploring clients’ experiences with Extension measures another dimension of program quality.

Conceptual Framework

Embracing the spirit of Total Quality Management (TQM), it is important to conduct in-depth analyses to determine if the level of quality is uniform across the different process carried-on by the organization (Royse, Thyer, Padgett, & Logan, 2006). TQM conceptualizes organizations as networks, or systems, of interdependent components encompassing critical factors, practices, techniques, and tools (Hellsten & Klefsjö, 2000; Tari, 2005). Hackman and Wageman (1995) summarized four principles that should guide any intervention aimed to increase the quality of the products and services of an organization according to the writings of the TQM founders: (a) focus on work processes, (b) analysis of the variability in processes, services, and outcomes, (c) management by fact, and (d) continuous learning and
improvement. The first principle addresses the idea that an organization must articulate how it operates and set standards for performance. In Extension, plans of work and objectives serve as a basis for describing work processes and for assessing fidelity of program implementation and the generation of impacts.

Thus, quality is seen as being a direct result of work processes within the organization and, in the case of Extension, this relates to aspects of programming and delivery of educational interventions. Hackman and Wageman (1995, p 311) note that “uncontrolled variance in process or outcomes is the primary cause of quality problems” and this leads to the second principle, which is the analysis of FCES’ services and outcomes through the annual CSS. The resulting data are reported to county and state-level administrators for use in making management decisions aimed at program improvement. TQM assumes that people are naturally interested in improving their performance and will be actively involved in doing it, if they receive the appropriate information and tools. The utilization of the results from the CSS should lead to a continuous learning and improvement within the Extension organization, thereby accomplishing the fourth principle of TQM.

The analysis of processes, services and outcomes can be conducted with data from either internal or external sources. Customer satisfaction surveys have maintained a prominent place in the agendas of researchers since the early 1980s (Allen & Rao, 2000) because they are a useful tool for obtaining an external perspective on the quality of services and outcomes. Rennekamp et al. (2001) examined the customer satisfaction of the Kentucky CES and found that overall almost 92% of the clients were either satisfied or very satisfied with the service. It is worth mentioning that respondents in the same study also perceived that Extension valued all questions from its clients equally, provided answers in a timely fashion, and treated people with respect and dignity. Extension should not only be competent, it needs to show real concern for the clients (Haile & Israel, 2005) which will lead to more repeating loyal customers (Terry & Israel, 2004). Customer satisfaction is such an important measure of quality that in the Malcolm Baldrige National Quality Award criteria customer focus and satisfaction account for more than 25% of the possible points of evaluation (Allen, 2004). The results obtained from a CSS can be used to establish a benchmark against which similar programs can compare their performance. For example, Radhakrishna (2002) compared the results from Texas and Florida against those from South Carolina.

Although a CSS provides an assessment of the general satisfaction of Extension’s clients, it is important to explore the data further to make sure that differences are not due to significant variation in program experiences between clientele groups. Multiple studies have shown, however, that gender, age, and education (Anderson, Pearo, & Wildener, 2008; Caruana, 2002; Mittal & Kamakura, 2001; Oly Ndubisi, 2006) have an effect on customer satisfaction and loyalty. Female automotive customers were found to report greater satisfaction with the service than did males (Mittal & Kamakura, 2001). Similarly, gender plays a moderator role on the trust-customer loyalty relationship in banking whereby, female customers are significantly more loyal than men when the bank is deemed very trustworthy (Oly Ndubisi, 2006). Several recent studies also suggest that the basis for customer satisfaction differs between men and women, with the former focused more on functional aspects and the latter were influenced more by affective and relational aspects of the service experience (Anderson, Pearo, & Wildener, 2008; Voss & Cova, 2006). In the case of race-ethnicity, one study reported similar levels of customer satisfaction but the importance of each
Aspect of service quality was found to differ among Hispanics, African-Americans, and non-Hispanic whites (Lopez, Hart, & Rampersad, 2007). In sum, the principles of TQM and findings from research on customer satisfaction give credence to efforts to assess how well Extension is serving different market segments.

**Purpose and Objectives**

The purpose of this study is to explore if audience diversity has an effect on the perceptions of clients regarding the quality of services provided by Extension. The objectives are:

1. To describe and look for associations in how assessments of the quality of Extension services differed by race and gender.
2. To describe and look for associations in the outcomes of the experiences with Extension services by race and gender.

**Methods**

Data from the Customer Satisfaction Surveys (CSS) for the years 2003 to 2007 were used in the study. The self-administered survey was sent to a sample of clients who were selected from the population that had attended a workshop or seminar, called the Extension office, or visited the office in order to solicit feedback about their experiences. The survey was implemented using a sequence of contacts – pre-letter, survey and cover letter, reminder post card, and second survey and cover letter to nonrespondents. A total of 2,808 useable surveys were pooled for the analysis (275 for 2003, 442 for 2004, 747 for 2005, 793 for 2006 and 551 for 2007). The response rate (RR1, AAPOR, 2004) was 58.2% in 2003, 51.0% in 2004, 63.6% in 2005, 63.3% in 2006 and 60.1% in 2007.
### Table 1

**Descriptive Statistics for Service Quality, Outcomes, and Overall Satisfaction**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Quality</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>1825</td>
<td>65.5</td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>817</td>
<td>29.3</td>
<td></td>
</tr>
<tr>
<td>Other(^a)</td>
<td>145</td>
<td>5.2</td>
<td></td>
</tr>
<tr>
<td>Timely Delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>1772</td>
<td>63.6</td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>843</td>
<td>30.3</td>
<td></td>
</tr>
<tr>
<td>Other(^a)</td>
<td>171</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>Relevancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>1696</td>
<td>61.1</td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>859</td>
<td>30.9</td>
<td></td>
</tr>
<tr>
<td>Other(^a)</td>
<td>222</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>Ease of Understanding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>1824</td>
<td>65.8</td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>805</td>
<td>29.0</td>
<td></td>
</tr>
<tr>
<td>Other(^a)</td>
<td>143</td>
<td>5.2</td>
<td></td>
</tr>
<tr>
<td>Service Quality Index</td>
<td>2740</td>
<td>4.48</td>
<td>.78</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunity to Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2188</td>
<td>79.7</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>452</td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>106</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>Solved the Problem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1872</td>
<td>86.2</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>118</td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>183</td>
<td>8.4</td>
<td></td>
</tr>
<tr>
<td>Shared Information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2002</td>
<td>73.3</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>650</td>
<td>23.8</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>81</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td><strong>Overall Satisfaction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>1855</td>
<td>66.8</td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>765</td>
<td>27.6</td>
<td></td>
</tr>
<tr>
<td>Other(^a)</td>
<td>156</td>
<td>5.6</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)Other includes Neither satisfied nor dissatisfied, Dissatisfied, and Very dissatisfied.

Data for each dimension of quality and outcome of use of Extension services were analyzed by race and gender using cross-tabulations and Chi-square tests for significance. Additional demographic attributes and two measures of extension experience were included in regression and logistic regression models to test for potential moderator and mediator effects (Barron & Kinney, 1986) in the relationships between quality and race/gender using software from the Statistical Analysis System (SAS) Institute. To address problems with missing data, values for the demographic controls and Extension experience variables were estimated using multiple imputation prior to the regression analyses (Schafer & Graham, 2002; Yuan, 2000). Logistic regression was used to estimate the effects of race and gender categories on the likelihood of being...
“Satisfied” versus “Very satisfied” with the quality of the experience. The same procedure was used to estimate the effects of those same variables on the likelihood of having an opportunity to use the information, solving the problem, and sharing the information with others. A significant parameter estimate means that the predictor variable affects either the quality of the experience, outcomes of using Extension’s services, or both.

Table 2

<table>
<thead>
<tr>
<th>Demographic Attributes and Extension Experience</th>
<th>N</th>
<th>M%/</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>2411</td>
<td>89.6</td>
<td></td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>147</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>77</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>57</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1325</td>
<td>47.2</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1483</td>
<td>52.8</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>2808</td>
<td>56.5</td>
<td>15.2</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some H.S. or less</td>
<td>103</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>High School diploma or GED</td>
<td>547</td>
<td>19.5</td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>1038</td>
<td>37.0</td>
<td></td>
</tr>
<tr>
<td>4-year College degree</td>
<td>663</td>
<td>23.6</td>
<td></td>
</tr>
<tr>
<td>Graduate degree</td>
<td>457</td>
<td>16.3</td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm</td>
<td>440</td>
<td>15.7</td>
<td></td>
</tr>
<tr>
<td>Rural, non-farm</td>
<td>794</td>
<td>28.3</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>1574</td>
<td>56.1</td>
<td></td>
</tr>
<tr>
<td><strong>Extension Experience</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extension contacts last 12 months</td>
<td>2808</td>
<td>5.3</td>
<td>8.0</td>
</tr>
<tr>
<td>Type of Contact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office visit</td>
<td>647</td>
<td>25.2</td>
<td></td>
</tr>
<tr>
<td>Phone call</td>
<td>533</td>
<td>20.7</td>
<td></td>
</tr>
<tr>
<td>Planned program</td>
<td>1392</td>
<td>54.1</td>
<td></td>
</tr>
</tbody>
</table>
Findings

Significant associations were found to exist between gender of the respondent and the perception of quality of Extension services. Although the overall satisfaction reported by Extension clients was above the legislated performance standard, Table 3 shows a small but statistically significant association between gender of the respondent and most of the indicators of satisfaction. A larger percentage of women were very satisfied for each of the four items concerning service quality, as compared to men, and the mean for the service quality index also was significantly higher for women than for men. Although the opportunity to use the information was not different, more women said that they had their problem solved or the question answered than did men (87.7 and 83.9 percent, respectively). Similarly, women were slightly more likely to share information with others. Finally, women had a somewhat higher percentage who were very satisfied with the overall service of the Extension office than did men (69.4 and 63.7 percent, respectively).

The respondent’s race also was significantly associated with the perception of satisfaction for several indicators of service quality. Specifically, Whites had the largest percentage who were very satisfied with the timely delivery and relevancy of the information, followed by Hispanics (Table 4). Blacks and persons of other races had lower percentages saying that they were very satisfied with the timely delivery and relevancy of the information. Because the number of respondents was relatively small for each race category except Whites, the difference did not achieve statistical significance for accuracy of the information and ease of understanding. The trend for accuracy and ease of understanding, however, followed the pattern for the other two items. Whites and Hispanics were also more likely to use the information (80 percent versus 68 percent for Blacks and Others) but did not differ from Blacks and persons of other races on whether the information solved the problem and sharing the information. Finally, a higher percentage of Hispanics and Whites reported that they were very satisfied with their overall experience than did Blacks and persons of other races (68.4, 67.8, 55.8 and 60.7 percent, respectively, in Table 4).

Tables 5 and 6 summarize the results from logistic regression and regression analyses. The logistic regressions in Table 5 predict the likelihood of being “Very satisfied” versus “Satisfied” for the service quality dimensions (the other response categories were excluded from these models). Similarly, the model in Table 6 compares “Very satisfied” and “Satisfied” for the overall satisfaction measure and “Yes” versus “No” and “Don’t know” for the outcome measures. The results further support that there are race and gender differences while controlling for other demographic characteristics and type of contact. With regard to gender, men were less likely to report that they were very satisfied with each aspect of service quality (accuracy, timely delivery, relevancy, and ease of understanding) than did women, as shown by the significant negative parameter estimates for males in Table 5. Likewise, men were predicted to have a lower score on the service quality index than women (see Table 5) and they were less likely to be very satisfied with the overall service of the Extension office (Table 6). On the other hand, controlling for other demographic variables in the model reduced differences between men and women on the two outcome variables, solved the problem and shared information, from significant in Table 3 (p=.024 and .042, respectively) to nonsignificance in Table 6 (p>.05 for both outcomes). This suggests that other variables, such as education, the amount of contact with Extension, and the type of contact (e.g., office visit, phone call, or planned program) might mediate the relationship between these outcomes and gender that was observed earlier in Table 3.
Table 3
 Service Quality, Outcomes, and Overall Satisfaction by Gender

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>$p^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Quality</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>61.3</td>
<td>68.6</td>
<td>.00</td>
</tr>
<tr>
<td>Satisfied</td>
<td>32.9</td>
<td>26.7</td>
<td>.00</td>
</tr>
<tr>
<td>Other$^b$</td>
<td>5.7</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>Timely Delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>59.7</td>
<td>66.6</td>
<td>.00</td>
</tr>
<tr>
<td>Satisfied</td>
<td>34.0</td>
<td>27.3</td>
<td>.00</td>
</tr>
<tr>
<td>Other$^b$</td>
<td>6.3</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>Relevancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>56.3</td>
<td>65.1</td>
<td>.00</td>
</tr>
<tr>
<td>Satisfied</td>
<td>35.1</td>
<td>27.3</td>
<td>.00</td>
</tr>
<tr>
<td>Other$^b$</td>
<td>8.6</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Ease of Understanding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>61.4</td>
<td>69.5</td>
<td>.00</td>
</tr>
<tr>
<td>Satisfied</td>
<td>32.8</td>
<td>25.9</td>
<td>.00</td>
</tr>
<tr>
<td>Other$^b$</td>
<td>4.6</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>Service Quality Index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>4.50</td>
<td>4.59</td>
<td>.00</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunity to Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>80.0</td>
<td>79.1</td>
<td>.73</td>
</tr>
<tr>
<td>No</td>
<td>16.5</td>
<td>16.7</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>3.6</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td>Solved the Problem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>83.9</td>
<td>87.7</td>
<td>.02</td>
</tr>
<tr>
<td>No</td>
<td>5.8</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>10.3</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td>Shared Information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>71.5</td>
<td>75.1</td>
<td>.04</td>
</tr>
<tr>
<td>No</td>
<td>25.7</td>
<td>21.6</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>2.8</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td><strong>Overall Satisfaction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>63.7</td>
<td>69.4</td>
<td>.01</td>
</tr>
<tr>
<td>Satisfied</td>
<td>30.0</td>
<td>25.7</td>
<td>.01</td>
</tr>
<tr>
<td>Other$^b$</td>
<td>6.3</td>
<td>4.8</td>
<td></td>
</tr>
</tbody>
</table>

$^a$ $p$-value is the significance level for test Chi-square (for categorical variables) or F-test (for the service quality index).

$^b$ Other includes Neither satisfied nor dissatisfied, Dissatisfied, and Very dissatisfied.
<table>
<thead>
<tr>
<th>Service Quality, Outcomes, and Overall Satisfaction by Race-ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Service Quality</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
</tr>
<tr>
<td>Very Satisfied</td>
</tr>
<tr>
<td>Satisfied</td>
</tr>
<tr>
<td>Other&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Timely Delivery</td>
</tr>
<tr>
<td>Very Satisfied</td>
</tr>
<tr>
<td>Satisfied</td>
</tr>
<tr>
<td>Other&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Relevancy</td>
</tr>
<tr>
<td>Very Satisfied</td>
</tr>
<tr>
<td>Satisfied</td>
</tr>
<tr>
<td>Other&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Ease of Understanding</td>
</tr>
<tr>
<td>Very Satisfied</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Service Quality Index</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Outcomes</td>
</tr>
<tr>
<td>Opportunity to Use</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Don’t know</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Solved the Problem</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Don’t know</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Shared Information</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Don’t know</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Overall Satisfaction</td>
</tr>
<tr>
<td>Very Satisfied</td>
</tr>
<tr>
<td>Satisfied</td>
</tr>
<tr>
<td>Other&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>p-value is the significance level for test Chi-square (for categorical variables) or F-test (for the service quality index).

<sup>b</sup>Other includes Neither satisfied nor dissatisfied, Dissatisfied, and Very dissatisfied.
Table 5
Regression of Service Quality on Demographic and Extension Experience Variables

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Accuracy</th>
<th>Timely Delivery</th>
<th>Relevancy</th>
<th>Ease of Understanding</th>
<th>Quality Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>.25</td>
<td>.06</td>
<td>.38</td>
<td>.30</td>
<td>4.42</td>
</tr>
<tr>
<td>Male</td>
<td>-.40***</td>
<td>-.37***</td>
<td>-.44***</td>
<td>-.45***</td>
<td>-.10***</td>
</tr>
<tr>
<td>Female</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Black</td>
<td>-.25</td>
<td>-.50**</td>
<td>-.51**</td>
<td>-.37*</td>
<td>-.08</td>
</tr>
<tr>
<td>White/Hispanic</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Age</td>
<td>.01</td>
<td>.00</td>
<td>-.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Education</td>
<td>.10*</td>
<td>.14***</td>
<td>.15***</td>
<td>.15***</td>
<td>.04**</td>
</tr>
<tr>
<td>Farm</td>
<td>.20</td>
<td>.00</td>
<td>.05</td>
<td>.04</td>
<td>.04</td>
</tr>
<tr>
<td>Rural nonfarm</td>
<td>-.05</td>
<td>-.02</td>
<td>-.08</td>
<td>-.16</td>
<td>-.04</td>
</tr>
<tr>
<td>Urban area</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Ext. contacts</td>
<td>.02*</td>
<td>.02**</td>
<td>.02**</td>
<td>.02**</td>
<td>.00</td>
</tr>
<tr>
<td>Office visit</td>
<td>.10</td>
<td>.29***</td>
<td>.30**</td>
<td>-.03</td>
<td>-.00</td>
</tr>
<tr>
<td>Phone call</td>
<td>-.03</td>
<td>.12</td>
<td>.34**</td>
<td>.07</td>
<td>-.10**</td>
</tr>
<tr>
<td>Planned program</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

Model Fit

<table>
<thead>
<tr>
<th></th>
<th>X² or F</th>
<th>p-value</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>39.8</td>
<td>.00</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>58.3</td>
<td>.00</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>72.6</td>
<td>.00</td>
<td>.03</td>
</tr>
<tr>
<td></td>
<td>55.1</td>
<td>.00</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>4.69</td>
<td>.00</td>
<td>.01</td>
</tr>
</tbody>
</table>

aParameter estimates are based on logistic regression, except for the service quality index. For the logistic regression models, a positive parameter estimate means that the respondent was more likely to be very satisfied. bDenotes reference category, which has a parameter estimate of zero by definition. cIncludes other non-Hispanic minorities.

***p<.001, **p<.01, *p<.05

Turning to differences by race-ethnicity, our preliminary analysis suggested that the key difference is between Black, non-Hispanic clients and all other clients (labeled White/Hispanic in Tables 5 and 6). Thus, the results in Table 5 show that Blacks are less likely to be very satisfied than other clients for three of the four service quality indicators (and the fourth one has an estimate in the same direction but is not significant). Note that differences between Blacks and other clients were significant for ease of understanding in the model with controls, whereas this effect was suppressed in Table 4. Though the service quality index was not significantly different for Blacks and others, the direction of the estimate was consistent with the individual items. Blacks also were less likely to report being very satisfied overall with the service of the Extension office (Table 6). Regarding the outcome measures, Blacks were significantly less likely to use the information than other clients and of those
who had an opportunity to use the information, Blacks were less likely than other clients to say that their problem was solved or the question answered. Like ease of understanding, the relationship of Blacks and having the problem solved appears to have been suppressed in Table 4. In this case, the respondent’s education level and the number of contacts with Extension appear to be factors in revealing the relationship.

Table 6  
Regression of Outcomes and Overall Satisfaction on Demographic and Extension Experience Variables

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Opportunity to Use</th>
<th>Solved the Problem</th>
<th>Shared Information</th>
<th>Overall Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>.46</td>
<td>.25</td>
<td>1.20</td>
<td>.40</td>
</tr>
<tr>
<td>Male</td>
<td>.03</td>
<td>-.05</td>
<td>-.16</td>
<td>-.26**</td>
</tr>
<tr>
<td>Female</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Black</td>
<td>-.79***</td>
<td>-.32*</td>
<td>.00</td>
<td>-.50**</td>
</tr>
<tr>
<td>White/Hispanic</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Age</td>
<td>.00</td>
<td>.00</td>
<td>-.01*</td>
<td>.01*</td>
</tr>
<tr>
<td>Education</td>
<td>.18***</td>
<td>.11*</td>
<td>.13***</td>
<td>.05</td>
</tr>
<tr>
<td>Farm</td>
<td>.08</td>
<td>.15</td>
<td>-.06</td>
<td>-.10</td>
</tr>
<tr>
<td>Rural nonfarm</td>
<td>-.16</td>
<td>-.00</td>
<td>.01***</td>
<td>.02</td>
</tr>
<tr>
<td>Urban area</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Ext. contacts</td>
<td>.03***</td>
<td>.04***</td>
<td>.02***</td>
<td>.03***</td>
</tr>
<tr>
<td>Office visit</td>
<td>.53***</td>
<td>.20</td>
<td>-.43***</td>
<td>.03</td>
</tr>
<tr>
<td>Phone call</td>
<td>.45***</td>
<td>.15</td>
<td>-.49***</td>
<td>-.07</td>
</tr>
<tr>
<td>Planned program</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

Model Fit

<table>
<thead>
<tr>
<th>X² or F</th>
<th>71.6</th>
<th>45.0</th>
<th>60.0</th>
<th>43.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-value</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>R²</td>
<td>.03</td>
<td>.02</td>
<td>.02</td>
<td>.02</td>
</tr>
</tbody>
</table>

*aParameter estimates are based on logistic regression. A positive parameter estimate means that the respondent was more likely to be very satisfied, use or share the information, or have the problem solved. *bDenotes reference category, which has a parameter estimate of zero by definition. *cIncludes other non-Hispanic minorities.

Finally, several of the control variables have significant effects on the measures of service quality and outcomes. Education showed a significant positive effect on every measure, except overall satisfaction (Tables 5 and 6). As expected, the number of contacts with Extension also was a positive factor in clients being very satisfied with the elements of service quality (but it was not significant for the index),
having an opportunity to use the information, having the problem solved, and sharing the information, as well as overall satisfaction. In addition, receiving information via a phone call or office visit generally had a positive effect on service quality ratings and using the information but was negatively associated with sharing the information, as compare to clients who attended a planned program or workshop.

**Conclusions and Implications**

Consistent with the studies by Caruana (2002), Mittal and Kamakura (2001), Oly Ndubisi (2006) and Reinartz, Thomas and Kumar (2005), we found that client attributes were associated with differences in customer satisfaction. The results have shown that Blacks and other minorities perceived having a somewhat lower quality experience with the services provided by Extension than did Whites and Hispanics. This is particularly true for the timely delivery, relevance, and ease of use of the information. One implication is that Blacks and other minorities are somewhat less likely to develop a loyalty to the organization and continue to patronize Extension at the levels of Whites and Hispanics because patronage depends on achieving a high satisfaction level (Terry & Israel, 2004). Gender of the respondent also was found to be significantly associated both with the quality of experience and for the outcomes of receiving Extension services.

Given these findings, action is needed to implement improvements consistent with Hackman and Wageman’s (1995) procedures for total quality management. Three actions can be recommended based on the results of this study. First, Extension should use more participatory approaches to promote equal involvement of the diverse clientele during the processes of assessing needs and developing Extension programs that deliver information in appropriate ways (Tuttle, Lindner & Dooley, 2004). One important step is to ensure that county advisory councils’ composition reflects the diversity of the local population. Making face-to-face contacts with members of minority groups also can build rapport and help agents to develop empathy for specific audiences (Guion, 2005b). Both formal advisory committee meetings and informal conversations can contribute to well-designed programs with appropriate educational activities.

Second, Extension professionals should develop skills for the delivery of information that are suitable for use with culturally diverse audiences. Learning about and practicing educational methods appropriate for diverse audiences can enhance the quality of clients’ experience and, in turn, their satisfaction and patronage. For example, Guion and Kent (2005) note that African American audiences will be more receptive to information that includes examples involving Blacks or validating their culture and norms. Guion and Kent also suggest having African American representatives present your message and encouraging audiences to ask questions about your programs. The latter accommodates Blacks’ preference for oral communication.

Finally, Extension should work to identify and get a better understanding of the cultural characteristics of the different market segments that are part of its clientele or community. As noted by Brennan (2005), people are more likely to accept solutions to their problems that are consistent with their local culture. One practical step for meshing with a group’s culture is to take the program to their turf and present it on their terms. Moving forward on these recommendations is important to creating a more uniform level of quality in Extension’s services, which is critical to the TQM process (Royse et al., 2006).
References


Enhancing Effectiveness of Extension Efforts: A Case Study of Malian Shea Butter Producers

Assa Kante
Oklahoma State University
Department of Agricultural Education, Communications and Leadership
Email: assa_diarra_kante@hotmail.com

Carl G. Igo
Montana State University
Division of Agricultural Education
Email: cigo@montana.edu

Martin J. Frick
Montana State University
Division of Agricultural Education
Email: mfrick@montana.edu

Abstract
The researchers conducted an ethnographic case study in three villages in Mali (West Africa) to ascertain shea butter producers’ perceptions toward technologies that improve the efficiency of shea butter production. The study revealed that the appropriateness of time and labor saving technologies for Malian women who produce shea butter depended on: 1) the relative cost of the technologies; 2) the accessibility of information on new technologies; 3) the arduousness of the work avoided; 4) the economic status of the households and of the women’s associations; and 5) the productivity of the participants in other economic activities. The study confirmed the conclusions of previous researchers who noted that external technical assistance from developed countries played a vital catalytic role in upgrading traditional technologies. Top-down technical assistance was not the best dissemination means. Participants preferred producer-led training along with visual aids. New shea butter processing technologies were requested by participants, and an understanding of the local context for technology application as well as a strong field presence of trainers during designing and testing was important for dissemination.

Keywords: Extension Education, Technology Adoption, Diffusion, Shea Butter
Introduction

In September 2008, the Population Reference Bureau reported that during the 20th century, almost 90% of the population growth took place in countries classified as less developed by the United Nations. Additionally, it was estimated that virtually all of the world’s population growth between 2008 and 2050 will occur in these less developed countries, which includes every country of Africa (Population Reference Bureau, 2008b). In Mali, one of the Western African nations, the 2008 population estimate was 12.7 million while the projected 2050 population was 34.2 million, an increase of 169%. Over 48% of the Malian population was under the age of 15, 29% of the population was undernourished, and the per capita income was $1040, based on 2007 U.S. dollars (Population Reference Bureau, 2008a). The nations of Africa may never see the economic prosperity of European or North American nations, Japan or Korea. However, it should be possible for Africa to ensure for its peoples a real improvement in their lives and a greater harmony between their physical resources, cultural traditions, natural environment, and material expectations. According to the World Bank’s Robert Calderisi, (2006) the nations of Africa need to be allowed to develop in their own way and not be told what to do. Despite their much-documented poverty, the African nations have enormous resources upon which to build a better life.

Historically, shea butter has been economically important to Malian rural women. These women were able to assist in the financial support of their families through the income generated from shea butter production. According to Botang (1992), over two million women in 13 African countries produced shea butter for cash and consumption. Shea butter was a high-value export to European countries and the United States, where it was considered a luxury product. It was often used as a substitute for cocoa butter in the chocolate and confectionary industries because it was sweet and oily (Food and Agricultural Organization, 1991). It also was used in the cosmetic industry for its high cleansing power (Food and Agricultural Organization, 1991). However, the inefficiency of the production process lowered productivity, and therefore profits for the rural women of Mali. Lilja, Sanders, Durham, De Groote, and Dembele (1996) suggested that technological change supported the empowerment of Malian women and that providing additional extension services, inputs or land would increase the women’s income.

Shea nut processing in Mali was the cultural domain of women. After collecting the nuts, women cleaned, shelled, and roasted the nuts, ground them into a paste, then kneaded the paste to separate the solids and oils. The production process involved 14 individual steps. Traditional production methods were physically demanding and inefficient, and the product lacked quality. For example, kneading by hand required an average of three hours (University of Saint Thomas, 2005). To help African women improve the quality of the product and the efficiency of production, a fair-trade, non-profit organization, Shea Yeleen International, was founded in 2004 (R. Wright, personal communication, March 2004). This organization, in collaboration with faculty and students at the University of Saint Thomas (UST) in St. Paul, Minnesota, designed a mixer to knead shea paste, thus reducing the physical labor and time required to separate the solids from the oils. Ultimately, the goal of this project was to improve women's lives in Mali by providing them with access to new and culturally appropriate technology, which then expanded the women’s economic opportunities.

Effective distribution of this technology held the possibility to reduce poverty in Mali by potentially increasing the
income of women. Toward that means, it was necessary to determine the extent to which Malian women involved in shea butter production were willing and able to adopt relevant technological innovations and diffuse them using a producer-led approach.

Despite the potential of shea butter as a good source of export earnings, the traditional method of processing provided a poor-quality product with a low fat yield of about 15 percent (Fleury, 1981). This limited the product’s utilization both locally and internationally. To improve the yield and quality it was necessary to develop improved methods for processing shea butter (Olajide, Ade-Omowaye, and Otunola, 2000). Without standard operating procedures or guidelines, the process was difficult to replicate. To improve shea butter production, the Food Technology Laboratory (LTA) at Institut d’Économie Rurale (IER), the main government-funded research institute in Mali, reviewed the traditional processing of shea nuts and developed improved processing techniques (LTA, 2004). These techniques were introduced through an adult training program with an instructional poster series on shea butter quality management (Kante, 2004).

However, getting a new idea adopted even when it had obvious advantages was often difficult. A lengthy introductory period was often required before the innovation was widely adopted. Often this resulted in research results remaining unused (Riesenber and Gor, 1989). Therefore, there was a need to study factors affecting the adoption rate of technological innovations for efficient shea butter production processing methods in Mali and to develop appropriate outreach strategies for the diffusion of those innovations.

**Theoretical Framework**

Progress in agriculture was achieved through extension workers who transferred the results of scientific research to producers (Macadam, 2000). Despite the efforts of extension personnel and researchers, the developed technologies took time to reach the targeted populations. Therefore, it was essential to understand outreach strategies and individuals’ perceptions towards innovations in order to eliminate barriers to technology transfer in rural areas. Various extension models were used around the world, including linear “top-down” transfer of technology; participatory “bottom-up” approaches; one-to-one advice or information exchange; and formal or structured education and training. Besides more traditional extension approaches, the use of the producer-led method of introducing new technologies and practices and consulting with other farmers held promise for the transfer of scientific research and technology to rural areas (Lopez & Bruening, 2002). According to Black (2000), no single model or strategy was likely to be sufficient on its own.

The aim for introducing new technologies in rural settings was to have populations apply them as their own practices. Lionberger and Gwin (1991) noted the factors that seemed to affect the motivation of farmers to use new practices were functions of a dynamic network of institutional, situational, and personal components. These factors were in a constant state of interaction, combining in unique ways to direct the decision-making process of individuals considering alternative courses of action. Düvel and Abate (2004) noted implications for extension efforts were contingent on media contact, while education had significant impact on adoption behavior. Further, Lionberger and Gwin, (1991) stated:

In agriculture, technical information, supplies, credit, attitude changes, and changes in present farming methods have to come between awareness and use of an innovation. You have to examine all the variables in a local situation and make as many of those variables as
possible helpful or at least not an obstacle to adoption.
We can influence change…
But don’t expect to achieve instant agricultural development with a magic gadget (p. 15).

Inaizumi, Singh, Sanginga, Manyong, Adesina, and Tarawali (1999) concluded that when a technology was appropriate, it stimulated a process of autodiffusion, through a dynamic farmer-to-farmer horizontal spread. Rapid adoption of agriculture technologies by resource-poor farmers would require farmers’ increased participation in the technology development and evaluation process in order to ensure that the technology would be appropriate for their needs.

In Ghana, Effa and Herring (2005) found that rural women who participated in educational seminars adopted agricultural innovations at a significantly higher rate than non-participants. Hyman (1991) noted initial decisions for participation to test the technologies were based on politics and family ties. Although the technology was generally accepted, in a few cases women especially were reluctant. Hyman also noted the main reasons for the reluctance were a) the process did not correspond to the traditional steps of shea butter production; b) higher labor intensity was required, or c) lower shea butter yields resulted. Hyman further noted the following issues regarding the adopting of shea butter processing equipment:

The experience with shea butter processing equipment illustrates some common lessons in the introduction of new technologies like (a) providing training for proper operation, (b) establishing a sustainable system for maintenance and replacement parts, (c) criteria to help ensure an equitable distribution of costs and benefits, and (d) incorporating the preferences of users in the design (p. 1265).

Understanding the local context was necessary for successful application of the diffusion and adoption process. In-depth interaction was essential at all stages, from designing and testing through dissemination. A strategy for disseminating technology must be based on a clear identification of the target beneficiaries and their resources and constraints (Hyman, Stifetel, Moreau, and Nichols, 1988). Further, according to Hyman (1991), the main benefit of upgraded technologies for shea butter production was that reducing the amount of labor involved allowed women to conduct other income generating activities. In rural Malian societies, women had few opportunities for individual wage employment due to socio-cultural barriers.

Purpose and Objectives
The purpose of this research project was to ascertain the factors affecting adoption and diffusion of technological innovations by female shea butter producers in Mali.

The study’s specific objectives were:
1. Identify barriers to the adoption of new shea butter processing technologies;
2. Identify the information channels used by selected Malian shea butter producers to receive production processing practices information; and
3. Identify the types of training preferred by selected Malian shea butter producers.

Methods
This case study research utilized purposefully selected sites and individuals to focus on Malian village women involved in shea butter production who were
considering adoption or had recently adopted new shea butter production technology. Because of unique differences in infrastructure, business organization, and production practices at the village level, three distinctly different villages were selected. Dio Gare was located 45 kilometers west of Bamako, the capital city of Mali. The women in this village had recently worked with the University of St. Thomas in testing a manually operated churn. Zantiebougou was located 200 kilometers southeast of Bamako and had an organized shea butter marketing cooperative. Doila was 180 kilometers south of Bamako; the women there had a loosely organized producer’s association and had mechanized shea butter processing. The illiteracy rate among adults in these areas was approximately 80 percent (Oxfam America, 2006). The workforce was largely informal or engaged in subsistence agriculture. The population spoke Bambara, the most commonly spoken local language in Mali.

The interview protocol included topics related to processing methods, technology adoption, product quality, and marketing. An open interview process was used due to the differences between the experiences of the women in the three communities (Merriam, 1988). As a native Malian, the researcher used the participant-observer approach and relied on verbal and non-verbal cues from participants as questioning prompts. The researcher stayed seven days in each village to become acquainted with the study participants, gain their confidence, observe their practices, and conduct interviews.

In June 2007, the researcher visited each community and was introduced either directly to the village residents or to a village chief. The researcher shared the study purpose and background information with the village chief, who then directed the researcher to appropriate participants.

The interviews were conducted at two levels: individuals and focus groups. Individual interviews were conducted with youth and adult shea producers, and with shea butter users in each village. After the individual interviews and observations, the researcher brought together focus groups of 6-10 producers to gain further insight regarding social implications for adopting and diffusing the new technology.

Though the interview protocol served as a guide to the interviews, the questions were often followed by probing remarks which allowed the researcher to gather more in-depth information regarding the perceptions of participants. The villagers were encouraged to tell their stories about the introduction of technological innovations. The guidelines of Gay, Mills, and Airasian (2006) were used for constructing the interview protocol. All interviews were audio taped and video recorded, with the consent of the participants. The researcher kept field notes and transcribed the interview tapes following each round of data collection. As a triangulation measure, the researcher observed shea butter processing and recorded the essential aspects of the process.

**Results**

The content of the transcripts from the recordings was organized into themes according to the responses to the questions. Outlines were formulated according to participants’ main thoughts, ideas, and perceptions regarding each question or group of questions. Based on the outlines, four main themes were identified: 1) formal and informal organization of processing methods; 2) factors supporting the new technology; 3) barriers for adoption/diffusion of the new shea butter technologies, and; 4) comparison of shea butter quality between the traditional and new processing methods.

**Formal and Informal Organization of Processing Methods**

In some villages, women filled three to four 200-liter tanks with the collected
shea nuts. Little by little, they processed the shea nuts and sold their final product. In Dio Gare the biggest market for shea butter was located in Kayes, one of the administrative regions in Mali. Traders came from Kayes and bought the butter.

Participants in Zantiebougou noted there had been a big change in shea butter processing. Women in the villages recently had been advised to give up the underground storage of the nuts. One of the participants reported:

The shea nuts are boiled now before storage and extraction of the oil. When the new processing method is applied, the shea butter has better taste, flavor, and color, and consequently a better price even at local market: 350 FCFA (€ 0.53) per kilogram instead of 150 FCFA (€ 0.23) per kilogram.

In attempts to improve quality, new processing technologies had been introduced. These included triage (removing germinated, shrunken, and insect damaged kernels), a machine grinder, and the hand-powered mixer. However, women reported they preferred the manual churning to the mechanical method, because it yielded higher extraction rates and higher quality butter even though it was time and energy consuming.

The shea butter cooperative was producing two grades sold at different prices and different places. Grade 1 was sold to a Canadian buyer for 3500 FCFA (€ 5.34) per kilogram. Total annual sale was 70 kilograms. Grade 2 was sold in Bamako for 1000 FCFA (€ 1.52) per kilogram.

Factors Supporting the New TechnologyWomen’s Initiative. Women were free to introduce any kind of technology related to their income generating activities. Men encouraged women to improve their economic situation.

In their social system, women were well invested in the decision-making process and were independent. Men were not seen as more influential in decisions regarding shea butter production. Within each village, men, women, and the elderly were exposed to the issues and made decisions collectively. Culturally, women were respected and their decisions and needs were given priority by local government administrators. From the point of view of the participants, women played an important role in their society.

The idea of introducing the shea butter mixer was initiated by University of Saint Thomas and not by women, but the women in Dio Gare indicated they saw the opportunity for increased employment and enhanced economy. Additionally, through focus groups, they reported a lack of teamwork and financial support to effectively institute new initiatives.

Education and Training. A male interviewee stated the education of women was beneficial for the village, and opportunities within government had been given to well-educated women because of their unique capabilities. The researcher observed that both men and women were involved in organizing training sessions for shea butter processing. In terms of the participants’ choice for the training setting and styles, participants reported preferring face-to-face training with visual aids like video or film. One of the participants said, “For adult learners, explaining and presenting an image is more beneficial for learning.” Participants in Doila preferred to have books, images, and face-to-face exchanges as training techniques. In terms of training needs, cooperative management was a primary concern. The participants relied on their ability to master innovations, and age did not play a role in who was trained. Overall, the women had a preference for farmer-to-farmer transmission of information with visual aids.
Shared Responsibility for Shea Trees.
Participants reported plans to cultivate shea trees for increased productivity. They also noted planting and growing the trees would require the help of men. One respondent stated,

If you consider the whole process of shea butter production, women can prepare shea butter; however, they cannot take care of the shea trees. Therefore, there is a gap between growing shea trees and making a profit from the butter. If we can have men in the village take care of the shea trees, this will be a good thing. We should share roles between individuals or groups of men to take care of the plots of shea trees. Within three to four years this will be a high-quality project for all those involved with the shea butter process, including those who now cut the trees down.

Information Channels. The main information channel was through the women’s association weekly meeting. A participant reported, “The information is given to the president of the women’s association, who, in turn informs all the women in the village at a meeting.” The meeting date, time, topic and location were provided in advance. Another information channel was the village chief. One participant stated, “Information is not easily available, Internet is not accessible, and information sources are not diversified.”

Participants’ View of Innovations.
Participation of beneficiaries was important and necessary for the success of the project. When a new technology was introduced, few people were willing to adopt it until they saw the benefit. From earlier experiences, a male participant reported,

“Most people want to wait and see how it will work. If the experience doesn’t work, they won’t approach.” Participants reported they were always interested in ways to improve product quality because of the price benefit, even on the local market. One participant reported, “We always test and adapt new technologies to line up with our state of production.”

Other Current Issues in the Village. A crucial problem was the lack of an external market for shea butter. The aim of the villagers was to meet outside market requirements using their own tools. One interviewee stated:

We need to sell all our products in order to motivate women to produce more of the quality we require. If we cannot sell, nothing will work. Actually, in terms of quality control, we need to be more equipped and have more tools to be able to meet the standards. If we could directly export our shea butter, there would be a significant increase in our profits. If we sell our butter in Mali, we lose part of our profit.

Barriers for Adoption/Diffusion of the New Shea Butter Technologies
A primary adoption barrier was the financial constraint of acquiring the newly introduced mixer machine. According to one participant, “When you consider the cost of the machine, a single woman or group of women cannot presently afford it.” In Zantiebougou, participants believed the process was time consuming. Nevertheless, the Zantiebougou women noted that if one wants money, one has to take time.

The researcher observed the participants were not the main initiators of the technologies introduced in the shea butter processing, but most of them
appreciated the innovations because of time and labor saving rewards. In one village, the majority of participants still preferred the traditional manual churning because they believed it yielded a higher extraction rate and higher quality of the end product. Their main concerns were securing reliable external markets and meeting the international production standards. However, they did concede the machine was labor and time-saving.

For quality improvement, boiling and drying the nuts before storage was practiced in much of the study area. Participants were aware of the benefits of pretreatment. However, the time required for the boiling and drying processes was also an adoption barrier. For some women, the only available time to boil the nuts was at night after other family and domestic responsibilities were completed. Therefore, boiling was not seen as a labor-saving innovation, although most of the women did believe boiling increased the quality of the final product. The very rainy season (August) added constraints to drying. Wood or charcoal stoves with low fire were used to aid drying during the rainy season. Often children were responsible for gathering wood, watching the fire, and turning the nuts.

Comparison of Shea Butter Quality from the Traditional and New Processing Methods. Each community had a homeopathic therapist from whom villagers sought medical advice and attention. The researcher interviewed the therapist in each village to identify perceived health efficiency differences between shea butter processed using traditional processing or the new technology methods. The therapists reported using shea butter from both the traditional and the mechanized processing methods, but noted there were no differences in usability or health benefit. However, women using shea butter for cooking or cosmetics did report differences in color, smell, and viscosity; they believed shea butter derived from the boiling process was higher quality.

One of the adopters of the new technology reported:

There is a difference between the precooked dried nuts (new processing methods) and the traditional process. The butter from the traditional process has some off-odors and flavors. In the traditional drying method with firewood, the nuts get a smoky smell, which is not as valued. In the boiling system there is no off-smell. After drying, the boiled nuts will produce the same texture of paste as the traditional process.

Conclusions and Implications

The study revealed the appropriateness of time and labor saving technologies for women depend on: 1) the relative cost of the technologies; 2) the accessibility of information on new technologies; 3) the arduousness of the work avoided; 4) the economic status of the households and of the women’s associations; and 5) the productivity of the participants in other economic activities. A strategy for disseminating any technology needed to be based on clear identification of the target beneficiaries and their resources, their preferences, and their constraints. The involvement of rural groups as beneficiaries in the design process of the technological innovations was essential for acceptance and adoption. Amidavi, Kroma, and Davis (2006) reported that rural groups who engaged in partnerships with other actors also promoted mutual learning and created new investment options. Some of the outcomes from these group efforts included the utilization of new technology, enhanced production and incomes, improved infrastructure, and compliant behavior for collective action.

The study reconfirmed the conclusions of Hyman, et al. (1988) that
external technical assistance from developed countries played a vital role in technology adoption. New technologies had to be requested, and an understanding of the local context for their application as well as a strong field presence during design and testing were important for dissemination.

Most participants received information in weekly meetings, from opinion leaders or from a radio station at the village level. Additionally, some participants had access to newsletters from women’s associations and a few had access to internet market information. In some of the study area, there was an extension agent who also contributed to educating participants on shea production and processing technologies.

Participants preferred on-site and in-person training using visual aids. Farmer-to-farmer knowledge distribution had a long history and proven sustainability, therefore was highly valued, especially from one generation to another. Participants perceived on-site trainers and continuously accessible resources like DVDs or extension fact sheets as examples of sustainable knowledge distribution.

Governmental and non-governmental agencies should collaborate to develop an extension-training program for shea butter processing. Effective outreach will require workshops, lobbying, and awareness from all decision makers. The marketing cooperative in Zantiebougou was effective, thus assistance should be provided to organize women in cooperatives and train the members in cooperative management and marketing. The governmental and non-governmental agencies should also provide essential training to potential community educators in adult teaching methods and shea butter quality management methods. All training programs should use visual aids with emphasis on interpersonal methods. The emphasis should be on demonstrations to facilitate increased knowledge and skill development.

The participants valued knowledge. To improve technology assimilation, outsiders must recognize that learning and distribution of information are acquired through both oral and visual transmission. Community leaders were doing most of the dissemination of information regarding shea processing technologies. Those leaders should be trained to access new technologies, then empowered to present the new technologies in their respective communities. Organizing an educational initiative similar to the Farmer Field Schools reported by Simpson and Owens (2002) may prove effective. It must be noted however, Simpson and Owens indicated there was a chance the Farmer Field Schools favored those who were literate and had attracted participants with prior exposure to western-culture sciences.

Alternative processing technologies need further investigation. Additional research is needed to compare the recovery rate and product quality between traditional and new processing methods. The new knowledge generated can be delivered through expanded extension programs. To organize in associations or cooperatives additional management training offered through extension will be necessary. Further study regarding the efficiency of information channels in the villages is also needed.

The increased quality of the shea butter and the reduction of labor will improve the productivity, efficiency, and effectiveness of the shea butter process. Additional research opportunities exist to evaluate the effectiveness of external markets and cooperative marketing systems as they are developed.

A microfinance program with results such as those reported from a study in Ghana by Effa and Herring (2005) can facilitate the adoption of shea butter processing technologies by Malian women. The Malian government and/or non-governmental organizations should provide financial assistance in the form of grants or low-interest loans to women’s cooperatives.
in order to enable adoption of innovations, such as the churning machines. Men must be encouraged to help women care for shea trees in order to promote establishing shea tree orchards, thereby reducing constraints such as travel distance for collection and insecurity of supply. Governmental policies must be developed to protect shea trees. Knowing the long agronomic cycle of the shea species, these actions would benefit future generations of Malian women.

Finally, follow-up studies to this research should be conducted to examine: 1) ways increased quality of shea butter will impact development of quality standards and supply to international markets, 2) effects to the Malian economy from the influx of foreign currency driven by the international demand for shea butter, and 3) channels through which the Malian Extension Service may establish effective education programs for Malian women who engage in shea butter production.

References


Manuscript Submission Guidelines

General Requirements
All manuscripts must indicate the type of article—Feature; Commentary; Tools of the Profession; Book Review—on the title page of the manuscript. All manuscripts must be submitted online at http://www.aiaee.org/submit.aspx. Manuscripts cannot be published or be under consideration for publication in another journal.

The Journal of International Agricultural and Extension Education (JIAEE) follows the standards set forth in the latest Publication Manual of the American Psychology Association (5th ed.). The JIAEE is the official refereed journal of the Association for International Agricultural and Extension Education (AIAEE).

Feature Articles
Feature Article manuscripts are submitted online. Microsoft Word files only may be submitted. A title page with manuscript title, authors’ names, institutions, complete addresses, telephone and fax numbers, and e-mail addresses is required. The manuscript must include an Abstract (a succinct idea of the article’s content) not exceeding 250 words, followed by 5-7 Keywords (selected from a list of topics available on the submission log on page), Introduction, Theoretical/Conceptual/Operational Framework, Purpose and Objectives, Methods, Findings/Results, Conclusion, Recommendations/Implications, and References, or similar appropriate headings. There is no fee charged for submitting a feature article. Feature Articles cannot be longer than 20 double-spaced (11 point font) pages (not including the title page) with one-inch margins on all sides.

Commentary Articles
Commentary Article manuscripts are submitted online. A title page with manuscript title, authors’ names, institutions, complete addresses, telephone and fax numbers, and e-mail addresses is required. The article must include an Abstract not exceeding 250 words. Please include 5-7 Keywords (selected from a list of topics available on the submission log on page) to describe your manuscript. Commentary Articles should be no longer than eight double-spaced (11 point font) pages (not including the title page) with one-inch margins on all sides.

Tools of the Profession Articles
Tools of the Profession Article manuscripts are submitted online. A title page with manuscript title, authors’ names, institutions, complete addresses, telephone and fax numbers, and e-mail addresses is required. Please include Keywords (about seven) to describe the manuscript. Tools of the Profession Articles should be no longer than four double-spaced (11 point font) pages (not including the title page) with one-inch margins on all sides.

Book Review

Page Fees
There is no submission charge for the manuscript, but there will be a $10.00/publication page ($20.00 for non AIAEE members) fee assessed to the lead author if accepted for publication after the peer review process.

More formatting issues are posted at http://www.aiaee.org/jiaee/archive/OnlineGuidelines.pdf; authors must follow these requirements prior to submitting manuscripts to the JIAEE. Submit manuscripts online at http://www.aiaee.org/submit.aspx