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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, Tools of the Profession Articles, and Book Reviews.

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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*. These articles are invited by the editors. 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. Book Reviews provide insight on current books related to international agricultural education.

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From the Executive Editor

I am pleased to publish the third issue of Volume 19 of *JIAEE.* This issue includes five feature articles related to reflections on the 2011 World AIAEE Conference and unique programs conducted in Nigeria, Mexico, Armenia and Scotland. In addition, you will find a thought provoking commentary on Extension and Outreach written by our immediate past AIAEE president Dr. Jimmy Lindner and colleague Dr. David Dolly.

This is the third issue of Volume 19 under the leadership of the editorial team of Brenda Seevers, Executive Editor; Amy Harder, Managing Editor; and Kim Dooley, Past Editor. During this year we have updated the guidelines for submission, added DOI numbers to articles published in previous issues and updated the website. The journal is an important scholarly publication in international agricultural and extension education. Its relevance and credibility is directly related to the quality of submissions received and published.

An important element in all publications is timeliness and relevance of submissions. Potential authors can increase their chances of publication by carefully reading and following all submission guidelines. Many articles submitted are rejected without review for failure to follow this procedure. Another issue the journal experienced this year was the number and availability of qualified reviewers. It is a privilege AND a responsibility to serve as a reviewer for JIAEE. Dedicated, qualified reviewers are desperately needed that will not only accept the assignment but complete it in a timely manner. JIAEE has had a proud history of reviewing and publishing articles in a timely manner. Your assistance is needed to maintain this status.

An important and continued issue is the need for qualified and willing reviewers. In order to maintain the quality and integrity of the review process, we need reviewers who are committed to taking the time to appropriately and thoroughly review in a timely manner. This is an excellent way to give back to your profession and professional association. If you are not already a reviewer, you can go online and register.

I hope you enjoy the issue and will consider submitting papers presented at the conference for publication in *JIAEE.*

Sincerely,

Brenda Seevers
Executive Editor, *JIAEE*

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Extension and Outreach: Not a Question of If, but How

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Abstract

In this article, the authors develop a conceptual framework for effective extension and outreach. Based on both our experiences and research and those of leading scholars and practitioners in the field, we offer the following ten ideas for thought, debate, discussion, and implementation. Effective extension systems must: be institutionalized, well-defined, and well-funded; address important/contemporary issues/problems; be sufficiently nimble and flexible in order to address emerging issues; be a credible and unbiased source for information/education and solutions/research; understand the needs of its customers; embrace participatory and integrated approaches; recognize that little happens in isolation and create regional/global sustainable partnership/linkages with governments, NGOs, researchers and educators; be excellent stewards of resources acquired; recognize that return on investment (ROI) from its research and outreach must be well-documented; and allow for decentralized decision-making and action when warranted.

Keywords: Extension Systems, Advisory Services, Managing Change, Perspectives, Marketing

A few years back, the Editorial Board of JIAEE decided to start an annual Seminal Article Series. The purpose of this Series is to stimulate thought and discussion of issues important to our profession. We think this Series has done just that and are pleased to continue this tradition with our contribution herein. In the first article in this series, Jim Christiansen (2005) wrote about "Addressing the Right Issues and Raising the Right Questions in AIAEE" (p. 5). Chief among challenges presented to the reader was using our professional talents to make a difference in the world. Burt Swanson (2006) wrote about "The Changing Role of Agricultural Extension in a Global Economy" (p. 5). He challenged readers to embrace new approaches to extension systems and emphasized the type of leadership needed to ensure this happens. Barbara Ludwig (2007) wrote about "Today is Yesterday's Future: Globalizing in the 21st Century" (p. 5). She writes about planning for the future of extension and not just letting the future happen as a passage of time. Gary Wingenbach (2008) wrote how the "Journal of International Agricultural and Extension Education Scholarship" was our "Passport to the World" (p.7). He, perhaps, would know better than most as he served as editor of this Journal for six years. He provides the reader with thoughtful suggestions to improve the focus and quality of writing in our profession. Don Meaders (2009) wrote "A Brief Review of the History of the AIAEE" (p. 7). He was invited to write this article to help us remember our past as we celebrated our first 25 years as an organization. We see a lot of commonality in these seminal articles: We have a lot of really smart people thinking about some very important problems; we have some serious contemporary issues facing agricultural and extension education that we collectively need to address; and we have a strong organization in AIAEE that can act as a catalyst to help our memberships' professional development goals. Our contribution to this Seminal Series draws from much advice provided by these authors as we thought about how to conduct extension and outreach in the future.

The genesis of this paper comes from an invited talk we gave at the International Congress on Tropical Agriculture held a few years back. A shorter and refocused version of this ongoing conversation between the authors was provided by James Lindner at the opening ceremonies of the 2012 AIAEE conference in Bangkok, Thailand. While we have both worked extensively internationally, many of our examples are a set within the geographical context of the United States and the Caribbean. In such instances we encourage the ready to critically discern the applicability within their own geographical context.

Introduction

Food security, food safety, food production, and food marketing are contemporary issues necessitating strong and vibrant extension and outreach programs in developing countries. The authors of this paper agree with Rivera's (1990) statement that the appropriate extension model or system is situational in context, content, culture, and politics. Despite these constituents of extension currency, all systems are influenced by past experiences. The most essential feature of the past is a perception of free advice, state-run management and delivery and a head start from research initiatives. The purpose of this paper is to develop a conceptual framework for effective extension and outreach. Much has to be considered regarding a suitable model for extension systems and outreach programs.

The authors of this paper contend that for any extension system to be effective it must: (a) be institutionalized, well-defined, and well-funded; (b) address important and contemporary issues/problems; (c) be sufficiently nimble and flexible in order to address emerging issues; (d) be a credible and unbiased source for information and education and for solutions and research; (e) understand the needs of its customers; (f) embrace participatory and integrated approaches; (g) recognize that little happens in isolation and create regional/global sustainable partnership/linkages with governments, NGOs, researchers, and educators; (h) be excellent stewards of resources acquired; (i) recognize that return on investment (ROI) from its research and outreach must be well-documented; and (j) allow for decentralized decision making and action when warranted.

Historical Contexts

Historically, extension and outreach programs focused on adoption and diffusion of technological advances (Swanson, 2008). The classic example of this is the study of adoption and diffusion of hybrid corn in Iowa (Ryan & Gross, 1943). The Iowa State University Extension Service had a primary role in diffusion of this technological advance (Rogers, 2003). Swanson (2008) wrote that much of the development of new agricultural technological advances and the diffusion of such are being taken over by privately held companies. He further wrote that extension needs to take advantage of the opportunity to create partnerships with those privately held companies that are developing and diffusing technological advances.

Swanson's statement reflects a distinct separation of responsibility between traditional state-run mechanisms for extension and those initiatives by private agribusinesss companies and non-governmental organizations. There is a weakened impact of state extension throughout global agricultural systems. Yet the state extension system is an indelible feature of agriculture systems globally. Appropriate state partnerships with private companies and nongovernmental mechanisms must still be considered for the future. As extension's role changes in the diffusion of technological advances, opportunities to expand into human resource use and development are presented.

Reflections of an Effective and Efficient Extension and Outreach Program

Be institutionalized, well defined and well funded

While there is general consensus regarding an institutionalized outfit for effective extension, there is much concern about systems that are not well defined and well-funded. Invariably, many services lack adequate clearly defined extension objectives that can become operational in specific short-term and long-term arrangements. Objectives do not process through participatory approaches that derive suggestions from all the participating elements. With respect to funding, allocations to entire Ministries and Departments of Agriculture are generally smaller than those to other state Ministries. Within the extension services, most funds can only support the cost of personnel resource, with little remaining for extension program development.

There are numerous extension systems models used throughout the world, some with great success and others with less success. The unfortunate problem is that successful models do not appear to have global transferability. Issues such as relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003) affect the ability of countries and regions to effectively adopt extension models that are successful in other countries and regions. It

could be argued that over-adoption of extension models, based on limited success in other countries, weakens the ability of a country or region to develop an institutionalized, well-defined and well-funded extension system.

Consider for example the Training and Visit extension system (T&V). Once touted by the World Bank as an extension model "designed to overcome some of the inherent weaknesses of public extension systems," (Anderson, Feder, & Ganguly, 2006, p.12), T&V was widely adopted by many countries and regions, but ultimately failed to become a sustainable and transferable model.

According to Roseboom (2004), most developing countries have not meet the "investment target of 2% of agricultural GDP in agricultural research and extension" (p. 33). Roseboom further wrote that:

> Supported by economic impact studies that report on average high rates of return, there is a widely shared opinion that there is considerable underinvestment in public agricultural research and extension. In other words, the potential of agricultural research and extension in enhancing agricultural productivity and production is not being exploited fully. (p.33)

Address important/contemporary issues/problems

In the United States at the national level, National Institute of Food and Agriculture (NIFA) (www.csrees.usda.gov/) has developed 13 emphasis areas: Agricultural & Food Biosecurity, Agricultural Systems, Animals & Animal Products, Biotechnology & Genomics, Economics & Commerce, Education, Families, Youth & Communities, Food, Nutrition & Health, International, Natural Resources & Environment, Pest Management, Plants & Plant Products, and Technology & Engineering (NIFA). State-level extension programs are typically organized around agriculture and natural resources, family and consumer sciences, 4-H and youth development, and community development.

The recent categories which the Government of Trinidad and Tobago used to judge its national agricultural entrepreneurial awards indicate options for program emphasis. These include: Integrated Mixed Farming, Large Scale Crops, Small Scale Crops, Nursery Production/Plant Propagation, Livestock, Apiculture, Amenity Horticulture, Agro Forestry, Agro Processing, and Grow box/ Container/ Hydroponics. (Greenvine, 2008)

Extension must therefore address important contemporary issues in a leveled global arena.

Be sufficiently nimble and flexible in order to address emerging issues

Extension needs to have organizational and structural mechanisms (policies, procedures, etc.) in place to ensure it is able to adapt and respond to changing situations. Extension, further, needs to have organizational and structural mechanisms in place to ensure it does not get caught up in fads and fashions. Just as many corporations dedicate a portion of their resources (both capital and personnel) to research and development, so too should extension dedicate resources to emerging issues and change. Local, regional, and national planning/action teams and continuous in-service and training is also needed to ensure extension can adapt to both planned and unplanned emerging issues.

An example of planned emerging issues is the National Invasive Species Management Plan, of which NIFA is an integral partner (National Invasive Species Council, 2008). Actions called for in the plan include: prevention, early detection, rapid assessment and rapid response, control and management, restoration, and organizational collaboration. An example of unplanned emerging issues is Texas Agrilife Extension's response to Hurricane Ike. Texas Agrilife Extension was called to coordinate efforts to locate, feed, water, transport and/or dispose of an estimated 40,000 displaced livestock (Fannin, 2008).

The Caribbean region has had its share of emerging issues. For instance, there are the occasional outbreak of new pests and diseases, new marketing arrangements, the fierce onslaught of hurricanes, flooding, and sometimes other natural disasters. Extension must successfully contribute to these challenges. There must be funding for these situations and planned resolve through appropriate stakeholder mechanisms and preventative operations. The case of the invasion of the hibiscus mealy bug is instructive. This pest had threatened food security as it attacked a wide berth of host crops. The region's extension mechanisms were able to mobilize all resources with the use of suitable institutional mechanisms in order to manage the invasion.

Be a credible and unbiased source for information/education and solutions/research

Being a credible and unbiased source for information/education and solutions/research is the hallmark of extension. The Food and Agriculture Organization of the United Nations (www.fao.org) lists nine global issues being addressed by its organization: avian influenza, biodiversity, bioenergy, climate change, food safety, millennium development goals, trade, water scarcity, and world food situation. Extensionists and researchers from around the world are involved with addressing these issues. The credibility of extensionists and researchers involved in developing and delivering solutions to these problems must be beyond reproach. Massey (1994, ¶ 10) wrote that "If extension is to maintain its reputation for being an objective and unbiased educational resource, we must discard the presumptuousness [of] thinking that we have the answers, learn from history that the best available research is transient and present all sides of the issue in as fair a manner as possible."

Understand the needs of its customers

In Chambers' (1995) seminal article, "Poverty and Livelihoods: Whose Reality Counts?" he highlights the need for professionals to better listen to the needs of the beneficiaries. No organization or institution can survive if it is not meeting the needs of its customers. Escalating food, oil and energy costs over the past couple years followed by the recent collapse of financial markets have many implications for extension. Increasing oil and energy costs were major factors resulting in increased food costs over the past several years. As oil prices rose, biofuels became a more financially attractive energy option, thus driving up food costs. In response to the increases in fuel costs, the Cornell Cooperative Extension Service (http://nyc.cce.cornell.edu/emerginginitiatives/energy-biofuels.php), as well as others, has identified biofuels development as an emerging issue that is supported with research and outreach. Coupled with increases in direct and indirect costs to farmers through transportation, agrichemicals, etc, farmers have been forced to increase their prices and consumers have been forced to pay more. The collapse of the

financial markets limits the ability of farmers to access needed lines of credit for input purchases, equipment maintenance and purchases, land purchases, etc. One could speculate, as well, that there will be lower levels of development aid funds available for extension and outreach. The above example presents a paradoxical challenge for extension. With increased interests in biofuels, farmers cultivating corn, for example, benefited from higher prices, while consumers were hurt by higher prices. With the global collapse of the financial markets, energy and oil prices have dropped, making cultivation of corn less profitable; those farmers that shifted to cultivating corn are now hurt by lower prices. The question that extension must continually ask is "Who are our customers and how to we best meet their needs?"

Embrace participatory and integrated approaches

In the classic text, "Pedagogy of the Oppressed," Freire (2003) cautions against educational systems in which the teacher is the holder and transmitter of all knowledge and the students are knowledge repositories. Rajesekaran, Martin and Warren (1994) wrote that extension must take into account indigenous knowledge when developing and delivering programs. Participatory rural appraisal (PRA) and participatory action research (PAR) are two promising approaches that extension can use to address the needs of its customers. A study conducted by Tuttle (2003, p.177) using PRA and PAR in Puentes and Lo Roca, Mexico found that "the people were able to articulate their extension programming needs in a participatory manner quite different from methods employed in the past." Tuttle further noted that by using participatory approaches and taking indigenous knowledge into account, relationships between the community and extension were enhanced.

Recognize that little happens in isolation and create regional/global sustainable partnership/linkages with governments, NGOs, researchers and educators

It would be easy to compile a list of thousands of organizations – government and NGOs, – that provide aid for agricultural development and support extension programs. Some that come immediately to mind are: Food and Agriculture Organization of the United Nations, United States Agency for International Development, the World Bank, Consultative Group on International Agricultural Research, World Cocoa Foundation, International Center for Tropical Agriculture and Fundagro. Extensionists and researchers must develop long-term strategic relationships with these organizations as well as governments rather than looking to them merely as funding sources.

Partnering does occur throughout the world with varying success. There are established local, regional and international organizations that integrate their outreach efforts in order to collaborate on current field challenges. A major problem with the effort concerns the inability to sustain these collaborative efforts for long-term resolve. Institutions easily revert to isolation at the expense of completing extension assignments. Invariably, front-line extension agents are left bereft of support to continue programs that have begun.

Be excellent stewards of resources acquired

There is a saying that "We must be good stewards of our trees or one day we will be without forests" (author unknown). As agriculturalists we must be good stewards of the resources that we have. Farmers must be good stewards of their

land, livestock, equipment and financial resources if they are to be profitable. Extensionists must be good stewards of the resources available to them to carry out their work and maintain the trust of their customers. Many extension systems are using logic models to help document how resources will be used and what the intended outcomes are. NIFA along with many other funding agencies have recently adopted the position that funding requests must be support by a logic model. According to NIFA a logic model:

> "Clarifies the linkages between investments and activities, outputs and expected outcomes of policy, program or initiative; communicates externally about the rationale, activities and expected results of the policy, program or initiative; tests whether the policy, program or initiative "makes sense" from a logical perspective; and provides the fundamental framework on which the performance measurement and evaluation strategies are based …"

Recognize that return on investment (ROI) from its research and outreach must be well-documented

According to Richardson (1996), extension and outreach programs must provide quantifiable measures of impact including calculations on return of investments. Everson's (2002) research has shown that direct economic impacts from extension justify additional investment. For extension systems and advisory services to attract additional resources for agricultural development, evaluation and accountability must be pervasive throughout an extension system. Those systems, services, programs, etc. that can document gains in excess of costs will likely see additional investment.

Allow for decentralized decision-making and action when warranted

The goal of decentralization should not be to push financial responsibility to the community level, but rather to get communities more involved in decision-making. Decentralization has been at the core of extension reform since the mid-1980's (Rivera, 1996). According to Swanson and Samy (2003), while some countries have historically embraced decentralization with great success, other countries have only recently enacted reforms, with limited success, to decentralize extension (Seepersad & Douglas, 2002). Seepersad and Douglas (2002) offered suggestions based on their case study for others wishing to implement decentralization plans. These suggestions focus on: realistic goals, stakeholder involvement, flexibility, focusing, pilot testing, monitoring, pre-planning, and following sound organizational development practices.

Alex, et al. (2000, p. 13) provided eight good practices appropriate for decentralizing extension programs: "Centralize or decentralize programs as appropriate to the service;" "adapt strategies to local institutional environments;" "strengthen central support services for extension;" "provide mechanisms for policy formulation in mixed systems;" "expect to continue public sector financing;" "fiscal transfers for research and extension;" "plan for transition and local capacity development;" and "ensuring monitoring and evaluation of decentralized systems."

Final Thoughts

As extensionists grapple with how best to develop and administer effective and efficient extension and outreach programs,

the authors of this paper provide a conceptual framework from which discussion can flow. We doubt many would argue the ten ideas offered are ground-breaking or particularly insightful. To wit, we ask why then has implementation of such been so problematic? Clearly, there is work to be done. With a world population of over seven billion people, extension systems and advisory services are "on the clock" to address food security, food safety, food production, and food marketing problems that will only increase as our global population increases.

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Student Educational Responsibility: A Case Study of Emotional Response to International Education

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Abstract

This study focuses on student emotional reactions toward new events or stimuli within a learner-centered, international education course. Using the primary tenets of appraisal theory, researchers analyzed novel stimuli, as identified by the students, and students' emotional reactions toward each stimulus. Participants were immersed into two separate Scottish island communities for a 22-day period. The primary course objective included students developing leadership skills associated with community development while working with rural Scottish communities. Results indicated that students experienced a wide range of emotions associated with multiple stimuli. Identified stimuli were dichotomized into two categories, the international immersion process as well as the shift in educational responsibility from instructor to student. Emotional magnitude and coping mechanisms differed from student to student. Post international study reflections indicated that students experienced a deeper learning experience when using a learner-centered approach to international education.

Keywords: Higher Education, Experiential Learning, Student Issues, Qualitative Research

Introduction

For decades, researchers have emphasized the need for universities to assist students in developing skills and attitudes associated with success in a globally interconnected and interdependent world (Carlson & Widaman, 1988; Hayward, 2000; Snyder, Lamm, Brendemuhl, Irani, Roberts, Rodriquez, & Navarro, 2011). This is especially true within the corporate sector, where there seems to be a shortage of global leaders (Moore, Boyd, Rosser, & Elbert, 2009). In the corporate arena, the ability to relate to and interact with diverse cultures is often a pre-requisite for global employment (Pierce & Newstrom, 2000). Developing cross-cultural skills not only enhances one's ability to work with others from diverse backgrounds but also increases one's social competence within diverse societies (Harris, Moran, & Moran, 2004). In order for universities to produce globally competitive students, they must provide international experiences that shape global and cultural understanding (Gouldthorpe, Harder, Stedman, & Roberts, 2012; Moore et al., 2009).

Several post-secondary institutions have addressed these concerns by implementing courses that enhance students' cross-cultural skills and global understanding (Connell, 2003; Kitsantas, 2004; Larsen, 2004). However, the facilitation of these courses differs from institution to institution. For instance, some instructors design international experiences to enhance student civic awareness through studying specific historic events such as the Holocaust (Clyde, 2010). Others use the opportunity to assist international communities through service-learning (Prins & Webster, 2010; Tonkin & Quiroga, 2004). Regardless of the instructional facilitation, these courses were intended to develop student cultural and interpersonal skills within an international context.

In general, research examining international courses supports the idea that global exposure and immersion can be an effective way for students to acquire cultural understanding and cross-cultural leadership skills (Brooks, Frick, & Bruening, 2006; Earnest, 2003). However, while international courses have proven beneficial in enhancing international leadership development, student response toward foreign environments can vary. In fact, students who are exposed to foreign cultures often exhibit visceral emotional reactions (King & Young, 1994). Subject to their experiences, student reactions can range from negative to positive and vary in magnitude (Van Der Meid, 2003). Emotions, deeply woven into the human psyche, play a key role in how individuals experience new cultures (Baños, Botella, Alcañiz, Liaño, Guerrero, & Rey, 2004).

Emotions are intertwined with student learning. In some instances, positive emotions improve student cognition, as explained by Csikszetnmihalyi's (1990) *Flow* theory. In contrast, in the presence of fear and anxiety, emotions diminish students' cognition by limiting higher cognitive processes (Hains & Balschweid, 2008). Students who experience learner-centered pedagogy for the first time often evoke emotional responses associated with the latter as they become responsible for their own learning (Felder & Brent, 1996). Students who are accustomed to educational settings in which an expert conveys, rather than facilitates, knowledge may not appreciate and may even resist this type of teaching (Estes, 2002; Felder & Brent, 1996). This resistance prevents many

instructors from making the teacher-centered to learner-centered transition (Estes, 2002).

International education has also been shown to evoke emotion. Students who are immersed into foreign environments frequently express feelings of disconnect, alienation, and disengagement (Chinn, 2006). This cross-cultural adjustment varies among students depending on their cultural norms and beliefs as well as well prior experiences with diverse cultures (Harrison & Voelker, 2008). These feelings often stifle student engagement, limiting their educational potential (Baños et al., 2004).

Theoretical Framework

The intersect between student international experience and evoked emotion can best be explained using Scherer's (1999) appraisal theory. Appraisal theory is based on the notion that emotions are elicited from an individual's evaluation (appraisals) of events or objects (stimuli). Stimuli are evaluated using four criteria. These criteria include:

1. The extent to which the stimuli is novel or agreeable to the individual.
2. The significance of the event toward meeting the individual's needs or goals.
3. Individual ability to influence or cope with potential outcomes from stimulus interaction.
4. The compatibility of the event or stimulus in relation to social and personal norms, beliefs, and values. (Scherer, 1999).

As students interact with international events (stimuli), they place value judgments on stimuli based off their prior knowledge and perceived novelty of the stimulus. According to Scherer, Schorr, and Johnstone (2001) an individual appraises a specific stimuli based on internal beliefs, cultural norms and ability to cope with the situation. If stimuli are perceived as aligning with their beliefs, neutral or positive emotions may be evoked. However, if stimuli challenge the individual's beliefs, often negative emotions are evoked. Following initial appraisal, varied reactions occur depending on the coping process available to the individual (Lazarus, 2006; Scherer et al., 2001). Within this study, emotions evoked from stimuli are a result of the student's participation in a learner-centered international experience (see Figure 1).

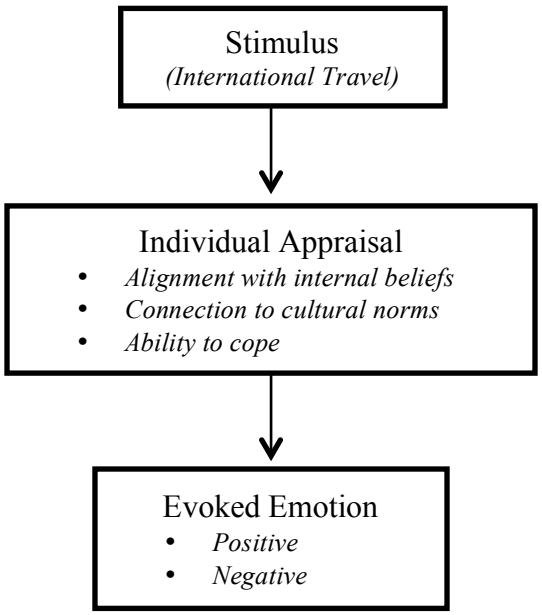

Figure 1. Stimulus Appraisal Theory. Appraisal of stimuli in a learner-centered international travel setting

Purpose & Objectives

While there have been several studies attempting to explain the impact international courses have on student development (Ogden, 2010; Rodriguez, 2011; Savicki & Cooley, 2011), few have examined specific stimuli which evoke positive and negative emotions. The purpose of this study was to investigate student response toward novel experiences (stimuli) during a learner-centered international leadership development course. In order to examine student experiences in depth, the following research questions were considered:

1. What situations/events do participating students view as novel stimuli when immersed in a learner-centered international setting?
2. How do students appraise/react toward identified stimuli within a learner-centered international setting?
3. How are the student appraisals/reactions different toward similar stimuli within a learner-centered international setting?

Methods

Research Context

Student participants were enrolled in the course *Community Development in Scotland: A Learning Journey*. The course consisted of two components. The first consisted of a pre-immersion course implemented in Spring 2010. The course was designed to weave Scottish culture and history using insights gained from course readings, reflective journaling, Scottish case studies, and cultural activities such as a Scottish ceilidh and Burn's Supper. The second component included a 22-day international immersion experience within small Scottish agricultural island communities. During their immersion, students assumed full responsibility of their

experience by establishing local contacts, conducting interviews with community stakeholders, analyzing data, and making recommendations for future community collaborations. As students assumed educational responsibility, the educational focus shifted from a teacher-centered environment to that more learner-centered environment. The professors served as references or provided guidance when needed.

Research Participants

The international team consisted of two professors, two graduate students and four undergraduate students majoring in Agricultural Education at the University of Kentucky. For this study, the researchers focused solely on the student experiences. Student demographics including gender, age and educational level, race, geographic upbringing, and prior international experience(s) are identified in Table 1.

Table 1. Student Demographics

Gender	Age & Education Level Grad/Undergrad	Race	Geographic Upbringing	Prior International Experience(s)
Male	24 – Grad. Student	Caucasian	Rural	Afghanistan
Female	33 – Grad. Student	Caucasian	Rural	*Scotland & England
Female	22 – Undergrad.	Caucasian	Urban	Jamaica
Female	22 – Undergrad.	Caucasian	Rural	None
Female	20 – Undergrad.	African American	Rural	None
Female	20 – Undergrad.	Caucasian	Rural	Canada

*While four of the six students had traveled internationally, only one had been to Western Europe.

Data Collection

In order to obtain detailed information regarding individual assessments of international stimuli, a layered qualitative case study was undertaken (Patton, 2002). While each student represented an individual case, the primary unit of analysis was the overall class. As part of their course assignment, students maintained reflective journals prior to and throughout their international experience. Reflective journaling allowed students to convey inner dialogue, thoughts, feelings, and actions (Hubbs & Brand, 2005) as they participated in the study. Additionally, participating professors were charged with maintaining journals to record day-to-day interactions and experiences with both students and the community. More specifically, faculty documented student–faculty dialogue, student–student dialogue, behavioral observations, and cultural interactions as perceived by the individual faculty.

Data Analysis

Student and faculty journals, collected after completion of the course, became rich data sources for identifying student stimulus appraisal and emotional reactions. Using Scherer's Appraisal Theory (1999) and Parrot's (2001) emotional categories as a framework, two researchers independently coded student data, establishing interrater reliability. Researchers' used Parrot's (2001) emotional categories during initial coding to identify student emotions. Once student emotions were established, they were used to examine the stimuli that evoked the resulting emotion. Finally, second cycle thematic coding techniques were used to categorize

themes associated with both stimuli and student emotions (Patton, 2002; Saldaña, 2009).

Credibility was established by confirming first and second cycle themes with student and faculty participants during individual meetings. Furthermore, student journals were cross-referenced with faculty journals, confirming identified themes and enhancing data trustworthiness.

Limitations of Study

The study took place in a specific international setting; therefore, results only pertain to the students during the examined time and place. It is assumed students were forthright when journaling about their experiences and completed their reflections in a timely fashion. Another consideration includes faculty perceptions regarding student interactions as documented in the faculty journals. The researchers attempted to limit professor bias by cross-referencing events and conversations with student journal entries, revealing a more holistic perspective. Lastly, the findings presented are solely the views expressed by participants.

Results

Students' international stimuli are presented in five thematic categories: (a) travel preparation; (b) international travel; (c) cultural immersion; (d) individual interaction; (e) roles and responsibilities. Representative quotes were chosen to showcase the magnitude and variance of individual reactions. Due to page limitations, results were presented in tabular format with direct student quotes provided as evidence for emotional expression. Results from the first identified theme – travel preparation (prior to leaving) – are represented in Table 2.

Table 2. Primary Theme 1: Student Appraisals and Evoked Emotions

Secondary Theme	Students' Emotions	Student Evidence
How one will be perceived	apprehension, hope, happy, uncertainty, interesting, wonder, excited, stressful, nervous	*"I am very excited, stressed, and nervous. How will I be perceived in Scotland/UK??"* *"I expected most people to be intimidated… we would be mostly talking to each other."*
Pre-travel course	love, happy, like, hope, fun, boring, interest, amazed, enjoyment, like	*"Facilitations are always interesting to me…This class brought out many aspects I hadn't thought about."*
Family connection	sadness, guilt, yearning	*"As we were settling down for bed Sunday night it hit me full on. I probably cried for a good half hour. I know this is an amazing opportunity, but I feel massive amounts of mommy guilt."*
International anticipation	excitement, amazing, uncertainty, thankful, frustration	*"I am so excited to go to Scotland, but the uncertainty of what all is going on and how we are being assigned is rather frustrating."*

Students expressed four thematic stimuli relating to international travel preparation. The first pertained to cultural perception, or how the Scots would perceive the students upon arrival. Students professed a range of positive and negative emotions within this category. Perceptions of cultural isolation and solitude created feelings of anxiety and uncertainty, foreshadowing Chinn's (2006) conclusions of international loneliness. In contrast, students also conveyed emotions of excitement as they anticipated meeting new people and learning about Scottish culture.

The pre-immersion course was, for the most part, positively received. Students expressed positive emotions, including empowerment and joy, towards course content. This supports the assertion that domestic courses that utilize international contexts for learning can be well received by students (Lehman, 2009).

Finally, within the category of travel preparation, students identified leaving their families and homes and the anticipation of international travel as emotion-provoking stimuli. Overall, students expressed emotions of excitement; however, they were torn between being excited about the experience, and being sad to leave family or uncertain about the future.

The next table (Table 3) illustrates the entirety of student travel. It is important to note that students were responsible for coordinating their own travel arrangements, shifting the learning process associated with international travel to the student.

Table 3. Primary Theme 2: Student Appraisals and Evoked Emotions

Secondary Theme	Students' Emotions	Student Evidence
Urban experience (London/Edinburg)	unexcited, pissy, dread, interesting, frustrating, hate	*"I miss farms and farm animals – big cities just don't cut it for me."*
Travel arrangements	frustration, surprise, amazement, unbelievable	*"After 5 hours I'm still sitting in this damn airport! I am so upset I just want to go home. We should have all been on the same flight!! We have no way of communicating at all and this is ridiculous."*
Traveling alone	frustration, interesting, horrible, nervous, worried, scared	*"This whole ordeal is frustrating. I don't want to travel alone especially with not being able to hear. I'm so mad. At this point I just don't want to go. At all."*
Driving	frustration, annoyed, scared, petrified	*"I was petrified driving a stick shift, on the opposite of the car and on a one-way road. Definitely quite the experience and I was so scared that I parked it and about had a mental breakdown and couldn't pick up the boys."*

Data analysis revealed that international travel evoked several negative emotions. Although many of the students had traveled both domestically and internationally, few of them had traveled alone. Identified issues included communication difficulty, urban culture, and flight cancellations as catalysts for frustration, anger, and fear. Lastly, one student could not finish her driving task due to cultural differences.

Within this study, stimuli associated with independent international travel diminished the students' experience by evoking a magnitude of negative emotion. This supports Hains and Balschweid's (2008) assertion that negative emotions can limit student cognitive aptitude. Furthermore, the shift in responsibility regarding travel arrangements enhanced student anxiety as it was the first time several of the students had to make their own arrangements (Estes, 2002).

Once immersed into their rural Scottish communities, students professed six stimuli relating to their cultural interaction (Table 4).

Table 4. Primary Theme 3: Student Appraisals and Evoked Emotions

Secondary Theme	Students' Emotions	Student Evidence
Knowledge of culture (or lack thereof)	idiotic, comfortable, careful, passion, excited, love, enjoyment	*"I now understand the importance of researching where you are going… Not only can I be more comfortable but it shows the other people that you actually care."*
Connection to people in community *(Scottish Community)*	amazement, unwelcomed, hilarious, charmed, interesting, impressed, hopeful, touched, passionate, empathy, attached, protected, love	*"The pub that night was too much fun. The boys broke out the bongo and guitars, we closed the joint down and had them play music at the retreat. Yet again – more of an emotional attachment with the people."*
Social events	amazement, fun	*"Last night we went to the pub…it was a lot of fun, especially since all the people there last night were relatively our age. It was a blast."*
Food	wonderment, best, amazement, enjoyment	*"I really wanted authentic fish and chips, but my luck they had just ran out. That's okay, because I got to try some scrumdidliumptious lamb. It was a little fatty, but amazing!"*
Land & Agriculture	wonderment, surprise, moved, interesting, amazement, enjoyment, disbelief, happy	*"…there are a lot of wind turbines here. They were scattered over open fields, on top of hills, etc. It was wonderful."* *"The drive out to Inverary was fun. It was nice to see things I remembered from our honeymoon."*

Cultural norms	frustration, disgust, happy, pissed off, precious, confused	*"Our cultural experiences here have been tremendous! The night we arrived here we had a wonderful dinner & dancing party called a Ceilidh… It was so much fun."* *"There is so much unhealthy tradition here…The political processes are cumbersome and unwelcoming."*

Overall, students expressed relatively positive emotions toward their cultural interactions. Several identified the knowledge gained in the pre-immersion course as helpful in establishing relationships quickly. Students professed being pleasantly surprised by the friendliness of their communities and enjoyed adapting to Scottish cultural norms, so much so that they began feeling protected and connected to the local community (Baños et al., 2004). In most cases, the cultural experiences were appraised as positive, which heightened the student experience (Csikszetnmihalyi, 1990: Sherer, 1999). However, one student exhibited negative emotions toward the political hierarchy, identifying the political processes as "cumbersome."

The next theme encompasses the range of perspectives toward students' "home" (refer to Table 5). Throughout data analysis an overwhelming theme emerged, the student connection to home. However, the context in which they referenced home differed substantially. Several students identified strained relationships within their group as a catalyst (stimulus) for being homesick. Other students identified home as a place to which they would like to return. This is in contrast to students who identified home with family members. Specifically, these stimuli evoked emotions associated with sadness and loneliness.

Table 5. Primary Theme 4: Student Appraisals and Evoked Emotions

Secondary Theme	Students' Emotions	Student Evidence
Interaction within group	isolated, difficulty, tense, impatience, bonkers, nice, weird, disconnected, frustrating, enjoyment, sorry, enjoyment, love, comfortable, safe, faith, stoked	*"I am already exhausted. I'm getting homesick. Our group is not meshing nearly as well as it could. I feel that I need to stay excessively positive else the whole group will get down."* *"As for my future roomies on the island I am totally stoked!!"*
Home connections	despising, broken hearted, anxious, worry, regret, homesick, miss, frantic, sad, upset, scared, needy, disappointment, pressure, stress, lonely, disconnected	*"I want to go home. Never in my life have I been this homesick. Sure it doesn't help that things in (home city)… are falling apart for them & feel like I need to be there."* *"Wish I had better internet or cell service but I have realized that I don't have anyone I feel*

		I must speak to via phone except dad…Not homesick and just happy here."
Going home	hopeful, anxious, excited, heartbroken, sad, hate	*"They have been fantastic and so hospitable and the thought of leaving in a week breaks my heart."* *"Don't know what the state of my apartment might be in though, but at least I will be HOME! HOME HOME HOME…"*

In stark contrast, other students identified their new communities as their home and professed their anxiety and sadness to leave. Still others did not miss their connection to Kentucky and believed their peers to be home for them.

Finally, the following table (Table 6) showcases stimuli identified by students as they took responsibility for their educational roles within the Scottish communities. While students identified similar stimuli regarding their education development, their appraisal toward each stimuli and correlating emotions varied. Several students felt empowered and excited to be taking on their responsibilities. Others experienced situations of gender bias, evoking negative emotions toward an individual. Furthermore, some students did not feel empowered enough and felt that their efforts were useless, leading to feelings of disappointment and confusion.

Table 6. Primary Theme 5: Student Appraisals and Evoked Emotions

Secondary Theme	Students' Emotions	Student Evidence
Community interviews	nervous, frustration, uncomfortable, unsatisfied, uninterested, concerned, happy, enjoyment	*"Today I got up and ready for an interview with (person)-bastard….he wouldn't look at me and wouldn't have shit to do with me because I was female. I guess that was frustrating and really pissed me off because times have changed and I expect equal respect."* *"She is one of my favorite people so far to talk to. She's a dairy farmer…Plus, she cusses like a sailor."*
Final Project	uncertainty, concerned, anticipation, not excited, not worried, exhaustion	*"Many times I felt that we were overstaffed with not enough for us to reasonably feel like a part of the project."* *"I believe I have done a pretty good job at beginning our initial questioning and data collection. I can't wait to learn more…"*

Individual contribution	fear, interest, unexcited, confusion, useless, happy, disappointment, beneficial	*"I feel kind of useless at this point however. This social infrastructure deal already isn't … something I'm comfortable working with let alone talking to a community about."* *"I believe that as time goes on I will become more confident and…realize that I can be an important part of this team. I can't wait!"*

Thinking retrospectively about their international leadership experience lead students to express a more positive outlook on international travel in general. Post-trip reflections indicated students viewed their international experiences in a more positive light, when compared with some of the negative emotions expressed in on-site journaling.

Conclusions,/Recommendations/ /Implications

With increasing importance being placed on international education, global understanding gained through cultural immersion is an effective way for students to acquire this knowledge (Brooks et al. 2006). Throughout the immersion process, all students experienced visceral reactions towards their experience, although the stimuli for which they attributed the response differed from individual to individual. With this in mind, much emphasis should be placed on the importance of preparatory classwork. All students recognized the importance of conducting deep and insightful research within the Scottish communities. However, students did indicate they felt more emphasis should be placed on learning about the specifics of the country and potential social situations they could face.

Perhaps even more importantly, pre-immersion preparatory classwork should move beyond the history and culture of the study country; there should also be ample focus on how one may be affected emotionally or cognitively throughout the experience. It is recommended that educators seek to understand the student developmental process as they participate in international leadership experiences, as well as taking it into account when designing the international experience. If this process is overlooked, students may perceive their experience as negative, limiting their cultural development (King & Young, 1994). When students understand their own developmental processes, they are more likely to think metacognitively in order to adapt and respond more quickly in novel situations. Metacognitive thinking should be elaborated on prior to departure and reinforced during the class to ensure students have the skills to cope and react accordingly while overseas.

As today's educators continue to explore and begin to utilize student centered teaching, it is important for them to thoroughly understand the student-centered process. It is easy to recognize that students will have visceral responses to various stimuli they encounter within other cultures; it should be just as clear that the same students will demonstrate both positive and negative emotional responses. Therefore, just because students may have a negative visceral response towards a stimulus initially, that is not necessarily undesirable. Both negative and positive emotions can be catalysts for learning. Similarly, once educators have taken students on an international leadership experience, it may become apparent that some students were

simply not ready for international travel. While this may make certain situations more aggravating, it is not necessarily negative. It is still a learning experience for everyone involved.

Other tools that assist in making the international leadership experience more meaningful are reflective journaling and situational analysis. Both reflective journaling and analysis of situations is recommended for use in order to create a more experiential environment (Gouldthorpe et al., 2012; Ricketts & Morgan, 2009). In addition, by focusing on issues, experiences and situations encountered within other cultures, students are encouraged to consider their reactions to various stimuli. By reconsidering their reactions and making judgments, this could assist students in improving their reactions to the same stimuli in the future. In this case study, students were able to better understand the events and situations happening around them through reflective journaling. The journals served as an emotional outlet for many of the students and helped to dissolve many problems before outbursts of emotion could occur. Students documented both professional and personal growth on the trip, as can be seen from the student quote below:

> *I can tell already that I have grown a bit since day one. Slowly but surely I have gained more confidence in myself, learned to respect myself, and learned more to shut up and listen and wait for a good time/thing to say. I feel my listening skills have increased since the class we took this past semester. By utilizing this trait I believe my future will be easier seeing I can make logical statements and ideally be able to be a better conflict resolver.* (Student Reflective Journal)

For all of the aforementioned reasons, the researchers would argue that reflective journaling should be structured as a free write, instead of placing parameters around the activity. This allows students to use the journaling for their own educational purposes, and does not limit how the assignment is applied.

Finally, even as educators decide to make their international educational trips and courses more student-centered, it is still imperative to set up specific interactions, field trips and situations that allow students to experience the application of leadership within other cultures (Ricketts & Morgan, 2009). As has been illustrated throughout this study, students demonstrate a wide variety of emotional responses within stressing situations (such as international travel). Without purposeful planning, students may never think critically about the leadership skills or knowledge necessary for successful interaction within international situations. Those who get caught up in the cognitive overload may need more educational scaffolding up front – so they can actively experience and think critically within a new culture.

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Strengthening Armenian Irrigation Capability through Extension Education and Mentoring

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Abstract

The disintegration of the Soviet Union in the early 1990s led to the creation of 440,000 small, privately owned farms in the country of Armenia. Armenian farmers, largely untrained in crop production, needed education and experience in all aspects of agriculture production, including irrigation management. In order to provide irrigation information and resources to individual farmers, the Armenian extension system itself was in need of mentoring by qualified individuals. Utah State University (USU) extension irrigation specialists trained Armenian extension personnel in irrigation fundamentals, implemented a soil moisture monitoring program and conducted on-farm irrigation research. Between 2001 and 2005, USU Extension trained Armenian extension specialists and agents in over 25 in-country irrigation management workshops. The mentoring team monitored soil water in on-farm demonstrations and reduced the number of irrigation water events on many fields through scientific irrigation scheduling.

They also conducted impact interviews each fall and found that 54–61% of farmers saved irrigation water and farmers averaged $41–$159 USD per hectare in net benefits from the program. Prior to 2003, Armenian flood irrigation management was perceived as "inefficient." The irrigation specialists conducted 60 in-field efficiency evaluations and found that Armenian farmers achieved above average efficiency. This multi-year project suggests that education and mentoring efforts improved irrigation management, which in turn could reduce the demand for irrigation water and improve the economic and agricultural sustainability of Armenia.

Keywords: Armenia, Soil Moisture, Irrigation Fundamentals, Irrigation Management, Irrigation Efficiency

Introduction

Armenia is a small, historic country landlocked by Turkey, Georgia, Azerbaijan and Iran. Towards the end of the 69 years of Soviet rule (1922–1991), production agriculture consisted of 840 large, highly subsidized and centrally managed collective farms (Bledsoe, et al. 2006). Farms were normally several hundred hectares in size with farm machinery, storage facilities, cement canals, and irrigation systems. The Soviets managed these farms with specialized labor. One person's responsibility was planting; another's irrigation or weed control. Few Armenians understood or participated in all aspects of crop production: planting, growing, and harvesting. Under this system, incentives to share knowledge of improved management practices did not exist. In fact, knowledge was power, highly guarded and quite often used for personal gain.

After independence, Armenian villages and cities divided the nearby collective farms amongst the local citizens. The 840 large farms were divided up into 440,000 small, privately owned, unsubsidized farms, varying in size from 0.4–2 hectares (Bledsoe, et al. 2006). This drastic change almost collapsed the system, but failure was not an option. Now, Armenia required self-sufficiency in agriculture production not only for subsistence as a nation, but also for economic growth. Private citizens inheriting small farms were inexperienced and uneducated in the various aspects of crop production. Additionally, personnel in the newly created extension system were not adequately trained or experienced to meet the needs of the agricultural community, and the mentality of guarding information still persisted. The irrigation infrastructure, designed for large collective farms, was inadequate for delivering water to small farms.

In 1996, the United States Department of Agriculture (USDA) initiated an economic development program called the Marketing Assistance Program for Armenia (MAP). This program solicited crop production specialists to work with Armenian Universities, the extension system, government officials and local farmers to improve crop production practices. In the late 1990s, regional droughts highlighted the importance of irrigation management for Armenia's agriculture production system. Over the last several decades, excessive water withdrawal from Lake Sevan, Armenia's largest lake, had led to a water level drawdown of 60 to 80 meters. Sustainable use of Armenia irrigation resources needed to be addressed.

An estimated 85% of Armenian farms utilize irrigation for sustainable crop production. Yet most extension agents and farmers lacked understanding of irrigation fundamentals, soil–water–plant interactions, crop water use, and crop rooting depth. The USDA/MAP recruited Utah State University's International Irrigation Center in early 2001 to provide education on

irrigation management. Utah's climate and topography are similar to Armenia's. Although Utah's crops and cropping practices are different, Utah's and Armenia's reliance on irrigation is similar. Thus, Utah State University (USU) Extension was well suited to spearhead this irrigation educational effort. Under the direction of USU Extension Specialists, the program ran from 2001 to 2006, when it was placed under the umbrella of the Armenian Center for Agribusiness and Rural Development (CARD).

Purpose and Objectives

Irrigation training is key to gaining maximum crop yield from a limited quantity of water (Ratnakar & Das, 2006). In order to realize this impact, farmers and extension personnel must understand soil–water interactions, crop rooting depth, crop water use, and irrigation efficiency. Learning irrigation fundamentals and gaining experience in irrigation management will best conserve limited water resources and improve sustainability of crop production. Utah State mentors desired to develop a team of Armenian irrigation specialists and agents who were recognized as experts in irrigation management and who understood the importance of on-farm research and dissemination of science-based information to individual farmers. In order to accomplish this objective, USU implemented the following programs: (a) Irrigation fundamentals, workshops and trainings for Armenian extension personnel, (b) Soil moisture monitoring program with local farmers in every marze (similar to a state in the United States), and (c) On-farm irrigation efficiency research. The expectation was not only that Armenian extension personnel would become more knowledgeable in irrigation water management but also that Armenian farmers would improve management and sustainability of irrigation water nationwide.

Methods

In collaboration with USDA/MAP and the Armenian Agricultural University, USU Extension established the Small Farm Water Management Research Center (SFWMR or Center), consisting of the Center staff, Armenian natives, included a director, an irrigation engineer, an irrigation technician, and a secretary. Over the course of the program, USU Extension provided mentoring support with in-country visits from two irrigation extension specialists (multiple in-country visits), two county extension faculty (summers of 2003 and 2004), a vegetable specialist, and a soils specialist (multiple in-country visits). The project remodeled the Center's laboratory and supplied it with simple testing and research equipment such as pH and conductivity meters, hand held global positioning systems (GPS) units, soil augers and probes, drying ovens, and scales. USU Extension specialists trained the Center staff on the use of laboratory equipment. On every field visit, specialists used the pH/conductivity meter to determine irrigation water quality throughout the country of Armenia. They used GPS units to identify soil moisture monitoring fields, water quality testing sites and field research sites. They trained Center staff to proficiently use scales and the drying oven during irrigation efficiency research.

An on-farm water management project in Pakistan focused on providing technology and improvements in efficiency with minor emphasis on education of the local farmers and extension personnel. Evaluations of random Pakistani farmers showed an emphasized need for demonstrations, training sessions, and workshop/seminars (Mirani, et al, 2003). Successful implementation of an irrigation

technology program requires extension workers and local farmers to participate and support the project (Noruzi and Chizari 2006). Without local farmer participation in the irrigation management process, farmers will be less likely to adopt sustainable practices (Drost, et al, 1996). USU Extension focused on teaching native extension personnel to develop on-farm irrigation programming and irrigation research activities.

Mentoring effectively helps inexperienced individuals develop and progress in their profession (Byington, 2010). This irrigation program developed trained and knowledgeable Armenian extension workers in each marze. In 2003, Armenian extension and Center staff attended a three-week training and mentoring program coordinated by faculty and staff at the USU International Irrigation Center. Armenian short course participants experienced irrigation systems management and training that would have been impossible to create in their own country. From 2001 to 2005, USU Extension and Center staff conducted over twenty-five in-country training seminars ranging in length from four hours to two and a half days in length. USU specialists focused workshops on soil–plant–water relationships, irrigation scheduling concepts, determining soil moisture by feel, water measurement, irrigation efficiency evaluations, and crop production. At least one workshop or training was held in each of Armenia's ten marzes, and 9 to over 25 extension agents and farmers participated in each event. Workshop participants evaluated selected workshops with a written anonymous survey prepared by USU. Evaluations were intended to teach Armenian extension personal the value of constituents' feedback, ensure relevancy in the material being taught, and improve the quality of future workshops. Additionally, the evaluations indicated knowledge gained by the participants.

Important mentoring occurred through the soil moisture monitoring program. The center staff, with help from USU Extension, initiated a soil moisture monitoring program throughout the country. In 2001, 30 farms participated in monitoring soil moisture in five marzes using resistance blocks and hand held meters (WaterMark©, purchased from Irrometer Company, Riverside, CA). At each farm, the USU mentor, the Armenian extension specialist and agent and the farmer placed soil moisture sensors in the field at the following depths: 30 cm, 60 cm, and 90 cm. The local extension agent used a hand-held meter to determine soil moisture levels, which he recorded and also reported to the farmer. Center staff and USU Extension mentors visited each field location twice during the growing season with the local Armenian extension worker and the farmer. At the end of each season, center staff removed the soil moisture sensors from the field, stored them during the winter and reinstalled them in a new field the following year. Due to the success of these initial efforts, the soil moisture monitoring program expanded to 107 farms in 2002, 150 farms in 2003 and 111 in 2004. Over 30% of Armenia's villages had at least one soil moisture monitoring data collection site involving the local extension personnel and a farmer. In all total, 398 farmers participated in the soil moisture program. In 2003, at the height of the program, soil moisture was monitored in 15 fields in each of the ten marzes. Farmers utilized the soil moisture data to answer two questions, prior to irrigation water application, "Is it time to irrigate?" and after irrigation water application, "Was the proper amount of irrigation water applied?" The soil moisture monitoring program continued under the direction of USU Extension until 2005.

At the end of each field season, Center staff and the USU mentor conducted impact interviews with individual farmers. Farmers were selected based on the region and the logistics of being able to travel to the farm, meet with the farmer, and conduct the interview. The USU Extension mentor, Center personnel, and the local extension agent met with the farmer at his field or home. Due to the lingering mentality of guarding information, the USU Extension mentor initiated and directed the interview. Local farmers opened up to a foreigner during field conversations, and Armenian extension personnel learned interviewing and data collection skills. USU recorded all responses in a field note book and later summarized them in a spreadsheet. Each farmer responded to the following questions: (a) How did you utilize the soil moisture monitoring data? (b) Did the information improve your irrigation management? (c) What benefits did you receive by participating in this program, i.e. water savings, cost savings, yield increases, labor savings? (d) Was there anything that you would have changed with the program? (e) Did you share the information and knowledge with neighbors? The interview ended by the farmer or extension agent providing any final comments, concerns or suggestions. Due to limited time and resources, and challenging road conditions, USU Extension and the Center Staff could not interview every farmer who participated in the soil moisture monitoring program. The first year of the program in 2001, 16 farmers participated in impact interviews. The number of interviewed farmers increased annually, with 31 interviewed in 2002, 63 in 2003, and 75 in 2004.

The Center staff and USU Extension faculty set a goal to conduct surface irrigation efficiency research on two farms in each marze annually for 3 years. Simply put, an irrigation efficiency evaluation measures the amount of water entering the field, the amount of water leaving the field, and the amount of water stored in the crop's root zone. Utah State Extension trained Center staff to measure incoming and outgoing water with portable flumes. Center staff collected soil samples pre and post irrigation at multiple depths and calculated the amount of irrigation water delivered to the root zone. Center staff measured furrow length, slope, and advance rate of the irrigation water at each field. From this data, center staff calculated irrigation efficiency on more than sixty irrigated fields utilizing modern farm irrigation evaluation principles (Merriam and Keller, 1978).

Findings and Results

The Armenia Small Farm Water Management Research Center organization created a key mentoring and educational irrigation program for Armenia's small farms. The Center and USU Extension mentors identified water management issues, coordinated training, and implemented research efforts nationwide. These efforts provided a forum for collaboration, cooperation, and advancement in irrigation management. Most importantly, USU Extension trained and provided real world irrigation experience for the Center Staff, which enabled them to become known as Armenia's "irrigation experts."

Investing in irrigation water management infrastructure is thought to be the most effective way to improve irrigation management. At the present time, improving irrigation infrastructure is simply infeasible for Armenian farmers. Armenian agriculture will always utilize surface irrigation, due in part to the existing surface water supply infrastructure and also to the prevalence of the numerous small farms with limited access to credit for financing irrigation technology advancements. The current need for Armenian farmers is knowledge and

training in irrigation water management. USU Extension provided important knowledge transfer to the Armenian extension specialists and agents regarding irrigation principles and management. This training and information provided another useful extension tool for the agent's portfolios. Both extension personnel and farmers enthusiastically received irrigation water fundamentals and management workshops and felt the information was "valuable and timely" (Hill, et al. 2006). Evaluations of the evapotranspiration/ irrigation training held in Tavush (2003) rated the program very high. The relevance of the topics, quality of teaching materials, presenter's knowledge of the subject, and preparation of the presenters were rated "excellent" by 84% of participants. One participant stated, "the workshop was conducted in an excellent way and was very educational." Regarding the irrigation training held in the western United States, Armenian participants rated the three-week training session as "very good." One Armenian extension personnel member expressed that he "learned more about irrigation methods and research in three and a half weeks than he would have learned in six years," otherwise. Some of the extension agents commented that they were not "irrigation specialists," and the knowledge obtained in the irrigation training was new and particularly useful. They applied to the training in soil moisture monitoring, furrow irrigation evaluations, visits with farmers, and field seminars (Hill, et al. 2006).

The soil moisture monitoring program created a venue for mentoring, engagement, and professional development of Armenian extension agents and specialists. To maintain good political relations, the Armenian government employs as many people as possible. Extension personnel typically have an office with a chair and a desk but do not have any equipment, be it phones, pencils, paper, computers or printers. Lack of resources greatly reduced extension programming and hindered extension personnel from providing science-based knowledge to the people. During the Soviet years, personnel collected data but rarely shared it with the "on-the-ground" manager, resulting in mismanagement of irrigation resources. The soil moisture monitoring program provided equipment, travel, and office supplies, which allowed the Extension personnel to do their job and share information with the farmer, in many cases for the first time. By sharing knowledge and skills, the Armenian extension workers empowered farmers with decision-making skills, resulting in improved production and lifestyle.

Annual fall interviews by the Center staff and USU Extension showed farmers benefited greatly from the soil moisture monitoring program. Table 1 summarizes the impacts of the program. Armenian farmers utilized the soil moisture data collected on their farms to adapt their irrigation water practices. This often improved their crop production in comparison to neighboring farms and historic production levels. Not every farmer reported an economic benefit from the soil moisture monitoring program, but the average benefits were significant in comparison to average monthly wages (average wage of an Armenia government employee is $40.00 USD/month). A majority of farmers reported applying less irrigation water. When farmers reduce irrigation frequency, they have less labor associated with crop production and they conserve water, which is the objective. Farmer-to-farmer mentoring increased throughout the program as farmers participating in the soil moisture program began sharing their newly gained knowledge of irrigation management with their neighbors.

Table 1. Soil Moisture Monitoring Impact Summary from 2001–2004

Year	Fields monitored	Farmers interviewed	US$ per ha benefit[a]	Irrigation water savings[b]	Production increase[c]	Farmers who shared knowledge[d]
2001	30	52%	$41	54%	38%	1
2002	107	29%	$159	61%	55%	2
2003	150	42%	$105	56%	49%	4
2004	111	68%	$137	57%	43%	6

[a]The average economic benefit received from utilizing recommendations from the soil moisture monitoring program.
[b]The percent of farmers reducing the number of irrigations applied.
[c]The percent of farmers who reported production increases as a result of following the recommendations of the Soil Moisture Monitoring program.
[d]The number of farmers who shared soil moisture information with neighboring farmers.

During the last several decades, Lake Sevan, a natural fresh water lake that contributes a significant amount of irrigation water to the country of Armenia, has been drawn down 60 to 80 meters. Obviously, such continued use is not sustainable and the cause of the drawdown must be slowed or stopped. The majority of Armenian irrigation systems are flood systems. A few sprinkler systems with risers on a fixed grid pattern exist in some areas of Armenia. In the United States, poorly managed flood irrigation systems are typically 25 to 35% efficient, and sprinkler irrigation systems are 65% efficient (Draper, 2010 and Morris & Lynne 2006). Modern irrigation thought suggests that Armenian farms should upgrade the efficiency of their irrigation systems, thus saving substantial amounts of water. After evaluating more than 60 irrigation efficiency studies, specialists discovered many extremes in irrigation application efficiencies, ranging from 20 to 100%. Surprisingly, the average application efficiency was 60%, much higher than in typical U.S. flood systems. The more efficient Armenian irrigation systems tend to utilize short furrows (<10 meters in length) or small level basins (<30 meters in length). Farmers captured the tail water (water leaving the field) and distributed to lower lying fields, which also improved average irrigation efficiency. By managing irrigation intensively, farmers achieve better efficiencies. Generally speaking, when the Armenian farmer had the water, he or she was in the field tending it. In some of the fields where irrigation efficiencies were high, the farmer applied a large amount of water for a short amount of time.

Conclusions, Recommendations, and Implications

Over 440,000 Armenian farmers needed fundamental irrigation water management training. The most efficient way to train these farmers was through the Armenian extension personnel, who themselves required mentoring, educational training and experiences in irrigation management. USU Extension had the necessary expertise to meet these needs.

USU Extension created a venue for training and mentoring extension personnel by formal irrigation trainings, on-farm soil moisture monitoring, and irrigation field research. Additionally, this venue provided 398 individual farmers, representing 30% of

Armenia's villages, with on-farm, applied learning experiences. Armenia irrigators quickly adopted the soil moisture monitoring program and received benefits in water savings, reduced labor, and production increases. Over 60 irrigation efficiency studies revealed that Armenian irrigators intensively manage flood irrigation systems to receive above-average efficiency results. The soil moisture monitoring program and irrigation efficiency studies suggested that irrigation system upgrades are not the solution to sustaining Armenia's water resources. Local farmers, through extension personnel, were better prepared to conserve water by improving irrigation management because of education, research, and mentoring.

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Information-Seeking Behavior and Utilization among Snail Farmers in Oyo State, Nigeria: Implications for Sustainable Animal Production

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Abstract

The authors of this study examined the information-seeking behavior and utilization among snail farmers in Oyo State with the view of improving animal production to achieve food and nutritional security.

Simple random sampling was used to select one hundred and twenty respondents out of three hundred and sixty-five registered members in Oyo state. Interview schedule was administered to elicit information relating to socio-economic characteristics, information-seeking behaviour and utilization among snail farmers and the constraints faced by the snail farmers. Data were analyzed using frequency counts, mean, percentages, and correlation.

Most of the respondents were literates. This factor increased their capacities for seeking and utilizing agricultural information. Lack of credit facilities and inadequate information from extension agents were the major constraints identified by the farmers. There was a significant relationship between the sources of information and information-seeking behavior of these farmers as well as the utilization of such information ($r = - 0.261$; $pv = \geq 0.05$). Significant relationship also existed between constraints faced by the farmers and information-seeking behavior and utilization by these farmers ($r = - 0.23$, $pv = 0.01$).

Most of the respondents had high information-seeking behavior and utilization, which implies that farmers are willing to seek information that will improve their productivity. Efforts should therefore be made to promote the information utilization of farmers through the extension services of agricultural development projects in order to facilitate the transfer of technology. This will enhance the productivity and income of snail farmers and subsequently improve their standard of living.

Keywords: Information-Seeking Behavior, Utilization, Technology, Production, Snail Farmers, Nigeria

Introduction

Information is the collection, storage, processing, and dissemination of new data, pictures, facts, messages, opinions, and comments required to understand and react accurately to personal, environmental, national, and international conditions, as well as to be in a position to take appropriate decisions (David, 2006). Quality information rests on three pillars, which include: accuracy, timeliness, and relevance. Accuracy of information is when information is free of bias, while timeliness means recipients can get information when needed. Information is an essential resource that individuals, government officials, and professionals should have access to (Bentley, Barea, Priou, Equise, & Thiele, 2007).

Snail farmers need to seek and utilize information that can improve the farming system in Nigeria. This will not only increase their agricultural productivity but also improve their standard of living. For farmers to increase their agricultural production, they must have good information-seeking behavior that will enable them to adopt improved production technology (Ali-Olubandwa, Odero-Wanga, Kathuri & Shivoga, 2010). Information-seeking behavior is a way of gathering sufficient data to address perceived information gaps. According to Owolade (2008), Information-seeking behavior is the "totality of human behaviour in relation to sources and channels of information sought" (p.3). The information seeking-behavior of an individual arises from the need to satisfy identified goals and move from the level of uncertainty to the level of certainty. Agricultural information is useful for farmers covering up their inadequacies in knowledge of certain basic practices that may include technical, marketing, social, and legal agricultural information. It often involves face-to-face communication, as well as passive reception through advertisements in print and electronic media (Yahaya, 2003).

Owolade (2008) noted that "there is a lot of information available to snail farmers who are interested in increasing their productivity but farmers display diverse attitude towards seeking and utilizing the information available to them" (p.24). Some have a high information-seeking behavior while some others do not. This difference in attitude affects the type of information being sought and their productivity. Information-seeking behavior helps in ensuring improved snail farmers' livelihood through the utilization of information.

Snails have been recognized as a reliable source of protein to human beings, and they are useful in research. Some conventional animal protein sources such as beef, goat meat, pork, mutton, etc. have become too expensive for the average citizens in developing nations (Omole, 2000). Consequently, the common man has to look for cheaper and unconventional sources of animal protein for survival. Snail is an excellent and cheaper source of animal protein; it is low in sodium, fat and cholesterol but contains high levels of iron and calcium. It has been used in the treatment of hypertension, anaemia and other fat-related ailments (Owolade, 2008). Due to the increasing importance of snail, demand has been on the rise. It has been estimated that Paris (France) alone consumes more than 100 million snails annually (Owolade, 2008). Recently, snail populations in Nigeria have declined considerably because of the impact of human activities on their natural habitats. Such practices include deforestation, indiscriminate bush burning, and collection of immature snail for consumption. This trend, coupled with the fact that there are no significant efforts at large scale snail

breeding (as with other livestock such as cattle, sheep and poultry) means the possibility of snails going into extinction is not far-fetched.

Snail breeding is an important source of income for farmers in rural areas, private bodies and other institutions. The profitability of snail farming hinges largely on the use of modern techniques in production, which require acquiring information on hatchery, feeding, housing and marketing of the products.

Recent improvement in snail production includes utilization of concentrate feeds in the nutrition of snails, and this requires specialized information from professionals. The continuous use of conventional methods in snail production cannot meet the present demand. With the rise in population, there is need for snail farmers to seek information in the use of modern techniques to increase their production. Moreover, snail rearing has become one of the fastest growing types of food production in developing countries.

The ever-growing demand for the local production of snail necessitates increases in its production. However, increase in local production can be achieved through capacity improvement of snail farmers by providing them information and through continuous education. This can only be achieved in the presence of keenly developed information-seeking behavior among farmers. Several factors that limit the information-seeking behavior of snail farmers have been identified. These include availability of infrastructures, technical competence, and literacy level.

Purpose of the Study

The purpose of this study was to ascertain information-seeking behavior and utilization among snail farmers in Oyo State Nigeria with the view of improving access to information that will translate into increased productivity.

The specific objectives of the study were to:

- determine the selected socio-economic characteristics of snail farmers in Oyo State,
- identify the sources of information available to snail farmers in Oyo State,
- determine the level of information-seeking behaviour and utilization among snail farmers in Oyo State, and
- identify the constraints facing snail farmers in Oyo State.

Hypotheses of the study

$H0_1$: There is no significant relationship between sources of information and the level of information-seeking behavior and utilization among snail farmers.

$H0_2$: There is no significant relationship between the constraints faced by snail farmers and their information-seeking behavior and utilization.

Methodology

Primary data was used for this study. This was collected through the use of structured interview schedule. Personal characteristics of the respondents (such as age, level of education, sex, marital status, and family size), sources of information available on snail production, constraints faced by farmers, and level of information utilization were assessed in the study. A list of snail farmers was obtained from the snail farmers association at the Institute of Agriculture Research and Training (IAR&T), Apata Ibadan. There were 350 registered members, out of which 120 respondents were selected by simple random sampling technique. Descriptive and inferential statistical tools were used to

analyze the data collected. The descriptive statistical tools used include frequency count and percentage, while the inferential statistical tool used was correlation.

Results and Discussion

Age distribution of the respondents revealed that most of the farmers were in their middle-age. This negated the assertion made by Akinbile (2004), which states that "most of the famers in Nigeria are old with young people preferring white-collar jobs" (p. 35). As a majority of the farmers are middle-aged, they are active in agricultural production. Eighty-two percent of the respondents were males, while 18.0% were females. This showed that males are more involved in snail production than females, an observation that agrees with Owolade's (2008). This may be because of the tedious nature of snail production activities. This finding is corroborated by Lawal (2012), who stated that "African women saw themselves as weaker vessels and object of use" (p. 2). She further pointed out that there are societies in Africa which see a woman as subservient to man, in mental and biological capacity. Such belief or perception of women may limit their involvement in agricultural production. Women prefer processing and marketing of the farm produce to actual farm work (Akande, 2003).

Most of the respondents were literates. High level of literacy among respondents may therefore boost their capacity to seek and utilize information that will improve snail production. Regarding marital status, 85.0% of the respondents were married, 10.0% were single, and 5.0% were widowed. This showed that snail farming plays an important role in supporting family welfare. Most of the respondents were married. This may, however, slow decision-making and information utilization among farmers, as they are likely to consult family members before adopting and utilizing information.

Regarding religion, 68.0% of the respondents were Christians and 29.0% were Muslims, while 3.0% practiced traditional religion. This proved that snail farming is generally practiced among different religions. The implication is that there is no religious taboo against snail production in the study area.

Table 1. Distribution of Respondents Based on Selected Socio-Economic Characteristics in Oyo State, Nigeria, 2011 (n = 120)

Variables	Frequency	Percentage
Age		
≥30	**11**	**9.0**
31-40	**14**	**12.0**
41-50	**44**	**37.0**
51-60	**22**	**18.0**
61-70	**29**	**24.0**
Total	**120**	**100.0**
Sex		
Male	**98**	**82.0**
Female	**22**	**18.0**
Total	**120**	**100.0**
Level of education		
No formal education	**1**	**1.0**
Primary	**2**	**2.0**
Secondary	**11**	**9.0**
Tertiary	**106**	**88.0**
Marital status		
Single	**12**	**10.0**
Married	**102**	**85.0**
Widowed	**6**	**5.0**
Total	**120**	**100.0**
Religion		
Christianity	**81**	**68.0**
Muslim	**35**	**29.0**
Traditional	**3**	**2.0**
Others	**10**	**1.0**

Source: Field survey, 2011

Description of respondents according to family size in Oyo State, Nigeria, 2011. Table 2 shows that 38.0% of the respondents had a family size of between 1 and 4 members, while 51.0% had a family size of between 5 and 7 and 12.0% had at least 8. This showed that most of the respondents had family size of 5 or more. As a majority of the respondents had large family sizes, farming in the study area may depend on family labor. They may not need to employ outsiders to work on their farm. This should reduce cost of production and subsequently increase farmer's income.

Table 2. Distribution of Respondents on Family Size in Oyo State, Nigeria, 2011

Family size	Frequency	Percentage
1-4	45	38.0
5-7	61	51.0
8 and above	14	11.0
Total	120	100.0

Source: Field survey, 2011

Description of respondents based on their organizations in Oyo State, Nigeria, 2011. Farmers' organizations have been identified as an effective channel of information to farmers. This result revealed that 80.0% of the respondents belong to the snail farmers association while 20.0% did not. Because the majority of the famers belong to some associations, useful information can be passed to the farmers through such associations by extension agents. This finding was supported by Androulidakis, Freeman, Bicoku, Peqini, Agolli & Korra (2002) who stated that "farmers' associations aid adoption of improved fertilizer technology" (p 49).

Table 3. Distribution of Respondents Based on Farmers' Organizations in Oyo State, Nigeria, 2011

Farmers' Organizations'	Frequency	Percentage
Yes	80	96.0
No	20	24.0
Total	120	100.0

Source: Field survey, 2011

Description of respondents according to scale of snail production in Oyo State, Nigeria, 2011. Scale of production may influence information-seeking behavior and utilization among farmers. Scale of production refers to size of stock (the number of snails reared by the respondents). Table 4.0 shows that 53.0% of the respondents have 1,000 snails or less, 43.0% have 2,000 snails, and 4.0% have 3,000 snails, while only 1.0% of the farmers have at least 4,000 snails.

This result revealed that most of the farmers were small-scale farmers. Farmers with large number of stocks may seek and utilize more information than small-scale farmers in order to maximize profits. Owolade (2008) also found "significant positive relationship between information-seeking behavior of farmers in Oyo state Nigeria and their farm size" (p.41).

Table 4. Distribution of Respondents on Scale of Production in Oyo State, Nigeria, 2011

Scale of Production	Frequency	Percentage
≥ 1000	64	53.0
1001-2000	52	43.0
2001-3000	4	4.0
Total	120	100.0

Source: Field survey, 2011

Description of respondents based on sources of information in Oyo State, Nigeria, 2011. Table 5 shows the various sources of information on snail farming to farmers. The result showed that the majority of the respondents sought information on snail production through various sources, which include radio, television, internet, telephone, extension agents, friends, newspapers, video, and farmers' associations. This showed that farmers are willing to seek and utilize any information that will increase their production. Sixty five percent of the respondents got information through radio, 76.0% obtained information from television, while 53.0% respondents indicated newspapers. The result also revealed that majority (65.0%) of the

respondents listen to radio. This indicated that radio may be a very effective medium of disseminating new agricultural innovations to farmers. This was corroborated by Ayandiji, (2003), who stated that the "radio is the cheapest and quickest means of passing information to farmers in Oyo state" (p.4). Kock, Harder, and Saisi (2010) also agreed that "radio is an effective medium of communicating market information to farmers" (p.10). Therefore, efforts should be made by extension agents to ensure feedback from the farmers. Most (30%) of the respondents do not obtain information through telephone. This may be due to high cost charged by telecommunication companies in Nigeria for such services, making regular use of this medium unsuitable.

Table 5. Distribution of Respondents on Sources of Information in Oyo State, Nigeria, 2011 (n=120)

Sources of information	Frequency	Percentage
Radio	78	65.0
Television	91	76.0
Internet	21	18.0
Television	42	35.0
Extension agents	60	50.0
Friends	55	46.0
News paper	64	53.0
Farmers' Associations	70	58.0

Source: Field survey, 2011

Constraints to snail farming in Oyo State, Nigeria, 2011. Constraints experienced by respondents during snail production include difficulty in retrieving information from the internet, lack of credit facilities, poor market for produce, high cost of snail farming equipment, and inadequate information from extension agents. Seventy-eight percent of the respondents perceived the cost of snail farming equipment as prohibitive. This might hinder them from seeking and utilizing information that could have improved their agricultural productivity because they would not be able to purchase the recommended equipment. Seventy-seven percent of the respondents did not have access to information on snail production. The result showed that limited access to information needed on snail production might affect farmers' productivity.

Seventy-four percent of the respondents had problems of poor management practices that cannot produce sufficiently buoyant credit facilities required to purchase high tech machineries.

There is a poor market for produce. This may limit the farmers to subsistence level of production thereby preventing them from seeking more information that may increase production. Therefore attention should be geared toward addressing all these problems to achieve increase in snail production in Nigeria.

Table 6. Percentage Distribution of Respondents Based on Constraints to Information- Seeking Behavior and Utilization Among Snail Farmers in Oyo State, Nigeria, 2011

Constraints to snail farming	Severity		
	Not severe	Severe Freq.	Most severe
High cost of snail farming equipment	3.0	36.0	11.0
Low literacy level	6.0	0.001	0.00
Difficulty in accessing information	9.0	24.0	43.0
Difficulty in retrieval of information	13.0	31.0	33.0
Inadequate information	10.0	45.0	23.0
High cost of maintenance of equipment	44.0	23.0	8.0
Lack of good management practices	44.0	18.0	13.0
Poor market for the produce	6.0	41.0	32.0

Source: Field survey, 2011

Description of respondents on frequency of information utilization in Oyo State, Nigeria, 2011. This finding showed that the majority (84.0%) of the farmers rarely use information given on improved housing management practices and 74.0 % rarely use information on improving management practices, while most (66.0%) of the respondents always make use of information on capital acquisition. Seventy percent use information on improved snail feeding. These results indicate that snail farmers made use (either rarely or always) of information on improved snail rearing to enhance their income. This implied that their standard of living will subsequently be improved.

Table 7. Percentage Distribution of Respondents Based on Frequency of Information Utilization in Oyo State, Nigeria, 2011

Variables	Never Use	Rarely Use	Always Use
Improving housing/land	2.0	84.0	14.0
Improving management practices	5.0	74.0	21.0
Improving snail production	9.0	71.0	20.0
Getting capital to start snail production	20.0	14.0	66.0
	6.0	24.0	70.0

Improving on feeding snail rearing			
Improving source of income	12.0	18.0	80.0
Improving on breed or parent stock	25.0	10.0	65.0

Source: field survey, 2011

Description of respondents according to level of information seeking behaviour and utilization in Oyo State, Nigeria, 2011. Table 7 revealed that 69.0 percent of the respondents had high or favorable level of information-seeking behavior and utilization while 31.0% had low or unfavorable. As most (69.0%) of the respondents had high level of information-seeking behavior and utilization, this means that farmers are willing to seek and utilize information that will increase their production. Thus, farmers' income will be increased and their standard of living will be enhanced.

Table 8. Distribution of Respondents According to Level of Information Seeking Behaviour and Utilization in Oyo State, Nigeria, 2011

Information seeking behavior and utilization	Frequency	Percentage
High (favorable)	83	69.0
Low (Unfavorable)	37	31.0
Total	120	100.0

Source: Field survey, 2011

Hypotheses Testing Relationship between sources of information and level of information-seeking behavior and utilization in Oyo State, Nigeria, 2011. The r-value of -0.261 and p-value of 0.004 at 5-percent level of significance indicate that there was a significant relationship between sources of information and information-seeking behavior and utilization by the farmers. Therefore the null hypothesis was rejected. This implies that farmers' sources of information had great effect on the information utilization in snail production. This might be because some sources are more persuasive than the others; for example, they might prefer interpersonal communication. The more interpersonal the media used for information dissemination, the greater the likelihood the farmer uses the information.

There was a significant relationship between constraints faced by farmers and information-seeking behaviour and utilization (r= -0.23, pv=0.01). This implied that lack of capital and poor market for the farm produce prevented the farmers from using the information given. This may reduce their productivity and affect the food security of the country as a whole.

Table 9. Relationship Between Sources of Information, Constraints and Level of Information-Seeking Behavior and Utilization in Oyo State, Nigeria, 2011

Variable	r-value	p-value	Decision
Sources of information	-0.261	0.004	Significant
constraints	-0.230	0.011	Significant

At 5% level of significance

Conclusion, Recommendations, and Implications

There was a favorable level of information-seeking behavior and utilization among the respondents. The farmers were willing to seek and utilize information that will increase their production and income. The farmers prefer an interpersonal medium of communication in the dissemination of information on snail production. The major constraints faced by farmers in the study areas include: difficulty in retrieving information from the internet, lack of credit facilities, high cost of snail farming equipment, and inadequate information from extension agents. These constraints limit farmers' productivity and can threaten the food security of the nation if the trend is not checked.

Government should provide credit facilities to snail farmers in the study areas and strengthen the extension activities of the Agricultural Development Programme by employing more extension agents to provide information to farmers.

Extension agents need to evaluate their roles and ensure that farmers are satisfied with information disseminated to them. This will encourage the farmers to adopt improved production technology as well as increase farmers' productivity to achieve food security in Nigeria.

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Perception Meets Reality: A Case Study of Faculty and Student Reflections of Participation in the 2011 World (AIAEE) Conference and Related Activities

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Abstract

Students benefit much from participating in international experiences. So too do faculty. The purpose of this qualitative case study was to explore faculty members' and students' pre- and post-reflections of participation in the 2011 World (AIAEE) Conference. Seven faculty members (four female and three male faculty members) and six students (three female and three male students; five graduates and one undergraduate) at Texas A&M University were purposefully selected to participate in the study. Respondents recorded their pre-conference reflections about Namibian life, its agricultural systems/practices, and barriers prohibiting participation in international agricultural research or development activities approximately one month before the conference; post-conference reflections were recorded about one month after the conference. Faculty and students alike held similar thoughts about Namibia and her peoples, agricultural systems, and practices during the preflection exercises. Respondents described Namibia as a poverty-stricken, desert-like country where classism existed and agriculture was defined as small-scale, subsistence production practices. Post-conference reflections were changed by the experience; respondents standardized their experiences using their own cultural lenses and U.S.-centric views. Both groups reported time away from family, financial concerns, and language skills as barriers prohibiting international involvement. Future AIAEE conferences in non-U.S. locations should include pre- and post-conference experiences for faculty and students, apart from the conference venue, to broaden participants' perspectives about life and agricultural systems/practices in the host country.

Keywords: Students, Faculty, Experiential Education, Professional Development

Introduction

New communication technologies and networks continue to lessen the knowledge gaps between known and unknown facts about foreign lands from U.S. perspectives. Faculty, students, and scientists worldwide communicate more readily as networks become more reliable, and these communications are changing education, business, and lifestyles. While near equal evidence can be found to support students' and faculty members' participation in international experiences, understanding if these two groups view such experiences equally or differently may be the greatest long-term benefit. A graduate course at Texas A&M University took advantage of the location (Namibia) for the Association for International Agricultural and Extension Education (AIAEE) 2011 World Conference to explore students' and faculty members' pre- and post-experience reflections of Namibia and its agricultural systems.

The *Journal of International Agricultural and Extension Education* (*JIAEE*) has served its readers well in reporting the benefits, barriers, and issues of international study, research, and service opportunities. Most *JIAEE* studies of this nature have been devoted to students' knowledge of international issues, preparedness for international study, concerns, and/or barriers to participating in international educational experiences (Andreasen, 2003; Briers, Shinn, & Nguyen, 2010; Bruening & Frick, 2004a; Bruening & Frick, 2004b; Connors, 2004; Ingram, Smith-Hollins, & Radhakrishna, 2009; Irani, Place, & Friedel, 2006; McGowan, 2007; Tritz & Martin, 1997; Wingenbach, Chmielewski, Smith, Piña, & Hamilton, 2006; Wingenbach, et al. 2003). Although not as prevalent over the past decade, recent *JIAEE* articles have focused on globalization effects experienced by faculty in teaching and research abroad opportunities (Dooley & Rouse, 2009; Dooley, Dooley, & Carranza, 2008; Harder, Wingenbach, & Rosser, 2007). Minimal research exists whereby students' and faculty members' beliefs and/or concerns of the same international experience were considered under the same setting. Do students' pre- and post-experience reflections mirror faculty members' reflections of the same experience?

Students' Perspectives

Most recently, Briers et al. (2010) found a "positive relationship between students' willingness to study abroad and their beliefs that participating in a study abroad program would improve their competitiveness in the global marketplace" (p. 15). Other influences on students' decisions to participate in international educational experiences included affordability, the country itself, and subject matter. Financial issues posed the greatest barrier to participation; another difficulty was the language barrier. Briers et al. learned that students preferred faculty-led programs or similar experiences. Briers found that students' fears can be mitigated sufficiently so that, when given the opportunity to study abroad with faculty guidance, they would do it. Perhaps a similar, yet unspoken, situation exists for faculty members. That is, do faculty members participating in their "initial" international experience mirror students' fears about such experiences?

Ample evidence exists from previous studies related to undergraduates' perceptions of international educational experiences. Among those include Wingenbach et al. (2003), who found that students' knowledge of international agricultural policies, products, peoples, and cultures could be advanced through increased experiential learning via study abroad. Wingenbach et al. (2006) followed

up the earlier study with a more focused effort in the form of a case study of undergraduates participating, in what for some was their "first ever" experience, in a series of Texas–Mexico field days. Prior to traveling to Mexico, students expressed negative attitudes toward the country and perceived its agricultural practices to be traditional and not technologically advanced. The students expressed concerns related to personal safety, language, finances, and family as barriers to participating in an international experience. Post-experience reflection revealed attitudinal changes; students expressed positive beliefs about the people and practices in Mexico. However, the identified barriers to international experiences of personal safety, language, finances, and family remained unchanged. Others (Bruening & Frick, 2004b; Connors, 2004) found undergraduate students to be positive about their international experiential learning situations. Can the same be said about graduate students' international experiential learning situations?

Faculty Members' Perspectives

Dooley and Rouse (2009) reported on the longitudinal effects of the Faculty Abroad Seminar (FAS) at Texas A&M University. One aspect of the FAS was "to contribute to the internationalization of faculty by directly exposing them to the culture, history, government, business, and language of Mexico" (p. 40). Texas A&M's FAS program provided culturally-enriched experiences (10-day seminars in Mexico), for which more than 135 members had participated in up to the time of the Dooley and Rouse (2009) study. The authors conducted a census study of all participants from 1994–2007. Respondents reported that their FAS participation had changed them personally and professionally, most notably through improved teaching techniques such as incorporating case studies and more international topics into their curriculum. It was also reported that their research had been impacted by making new contacts in Mexico and by expanding research opportunities for their graduate students. "Faculty research impacts are an integral part of higher education faculty development" (p. 55).

Dooley and Rouse (2009) was actually an extension of the Dooley et al. (2008) research concerning faculty members' beliefs, barriers, and benefits to participation in the Texas A&M University FAS seminar in Mexico. In that earlier study, Dooley et al. (2008) found (through analyses of the respondents' perceived changes as a result of their participation) that "collaboration with Mexican faculty and institutions was not as difficult as originally thought; personal relationships were critical for international collaboration" (p. 36) to occur; and, participants gained a deeper "appreciation of the diversity of Mexican culture after participation" (p. 36) in the FAS seminar. The authors also noted that junior faculty members' workloads and time constraints were added pressures in the promotion and tenure process that prohibited, or at a minimum inhibited, their participation in the FAS seminar. Although this finding is most likely a realistic outcome at all land-grant universities, it is probably a better indicator of the "culture" of scholarship at our institutions, rather than a telling philosophy about internationalization at our schools. The Dooley et al. (2008) study used qualitative analyses of the "preflection–post-reflection" method, first introduced to the AIAEE profession by Jones and Bjelland (2004), and expanded and formalized by Wingenbach et al. (2006).

Hand, Ricketts, and Bruening (2007) studied faculty members' professional development activities vis-à-vis their international experiences. Faculty reported

"improved teaching techniques, increased integration of international examples, and a heightened global perspective; they perceived student benefits included a more diverse viewpoint on world events, improved interpersonal interactions, and increased post-graduation employability" (p. 148). Faculty also reported their barriers included costs, limited resources, and time commitment.

Finally, one study (Harder et al., 2007) was found in the *JIAEE* that focused on graduate students' and faculty members' perceived factors affecting international research opportunities. United States faculty and graduate students perceived an increased level of international collaboration in programmatic and research opportunities after having participated in an international research project (in partnership with a Mexican agricultural university). Personal interests and commonality in research goals facilitated collaboration. Graduate students perceived increased opportunities for research, although language/communication difficulties presented barriers to collaboration. All respondents noted work schedules, lack of university resources, and time constraints as additional barriers to their international research prospects. Harder et al. (2007) concluded that despite the barriers, faculty and graduate students should be recruited and encouraged to participate in international research projects because of the many benefits derived from such experiences.

The theoretical framework was based upon Rogers' (2003) diffusion of innovations theory. Rogers defined an innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 12). In this study, the innovation was operationally defined as participation in the 2011 World (AIAEE) Conference in Namibia. Rogers wrote that innovations perceived to have high degrees of relative advantage are more likely to be adopted; relative advantage is the degree to which an innovation is perceived as being better than the idea it supersedes. However, relative advantage can be counterbalanced by one's barriers to participation (Schifter, 2000); so, we need to study both relative advantage and barriers.

Purpose and Objectives

The purpose of this study was to explore faculty members' and students' pre- and post-reflections about participating in the 2011 World (AIAEE) Conference in Namibia. Research objectives were to

1. Compare participants' pre- and post-conference reflections about "life" in Namibia,
2. Compare participants' pre- and post-conference reflections about "agricultural systems/practices" in Namibia,
3. Identify internal and external barriers to participating in international agricultural research or development activities, and
4. Describe participants' expected personal gains from participating in the 2011 World (AIAEE) Conference in Namibia.

Methods

Background information for the 2011 World (AIAEE) Conference in Namibia as well as the study's design, participants, and an explicit description of the research instruments are presented to facilitate understanding of this research. Following are subsections for each area.

Context for the 2011 World (AIAEE) Conference

The 2011 World (AIAEE) Conference in Namibia was hosted and supported, in part, by the University of Namibia (UNAM), Agricultural Scientific Society of Namibia (AGRISSON),

International Federation of Information Technology in Agriculture (INFITA), and the International Association of Agricultural Information Specialists (IAALD). INFITA and the IAALD were non-Namibia associations. The 2011 World Conference theme was "*Sustainable Value Chain Agriculture for Food Security and Economic Development*."

The 2011 World (AIAEE) Conference was only the fourth occurrence in 27 years in which the AIAEE participated in a joint conference with host national institutions/associations. Three previous joint conferences were held in Trinidad/Tobago (1999), South Africa (2002), and Ireland (2004) (J. Elliot, personal communication, January 3, 2012). One must note the importance of this distinction for AIAEE members because, although AIAEE members had separate research paper sessions and business meetings in Namibia, other organizations' members could, and did, join them for other activities. A pre-conference educational trip (three days) to northern Namibia (mostly for graduate students) and on-campus (three-day) professional development workshops (mostly for UNAM faculty members) were well attended by graduate and faculty members alike. Three- to five-day post-conference educational tours throughout Namibia were offered and well attended by faculty members and graduate students (G. Wingenbach, personal communication, January 16, 2012). Multiple day activities allowed faculty and students ample time to interact with Namibians, thereby increasing opportunities to more fully discuss and understand life and agricultural systems in Namibia.

Study Design

A qualitative case study was used to conduct this research (Schmuck, 2006). Kenny and Grotelueschen (1984) wrote that qualitative case studies can be characterized as detailed studies of separate cases that identify and describe phenomena, and contribute to the development of theory. Case studies provide detailed and holistic descriptions on the phenomena under study, often using recognizable and non-technical language (Kenny & Grotelueschen, 1984).

Seven faculty members and six students at Texas A&M University were chosen purposefully for the data collection process. Merriam (1998) stated "purposeful sampling is based on the assumption that the investigator wants to discover, understand, and gain insight and, therefore, must select a sample from which the most can be learned" (p. 61). Five of the six students enrolled in independent studies courses as part of their 2011 World (AIAEE) Conference participation. The researcher directed some of those independent studies but did not collect data directly from students or faculty responding to this study; a different researcher collected and assisted in the analyses of data.

Prior to participation in the 2011 World (AIAEE) Conference in Namibia, faculty members and students completed a preflection exercise to benchmark their pre-conference reflections about life in Namibia, its agricultural systems/practices, and the internal and external barriers to participating in international agricultural research or development activities. Jones and Bjelland (2004) wrote

> *Preflection* is a process of being consciously aware of the expectations associated with the learning experience…it increases the readiness capacity of students to learn from their experiences, thereby increasing their capacity to reflect upon the concrete experience and increasing the overall learning by the student. *Preflection* provides a

> bridge between thinking about an experience and actually learning from the experience. (p. 963)

Following the 2011 World (AIAEE) Conference, faculty and students completed a post-conference reflection exercise. Brockbank and McGill (1998, as cited in Gamble, Davey, & Chan, 1999) noted that

> Reflection may be defined as firstly, the process by which an experience is brought into consideration, while it is happening or subsequently; and secondly, the creation of meaning and conceptualization from experience. Critical reflection may develop one's potentiality to look at things as other than they are. (p. 2)

Preflection and post-conference reflection instruments were modified from the originals established by Wingenbach et al. (2006). Both instruments contained similar, open-ended questions (Table 1), and the preflection instrument had four background information questions. To accurately capture participants' pre- and post-reflections, the researcher enlisted assistance to create a web-based survey whereby participants entered their thoughts in an untimed format. Respondents received an invitation to enter (unique login names and passwords) the secured online preflection exercise one month prior to the 2011 World (AIAEE) Conference; the post-reflection occurred within one month after conferees returned to Texas.

Table 1. Participation in the 2011 World (AIAEE) Conference: Online Survey Instrument, 2011

Preflection Instructions and Questions	Post-reflection Instructions and Questions
Instructions: There are no correct or incorrect responses to the essay questions; we are only interested in your honest answers. To complete the essays, no individual research is needed on your part; we only want to know what you think about Namibia.	Instructions: Please remember there are no correct or incorrect responses to these questions; we are only interested in your honest answers.
1. In general, what are your preconceptions, beliefs, and/or views about "life" on the African continent?	1. Overall, were your pre-trip beliefs and/or views about "life" on the African continent changed after participating in the 2011 World Conference? If yes, how were they changed?
2. In general, what are your preconceptions, beliefs, and/or views about "life" in Namibia?	2. Overall, were your pre-trip beliefs/views about "life" in Namibia changed after the 2011 World Conference? If yes, how were they changed?
3. Describe, specifically, your top five pre-trip preconceptions, beliefs, and/or views about life in Namibia.	3. Now that you've experienced Namibia in person, please describe your top five beliefs/views about life there.
4. In general, what are your preconceptions, beliefs, and/or views about "agricultural systems/practices" in Namibia?	4. Again, now that you've experienced Namibia, what are your beliefs/views about its "agricultural systems/practices?"
5. Describe, specifically, your top five pre-trip preconceptions, beliefs, and/or views about	5. Please describe your top five beliefs/views about agricultural systems/practices in

Preflection Instructions and Questions	Post-reflection Instructions and Questions
agricultural systems/practices in Namibia.	Namibia.
6. What do you think are the opportunities for participating in international agricultural research or development activities?	6. Now that you've traveled abroad, what do you think about participating in international agricultural research or development activities?
7. Describe, specifically, the top three "internal barriers" that prevent you from participating in international agricultural research or development activities.	7. Thinking about your recent international experience, please describe your top three "internal barriers" that would prevent you from participating in international agricultural research or development activities.
8. Describe, specifically, the top three "external barriers" that prevent you from participating in international agricultural research or development activities.	8. Thinking about your recent travels, please describe your top three "external barriers" that would prevent you from participating in international agricultural research or development activities.
9. What do you expect to gain "personally" from participating in this international activity?	9. Did you fulfill your expectations of personal gains from participating in this international activity? Why or why not?

Note: Questions 1 and 6 were not analyzed for this study.

Data were coded (e.g., FFc = Female Faculty, MSt = Male Student, etc.) to protect respondents' anonymity and then were thematically analyzed using content analysis. Content analysis is a "reduction and sense-making effort that takes a volume of qualitative material" and identifies "core consistencies and meanings" (Patton, 2002, p. 453). Data were examined for recurring word patterns; themes were derived from those patterns. To ensure rigor, an external evaluator reviewed the data analyses, resulting in the confirmation of thematic patterns.

The study is limited in its generalizability by its representative participant group. Additionally, the ability to probe deeper into respondents' answers was limited by the use of a survey instrument, which may have limited the depth of the findings.

Results

Background information is provided to help the reader better understand the respondent group. Faculty members and graduate students at Texas A&M University were asked three questions during the preflection exercise that provided descriptive content for this study (Table 2). Respondents included four female and three male faculty members, and three female and three male students (five graduates and one undergraduate). Among the faculty members, twice as many had traveled to Africa and/or Namibia, and had participated in a study abroad course or research abroad project, than lacked this background. Less than one-half of the students responded positively to the same background information questions (Table 2).

Table 2. Frequencies for Respondents' Background Information

	Faculty (n = 7)		Students (n = 6)	
Questions	Yes	No	Yes	No
Have you traveled to Africa prior to the July 2011 trip?	5	2	3	3
Have you traveled to NAMIBIA prior to the July 2011 trip?	2	5	0	5
Have you ever participated in a study abroad course or research abroad project?	7	0	2	4

Life in Namibia

The first objective was completed by analyzing respondents' data for questions #2 and 3 on the pre- and post-conference reflection questionnaires. Participants' pre-conference reflections about "life" in Namibia centered on depicting Namibian life as being *poverty-stricken*, where *classism* still exists because of European influences, but it was also a country *rich in natural resources* despite a *desert existence*. Faculty members and students provided similar input, from which these themes emerged. A few responses related to communications, with a focus on modern luxuries (Wifi, e-mail, etc.) being present in large cities but lacking in rural areas. Preflective thoughts about "life" in Namibia were best summed up by several faculty members' comments.

- FFc: "They have more people living below the poverty line, but this doesn't mean that everyone does, and I expect there to be upper, middle and lower income levels evident. 1) Not expecting skyscrapers; 2) Different style of public transportation; 3) More poverty visible; 4) Interesting wildlife; and, 5) Different education system."
- MFc: "A hard way of life; Gender issues; Racial inequality; and A broad gap between the "haves and have nots."

Students' preflective thoughts were more focused on *food* (MSt: "The food of Namibia will be heavy on meat, rice, cassava, and fruit;" FSt: "I expect to see a corn/barley based staple food") and *living conditions* (MSt: "Lots of empty land;" "Rural population struggles with collecting adequate water for family use;" FSt: "typical comforts will be missed (internet, cell phone...etc.), cold showers, dirty toilets").

Post-conference reflections about Namibian life revealed changes in respondents' beliefs about how Namibians coped with daily conditions. Faculty members commented on how Namibians in rural areas (witnessed on pre- and post-conference activities) *maximized resources* (FFc: "all showed how dedicated Namibians are to working with the resources they have and with developing new resources, physical and human ones;" and MFc: "People everywhere can be happy with or without material items"). Also evident was respondents' *standardization of culture*, in that daily Namibian routines were viewed as resembling those found in the U.S. (e.g., FFc: "I truly believed that I would not have access to many things in my typical routine. So wandering through the grocery stores, driving through the small towns, and visiting the Etosha National Park presented strikingly similar experiences to life in the United States"). Students responded more about the *lack of visible poverty*, than did faculty members. Several students commented about Namibia's *socioeconomic status*, with some comparing it to that of South Africa, although South Africa's Gross Domestic Product was 36 times greater than

Namibia's ($14.6B) in 2010 (CIA World Factbook, 2011).

- FSt: "I had no idea that Namibia would be as developed in appearance. We did see some poverty, but traveling through Namibia reminded me more of West Texas than anyplace in Africa I have seen."
- MSt: "Life in Namibia is socioeconomically similar to that of South Africa."
- FSt: "Almost everywhere we went, everyone had a cell phone."

Agricultural Systems/Practices in Namibia

Objective two was derived from respondents' data for questions #4 and 5 on the pre- and post-conference reflection questionnaires. Participants' pre-conference reflections about Namibia's agricultural systems and practices clustered around traditional views of *pre-mechanized production practices*, *land tenure systems*, and *small-scale subsistence agrarian communities*. Students wrote more about their beliefs, whereas faculty members were more likely to provide short list responses. Examples of the thematic areas derived from the preflection exercise included:

- MSt: "Ethnic divisions still cause tension in society. White families still control productive commercial agriculture land; Agrarian communities dominate social and economic systems; Majority of black African communities rely on local production and/or small rural vendors for getting food supplies."
- FSt: "I expect to see agricultural development still at the rudimentary level as compared to that of developed countries like the US. Agricultural development that involved the use of limited inputs with poor yields/production."
- MFc: "Less mechanized. Different species of domesticated animals; Less mechanization of agriculture; Wide discrepancy between small holders and large landholders; and Agriculture that is less research-based."

Post-conference themes emanating from respondents' reflections about Namibia's agricultural systems/practices included *environmental concerns* (MFc: "agricultural production can be increased, but it has to be done in the context of their environment and constraints;" FFc: "They have a difficult task balancing agriculture with the environment and wildlife conservation"), *food security* (FFc: "Food security is a much bigger concern than food safety;" MSt: "crop production will continue to be low and food security over time will be a challenge"), and *modernization* (MFc: "U.S. should not view Namibia/Africa as having antiquated agricultural practices that no longer are beneficial or prosperous;" FSt: "Developed agriculture system in the south of the country with good handle on animal diseases, meat processing, marketing, and breeding").

Barriers to Participating in International Agricultural Research or Development Activities

The third objective was answered by analyzing respondents' data for questions #7 and 8 on the pre- and post-conference questionnaires. As a group, participants' pre-conference reflections centered on cultural illiteracy, time (apart from family), and finances as the primary barriers to participating in international agricultural

research or development activities. Faculty members were more concerned about *time*, and *acquiring similar research interests*, whereas students mentioned *financial concerns*, and *travel factors* (e.g., "airline difficulties," "potable water," and "politics") as barriers prohibiting their international involvement.

The most prevalent themes emerging from the post-conference reflections centered on *finances*, *familial displacement*, and oddly, *language skills*, although all commented that Namibia's English-speaking population posed no difficulties in communications; apparently language skills in a non-U.S. location weighed heavy on respondents' minds.

Expected Personal Gains from Participation in the 2011 World (AIAEE) Conference

The final objective was answered by analyzing respondents' data for question #9 on the pre- and post-conference reflection questionnaires. Participants' pre-conference expected personal gains from participation in the 2011 World (AIAEE) Conference were focused on *cultural understanding (appreciation of Namibian culture)*, *networking*, and *increased knowledge about international research*. Considering the 2011 World Conference was extremely far from the U.S., several faculty members commented that the travel experience itself would be a life-changing event (e.g., "This is going to stretch me and make me think about areas of the world that I don't think about regularly").

Post-conference reflections included *experience integration into local curricula* (FFc: "Most of my previous thoughts had been very one-sided, what can my students get out of it, typically skill based. Now I have a stronger belief that the skill is only a small part of what a student or faculty member gets out of participating in these activities."), *professional networks*, (MSt: "I made many contacts that will prove useful in beginning a career in international agricultural development"), and *increased research knowledge* (FSt: "Yes I did fulfill my expectations of participating in this program. I learned a lot from the research presentations, round table discussions and the Pre-conference tour. I was also able to network with colleagues and senior experts in the field of Agricultural Education and Extension"). Rogers' (2003) use of relative advantage (the degree to which an innovation [idea, practice, or object] is perceived as being better than the idea it supersedes) has applicability to personal gains. Respondents considered their gains as a result of attending (as opposed to not attending) the 2011 World Conference, which produced specific useful attributes that could not have been acquired by not participating in the conference. Future studies should explore factors affecting or affected by relative advantage, and other aspects of Rogers' (2003) diffusion of innovations theory.

Conclusions, Recommendations, and Implications

The 2011 World (AIAEE) Conference in Namibia provided selected Texas A&M University faculty members and students alike the opportunity to experience a country very different, yet somewhat similar to, their own state. The preflection and post-reflection exercises produced similar results to those found by Harder et al. (2007) and Wingenbach et al. (2006). In both cases, those researchers found U.S. participants' perceptions of Mexico, its agricultural systems and culture were transformed after having participated in faculty-guided experiences. Students, and researchers, had more positive, progressive beliefs about Mexico and its agricultural systems during the post-reflection exercises

(Harder et al., 2007; Wingenbach et al., 2006). Consistent with those findings, respondents' perceptions about Namibian life and its agricultural systems/practices were changed, most notably from participation in pre- and post-conference field experiences beyond the conference venue in Windhoek, Namibia.

Rogers' (2003) use of relative advantage is clearly supported by the fact that only conferees had opportunities (field experiences beyond the conference venue) to experience innovations (ideas, practices, or objects) that changed their perceptions about Namibian life and its agricultural systems/practices. Future AIAEE conferences in non-U.S. locations should include pre- and post-conference experiences, apart from the conference venue, to broaden participants' perspectives about host country life and agricultural systems/practices. Future AIAEE conferences in U.S. locations should have similar experiences for non-U.S. participants so their views are broadened about U.S. life and agricultural systems/practices.

Dooley and Rouse (2009) reported that participants in the Texas A&M University FAS program had changed personally and professionally, most notably through improved teaching techniques (also found by Hand et al., 2007), such as incorporating case studies and more international topics in their curriculum. In similar fashion, faculty members participating in the 2011 World (AIAEE) Conference in Namibia realized that the very experience itself would provide curricula enrichment for their future courses at Texas A&M University. Also, Dooley et al. (2008) found faculty members' networks for research collaboration in Mexico increased through the FAS program, as was found in the study by Harder et al. (2007). Students who participated in this study noted increased opportunities to conduct research and/or collaborate on research projects in Namibia, after having attended the 2011 World (AIAEE) Conference. Perhaps students were more optimistic about future research projects in Namibia than were faculty members because of enamored feelings about travel to Namibia. Just as likely, maybe faculty members disassociate actual research projects from research conferences in non-U.S. sites because of a greater sense of programmatic barriers to the research process in foreign lands. Additional research into this phenomenon is warranted if the AIAEE is serious about expanding its role and impact in international agricultural and extension education research programs.

Finally, the preflection/post-reflection process, introduced by Jones and Bjelland (2004) and formalized by Wingenbach et al. (2006), was found to be a worthy exercise for students and faculty members alike in this study. However, the process can be improved too. Future studies of this nature should determine the sources of respondents' perception base. Did they study statistics on Namibian life and/or its agricultural practices? Were respondents' preflections based on something other than scientific fact, such as "I think that…" or "I heard that…" or were they based in research specifically about Namibia?

A close examination of the barriers to participating in international agricultural research or development activities revealed very similar issues reported in earlier studies (Briers et al., 2010; Dooley et al., 2008; Harder et al., 2007; Wingenbach et al., 2006); resources (i.e., time, financial, institutional support) and personal confidence (i.e., language skills, cultural literacy) continue to limit faculty members' and students' full engagement in international experiences. Can these barriers be lessened or removed entirely from our collective efforts at globalization of our institutions? Additional AIAEE conference

research should be conducted to find solutions at lessening and/or removing such barriers. U.S. and non-U.S. conference sites offer much to enrich conferees' experiences; we need to continue developing greater understanding of our collective international experiences. And, we need to share those experiences with others who cannot attend the annual AIAEE conference.

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Improving Loan Distribution to Farmers: Informational Needs of Mexican Banks

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Abstract

The Mexican Ministry of Agriculture provides lending institutions outlooks for respective crops grown in the country. This study sought to assist in determining Mexican banks' perceptions of the relative advantage, compatibility, complexity, trialability, and observability of agricultural information from the Ministry to aid in distributing loans to farmers. Fourteen (N = 14) agricultural loan officers from Mexican banks were interviewed to meet the study's objectives. The majority of participants believed the Ministry's information had a relative advantage over other sources. Complexity was the primary barrier for lending institutions not adopting the Ministry's information. Providing the information more quickly, improved communication between both entities, and using social media were recommendations lending institutions provided the Ministry for increasing the rate of adoption of their information. Expanding the timeframe under which lending institutions receive commodity analyses from the Ministry may increase the amount of accessible finance to Mexican farmers.

Keywords: Diffusion of Innovations, Mexican Banks, Ministries of Agriculture, Loan Distribution to Farmers

Introduction

Finance is the most significant constraint to growth for entrepreneurs across the globe (de Mel, McKenzie, & Woodruff, 2011). Individuals in developing countries encounter a high level of difficulty and barriers in accessing finance (Schultz, 2009). Lending institutions have the ability to improve the lives of farmers throughout the world (Yasmeen & Sarwar, 2011). Financial credit plays a critical role in assisting agricultural production in developing and developed countries (Mohan, 2006).

The International Monetary Fund (2011) indicated Mexico is not classified as a developing country, but over forty-five percent of country's population lives in poverty. Mexico has the 12th largest economy in the world (USAID, 2012) and the 2nd largest economy in Latin America (The World Bank, 2012). Teichman (2008) indicated The World Banks' primary goal in Mexico is to reduce poverty. Banks can assist in decreasing the poverty rate among Mexicans by accelerating the loan appraisal process for entrepreneurs (Copestake, 2007). Paxton (2006) suggested Mexican banks should strive to decrease poverty and improve rural areas. Farming the local community is one approach rural Mexicans can use to overcome poverty (Tetreault, 2010). Mexican banks should more efficiently expedite loans to farmers in order to improve food production in local communities (Lustig, 2001).

The Mexican Ministry of Agriculture works to provide the national marketplace with high-quality food from the country's farms (SAGARPA, 2011). Increased participation in processing, supplying and marketing agricultural products in Mexico could lead to more income and enhance the standard of living for rural citizens (Zertuche Guerra & Eaton, 2000). The Mexican Ministry of Agriculture supplies agricultural statistics to lending institutions with the intent of assisting farmers acquire loans. Mexican banks need accurate agricultural statistics, in a timely manner, in order to identify the correct amount of finances needed for distribution to individual farmers (P. Brown, personal communication, August 10, 2011). The Ministry of Agriculture should work closely with Mexican banks in order to foster improved agricultural development throughout the country (Teichman, 2008).

Credit is essential for small farmers in Mexico to manage their production processes (Chang, 2009). Tetreault (2010) reported the lack of accessible credit for farmers is a problem in Mexico. There are specific agricultural lands in Mexico now utilized for nonagricultural use due to a lack of credit available to farmers (David, Dirven, & Vogelgesang, 2000).

Farmers required loans from Mexican lending institutions in order to purchase the appropriate machinery to harvest large acres of sugarcane (Arjona, Bueno, & Salazar, 2001). John Deere Capital Corporation, located in the United States, was the largest provider of farm machinery leases in Mexico (Nair & Kloeppinger-Todd, 2006). Gravel (2007) found that Mexican farmers did not receive loans from lending institutions in a timely manner in order to purchase seed, fertilizer, and equipment to plant crops.

Agricultural and extension education researchers have conducted studies associated with the role of banks and available credit for farmers across the globe. Dlamini, Masuku, and Dlamini (2008) suggested more robust banks are needed to serve small businesses in Swaziland. In a study with Honduran rural banks and farmers, Hernández and Place (2000) found the cooperation between rural banks and farmers was successful due to a climate of collaboration, ownership, and dedication

among the banks' stakeholders. Mudukuti and Miller (2002) reported information about credit was an educational need of female farmers in Zimbabwe. Credit was a constraint for farmers' adoption of hybrid rice seed in the Philippines (Cidro & Radhakrishna, 2007) and home gardening practices in Swaziland (Dlamini, Simelane, Keregero, & Dlamini, 2006). Access to credit is a problem many Afghan farmers face (Kock & Turnbull, 2011). This study was conducted to gain an understanding of Mexican lending institutions' awareness and usage of the Ministry of Agriculture's statistics in determining and disseminating loans to farmers.

Theoretical Framework and Literature Review

Rogers' (2003) diffusion of innovations was implemented to frame this study. Rogers (2003) defined rate of adoption as the relative speed an innovation is accepted by associates of the respective social system. The evolution in which an innovation is communicated across specified channels over time among members of a social structure is the diffusion of innovations (Rogers, 2003).

Rogers (2003) constructed a five-stage model to illustrate the innovation-decision process. Persuasion, the second stage, is when a decision-making entity develops a positive or negative perception toward the innovation. Aligned with the persuasion stage, Rogers (2003) identified five perceived attributes of an innovation, which aid in determining an innovation's rate of adoption: (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability.

Relative advantage refers to the extent to which an innovation is perceived as more advantageous than the previous method (Rogers, 2003). Economics and social status are examples of motivations that may influence an innovation's relative advantage. Individuals want to learn why a specific innovation is better than what currently exists. Relative advantage is the one of the most robust predictors of an innovation's rate of adoption (Rogers, 2003).

Compatibility is the extent to which an innovation is consistent with existing values and needs of budding adopters (Rogers, 2003). An innovation's compatibility produces familiarity toward the innovation for the potential adopter. Rogers (2003) suggested individuals will not adopt an innovation unless the innovation is familiar. The more compatible an innovation is perceived to be, the higher the likelihood of adoption because the innovation is less of a change in behavior than the previous approach (Rogers, 2003).

Complexity is the extent to which an innovation is perceived as difficult to comprehend and implement (Rogers, 2003). The complexity of an innovation is negatively correlated with rate of adoption. Rogers (2003) indicated complexity is the strongest barrier to an innovation's rate of adoption.

Trialability is the extent to which an innovation may be experimented with for a limited time (Rogers, 2003). Innovations that can be tested more easily have a higher rate of adoption. Rogers (2003) found early adopters perceive trialability as more important than late adopters. Individual trials assist potential adopters in learning how an innovation works through their respective environment (Rogers, 2003).

Observability is the extent to which outcomes of an innovation are observable to others (Rogers, 2003). Certain innovations are easier to observe than others. An innovation that is highly observable is more likely to be adopted than an innovation not easily observed from potential adopters (Rogers, 2003).

The diffusion of innovations has been used in international agricultural and extension education studies to identify an innovation's rate of adoption. Moriba, Kandeh, and Edwards (2011) used the diffusion of innovations to frame their study of technologies for farmers in Sierra Leone. Erbaugh, Donnermeyer, Amujal, and Kidoido (2010) implemented the diffusion of innovations as the theoretical framework for assessing IPM farmer adoption in Uganda. The diffusion of innovations was also used to frame a study on agricultural innovations in Guatemala (Oleas, Dooley, Shinn, & Giusti, 2010). Harder and Lindner (2008) incorporated the diffusion of innovations to scaffold a study of United States extension agents' acceptance of eXtension. The diffusion of innovations was also used as the theoretical framework in a study of Chinese agricultural faculty perceptions of web-based distance education (Li & Lindner, 2007).

Purpose and Objectives

The purpose of this study was to assess the dissemination of information from the Mexican Ministry of Agriculture's agricultural statistics division to lending institutions in order to more efficiently distribute loans to farmers for local food production. More specifically, this study sought to:

1. Describe lending institutions' perceived persuasion attributes of the Ministry of Agriculture's information; and
2. Describe lending institutions' recommendations to the Ministry of Agriculture for increasing the rate of adoption of the agricultural statistical information.

Methodology

This was a descriptive study of the fourteen ($N = 14$) agricultural loan administrators at Mexican lending institutions that loan currency to farmers. A fundamental qualitative research design (Dooley, 2007) was employed for this study. The agricultural loan administrator at each respective Mexican lending institution was purposively selected in order to meet the objectives of this study. Purposeful sampling allows the researcher to magnify the function of data attained from the context (Lincoln & Guba, 1985). The Ministry of Agriculture provided the names and contact information for each of the agricultural loan administrators. Each of the fourteen lending institutions offered credit for farmers to produce crops and livestock.

A semi-structured interview guide was utilized with participants to answer the study's objectives. Denzin and Lincoln (2008) indicated a semi-structured interview guide provides the researcher the opportunity to ask questions related to the study's objectives while simultaneously allowing respondents to share data that may uncover facets the researcher has yet to consider. Semi-structured interviews provide the researcher more flexibility than a structured interview guide (Lincoln & Guba, 1985). Each of the fourteen participants spoke fluent English. The interviews lasted approximately forty-five to sixty minutes and were conducted between June and November 2011. Interviews took place via Skype™ with the researcher and each individual agricultural loan administrator. The researcher utilized audio recorders and handwritten notes to record the interview data.

The dataset from interviews and observations was triangulated to achieve trustworthiness (Lincoln & Guba, 1985). Trustworthiness is the degree of confidence that the results represent the respondents and context of a study (Dooley, 2007). Lincoln and Guba (1985) reported that the generalizability, credibility, dependability, transferability, and confirmability of a

dataset to the context of the study and the population produce the study's trustworthiness. The data was triangulated from each of the fourteen participant interviews and member checks with each participant in order to attain trustworthiness. Denzin and Lincoln (2008) indicated triangulation and member checks are approaches to achieve trustworthiness.

Member checks are an approach to review the data received and obtain participants' agreement of the data (Denzin & Lincoln, 2008). The researcher implemented member checks as each participant was emailed a transcription of their remarks for confirmation. All participants ($N = 14$) in the study emailed their confirmation of the data they individually supplied before the researcher analyzed the data.

The researcher implemented an audit trail to consolidate, connect, and identify meaningful themes in the dataset. Denzin and Lincoln (2008) defined an audit trail as a series of records acquired in the data collection process. The development and inclusion of an audit trail improves the trustworthiness of a dataset in qualitative research (Merriam, 2009). Lincoln and Guba (1985) reported that an audit trail organizes, links, and prioritizes the data. Dooley (2007) indicated audio recordings, videotapes, field notes, and survey results are potential records that can be included in an audit trail. Electronically recorded data and field notes made up the audit trail in this study.

The data was analyzed through the implementation of the constant comparative method. Glaser (2002) identified the constant comparative method as a qualitative data analysis approach to discern units of data that create categories for postulated themes. Selective coding is routinely used in the constant comparative method to identify core categories in a dataset (Walker & Myrick, 2006). Glaser (2002) identified selective coding as the procedure for choosing the dominant category and authenticating its relationship to existing categories. Similar results and common themes were discovered from selective coding with the constant comparative method.

The results should not be generalized to Ministries of Agriculture and lending institutions in other countries due to the qualitative nature of this study. However, the results do provide insights on methods to more efficiently disseminate information to Mexican banks.

Results

Key findings emerged from the interviews with agricultural loan administrators at Mexican banks. The results were categorized based upon the study's objectives. Findings from the first objective were illustrated per each phase of Roger's (2003) persuasion stage. Results from the second objective were communicated per the predominant lending institution's recommendations for increasing the rate of adoption of the Ministry's information.

The first objective was to describe lending institutions' perceived Rogers' (2003) persuasion attributes of the Ministry of Agriculture's information. The majority of agricultural loan administrators believed information from the Ministry of Agriculture provided a relative advantage over other sources of agricultural information. Nine ($N = 9$) of the fourteen agricultural loan administrators participating in this study perceived information from the Ministry of Agriculture as advantageous and, therefore, used the information to distribute loans to farmers. The process of distributing loans and repayment is vital to Mexican banks (R13). One participant (R11) stated, "We believe the Ministry's information is the most accurate source we have to determine future market value of

agricultural commodities." Some participants (R2, R7, R9) indicated no other Mexican agency or organization had the immediate agricultural statistical information that the Ministry possessed. One agricultural loan administrator (R1) detailed further, "The loan process can be stressful for everyone involved, and the Ministry's price outlooks are the best, if not only, avenue to help us determine if a farmer can repay our loan."

Compatibility was found to be a contributor in the rate of adoption of the Ministry's information. Eight ($n = 8$) participants felt the Ministry's information was compatible with the immediate needs of their lending institution. R7 stated, "We need to understand the information we are given in an expeditious manner. The Ministry has provided us that." Two participants (R1, R12) believed the Ministry met their needs by providing information related to crop forecasts. Several responses were centered on familiarity with the Ministry's information, meeting the compatibility aspect of adoption. Three ($n = 3$) participants cited familiarity as the primary reason they adopted the Ministry's information to aid in assessing loans to farmers (R3, R10, R14). R3 added, "I am accustomed to receiving information from the Ministry and reading their information to help me make a quick verdict toward a potential loan is something I routinely do."

Complexity with the Ministry of Agriculture's information led to some lending institutions ($N = 4$) not adopting specific pieces of information. Four agricultural loan administrators (R4, R5, R6, R8) did not use the agricultural information from the Ministry of Agriculture because it was too difficult to comprehend for their loan inquiry processes. R4 stated, "The Ministry sends us too much information, pages and pages, to sort through for us to find fast answers to our questions. When we need to know what maize will sell for in six months, I don't need to read about squash to get it." R8 added, "We don't use their information a lot because it is difficult to understand." R6 said, "The information is hard to find and difficult to understand." R5 stated, "I think the Ministry probably has credible information but the information we receive is too challenging for us to practically use to evaluate loan applications."

All ($N = 14$) participants believed the Ministry's statistical information offered trialability. Each of the agricultural loan administrators reported at least one experience in which they used the Ministry's information to assist in their loan process. R9 added, "I really appreciate that the Ministry sends us a commodity analysis report each Friday. Whether we use it or not, it is available." Respondents echoed similar beliefs. R5 stated, "As the loan administrator, I don't have time to harass the Ministry of Agriculture for information because it is routinely available." R10 added, "It seems we always have the Ministry's price outlooks for crops in the office." The gratitude for the Ministry's price outlooks or commodity analysis was revealed in some interviews (R2, R7, R14).

Observability was the last Roger's (2003) persuasion attribute examined in this study. Six ($N = 6$) agricultural loan administrators observed the rate of adoption of the Ministry's information based upon loans repayment. R3 indicated if farmers were able to repay the loan, then the Ministry's information had a part to play in that success. Farmers repaying loans within the agreed timeframe was the measure of observability (R3, R8, R10, R12). Some participants (R5, R11) verbalized the difficulty of solely observing the Ministry's information and determining success. R11 stated, "We are talking about growing food

and Mother Nature has a greater influence on success than statistical information."

The second objective of the study was to describe lending institutions' recommendations for increasing the rate of adoption of the Ministry of Agriculture's statistical information. Twelve ($N = 12$) of the fourteen agricultural loan administrators wanted specific commodity price analysis information at least two weeks before processing loans related to that commodity. Processing and distributing farm loans were a judicious process (R3, R5, R6, R12, R13). R7 added, "It may take us at least a two weeks to gather the information we think we need before making the decision to approve a farm loan." R12 included, "Depending on the loan application, the research process can be intense or reasonably simple. I would like the commodity's forecast on my desk 10 days before I we review a potential agricultural loan." One participant (R1) stated, "Farm loans have a poorer history of being repaid than other commercial loans. If I could receive the Ministry's commodity forecasts two weeks before crop planting, we could make a better evaluation of which applicants could repay us." R9 added, "We work to get everything right. I would like an analysis of a commodity no later than two weeks before the prospective planting dates. This would help us make a better informed judgment and to distribute the loan expediently." R10 summarized the findings from this theme, "We want farmers to receive loans they can repay. We need specified crop forecasts two weeks ahead of the loan decision date in order to thoroughly review the crop analysis and the farmer's potential to repay the loan."

The complexity of the Ministry's information led to another area of need, in some cases. Ten ($N = 10$) agricultural loan administrators recommended establishing a stronger communicable relationship with personnel in the Ministry of Agriculture's agricultural statistics division. R3 stated, "We have difficulty contacting the Ministry sometimes. Even though their information can be challenging to understand if we had someone to talk directly to, when we had questions, it would help us." R9 added, "If I have questions about some of the Ministry's statistics, I need a point person to contact." R8 included, "I need a person to talk to when I have questions. Right now, I am not sure who that would be." Banks may use the Ministry's statistics more if they had someone to directly solicit their questions (R2, R7).

Other participants described how better communication would benefit their lending institution and the Ministry of Agriculture (R4, R13). R14 cited, "All banks need to make money and Mexico needs to feed itself. Stronger communications between us and the Ministry of Agriculture would accomplish multiple goals." R5 added, "Improved communications would help us distribute loans for efficiently and help the Ministry meet their goals." A further recommendation to improve communications was provided. R4 included, "I am not sure how many staff the Ministry of Agriculture has. If one Ministry professional were assigned to assist four to five banks, maybe communication between both partners."

As mentioned previously, some participants were grateful to the Ministry for providing their agricultural information. Some respondents believed the newsletters they received included too much information (R5, R8). Seven ($N = 7$) or half of the lending institutions, however, suggested Facebook or other social media platforms as a means of disseminating information or providing a direct link to the information once available. R1 added, "Our bank has a Facebook page that we use to inform customers about new products and services. The Ministry can include a link to

specific commodity information on their Facebook page to share with us." R9 stated, "Twitter and Facebook are everyday tools to share small amounts of information. Price outlooks on individual commodities could be tweeted or posted on the Ministry of Agriculture's Facebook. Their information is public and Facebook would make it more public." R12 added, "Our bank receives Twitter updates on costs for construction material and energy. This leads me to believe that outlooks for particular crops could be tweeted too." R5 provided a synopsis of the social media theme, "I like to receive information from social media outlets because it is usually concise and explicit. When we need the forecast for a commodity, we need it in a concise and explicit manner."

Conclusions

Most lending institutions perceived the Ministry's agricultural information as a relative advantage over other sources of information. Even though all lending institutions received statistical information from the Ministry regularly, the complexity of the Ministry's information was a barrier for some lending institutions adopting the information. Approximately 86% of the agricultural loan administrators needed individual commodity price forecasts no less than 30 business days before the growing season began for that respective crop. The majority of agricultural loan administrators wanted better communications between the Mexican Ministry of Agriculture and their lending institution. Using social media was recommended by half the participants as a resource to assist the Ministry in disseminating future agricultural statistics information.

Implications

Results from this study build upon Rogers' (2003) research on rate of adoption within his diffusion of innovations. Economics were one factor Rogers (2003) cited that will improve an innovation's relative advantage. Most participants wanted the Ministry's information at least two weeks before approving an agricultural loan. Adopting this recommendation would provide the Ministry's agricultural information with an amplified relative advantage over other sources for commodity price analyses. Rogers (2003) indicated innovations with a relative advantage over other sources have a higher rate of adoption among constituents.

Over 50% of the participants believed the Ministry's information was compatible to their lending institution's important needs. Rogers (2003) found that the more an innovation is compatible with the existing needs of a potential adopter, the more likely the innovation will be adopted. Some participants felt very familiar with the Ministry's commodity forecasts. The majority of participants wanted better communication between their lending institution and the Ministry of Agriculture. The potential for improved communication between both entities could increase the compatibility of the Ministry's information. Groups and individuals will not adopt an innovation without being familiar with the respective innovation (Rogers, 2003).

The complexity of the Ministry's information was a barrier causing some lending institutions not to adopt the information. Complexity is the most robust barrier for potential adopters (Rogers, 2003). The difficulty understanding the Ministry's information was reported as influencing complexity and, thus, prohibiting adoption. Implementing social media was revealed as an approach that may decrease complexity. Social media may provide the Ministry a tool to better disseminate their statistics and lending institutions an avenue to review succinct commodity information.

Decreasing the complexity of an innovation will increase the likelihood of the innovation's adoption (Rogers, 2003).

The results indicated that most participants believed the Ministry's information offered trialability. Rogers (2003) identified trialability as the capacity to test an innovation. All participants were provided opportunities to use and experiment with the Ministry's commodity forecasts. Innovations that provide the potential to be used have a higher rate of adoption versus innovations that do not allow for trialability (Rogers, 2003).

Observability was the most challenging persuasion attribute to evaluate. Rogers (2003) suggested particular innovations are less difficult to observe than others. The difficulties for agricultural loan administrators to observe commodity forecasts were apparent from the context of this study and the results provided.

Recommendations

Respective individuals within the Mexican Ministry of Agriculture's Statistics Division should be identified as points of contact for lending institutions. The Ministry of Agriculture should develop a comprehension of each respective lending institution's agricultural loan processing schedule in order to disseminate information more efficiently and, potentially, assist in improving the lives of farmers (Yasmeen & Sarwar, 2011). Ministry officials should work with lending institutions to ensure commodity forecasts and other agricultural statistics is not complex enough to prohibit adoption of the information.

Facebook, Twitter, or other social media tools should be used by the Ministry to disseminate agricultural information to lending institutions. Utilizing social media may assist the Mexican Ministry of Agriculture provide commodity analyses quicker to lending institutions (Copestake, 2007) to accelerate loans for improving food production in communities (Lustig, 2001). Improving the timeframe under which Mexican lending institutions receive commodity analyses from the Ministry may increase the accessible credit to Mexican farmers, as identified by Tetreault (2010).

Results from this study indicate the issues associated with distributing loans to farmers are not solely an educational issue but in addition communication issues. Agricultural and extension education researchers may need to engage agricultural communication researchers to assist in examining the role of social media in agricultural loan distribution. Incorporating social media may prove to accelerate the dissemination of the Ministry's statistics to lending institutions and, thus, broaden the academic knowledge of information dissemination tools that aid in the development of agricultural production.

Further research is needed to examine how Ministries of Agriculture, Extension Services, agricultural education institutions, and non-governmental organizations can collaborate with lending institutions to help ensure farmers receive loans in a timely manner. Agricultural and extension education researchers offer the expertise and connection in examining the dissemination of information from Ministries of Agriculture and other groups to agricultural lending institutions. This holistic collaboration may help in ensuring farmers receive funds to purchase resources in a judicious manner, as recommended by Gravel (2007). Investigating each feature of the loan distribution process may present methods to assist farmers in acquiring loans faster in order to produce food for local communities.

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