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Introduction and Table of Contents

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Introduction and Table of Contents

Abstract

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

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The *Journal of International Agricultural and Extension Education* (*JIAEE*) is the official refereed publication of the Association for International Agricultural and Extension Education (AIAEE). The purpose of the *JIAEE* is to enhance the research and knowledge base of agricultural and extension education from an international perspective. Acceptance rates for the past 3 volumes are: Volume 17=14%; Volume 18=14%, Volume 19=16%.

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.

Feature Articles

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

Other Article Types

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 summer issue of *JIAEE*. This issue includes five feature articles as well as the abstracts of scholarly works presented at the 2013 Annual Conference in Ft. Worth, Texas. If you were unable to join us for the conference, I hope you will enjoy reading the abstracts of papers presented and a list of the poster presentations. Award winners in various categories are also listed in this issue.

The theme for the conference this year was "Building Capacity through International Agricultural Extension and Education." The conference would not have been possible without the hard work and dedication of many people. We are deeply appreciative of the leadership provided by our host coordinator, Dr. Sandy Graham of Tarleton University and her team. Specials thanks also goes to AIAEE President, Dr. Theresa Murphrey, and the US Conference Planning team of Dr. Pete Vergot and Dr. Grady Roberts for their leadership and service to the organization.

I will take this opportunity to give you a "state of the journal" report. The acceptance rate for Volume 19 was 16%. For this volume there were 53 reviewers from 10 countries. We currently have 130 paid journal subscribers/members and 12 library subscriptions. The journal is financially solvent.

In January 2014, the leadership of the JIAEE will change. Dr. Amy Harder will assume the role of Executive Editor. We are currently searching for someone to assume the role of Managing Editor. If you are interested in this position or know someone who is, please review the call for for nominations found in this issue.

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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Selected Students' Perspectives on International Service-Learning: A Case Study in Chajul, Guatemala

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Keywords: Service-Learning, Study Abroad, Higher Education, Culture, Communication, Diversity, Adaptation

Abstract

The purpose of this study was to investigate a unique international service-learning experience between two non-governmental organizations (NGOs) and a college of agriculture. This case study focused on a 25-day international service-learning study abroad program to Guatemala for Texas A&M University students. Ash and Clayton's (2009a) service-learning model was used for Texas A&M University students to complete service-learning projects in the highlands of Guatemala. The study abroad group, working with two NGOs, completed multiple service-learning projects in three rural communities. Nine undergraduate students documented their experiences through field logs and reflection papers. Five major themes were revealed in students' written artifacts: adaptation, culture, collaboration, communication, and value of knowledge. This international service-learning opportunity empowered students to embrace different cultures and languages while applying academic knowledge gained through study abroad coursework in Guatemala. The results are useful for informing the policies and practices of future international service-learning opportunities through Texas A&M University. Future research should expand our understanding of interaction between land-grant universities and NGOs to maximize practical impacts of international service-learning projects in college of agriculture study abroad programs.

Introduction

The inclusion of service-learning courses in higher education has increased over the past two decades (Bringle & Hatcher, 2011). As a form of experiential education, service-learning helps students expand their knowledge, personal growth civic learning and academic engagement (Ash & Clayton, 2004; Ash & Clayton, 2009a; Clayton et al., 2005). Service-learning experiences can provide "a rich text from which academic lessons are learned through the interplay between theory and practice" (Bringle, Phillips, & Hudson, 2004, p. 5). Service-learning is defined as

> A course-based, credit bearing educational experience in which students (a) participate in an organized service activity that meets identified community needs and (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of civic responsibility (Bringle & Hatcher, 2009, p. 38).

One unique form to implement service-learning is through an international service-learning project while students participate in a study abroad program (Woolf, 2008). Combining service-learning and study abroad helps students do more than just study in another country (Bringle & Hatcher, 2011), adding value to each (Honnet & Poulsen, 1989). Students become engaged in challenging and diverse settings where they can apply course content to new situations, contribute to the host country community, experience new/unfamiliar issues, and learn about ideas different from their own (Bringle & Hatcher, 2011; Bringle et al., 2004). It helps students develop appreciation for other cultures, increases world mindedness and international concern, and helps them contemplate how solutions can be created for a variety of societal issues

(Bringle et al., 2004; Kim & Goldstein, 2005; Westrick, 2004). Everyone involved collaborates and should expect change, thus "service-learning encourages students to do things with others rather than for them" (Jacoby, 2003, p. 4). Service-learning during a study abroad helps students form bonds with peers, faculty, and the community in which they work while completing their projects and studies (Eyler, 2002; Westrick, 2004). As a result, Bringle and Hatcher (2011) suggested that international service-learning experiences provide opportunities for students not available in regular service projects or typical study abroad programs. They concluded that "the service experience sheds light on and provides an added dimension to the curricular component of the study abroad course" (Bringle & Hatcher, 2011, p. 11).

Texas A&M University emphasizes the need for international educational experiences to help students better understand the world around them (Sams, 2010). Such experiences enhance students' academic gains through application of critical thinking, community interaction, and social/global awareness (Sams, 2010; Woolf, 2008). There is potential for added value to service-learning when experienced in an international context (Eyler, 2002; Westrick, 2004; Woolf, 2008); this increases the need for service-learning projects to be developed to "enhance the core academic function of the university" (Woolf, 2008, p. 30). While the food and agricultural sciences lend themselves nicely to practical applications of service-learning projects in an international context, minimal research exists on students' perspectives of such projects in college of agriculture study abroad programs.

Theoretical Framework

An international service-learning study abroad program, "Guatemala Agricultural Leadership and Service-learning," was developed at Texas A&M University, and was based on the service-learning model (Figure 1) developed by Ash and Clayton (2009a). Ash and Clayton (2009a) emphasized service-learning components at the junction of academic material, relevant service, and critical reflection. The model also explains service-learning goals at the intersection of personal growth, academic enhancement, and civic engagement (Ash & Clayton, 2009a). Additionally, it describes collaborative partnerships between community, students, and faculty to create a service-learning environment (Ash & Clayton, 2009a). Ash and Clayton concluded that reflection enhanced the quality of learning and service project outcomes.

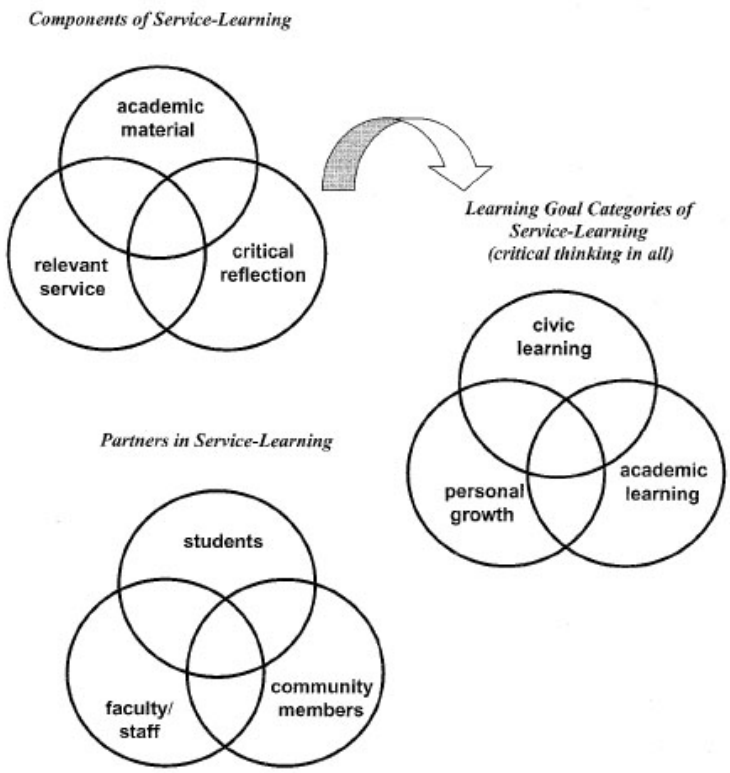

Figure 1. The components of service-learning. "Learning through critical reflection: A tutorial for service-learning students," by S. L. Ash, and P. H. Clayton, 2009a, Raleigh, NC: Authors.

Reflection is an integral part of experiential learning, and is "key to strengthening the power of service-learning" (Eyler, 2002, p. 519). Rogers (2001) defined reflection as a process to "integrate the understanding gained into one's experience in order to enable better choices or actions in the future as well as enhance one's overall effectiveness" (p. 41). Research shows that reflection generates, deepens, and documents learning, thereby challenging students to ask questions, compare theory to practice, and accept alternative perspectives (Ash & Clayton, 2009b; Jacoby, 2003; Whitney & Clayton, 2011). However, if students do not reflect on their service, their experiences may "support presuppositions, reinforce stereotypes, and fail to critically guide future action" (Hatcher & Bringle, 1997).

Methods

The purpose of this study was to investigate a unique international service-learning experience between two non-governmental organizations (NGOs) and a college of agriculture. This study used qualitative research methods (similar to those found in Miller, 2011) to analyze data from a case study. Merriam (2009) defined case study to be "an in-depth description and analysis of a bounded system" (p. 40). Therefore, a case study focused on a single area of concentration (Merriam, 2009). Guba and Lincoln (1981) suggested case studies are the best forms of qualitative research because they provide "information to produce judgment…Judging is the final and ultimate act of evaluation" (p. 375).

Seven female and two male undergraduates, one female graduate student, one female professor and two male professors participated in the service-learning experience in June 2012. Texas

A&M University was also joined by one male and one female leader from one of the NGOs that participated in all trip's activities and served as cultural instructors. Only the nine undergraduates were considered for this case study. This research was approved (#2012-0441) by Texas A&M University's Institutional Review Board.

Texas A&M University implemented an international agricultural service-learning study abroad program in partnership with two NGOs in Chajul, Guatemala. Chajul is located eight hours north of the capitol city, in the highlands of Guatemala. For 17 days the cohort experienced indigenous Chajul's people, food, hills, and living quarters, while gaining a sense of service and responsibility to the local community.

Although the service-learning project was in Chajul, the cohort had three days of training at the Texas A&M University's AGTEC (Agriculture in Guatemala: Technology, Education and Commercialization) center in Chimaltenango, Guatemala. At AGTEC, the cohort learned about gardening and sustainable agriculture and made compost and organic pesticides (Miller, 2011). The cohort learned how to build a *lombricompostura* (worm composter), which served as the service-learning project in Chajul.

In Chajul, the cohort teamed up with two NGOs, Limitless Horizons Ixil and Philanthropiece. By partnering with these NGOs, the cohort was able to enter indigenous communities that are otherwise closed to outsiders. The NGOs shared their community needs assessments and together developed the service-learning projects. Working with community members, it was determined that a *lombricompostura* needed to be built at three different schools. The *lombricomposturas* would help schools produce sustainable compost for their school gardens. Completing the project three times allowed the cohort time to test their learning through continued application (Clayton et al., 2005).

The service-learning project helped achieve course objectives by placing students in real-world situations where they applied academic concepts and used teamwork and critical thinking skills to complete their projects. The service-learning project helped the professors become facilitators of learning outside the classroom, rather than instructors (Bringle et al., 2004).

Case study data can come from multiple sources, including documentation, interviews, direct observations, participant observations, physical artifacts, and archival records (Cresswell, 2007; Yin, 1994). Data in this study were drawn from observations and documentation to understand and describe students' experiences of their international service-learning project.

Observations were conducted by three participant observers: two professors and one graduate student. The observers were interested in the students' reactions to culture and ability to apply their academics to the service-learning project. Written artifacts included

- Field logs, completed by nine undergraduates, documenting all activities related to the service-learning project; and
- Reflection papers (written after the project) on the three to five most fundamental and powerful concepts (leadership concepts from coursework) learned from the project.

Written artifacts were analyzed using inductive data analysis, through two sub-processes: coding and categorizing (Lincoln & Guba, 1985). Coding helps identify sections or pieces of information that do not require any further explanation (Lincoln & Guba, 1985). Categorizing helps organize

coded data by "lookalike" characteristics or themes (Lincoln & Guba, 1985).

Lincoln and Guba (1985) suggested trustworthiness in qualitative research is established through credibility, dependability, and transferability. To establish credibility, researchers had prolonged engagement (Klenke, 2008; Lincoln & Guba, 1985) in order to "be involved with a site sufficiently long to detect and take account of distortions that might otherwise creep into the data" (Lincoln & Guba, 1985, p. 302). Peer debriefings (Klenke, 2008) were facilitated by the researchers. Member checking (Klenke, 2008; Manning, 1997) was conducted to confirm the accuracy of themes, and to determine if there were any themes missing.

Findings

Several fundamental and powerful concepts were revealed after analyzing the service-learning project field logs and reflection papers. From these concepts, we derived five major themes: adaptation, culture, collaboration, communication, and value of knowledge.

Adaptation

Students experienced adaption by being open, flexible and improvising to meet the needs of the cohort, community, and service-learning project. Students were encouraged to pack their flexibility when preparing to leave for Guatemala, and several students noted this in their reflection papers. One student mentioned in their reflection "Coming to Guatemala taught me to be open to everything: the food, customs and beliefs, traffic laws (or lack thereof), and more" (R2). Upon beginning the service-learning projects, several students noted in their reflections and logs about a particular moment of the trip that encouraged them to unpack their flexibility.

> We began to apply flexibility to almost every obstacle that we faced throughout our trip. One particular instance was especially trying. The morning we were scheduled to go to Batzul for the last time, we had a last-minute change in plans and were switched to visit Visuchuj. My team had not planned at all for what we would do at Visuchuj. As panicked as we were, we pulled out our flexibility and put our plans from that morning into action. We adjusted our plans to accommodate what we had previously done at another school. We had a rough start, but we smoothed everything out and the time at that school was spent well (R2).

Learning to change plans last minute and still completing the task at hand empowered the cohort to adapt to any situation presented to them. Another student noted in their log,

> [On the trip] We had everything from physiological needs up to esteem needs, and we could have just given up and thrown in the towel. However, we realized that we were there for a higher purpose and we took the challenge of having limited resources and were able to teach the children important concepts about agriculture. We reached our highest potential at the moment and realized our self-actualization needs through improvising and overcoming what challenged us (R3).

The researchers observed the students realizing the importance of adapting to their environment. Other students mentioned in their reflection papers that they learned that,

> It takes patience, adaptability, and willingness for a little sacrifice. We had a choice of how to react when plans changed, and it was much more rewarding and amiable environment when people chose to unpack and turn on their flexibility. In the future I will be more accepting of changed plans and not complain when life doesn't unfold like I want it to (R4).

In addition to realizing the importance, students noted the practice of adaption, "Had we not done so [been so flexible], our success abroad would only have been a fraction of what it was, and we would have constantly been lagging behind" (R8). It became apparent that "it is important to adjust and overcome, should one wish to meet his or her objectives with accuracy" (R8). Students had numerous opportunities during the international service-learning project to accept, overcome, stretch their flexibility, and adapt to the environment and obstacles that arose over the course of the study abroad program.

Culture

The international service-learning study abroad enabled students to experience a culture other than their own. The partnership with the NGOs provided the students a unique opportunity to have a more hands-on experience with the indigenous culture in Chajul, Guatemala by eating lunch with Chajul families' homes and by participating in traditional Guatemalan practices such as weaving textiles and making tortillas. Upon arriving in Chajul, a student reflected

> This was our first day in Chajul. As we drove into this city we could tell that we were in a different place. As we arrived, people looked at us and covered their mouth as they giggled. This was the first time while in Guatemala that I actually felt like I was the outsider. I can only imagine what the locals were thinking (L2).

When reflecting experiencing meals in Chajul, one student recorded in their field log that eating lunch with the families helped their commitment to the service project.

> After lunch with our host family, I realized how committed I am to improving this community and service-learning project. The way they live completely overwhelmed me and made me appreciate this trip and what we are doing so much more (L1).

Another student reflected that,

> I saw the way the families in Chajul live, how many people live in such a small space, and how important the small things in life can be. Through seeing this, I decided to work as hard as I possibly could to help the people in Chajul, use what I have to give to the community, and hopefully improve their way of living, starting with agriculture (R8).

One student noted how meals with the families made them feel.

> It was our first experience to a family's home and a little over whelming. We had no idea the level of poverty that they lived in at as we were sitting in the middle of their house on a table that was not taller than my knees we were silent and reflecting on many things (L3).

The researchers observed how these meals in the homes of the town helped students embrace the culture they were working in. One student described the food and a woman's face to be "jubilant upon hearing our words of praise for her excellent cooking" (L2). Another student described the meals to be "humbling," yet "awkward because I can't speak directly to them, and don't know the customs or what manners I should exhibit" (R4).

Collaboration

By teaming up with two NGO's in Chajul, Texas A&M University's international service-learning study abroad program was able to introduce the participants to community leaders and agricultural experts. Through the project, students learned and reflected upon the importance of collaborating with the community and amongst the cohort members themselves. The collaboration began by the cohort meeting with Marcelinio, a local agriculturist from Chajul, who gave his insight on building *lombricomposturas*. "Our group and Marcelino exchanged ideas all morning in order to make an effective and easy compost worm bed for the kids to work with" (R1). Through the meeting's idea sharing, collaboration and language translation, one student wrote in their field log that,

> It was today that everything came together for us in having a better idea of what we would be working on, why we were doing it, and how we were going to do it. Today we met Marcelino, Ernesto, and Wilson. Ernesto started with presenting us with this idea of how to make a *lombricompostura*. He drew the design out for us on the marker board and we started working from there. This activity was a pretty complicated process because of the language barrier but we sat down and tackled the problem (L3).

Through this brainstorming meeting the cohort and Chajul agriculturalists were able to talk through every aspect of the service-learning project. After the meeting, one student noted

> By the end Ernesto's design had been changed completely. He didn't mind that we had changed the design; he was actually happy that we were able to give input and talk to him about why we thought the new design would work most efficiently (L3).

In addition to designing the project, the cohort collaborated with community leaders at each project site. Guatemalans taught the cohort how to use tools effectively. One student even mentioned, "I have a newfound respect for the carpenters who only have handsaws to work with!" (L1). The cohort learned to lean on each other for knowledge and skill in their group.

> From the first day joined together, each individual grew closer to each other and connected together in order to build and serve each community visited. But the team building did not stop there, the group also bonded and built each other up with the local individuals that also participated (R1).

The relationships that were established through the cohort working with the NGO partnership, community leaders, and schools, impacted the community of Chajul. Another student described in their reflections the impact of this collaboration,

> We all built connections with the people from each school and the people we were working with. At the last school we visited, Dominga grabbed my hand and held it. Dominga has been working with these schools and visits them at least once a month. I felt that when she grabbed my hand, we made a connection. I feel like she had realized how impactful everything that we had done was and was thankful (R5).

Communication

The theme of communication was also identified through students' field logs and reflection papers. The researchers observed upon arriving in Guatemala that several students were very nervous about being in a country whose first spoken language was not their own. In fact, one student described their emotions in their reflection, "I do not speak Spanish very well, therefore learning how to communicate and fill the gap between me and a Guatemalan could be frustrating at times" (R7). However, the cohort quickly realized that "even with language barriers and cultural difference, the group connected and provided for the community" (R1). One student noted in their reflection "taking initiative is a self-concept that an adult matures from being dependent to directing and taking control of a situation, even with language barriers" (R1).

Upon arriving in Chajul, the cohort tapped into the language barrier by planning the service-learning project with three agricultural experts from the community. "Drawing out every level and component of the *lombricompostura* was also the perfect visual aid to overcome the small language barrier between the specialists from Chajul and the students" (R5). Another student wrote, "This was a pretty complicated process because of the language barrier, but we sat down and tackled the problem" (L3). Through this activity, the students were prepared to embrace the language gap (Miller, 2011) by "building a bridge between the language barrier and cultural differences" (R7). Researchers observed that bridge was quickly built. The cohort of fifteen individuals included five fluent Spanish speakers (two students, one professor, and two NGO representatives). Each of these individuals was willing to translate as needed.

The researchers observed that communication became a key component of the service-learning project. The students' ability to embrace this theme immediately became apparent at Ixla, one of the service-learning project sites.

> During our time at Ixla we were faced with a larger language barrier than seen at any previous school. Through statistics provided by the director of the school, we learned that only 50% of the students and community members spoke Spanish, the others speak Ixil or Quiche. This not only left many [students] feeling helpless, but even the Spanish to English translators were at a loss for words. Being conscience of one's nonverbal communication is extremely important in these kind of settings, because it was the only we were able to communicate. Through body language, we also were careful to show their culture courtesy and respect (R6).

Knowing that language barriers existed, students chose to introduce their project with the telephone game as an icebreaker.

> We used the telephone game at Ixla to make a connection to the context we were teaching rather than just having an icebreaker game…As a result to this [language] barrier, teaching the kids about pests and plants was difficult but that icebreaker had addressed that barrier and everyone was trying twice as hard to make things work (R5).

Communication can be seen in terms of group dynamics and language, both of which impacted the time at Ixla. The researchers observed students at Ixla embraced communication challenges by drawing out instructions on the ground and using sign language.

> Even though this was a very different way of communicating than I was used to, it worked. I taught the children that the worms would benefit their garden by picking up a worm, pointing to the lombricompostura then the garden, giving it a big thumb's up. They seemed to understand what I was trying to communicate (R7).

Another student's field log described their thoughts on the communication barrier.

> I was totally out of my element and was very confused about how to interact with the students…I only needed a few words, and it was mostly action. After that I was having a great time and was feeling comfortable (L4).

Several students bridge the language gap by teaching English to the school children.

> I began to use my hands to describe things and asked them to gather around me on a pile of weeds that had been pulled out. I started with one leaf and made it a mask. I played with them for a little and ten pointed at the lead and said "en Español hoja y en ingles leaf" and they repeated after me…As we did this they pointed at things and I said them both in Spanish and English. It was unique how I was able to help them learn (L3).

Through the field logs and reflections, multiple students noted that it was essential to communicate thoughts, actions, and ideas to others. When spoken language is not an option for understanding, drawing or sign language can be useful.

Value of Knowledge

The final theme discovered in the field logs, reflections, and observed on the trip was the student's value of knowledge. Students noted the importance of a foundation of knowledge, which can then actively be implemented to their service-learning project.

Students reflected upon a foundation of knowledge that was laid for them during the AGTEC training before traveling to Chajul. "We learned organic solutions to the problematic overuse of chemical pesticides and fertilizers" (R8). The information gained from this training would eventually assist the service-learning project in Chajul.

Once the foundation of knowledge was grasped, and the service-learning project planned, the students became active learners, applying concepts from their study abroad courses, to the service-learning projects. One student noted "active learning encourages learners to take ownership and have pride in applying what they are being taught" (R6). "This pertains to Knowles' assumptions from class because adults can apply information to subject matter from

their previous knowledge and experiences with the activity" (R3).

When reflecting about the value of active learning, one student stated, "I now realize that I usually prefer informal learning environments because they allow for so much curiosity and creativity" (R4). This creativity fueled the cohort's initiative to take ownership in the service-learning project, and to include the community and school children throughout each activity. Students realized the need for motivating children, for teaching new material, immediately upon arrival at schools.

> …pertains to class which we learned about Knowles' six critical assumptions where children are not necessarily always ready to learn, but the teacher must create a channel for motivation to occur. We created motivation for students to learn through ice breakers (R3).

The schools' children took ownership of the *lombricomposturas* by "signing" the project with painted hand prints. Another student reflected that "keeping followers and learners involved ensures that they feel personally attached to the project they are working on or the material that is being presented" (R6). "If they do not feel ownership in the project, then when Texas A&M University returns next year, the lombricompoustra projects may no longer exist" (R6).

Conclusions

An international service-learning experience combined with a study abroad program adds value to the program as a whole (Honnet & Pulsen, 1989). The service-learning project in Chajul, Guatemala provided students opportunities to relate their service activity to academic materials received during the program (Ash & Clayton, 2004; Ash & Clayton, 2009a). Ash & Clayton's (2009) model highlighted the components, relationships, and learning goals that promote a service-learning environment. Through critical reflection exercises, students generated and documented their learning (Ash & Clayton, 2009b), such as identifying the three to five most fundamental and powerful concepts they learned from the service-learning project. These reflections helped students form five major themes about their experience: adaptation, culture, collaboration, communication, and value of knowledge.

The results of this study are useful for informing the policies and practices of international service-learning and study abroad programs. Based upon their experience, students formed opinions and developed new thoughts and ideas about culture, international travel, communication, and study abroad. Many students viewed the international service-learning experience as an applicable, real-world challenge to build their personal skills and prepare for future career opportunities.

Students learned to work with a team, build connections and trust within a community, supporting the findings of Miller (2011) who studied college of agriculture students' participation in an AGTEC internship. They built networks with two NGOs to complete practical service-learning projects. Students also recognized the benefit of conversations with Chajul agricultural experts to prepare for their projects. This particular aspect should be maintained. Students recognized the value of applying their academic training as they practiced this knowledge through their project, thus creating a true service-learning experience (Ash & Clayton, 2009a; Bringle & Hatcher, 2009).

This study was an account of one case that occurred during one 25-day study

abroad program with one group of students; therefore, the findings cannot be generalized beyond the cohort. Future research should expand our understanding of university and NGO interaction to better understand practical impacts of international service-learning projects in college of agriculture study abroad programs. It is important to incorporate both service-learning and study abroad experiences into the same curriculum.

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Information and Communication Technologies Use by Agriscience Teachers in Trinidad and Tobago

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The purpose of this study was to investigate information and communication technologies (ICT) usage among Agriscience teachers in Trinidad and Tobago. This knowledge will be used to develop preservice and inservice professional development programming for these teachers. Eighty-five percent (n = 77) of the secondary Agriscience teachers responded to a survey that assessed: (a) technology current use, (b) technology beliefs, (c) technology skills, (d) technology intentions, (e) barriers to technology use, and (f) personal data. Results indicated that Agriscience teachers in Trinidad have accepted ICT as useful tools. Teachers used ICT most frequently for personal reasons and less frequently for school-related tasks. Teachers generally believed that ICT help them accomplish tasks more quickly, enhance their quality of work, were easy to use, and that it could help to keep in touch with their students. However, beliefs varied based on age, career intentions, and computer literacy. Agriscience teachers also indicated that they possessed moderate skill levels and intend to use ICT as a part of their jobs. Differences in perceived skills were noted based on age, experience, and career intentions. Primary barriers centered on technical issues such as lack of hardware, inadequate technical infrastructure, and connectivity. Additionally, teachers believed that lack of a reward structure impeded technology usage.

Keywords: Agriscience Teachers; ICT; Information and Communication Technologies; Trinidad and Tobago

Introduction

Trinidad and Tobago is a twin island nation located in the Caribbean Region. Classified as a developing nation, Trinidad and Tobago is working to reach developed nation status by 2020 (UNESCO, n.d.). One component of this goal is agricultural development, which includes developing sufficient human capacity to meet current and future needs (Rivera & Alex, 2008). The Food and Agriculture Organization (FAO) of the United Nations (1997) recognized that secondary agricultural education can be an important component of this system. Specifically in Trinidad and Tobago, Ramdwar and Ganpat (2010) purported that secondary-level agriscience education is being pursued to develop the next generation of skilled agriculturists.

As Rivera and Alex (2008) noted, formal educational efforts are one piece of a larger human capacity system for an agricultural sector. In Trinidad and Tobago, formal agricultural education is offered at the primary level (5–11 years old), secondary level (12–17 years), and tertiary level (17 years and older) with the goal across all these levels being to help students develop appropriate skills to meet current and future industry needs (Ramdwar & Ganpat, 2010). One such skillset focuses on information and communication technologies (ICT), hardware and software technologies that allow for communicating, creating, storing, and sharing of information (Gulbahar & Guven, 2008).

Ultimately, future workers in the agricultural sector of Trinidad and Tobago will need to be proficient at using ICT. Secondary school-level agriscience education programs offer an excellent platform to nurture these skills. However, for this to occur, agriscience teachers in these programs must themselves possess the appropriate subject matter knowledge in using these technologies (Roberts & Kitchel, 2010). The current level of ICT proficiency among agriscience teachers in Trinidad and Tobago is unknown. Such knowledge could guide both preservice and inservice teacher education programming.

Theoretical Framework

Venkatesh and Davis's (2000) extension of the *Technology Acceptance Model*, also known as TAM2 (Figure 1), framed this study. TAM2 is based upon the original work of Davis (1986). Davis's original *Technology Acceptance Model* (TAM) theorized that an individual's behavioral intention to use a technology was influenced by two beliefs: (a) perceived usefulness and (b) perceived ease of use (Venkatesh & Davis, 2000). The authors also defined perceived usefulness "as the extent to which a person believes that using the system [or technology] will enhance his or her job performance" (p. 187) and perceived ease of use was defined "as the extent to which a person believes that using the system [or technology] will be free of effort" (p. 187). TAM suggests "the effects of external variables (e.g., system characteristics, development process, training) on intention to use are mediated by perceived usefulness and perceived ease of use" (p. 187). Additionally, TAM suggested that perceived ease of use is influenced by perceived usefulness since the "easier the system [or technology] is to use the more useful it can be" (p. 187).

TAM2 builds upon TAM by adding the following theoretical constructs: (a) subjective norm, (b) image, (c) voluntariness, (d) job relevance, (e) output quality, and (f) result demonstrability (Venkatesh & Davis, 2000). Subjective norm, image, and voluntariness are characterized as social influence processes that impact an individual's adoption or rejection of a technology, and job relevance, output quality, result demonstrability, and perceived ease of use as cognitive instrumental processes of perceived usefulness (Venkatesh & Davis, 2000). The subjective norm is a "person's perception that most people who are important to him think he should or should not perform the behavior in question" (p. 187); image is the "degree to which use of an innovation is perceived to enhance one's… status in one's social system" (p. 189); voluntariness is the "extent to which potential adopters perceived the adoption decision to be non-mandatory" (p. 188); job relevance is an "individual's perception regarding the degree to which the target system [or technology] is applicable to his or her job" (p. 191); output quality is a person's perception of the "tasks a system [or technology] is capable of performing and the degree to which those tasks match their job goals (job relevance)" (p. 191); result demonstrability is the ability of a person to "attribute the gains in their job performance specifically to their use of the system" (p. 192) or technology. The influences of the aforementioned theoretical constructs on perceived usefulness and intention to use a technology are illustrated in the Figure 1.

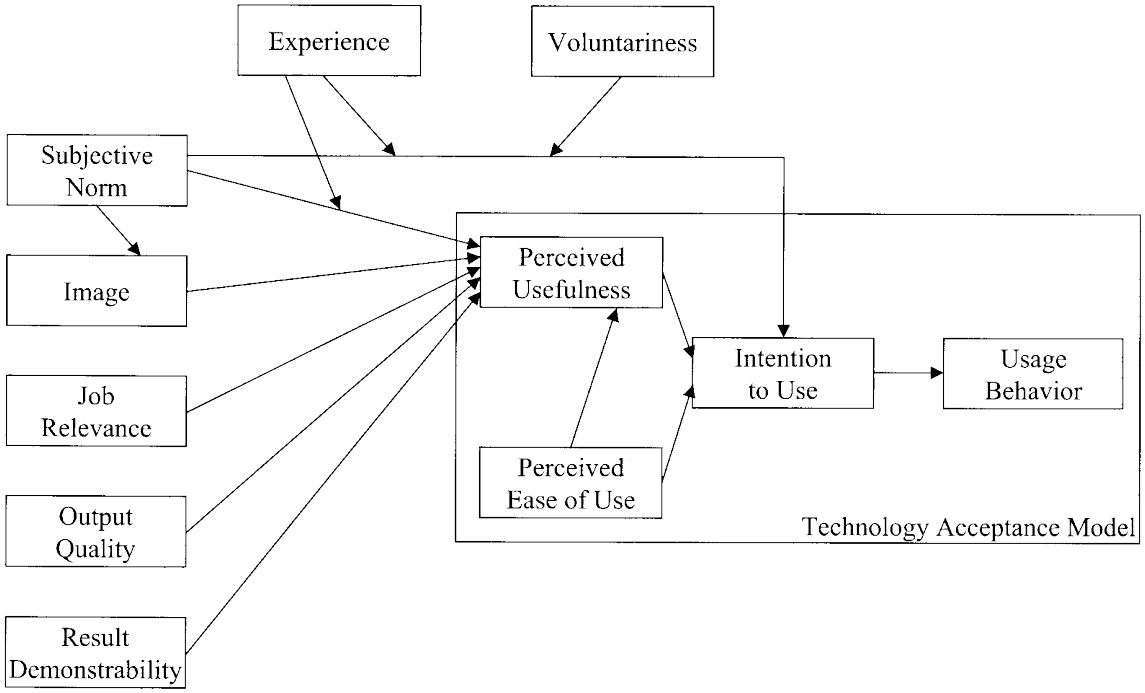

Figure 1. TAM2 (Venkatesh & Davis, 2000, p. 188)

Literature Review

ICT usage in Trindad and Tobago has been examined by several researchers. In a survey of the Waterloo Secondary School in Trinidad, Warner (2010) reported the secondary school utilized "available educational technological software as tools of motivation, encouragement, knowledge, communication and collaboration" (p. 137). Additionally, Warner reported that a survey of parents indicated 82% of the respondents had a computer but only 60% had Internet access. Parents also indicated they wanted the school curricula to include ICT (Warner, 2010). Waterloo Secondary School student council members suggested a weekly elective period be added to the school's schedule to allow students to learn skills like ICT, and teachers proposed ICT training should be on-going and not a one-time workshop (Warner, 2010). Furthermore, the local school board and alumni of the secondary school stated that teachers should make better use of existing technology resources (Warner, 2010).

Rampersad (2011) sought to determine if the mandated incorporation of ICT in a modern studies department had a positive impact on teaching and learning at an urban secondary school in Trinidad. Rampersad found teachers were using a variety of ICT during instruction (PowerPoint, audio clips, live streaming, wikis, and pictures) and during all major segments of a lesson (introduction, learning activities, and summary). Most of the teachers believed ICT is useful in making subjects more interesting, reaching a diverse set of learners, facilitating student-centered learning environments, developing deeper conceptual understanding of the content, increasing communication between teachers and students, managing and storing instructional material, and is an "excellent tool for repetition and reinforcement of content and skills taught" (Rampersad, 2011, p. 41). In addition, most of the teachers felt ICT allowed them to deliver content at a faster pace, but required more creativity and planning time. However, Rampersad reported that one teacher stated

ICT were not effective for teaching abstract, highly theoretical topics, and some teachers indicated that technical problems reduced instructional time and a back-up plan should be developed. Many of the teachers also felt they lacked the technical competence needed to deal with technical issues and the pedagogical knowledge necessary to more effectively utilize ICT (Rampersad, 2011). Furthermore, Rampersad found teachers believe students expected ICT to be used during instruction, are not as interested when ICT is not incorporated, and tend to believe information not presented with ICT is not important. Additional concerns related to students and ICT use were the lack of interest in reading created by using ICT, plagiarism, loss of formal writing and research skills, and the distraction of the technology itself. Overall, Rampersad reported "ICT offered excellent tools to both the teacher and the learner and its use contributed positively to both teaching and learning" (p. 66).

In a study of a secondary school in Port of Spain, Trinidad, Phillip (2007) reported that teachers and administrators believed the benefits of utilizing ICT outweighed the cost of purchasing ICT equipment. However, teachers and administrators were concerned about the physical security of the technology and the security of student information stored on the technology (Phillip, 2007). Phillip also reported teachers and administrators believed the effectiveness of ICT depended on the ICT competencies of the entire staff and noted that the level of ICT competency of the staff varied greatly. In addition, Phillip found younger teachers were more likely to be competent than older teachers, and many older teachers believed ICT skills would not be of benefit to them this late in their career. Phillip purported ICT competencies and skills must be included in the curriculum of Trinidad and Tobago's secondary schools. Phillip (2007) further claimed that ICT

> affects every aspect of students' activity, and the delivery of ICT skills and competencies are indispensable if we are to fulfil [*sic*] the obligation to produce students who are equipped to compete successfully in the highly competitive international environment created by the harsh realities of globalization. (p. 146)

Also in Trinidad and Tobago, Ragoonanan (2012) investigated primary school teachers' perceptions and competencies in regard to ICT and science education. Ragoonanan found the teachers did not use ICT because of a lack of technical and pedagogical knowledge and skill. However, after professional development, the primary teachers had a positive shift in their "perceptions of integrating ICT in science, and improved levels of technical and pedagogical competencies, confidence, and reflective practices" (p. 1). Similarly, Beeput (2012) examined school administrators and primary teachers' perceptions of ICT and teacher training in three Trinidad educational district. School administrators and primary teachers were found to possess a limited view of how ICT could be utilized. In addition, the administrators and teachers believed teacher-preparation programs were ill-prepared for integrating ICT into the primary school curriculum. What is more, Khan (2012) reported four rural primary school teachers in Trinidad and Tobago believed "accessibility to hardware and software, teacher competence, professional development, school policy, and space and time" (p. 1) impeded their use of ICT.

ICT usage among secondary agriscience education teachers has received little attention in the international

agricultural and extension education literature. In 2002, Shao and Bruening reported that Chinese agricultural schools were using more multimedia aids than in the past. However, in 2005 Shao and Bruening found that agriscience teachers in China had a lack of expertise in educational technologies. In 2003, Lu and Miller compared instructional technology competence between teachers in Ohio and Taiwan. Teachers had the greatest needs for database development and telecommunications. Demographic variables such as age, gender, years of teaching, and highest degree attained had low or negligible associations with teacher needs. There were no studies found that examined ICT as implemented in the agriscience program in Trinidad and Tobago.

Purpose and Objectives

The purpose of this study was to investigate ICT usage among agriscience teachers in Trinidad and Tobago. This knowledge will be used to develop preservice and inservice professional development programming for these teachers. The specific objectives were to:

1. Describe the level of technology use, beliefs, skills, and intentions by agriscience teachers in Trinidad and Tobago.
2. Describe the barriers to increased technology use.
3. Identify personal and school-related factors that impact technology use, beliefs, skills, and intentions.

Methodology

A survey research investigation was done among agriscience teachers in Trinidad and Tobago to assess issues related to the use of technology in agricultural science education. Agriscience is taught at the secondary level, which caters for students 12–17 years. The list provided by the Ministry of Education showed that 82 schools offered the subject with a total of 90 teachers. This constituted the study population. The research targeted all teachers employed in 2012, thus constituting a slice-in-time sample (Oliver & Hinkle, 1982). Survey instruments were hand delivered to all schools and follow up calls were made before eventual retrieval by hand. A total of 77 teachers completed the instrument, giving a response rate of 85.5%.

Adapted from the work of Gulbahar and Guven (2008), the instrument consisted of six parts which sought to measure: (a) technology current use, (b) technology beliefs, (c) technology skills, (d) technology intentions, (e) barriers to technology use, and (f) personal data. Technology current use was measured using ten questions that explored the extent to which technology was used in various education-related areas. Response categories ranged from 0 to >10 times in the last week (0; 1–5; 6–10; >10). Technology beliefs, technology skills, and technology intentions were measured using Likert-type scales consisting of 4 questions for each construct. Respondents were asked to indicate their level of agreement (SA – *strongly agree*, A – *agree*, D – *disagree*, or SD – *strongly disagree*) to each statement and responses scored (SA = 4, A = 3, D = 2, SD = 1). Barriers to technology use assessed the extent to which 19 possible constraints affected teachers' technology use at school. Respondents were asked to express their level of agreement on a 3-point scale and each response was scored (A – *agree* = 3, N – *neutral* = 2, or D – *disagree* = 1).

Personal data included: teachers' access to 12 technology software and tools at home, age, gender, level of education, experience in teaching, perception of computer literacy level, study of computer science as a subject, and intentions to continue a career in education.

The instrument was examined for content validity by colleagues at the University of the West Indies, the University of Trinidad and Tobago, and the University of Florida. After some changes, the instrument was pretested among six agriscience teachers in North Trinidad. Changes involved inclusion of additional barriers items, reconstruction of questions related to personal data, and replacement/rewording of some current technology items.

Data were collected over a 3-week period in October 2012, and analyzed used SPSS v 17. Results were presented as descriptive statistics, and ANOVA was used to explore relationships between personal factors and technology use in agriscience education.

Cronbach's alpha (α), the measure of reliability, was assessed for scales as follows: Technology current use (α = 0.87); technology beliefs (α =0.89); technology skills (α = 0.85); technology intentions (α = 0.88) and; barriers to technology use (α = 0.81).

Results

Table 1 shows the frequencies of the characteristics of the sampled population of agriscience teachers. The majority of the sample was female (56%), while 44% was male. Most respondents were between 30–39 years of age (29%); 28% were 40–49 years old; 27% were more than 50 years old; and others (16%) were even younger (20–29 years old). Almost half the sample completed a graduate degree (49%), while 41% held bachelor's degrees, and 10% possessed only diplomas. Most teachers (47%) never studied computer science as a subject, while 22% studied it at the tertiary level. Some (31%) of teachers had more than 20 years of experience; 28% had 11–20 years experience; 25% had 6–10 years of experience; and 16% had less than 5 years of experience. The majority of teachers intended to continue their career in the field of education (78%). Most teachers (42%) perceived their computer literacy level as moderate; the majority (70%) used computers more than 5 times weekly; 64% reported very easy access to computers at home, while 66% had somewhat easy access at school.

Table 1. Composition of the Sample of Agriscience Teacher (*n* = 77)

Variable	Response	Frequencies	Percent
Gender	Male	34	44
	Female	43	56
Age	20–29	12	15
	30–39	22	29
	40–49	22	29
	>50	21	27
What is the highest level of education you have completed?	Diploma	8	10
	Associate degree/Degree	31	41
	Graduate Degree	38	49
I studied computer science as a subject……	Never	36	47
	Yes, in secondary school	11	14
	Yes, at a diploma level	13	17

	Yes, at a tertiary level	17	22
Years of work experience in the field of education	0-5	12	16
	6–10	19	25
	11–20	22	28
	>20	24	31
Do you intend to continue your career in education?	Yes	61	78
	No	16	22
How do you rate your computer literacy level?	Very high	17	22
	High	22	28
	Moderate	32	42
	Low	6	8
I use a computer at home:	< 3 times weekly	14	18
	3-5 times weekly	10	12
	> 5 times weekly	53	70
Access to ICT equipment at home	No access	2	2
	Somewhat easy access	26	34
	Very easy access	49	64
Access to ICT equipment at school	No access	17	22
	Somewhat easy access	51	66
	Very easy access	9	12

Technology Current Use

Table 2 provides a summary of the current use of technology by agriscience teachers. Results show that weekly, teachers used technology more often to maintain personal contacts (38%, >10 times/week), for leisure purposes (38%, >10 times/week), and to enhance their own personal knowledge (29%, >10 times/week). Conversely, teachers used technology less often to send and retrieve assignments from students (74%, 0 times/week) and to assist with administrative tasks (51%, 0 times/week).

Table 2. Weekly ICT Usage by Agriscience Teachers (*n* = 77)

	Percentage of Teachers at Each Usage Level			
ICT Use	0 Times	1-5 Times	6-10 Times	>10 Times
Maintain personal contacts?	7	29	26	38
For leisure purposes/relaxation/unwind?	12	23	27	38
To enhance your personal knowledge?	4	32	35	29
Prepare teaching/training materials?	12	53	18	17
Search for information to prepare lesson plans/activities?	20	45	18	17
Acquire the knowledge you needed to enhance your training?	16	52	22	10
Store teaching materials?	24	44	17	15

Perform your personal tasks (online shopping, scheduling appointments etc?	36	25	25	14
Assist with your administrative tasks, communicating with your supervisors, colleagues, etc?	51	32	7	10
Send and retrieve assignments to/from students?	74	20	3	3

Technology Beliefs, Skill, and Intentions

Table 3 provides a summary description of teachers' technology beliefs, skills and intentions. Frequencies indicate that most teachers had strong beliefs in technology usefulness to accomplish tasks more quickly (M = 3.5; SD = .58); the use of technology enhances their quality of work (M = 3.5; SD = .53); that technology was easy to use for all tasks (M = 3.0; SD = .7); and that they intended to use technology more in their teaching sessions (M = 3.3; SD = .59).

Table 3. Technology Beliefs, Skill, and Intentions of Agriscience Teachers (n = 77)

	SA %	A %	D %	SD %	Mean (SD)
Technology Beliefs					
Using technology enables me to accomplish tasks more quickly	51	44	5	0	3.5 (.58)
Using technology enhances the quality of my work	55	44	1	0	3.5 (.53)
Using technology I am able to do much more work	47	43	10	0	3.4 (.68)
Using technology makes it easier to do my work	45	48	7	0	3.4 (.61)
Technology Skills					
I find it easy to use technology to do all my tasks	25	55	18	2	3.0 (.70)
I find it easy for me to become skillful in using technology	26	58	14	2	3.1 (.67)
I find it easy to use technology (hardware, software applications, etc...)	19	56	23	2	2.9 (.70)
Technology Intentions					
I intend to use technology more in teaching sessions with my students	33	59	8	0	3.3 (.59)
I intend to use technology more to get information out to my students	22	61	16	1	3.0 (.66)
I intend to use technology to communicate with my colleagues, prepare reports, etc….	22	68	10	0	3.1 (.56)
I intend to use technology more to keep in touch with my students	21	52	27	0	2.9 (.70)

Note. Data coded as SA = 4, A = 3, D = 2, and SD = 1.

Barriers to Technology Use

Results from Table 4 indicate that the major barriers to technology use by agriscience teachers in secondary schools were the limited access to key supporting devices (printers, scanners; M = 2.8; SD = .6), general shortages of computers (M = 2.8; SD = .6), the lack of a reward system to encourage technology use (M = 2.8; SD = .5), poor technical infrastructure (M = 2.8; SD = .4), and poor internet connections (M = 2.8; SD = .5). On the other hand, teachers

stated that the barriers with the least impact were the lack of interest by departmental colleagues in technology use (M = 1.9; SD = .8) and the unavailability of appropriate resources (M = 2.1; SD =.8).

Table 4. Barriers to Technology Use in Schools by Agriscience Teachers (n = 77)

Barriers	Agree %	Neutral %	Disagree %	Mean (*SD*)
There is limited access to media (printer, scanner etc.) for effective use of computers	86	6	8	2.8 (.6)
There is a shortage of computers for use by teachers	83	9	8	2.8 (.6)
There is no reward system in place to encourage technology use	78	21	1	2.8 (.5)
The existing technical infrastructure (wireless, access points) is poor	85	12	3	2.8 (.4)
Internet connection is usually unavailable, or poor	83	13	4	2.8 (.5)
There are insufficient financial resources for technology integration	74	23	3	2.7 (.5)
There is inadequate/inefficient instructional software/electronic resources	76	20	4	2.7 (.5)
There is an inefficiency/inadequacy of technical support when hardware/software problems arise	76	17	7	2.7 (.6)
Schools' computer laboratories are outdated/inefficient	66	26	8	2.6 (.6)
There is a shortage/lack of support services in instructional material development using modern technologies	67	21	12	2.6 (.7)
It is difficult to access the existing hardware (computer, projector etc.)	66	18	16	2.5 (.7)
The computers are outdated/slow and cannot do tasks required by teachers	60	32	8	2.5 (.6)
There is a lack of professional development opportunities for gaining knowledge and skill in technology use	57	26	17	2.4 (.8)
There is a lack of guidance and support by administration to develop teachers technological competencies	54	29	17	2.4 (.8)
There is insufficient time to prepare materials based on technology	58	24	18	2.4 (.8)
There are difficulties of improper teaching methods for technology usage	38	43	19	2.2 (.7)
Teachers lack the technical knowledge necessary to prepare materials based on technology	38	33	30	2.1 (.8)
There are little appropriate (useful information) resources available via technology	38	31	31	2.1 (.8)
There is a lack of interest by departmental colleagues in technology use	32	33	35	1.9 (.8)

Note. Data coded as agree = 3, neutral = 2, and disagree = 1.

Differences in Technology Current Use, Beliefs, Skills, and Intentions

Results (Table 4) indicate that there was a significant difference in *Technology Current Use* based on computer literacy levels (F = 5.78, p = .00). Tukey's b post hoc test revealed that persons with very high (M = 25.2; SD = 1.4) and high levels (M =

26.3; *SD* = 1.2) of computer literacy used computers more often than those with moderate (*M* = 21.1; *SD* = 1.0) to low (*M* = 17.3; *SD* = 2.3) levels of computer literacy.

There were significant differences in *Technology Beliefs* based on age, career intentions, and computer literacy. For age, there was a significant difference in technology beliefs (F = 2.93, *p* = .04) and Tukey's b post hoc test showed that persons older than 50 years (*M* = 12.8; *SD* = .44) believed that technology was less useful than younger teachers. There was also a significant difference in technology beliefs based on career intentions (F = 5.37, *p* = .02). Teachers who intended to remain in the field of education (*M* = 14.0; *SD* = .83) believed that technology was more useful than teachers who intend to leave the field. For computer literacy, those with lowest levels of literacy had lowest belief in the usefulness of technology.

There was a significant difference in perceived *Technology Skills* based on the variables age, experience, and career intentions. Based on age, (F = 4.00, *p* = .01), Tukey's b post hoc test indicated that teachers over the age of 50 (*M* = 8.0; *SD* = .39) believed that they were less skillful in using technology than younger persons. As regards years of experience (F = 4.02, *p* = .01), Tukey's b post hoc test showed that persons with more than 20 years experience (*M* = 8.0; *SD* = .36) believed they were less skilled in technology usage than others. For career intentions, results suggested that there was a significant difference in technology skills (F = 4.81, *p* = .03). Teachers who planned to stay in the field of education (*M* = 9.3; *SD* = .24) believed they were more skillful in technology use than those who intended to leave the field.

There were significant differences in *Technology Intentions* based on the factors age and computer literacy levels. Based on age (F = 3.03, *p* = .04), Tukey's b post hoc test showed that persons older than 50 years of age (*M* = 11.1; *SD* = .46) intended to use technology less than younger teachers. With respect to computer literacy levels (F = 4.80, *p* = .00), Tukey's b post hoc test showed that persons with low levels of computer literacy (*M* = 9.5; *SD* = .83) intended to use technology less than others with moderate to high levels of computer literacy.

Table 5. Differences in Technology Current Use, Beliefs, Skills, and Intentions of Agriscience Teachers (n = 77)

Independent Variables		N	Mean (*SD*)	F statistic	df	P-value	Effect Size
Dependent Variable: Technology Current Use							
Computer literacy	Very High	17	25.2 (1.4)	5.78	3	.00	.19
	High	22	26.3 (1.2)				
	Moderate	32	21.1 (1.0)				
	Low	6	17.2 (2.3)				
Dependent Variable: Technology Beliefs							
Age	20 - 29	12	14.2 (.58)	2.93	3	0.04	.11
	30 - 39	22	14.6 (.43)				
	40 - 49	22	13.5 (.43)				
	>50	21	12.8 (.44)				
Career Intentions	Yes	61	14.0 (.26)	5.37	1	0.02	.07
	No	16	12.7 (.51)				
Computer literacy	Very High	17	14.4 (.49)	2.65	3	0.05	.10
	High	22	13.9 (.43)				
	Moderate	32	13.7 (.36)				
	Low	6	11.7 (.83)				
Dependent Variable: Technology Skills							
Age	20 - 29	12	9.9 (.52)	4.00	3	0.01	.14
	30 - 39	22	9.6 (.38)				
	40 - 49	22	8.9 (.38)				
	>50	21	8.0 (.39)				
Experience	0 – 5 Years	12	9.8 (.52)	4.02	3	0.01	.14
	6 - 10 Years	19	9.4 (.41)				
	11 - 20 Years	22	9.4 (.38)				
	>20 Years	24	8.0 (.36)				
Career Intentions	Yes	61	9.3 (.24)	4.81	1	0.03	.06
	No	16	8.1 (.46)				
Dependent Variable: Technology Intentions							
Age	20 - 29	12	12.8 (.61)	3.03	3	0.04	.11
	30 - 39	22	12.9 (.45)				
	40 - 49	22	12.5 (.45)				
	>50	21	11.1 (.46)				
Computer literacy	Very High	17	13.1 (.49)	4.80	3	0.00	.17
	High	22	12.5 (.43)				
	Moderate	32	12.3 (.36)				
	Low	6	9.5 (.83)				

Conclusions, Implications, and Recommendations

Based on the data presented, several conclusions can be drawn. However, the small sample size and small effect sizes are limitations of the study. It would appear that agriscience teachers in Trinidad have accepted ICT as useful tools. Teachers used ICT most frequently for personal reasons and less frequently for school-related tasks, which was different than Rampersad's (2011) observations. ICT usage varied based on the self-described computer literacy of the teacher, likely an indicator of *perceived ease of use* (TAM2, Vankatesh & Davis, 2000). Agriscience teachers in Trinidad used ICT for a variety of tasks, with personal tasks ranking the highest. Tasks associated with job-related duties varied widely.

Agriscience teachers in Trinidad were not homogenous in their beliefs and skills related to ICT. Teachers generally believed that ICT helped them accomplish tasks more quickly, enhanced their quality of work, were easy to use, and could help in keeping in touch with their students. However, beliefs varied based on age, career intentions, and computer literacy. Agriscience teachers also agreed that they possessed moderate skill levels and intended to use ICT as a part of their jobs. But differences in perceived skills were noted based on age, experience, and career intentions. Differences in technology use intentions were observed for age and computer literacy levels. The variability in agriscience teachers beliefs, skills, and intentions is consistent with other types of teachers in Trinidad and Tobago (Beeput, 2012; Phillip, 2007).

Trinidad and Tobago agriscience teachers also expressed numerous barriers to ICT usage. Primary barriers centered on technical issues such as lack of hardware, technical infrastructure, and connectivity. Additionally, teachers believed that lack of a reward structure impeded technology usage. These identified barriers would be considered *external variables* (TAM2, Vankatesh & Davis, 2000) and would need to be addressed to give teachers the flexibility to adopt or not adopt ICT. The barriers expressed by agriscience teachers were similar to those expressed by other teachers in Trindiad and Tobago (Beeput, 2012; Khan, 2012).

These findings can be used to develop professional development programming for both preservice and inservice agriscience teachers in Trinidad and Tobago. Specifically, such programs should aim to help teachers learn about other pedagogical ways to use ICT. Perhaps teachers with advanced skills could share their techniques with other teachers. Additional programming could be developed to target specific sub-groups of teachers based on current skill level, especially for teachers with limited computer proficiency. The researchers would also support a continuous on-going professional development program, as suggested by Warner (2010).

Although not intended for generalization, this study may have implications for other Caribbean nations and other developing nations. If secondary agriscience education programs are to be a component of a larger human capacity development effort for the respective agricultural sectors, the technologies modeled in those programs should be examined. Additionally, the knowledge, skills, and beliefs of the teachers in those programs should be examined. The results from Trinidad and Tobago may provide some insight to guide initial efforts in these nations.

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Effectiveness of Farmer Information Needs Assessment as Perceived by the Farmers

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Abstract

In Bangladesh, adoption of new extension program and implication is still limited. The objectives of the study were to determine and describe farmers' perceptions on the effectiveness of Farmer Information Needs Assessment (FINA) and to explore the relationships between farmers' characteristics and their perceptions of FINA. The study was conducted in Hajigonj, Chandpur, Bangladesh. One hundred twenty FINA-participating farmers were interviewed with a multistage, random-sampling method. An overall moderate to highly favorable perception of the FINA program was found. About half of the farmers responded with moderately favorable perceptions of FINA in providing extension services. However, less than half of the farmers responded moderately favorably in adopting recommended practices, even though more than one-third of the farmers responded with highly favorable perceptions of FINA. Seven of twelve farmer characteristics showed a significant relationship with farmer perceptions of the effectiveness of FINA: that is, middle-aged farmers were more active participants in FINA and in farming than young people; more than 60% of participants operated small farms, and they were more motivated by the FINA program than large-farm operators; farmers with moderate to high incomes participated more in FINA than did low-income farmers; and increased contact with extension personnel and increased agricultural knowledge improved farmers' perceptions of FINA. The results allowed a conclusion that FINA, the leading problem assessment approach in agricultural extension, was effective for sustainable agricultural production. Extension departments and farmers can benefit from studying these results to identify and to solve their farming questions.

Keywords: Agricultural Extension Approach, Farmers' Perceptions, FINA, Hajigonj, Bangladesh.

Introduction

Agricultural enterprises involve two thirds of the rural population of Bangladesh (FFYP, 1998), which has an area of 56,000 sq miles and a population near 115 million (BBS, 2000; Mahtab & Karim, 1992). The economy of Bangladesh is dependent predominately on agriculture. About 85% of the total population lives in rural areas, and the major occupation of these residents is farming. Bangladesh has a limited cropped area of 14.27 million ha, and its cropping intensity is 176% (BBS, 2000), meaning that more than one crop is grown per year on the same land. In the 1999–2000 financial years, the agricultural sector contributed 25.5% of the Gross Domestic Product (GDP) (Anonymous, 2000; BBS, 2000). Despite these achievements, agriculture in Bangladesh has faced tremendous problems in sustainable crop production. A vast number of farmers seek substantial help for their farming problems. For sustainable food production, great care should be taken to address the needs of the farmers and to provide them with necessary inputs and information. Well-managed extension services are, therefore, needed for efficient transfer of technology (Enos, 1989; Pretty & Chambers, 1993).

Agricultural extension in Bangladesh has followed an evolutionary process of implementation with components of several organizational approaches (Rogers, 1995; Stone, 1997). A major role of agricultural extension in developing countries has been disseminating technologies generated by public sector research organizations through appropriate strategies such as demonstrations, field visits, farmers'

meetings, and use of media. Among these, the Training and Visit (T&V) approach was established during the late 1970s by putting extension services under supervision of the Department of Agricultural Extension (DAE) (Feder & Slade, 1986; Suryanarayana et al., 1990). The T&V approach improves communications between research and extension, and more than 40 countries have adopted this approach (Birkhaeuser et al., 1991). However, a study noted that agricultural T&V extension personnel (e.g., block supervisors) were found to lack technical and performance appraisal training that focused challenges in agricultural extension in Bangladesh (Reynar & Bruening, 1996). However, a practical study in Ethiopia revealed that the T&V approach was effective in disseminating innovations and increasing yields among contacted farmers, upgrading extension agents' skills, and imparting valuable lessons for other extension systems (Dejene, 1989).

Farmer information needs assessment (FINA) is an approach by the Department of Agricultural Extension (DAE), Bangladesh, in which farmers can identify their needs and extension workers assess these needs and recommend support. FINA is a principle of the revised extension approach of DAE. In this approach, the FINA program determines the key problems and opportunities that farmers face and types of information that they require to get a responsive extension services (DAE, 1999). The main elements of FINA are the Block Supervisors (BSs) diary, the Problem Census, Participatory Rural Appraisal (PRA) and consultation with other organizations responsible for conducting this program. Problem Census and BSs diary mainly are adopted by DAE where FINA programs are conducted by their field staffs, who meet with group of farmers to review agricultural situation, identify main problems, and discuss opportunities for possible solutions. The Problem Census is a participatory technique of DAE that assists farmers in analyzing, planning, and developing agriculture. In the field, it is focused in a group discussion where farmers identify their problems and suggest solutions through BSs. In the most cases, FINA is following the Problem Census process in which four major steps occur (a) organizing a meeting, (b) explaining a topic, (c) forming sub-groups and listing problems, and (d) discussing problems and concluding with solutions for assessment of farmers needs.

DAE suggested that FINA is an effective tool for identifying farmers' needs and solutions (DAE, 1999). Recently, it is argued generally that FINA programs are not sincere in identifying farmers' needs and providing effective extension services, resulting in a poor flow of information to the farmers. In accordance with the extension services, a study revealed that methods like personal contact, demonstration, group discussion, and literature were the most effective extension services for technology transfer, whereas radio programs, film shows, and meetings were moderately effective (Tripathy & Panday, 1967). An early study regarding the role of extension workers found that the field extension agent was the most effective person or means in agricultural motivation, as compared to neighbors and friends, village level worker, radio, Agricultural Extension Officer (AEO), literature, and film show. The finding also revealed that Block Development Officers (BDO) were not contacted by the farmers at all in any stages for farming questions (Rajaguru & Satapathy, 1971). In spite of huge challenges in communicating new agricultural developments to potential farmers, extension program plays an important role in providing food and fuel for the world's most

densely populated large country (Bartholomew, 1994). A similar study linked with the agricultural extension program revealed that the Mennonite Central Committee's (MCC) extension work had contributed to increasing the net income level of farmers and provided technical assistance to extension activities for accessing good quality seeds (Reynar et al., 1996).

A study was conducted regarding to the role of organizational group when a group reaches its goal based on its goal model. The results suggested that there was a significant positive relationship between group effectiveness and its members' performances (Deep, 1978). Another study revealed that 65% of contacted farmers were classified as *most effective* in influencing other fellow farmers, whereas 23% of the farmers were *moderately effective* and 12% were *less effective*. The findings stated that farmers who used extension teaching methods were effective in transferring extension knowledge on improved technology to other farmers in the area of their operation (Suryanarayana et al., 1990).

An extension study of communication media found no significant relationship between age of the farmers and their opinion of the effectiveness of the Mati-O-Manush program on Bangladesh Television in disseminating agricultural information (Islam, 1998). On the other hand, a study found that the age group of contact farmers has a significant negative relationship with the effectiveness of farmers in influencing the adoption behavior of the other fellow farmers (Suryanarayana et al., 1990).

A study revealed a positive significant relationship between the level of education of farmers and their opinion regarding effectiveness of information disseminated to the farmers through Agricultural Radio Programs (ARPs). The findings also indicated that an increased level of education of the farmers increases the opinion of the farmers regarding effectiveness of information passed through ARPs (Sarker, 1996). Research conducted on adoption of potato technologies found that the fertilizer costs, high seed costs, lack of quality seeds, lack of awareness, lack of knowledge about technologies and low price of potato at harvest period were perceived as great barriers for the adoption of technologies (Muttaleb et al., 1998).

Purpose and Objectives

The purpose of this study was to determine the effectiveness of the Farmer's Information Need Assessment (FINA) extension program as perceived by the participants. The specific objectives of the study were to:

1. Determine and describe the farmers' perception on the effectiveness of FINA in terms of (i) providing extension services and (ii) adopting recommended agricultural practices.
2. Find out the problems faced by the farmer in implementing FINA program.
3. Explore and describe the role of the selected characteristics (age, educational qualification, family size, farm size, annual income, organizational participation, cosmopoliteness, extension media contact, farming experience, farming facilities, innovativeness, and agricultural knowledge) of the farmers and reveal the relationships between farmers' characteristics and their perception on the effectiveness of FINA.

Methods

The study was conducted in six randomly selected unions from a total of twelve unions of the Hajigonj Upazila of

Chandpur District in Bangladesh (Table 1; Figure 1). The farmers who participated in the FINA extension program conducted by the BSs of DAE constituted the population of the study. The selected Unions were Hajigonj Paurashava, Barkul Paschim, Hajigonj, Hatila Purba, Rajargaon Dakshin, and Kalocho Uttar. First, eleven blocks from total nineteen were selected randomly for collection of population so that at least 50% of the blocks of each union were considered. Then, half of the FINA participating farmers of each of eleven blocks were selected using a table of random numbers (Kerlinger, 1973). Thus, a total of 120 sample populations were selected from 432 FINA participating farmers in nineteen blocks. In this study, variables were constructed as independent or dependent variables. The twelve selected characteristics (Table 2) of the FINA farmers were considered the independent variable, and *farmers' perception on the effectiveness of FINA* was considered the dependent variable of the study. Data were collected using interview schedules in a local language with respect to the objectives of the study. All qualitative data were converted into quantitative data using a suitable score wherever necessary, as in the following text and in Table 2.

Table 1. Distribution and Selection of Population in Unions and Blocks Constituting FINA Program in Hajigonj Upazila, Bangladesh

Name of Union	Name of Block	Total Population	Sample population	Reserve list[†]
Hajigonj Paurashava	Toragar	25	0	0
	Kongaish	23	11	1
	Katrabilwai	20	10	1
	Balakhal	24	0	0
Barkul Pschim	Ram Chandrapur	23	11	1
	Jakni	25	0	0
	Natehara	20	10	1
Hajigonj	Uechanga	22	11	1
	Olipur	20	10	1
	Suhilpur	23	0	0
	Kajirgaon	20	0	0
	Sudia	24	12	1
Hatila Purba	Hatila	23	0	0
	Tongirpar	20	10	1
	Belgar	24	12	1
Rajagaon Dakshin	Bakila	25	12	1
	Sorna	24	0	0
Kalocho Uttar	Kapikap	22	11	1
	Tarapalla	25	0	0
Total		432	120	11

[†] Reserve lists used in case of absence during data collection

Appropriate tests were developed to measure the independent variables (Table 2). *Age* of a respondent farmer referred to the period of time from birth to the time of the interview. The age of a farmer was measured in terms of years and was obtained during the interview. *Educational qualification* was measured in terms of grades (classes) passed by a respondent. If a respondent passed the final examination of class five, his education score was taken as 5. However, illiterate persons who could not read or write were given a score of 0; a person who did not know how to read or write but was able to sign only was given a score of 0.5.

Family size was measured by the total number of family member of the respondent, including the farmer, spouse, children, and other dependents full or partial. *Farm size* (FS) was measured in terms of actual operating land of a respondent. Farm size was computed in hectares using the following formula; $FS = A_1+A_2+A_3+ ½ (A_4+A_5)$, where, A_1 is the homestead area; A_2 is the cultivated area owned by a farmer; A_3 is the cultivated area taken by a farmer from others on a lease system; A_4 is the area given to others on the borga system (i.e., landlord and producer each get half of produce); A_5 is the area taken by a farmer from others on the borga system. *Annual income* has been used to refer to the total earnings of the respondent and the members of the family from agricultural and non-agricultural sources during a year and expressed in taka (local currency of Bangladesh). *Organizational participation* (OP) was computed of a respondent in the following formula, $OP = P_{om} \times N_i + P_{em} \times N_i + P_{eo} \times N_i$, where, P_{om} is the ordinary member, P_{em} is the executive committee member; P_{eo} is the executive officers (president, secretary etc.); and N_i is the number of organizations (i=1, 2, 3…). *Cosmopoliteness* was computed of a respondent in terms of the degree of cosmopoliteness (5-point scale) on the basis of the farmer's visits to the eleven different types of selected external places from the farmer's social system. *Extension media contact* was measured of a respondent in respects to the extent of contact with each of the twenty-one selected sources of extension media during last one year prior to data collection. The respondent's answer was classified as any of six responses scored from 0 to 5, where 0 indicated contact with extension media to be "not at all", and 5 indicated a "daily" basis. *Farming experience* was computed of a respondent on the basis of experience from active farming and was expressed in years.

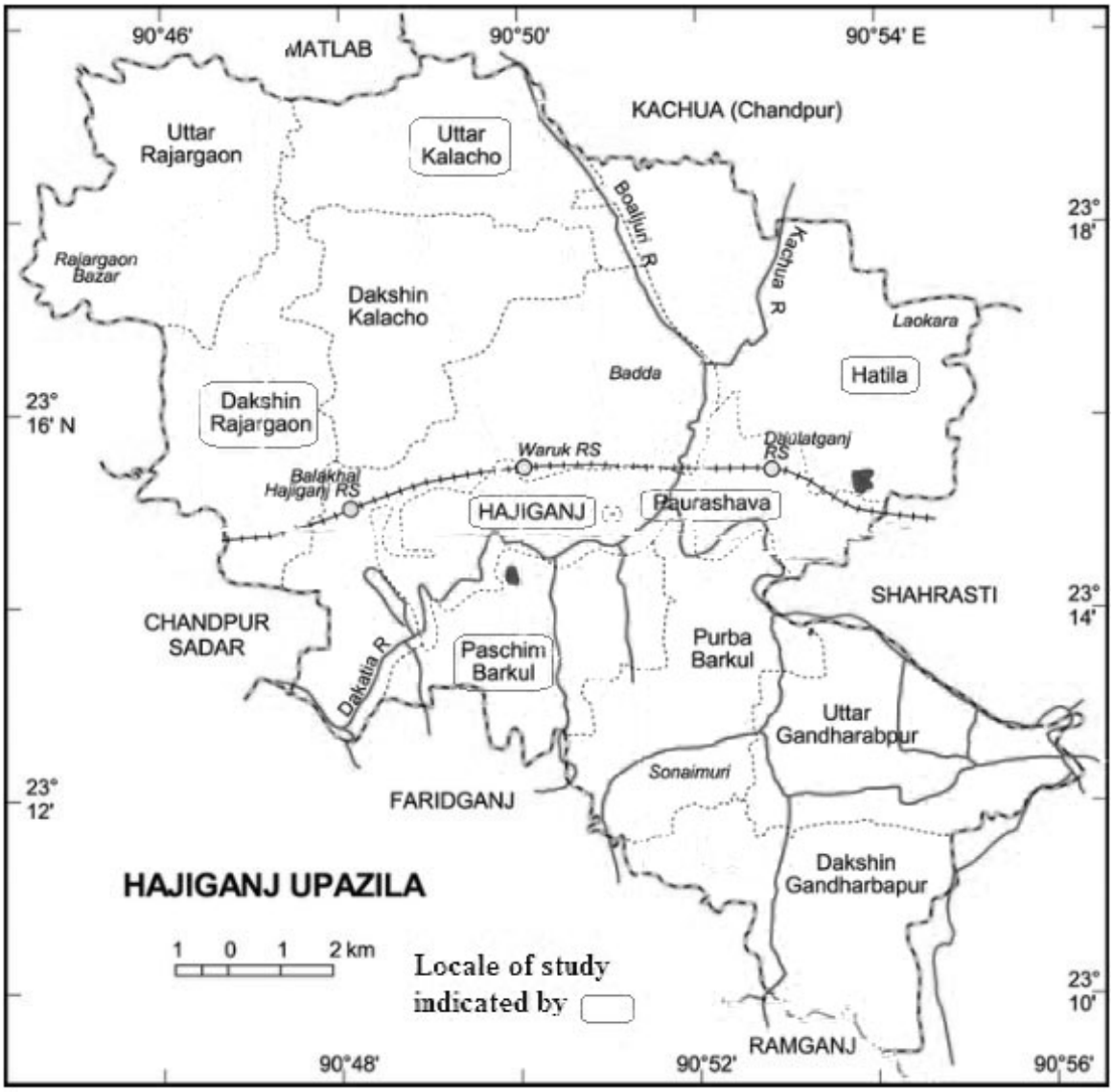

Figure 1. Distribution of locale in Hajigonj Upazila under Chandpur District of Bangladesh

Table 2. Prominent Features of the Selected Characteristics and Distribution of the Farmers in Accordance with their Scores (n=120).

Characteristic	Scoring unit	Possible score	Observed score	Categories	Farmers (%)	Mean	SD*
Age	Years	None	25 to 85	Young aged	12.5		
				Middle aged	52.5	51.6	12.97
				Old	35		
Educational qualification	Years of schooling	None	0 to 14	Illiterate	2.5		
				Primary	31.6		
				Secondary	47.5	7.2	3.88
				Higher secondary	14.2		
				Degree and up	4.2		
Family size	No. of members	None	3 to 22	Small	5.8		
				Medium	60.8	8	3.54
				Large	33.4		
Farm size	Hectare	None	0.2 to 5.5	Small size	61.7		
				Medium size	18.3	1.1	0.73
				Large size	20		
Annual income	000' Taka	None	18 to 543	Low	15		
				Medium	49.2	100.9	78.25
				High	35.4		
Organizational participation	Scores	0 to 51	0 to 25	Zero or no	5		
				Low	74.2	3.9	4.10
				Medium	20.8		
Cosmopolite-ness	Scores	0 to 40	7 to 34	Low	19.2		
				Medium	56.7	18	6.50
				High	24.1		
Extension media contact	Scores	0 to 105	22 to 75	Low	31.7		
				Medium	47.5	45.5	12.36
				High	20.8		
Farming experience	Years	None	2 to 65	Low	20		
				Medium	41.7	29.1	14.25
				High	38.3		
Farming facilities	Scores	0 to 63	10 to 59	Low	25.8		
				Moderate	64.2	37.4	9.67
				Sufficient	10		
Innovativeness	Scores	0 to 60	8 to 38	Low	17.5		
				Medium	47.5	27.1	6.47
				High	35		
Agricultural knowledge	Scores	0 to 50	24 to 48	Low	17.5		
				Medium	54.2	36.8	5.52
				High	28.3		

*SD, Standard deviation

Farming facilities was measured from twenty-one selected farming facilities on the basis of the following weighted scale, where 0 means no facilities, 1 means few facilities, 2 means moderate facilities, and 3 means sufficient facilities. *Innovativeness* was measured on the basis of the period of adoption of fifteen improved agricultural practices. Adoption of each practice was scored as 0 to 4, where 0 means no adoption, 1 means one year of adoption, 2 means two years of adoption, 3 means three years of adoption, and 4 means four or more years of adoption. *Agricultural knowledge* was computed of a respondent on the basis of response to twenty-five selected questions in the interview schedule. Score was assigned for correct answers from 1 to 3 according to the basis of the questions, and a 0 score was assigned for wrong answer.

Farmers' perception of the effectiveness of FINA was measured on the basis of the perception of the farmers in terms of (a) providing extension services and (b) adopting recommended agricultural practices. A four-point scale was used to measure the perception of the farmers. The scale contained fifteen statement questions on the effectiveness of FINA in terms of "providing extension services" and "adopting recommended agricultural practices" respectively. The response of each statement was weighted from 1 to 4. Where 1 means "disagree," 2 means "no opinion," 3 means "agree," and 4 means "strongly agree" with the statement. The perception score of a respondent was determined by adding up the weights for responses against all the thirty statement questions. The score ranged from 30 to 120, where a score of 30 indicated the most unfavorable perception and 120 indicated the most favorable perception on the effectiveness of FINA. The perception indices (PI) were measured by multiplying the frequency counts of each of the statements cell of perception scored as above assigned weights. The PI of each statement along with rank order was computed using the following formula: $PI = P_{da} \times 1 + P_{no} \times 2 + P_{ag} \times 3 + P_{sa} \times 4$, where P_{da} is the percentage of respondents who disagree; P_{no} is the percentage of respondent with no opinion; P_{ag} is the percentage of respondents who agree; and P_{sa} is the percentage of respondents who strongly agree. The PI score ranged from 100 to 400 in each individual statement, where a score of 100 indicated the most unfavorable perception and 400 indicated the most favorable perception on the effectiveness of FINA.

Problems faced during FINA program were computed on the basis of the twenty selected problems in the interview schedule. The answers of the respondents were scored as "very high," "high," "little," or "not at all." Weight was assigned to each response from 0 to 3, where 0 means not at all, 1 means little, 2 means high, and 3 means very high. The problem confrontation indices (PCI), along with rank order, was computed using the following formula: $PCI = P_{no} \times 0 + P_{lo} \times 1 + P_{hi} \times 2 + P_{vh} \times 3$, where, P_{no} is the percentage of respondents with no problem, P_{lo} is the percentage of respondents with a *little* problem, P_{hi} is the percentage of respondents with a problem classified as *high*; and P_{vh} is the percentage of respondent with a problem classified as *very high*. The value of the PCI score ranged from 0 to 300, where, score 0 indicated no problem at all and 300 indicated a *very high* problem in conducting the FINA program. Mean, standard deviation and co-efficient of correlation (r) were computed to test the hypothesis.

Results

Characteristics of Farmer

The age of the farmers ranged from 25 to 85 years, with average 51.6 (Table 2). The results revealed that the highest portion of FINA-participating farmers (52.5%) were middle aged, whereas a very low portion of farmers (12.5%) were young aged. The data noted that middle-aged farmers actively participated in farming activities. However, young farmers did not actively participate in their farming activities. The correlation data (Table 3) showed a significant negative relationship between age of the farmers and their perception on FINA. Perhaps, the older, experienced farmers felt that they did not need the services of FINA as much as the younger farmers did. Educational qualification of the farmers ranged from 0 to 14 with average 7.2. The data indicated that a major portion of the farmers (47.5%) was grouped as having secondary education. The data further showed that a very low portion (2.5%) of the farmers who participated in the FINA program were illiterate. The results showed that primary and secondary education farmers were higher participations in the FINA program than illiterate farmers. These higher rates of participation indicated their active participation because they were facing some problems and wanted to find the solutions from the FINA program. Therefore, a significant positive relationship occurred between education of farmers and their perception on FINA. Educated farmers believed that FINA is effective in identifying their problems and providing targeted solutions. On the other hand, the highest portion (60.8%) of the farmers had a medium-sized family. The data suggested that medium-sized families had positive attitudes on the effectiveness of FINA regarding their farming problems compared to small and large-sized families. However, the data overall showed no significant relationship between family size and farmers' perception of the effectiveness of FINA. The largest part of respondents (62%) owned small-sized farm. The correlation data showed a significant relationship between farm size and their perception on FINA. The results noted that farmers of small farm sizes were more motivated than big farmers. This is because small-sized farm operators want to develop their production efficiently using modern technologies and inputs. They believe that FINA is the effective way to identify their problems and to find solutions. Annual income was a great factor for farmers' perceptions. The results showed a significant relationship between incomes of the farmers and their perceptions of FINA. The highest portion (49%) of the respondents were medium-income farmers. Farmers with moderate to high income participated more in FINA than low-income farmers. Farmers who were not economically stable had low participation in FINA, perhaps because they might be involved in other income-generating activities during the FINA program.

Table 3. Co-efficient of Correlation (r) Between the Dependent Variables of Farmers' Perception of the Effectiveness of FINA and Independent Variables

Dependent variable	Independent variable	'r' value
Farmers' perception on the effectiveness of FINA	Age	-.27**
	Educational qualities	.20*
	Family size	-.06^{NS}
	Farm size	.18*
	Annual income	.19*
	Organizational participation	.01^{NS}
	Cosmopoliteness	-.10^{NS}
	Extension medial contact	.37***
	Farming experience	-.17^{NS}
	Farming facilities	.21*
	Innovativeness	.15^{NS}
	Agricultural knowledge	.26**

^{NS}Nonsignificant; *, **, ***Significant at 0.05, 0.01, 0.001 respectively.

Organizational participation (74.2%), cosmopoliteness (56.7%), extension media contact (47.5%), farming experience (41.7%), farming facilities (64.2%), innovativeness (47.5%), and agricultural knowledge (54.2%) were characteristics of the majority of farmers participating in the FINA (Table 2). Farmers who had higher contact with extension media and high agricultural knowledge had better perceptions of the effectiveness of FINA than farmers with lesser exposure to extension information. A similar study supported the idea that extension media contact helped farmers in gaining knowledge about fertilizer application and influenced the adoption of chemical fertilizer in Mozambique (Cavane, 1993).

The data further showed a significant relationship (Table 3) of extension media contact, farming facilities, and agricultural knowledge of farmers with their perception of FINA. However, organizational participation, cosmopoliteness, farming experience, and innovativeness had nonsignificant relationships with perception of FINA. The results showed that farmers with agricultural knowledge participated willingly because they knew FINA was the way to get their problems solved. Additionally, in the FINA extension program, Agricultural Extension Officer (AEO) and BSs are actively involved so that farmers concentrated in the meeting and got more answers about farming problems directly from extension officer

Table 4, Distribution of Farmers' Perception on the Effectiveness of FINA In a Potential Scoring Range of 15 to 60 (n=120).

Perception term	Categories	Farmers (No.)	(%)
Providing extension services	Slightly favorable perception (20 to 30)	32	27
	Moderately favorable perception (31 to 40)	55	46
	Highly favorable perception (41 to 49)	33	28
	Mean	**36**	
Adopting recommended agricultural practices	Slightly favorable perception (20 to 30)	25	21
	Moderately favorable perception (31 to 40)	53	44
	Highly favorable perception (41 to 53)	42	35
	Mean	**37**	

Farmers' Perception of the Effectiveness of FINA

Farmers' perception of the effectiveness of FINA in terms of providing extension services ranged from 20 to 49 against a range limit of 15 to 60, with an average score of 36. The highest portion of respondents (46%) was moderately favorable in this regard (Table 4). However, perception indices (PI) on fifteen selected statements ranged from 197 to 307 against a range limit of 100 to 400 (Table 5). According to rank order of PI, the most favorable perception statement was "develop a good relationship between farmers and extension workers due to FINA," whereas the lowest perception statement was "DAE conduct total extension activities based on responsiveness of farmers needs."

Farmers' perception of the effectiveness of FINA in terms of adopting recommended agricultural practices ranged from 20 to 53 against a potential range of 15 to 60, with an average of 37. A large portion (44%) of the respondents was moderately favorable toward adopting recommendations (Table 4). However, perception indices (PI) on fifteen statements in this regard ranged from 131 to 322 against a potential score of 100 to 400 (Table 6). According to the rank order of PI, the most favorable perception statement was "information gained about importance of organic manure application to the field due to FINA program," whereas the lowest perception statement was "knowledge gained about modern irrigation management through FINA."

Table 5. Following Statements Related to the Effectiveness of FINA on Farmers' Perception Indices (PI) and Rank Order (RO) in Terms of Providing Extension Services (n=120)

SL No	Statements	PI	RO
1	Develop a good relationship between farmers and extension workers due to FINA	307	1
2	Increased familiarity with different information media through FINA	305	2
3	Farmers can obtain rapid solutions of their identified problems from the extension workers through FINA	294	3
4	Increased accountability of the extension workers to the farmers due to FINA	288	4
5	Opportunity given to the farmers in participating to the different extension activities through FINA	283	5
6	Increased visits and monitoring of the extension workers to the farmers field due to FINA	279	6
7	Increased communication linkage of the farmers with different extension offices due to FINA	250	7
8	Ensure demand driven extension services of the farmers due to FINA	249	8
9	Decreased the cost of production of the farmers due to FINA	247	9
10	Farmers can participate more in different training activities through FINA	246	10
11	Farmers can reach the proper target of production through FINA	236	11
12	Farmers can identify their actual needs and problems through FINA	235	12
13	Farmers can use necessary practices for their farm due to participation in FINA	232	13
14	Increased familiarity of different extension methods to the farmers through FINA	207	14
15	DAE conduct total extension activities based on responsiveness of farmers needs	197	15

The overall perception of farmers on the effectiveness of FINA was that nearly half of the farmers (44%) responded moderately favorable (Figure 2). These data show that the FINA program was somewhat effective in providing extension services and encouraging farmers to adopt recommended agricultural practices. Nearly one third of

the farmers (32%) perceived the FINA program as highly favorable, but one fourth of the farmers (24%) perceived the FINA program as slightly favorable in providing extension services and adopting recommended agricultural practices. The data further revealed that extension service programs of FINA appeared not highly effective in identifying all agricultural problems and their solutions but found potential in solving some specific problems ranked in Table 5 & 6. The results further suggest rapport communication of agricultural extension officials to the farmers for increasing efficiency of FINA program.

Problem Confrontation in Implementing FINA

Problem confrontation indices (PCI) of the farmers according to the selected twenty problems (Table 7) in implementing FINA program PCI ranged from 114 to 270 in a possible range of 0 to 300. According to the rank order of PCI, "lack of adequate allowance for the participating farmers" was ranked at the top. However, "lack of coordination of the BSs with farmers in implementing FINA" was ranked at the bottom. The data showed some of the problems that were hindering the effectiveness of the FINA program. Farmers

Table 6. Farmers' perception indices (PI) and rank order (RO) in terms of adopting recommended agricultural practices by FINA (n=120).

SL No.	Statements	PI	RO
1	Information gained about importance of organic manure application to the field due to FINA programs	322	1
2	Knowledge increased about high yielding varieties of rice through FINA	315	2
3	Knowledge gained on high yielding potato cultivation through participating in FINA	297	3
4	Eagerness increased in cultivating fruits and vegetables to the homesteads through FINA	292	4
5	Information gained about modern techniques of jute cultivation due to FINA	290	5
6	Knowledge gained about seed production and management of vegetable crops due to FINA	283	6
7	Knowledge increased about pesticide application to the field due to participating in FINA	270	7
8	Knowledge gained about balanced fertilizers application to the field due to participating in FINA programs	248	8
9	Information gained about the reasons of Zn-fertilizers application due to FINA	246	9
10	Knowledge increased about homestead gardening techniques through FINA	242	10
11	Information obtained about methods of compost fertilizers preparation through participating in FINA	237	11
12	Knowledge gained about use of IPM to the field through participating in FINA	231	12
13	Knowledge gained about 'guti-urea' application due to participating in FINA	226	13
14	Information gained about cultivating green manure crops to the fields due to FINA	155	14
15	Knowledge gained about modern irrigation management through FINA	131	15

in rural areas did not have appropriate socio-economic conditions for active participation in FINA; consequently, they were busy in farming activities. They needed some extra

incentives for active participation in the FINA program and, hence, had lack of interest in participating in such programs.

Conclusion, Recommendations and Implications

The results revealed farmers' perception of the effectiveness of FINA. Data about farmers' characteristics revealed categories of the farmers who actively participated in the FINA program. Seven personal characteristics of farmers showed a significant relationship with farmers' perceptions of the effectiveness of FINA. Five characteristics of farmers did not show any relation with farmers' perception. Nearly half of the farmers showed a moderately favorable perception of the effectiveness of FINA. On the other hand, only a quarter of the farmers showed a highly favorable perception. Also, a quarter of the farmers showed a less favorable perception on FINA. Precisely half of the farmers perceived that FINA is effective in providing extension services. Hence, more extension work is recommended to achieve a goal of two thirds of the farmers having a favorable perception of FINA. The study revealed many of the problems that inhibit the success of the FINA program. It is suggested that the extension officers and field extension workers, including other agricultural supporting organizations, should concentrate on addressing the uppermost problems of the farmers.

More studies are needed to explore how the FINA extension program can be more effective for farmers. These results encourage future studies on the following points: (a) the scope of developing other techniques of FINA that can be employed through using training demonstration for farmers' educational progress, (b) problems that prevail in rural Bangladesh in the use of FINA and ways to overcome them, and (c) future prospects of FINA in Bangladesh.

Table 7. Problems Confrontation Indices (PCI) and Rank Order (RO) Faced During Implementing FINA Program (n=120)

SL No.	Problems	PCI	RO
1	Lack of adequate allowance (salary) for the participating farmers	270	1
2	Lack of good quality seed supply	241	2
3	Low market price of agricultural products	238	3
4	Disagree to attend in FINA meeting at distant places for high communication expense	236	4
5	High price of agricultural inputs, like seeds, fertilizers and insecticides	230	5
6	Lack of much remuneration and rewards for the participating farmers	227	6
7	Farmers don't want to spend enough time in FINA meeting	218	7
8	Lack of enough knowledge about FINA	206	8
9	Lack of eagerness of the BSs in conducting FINA due to insufficient budget	202	9
10	Lack of getting urgent solution of the identified needs of farmers	188	10
11	Farmers don't want to be present in the FINA meeting in a group	181	11
12	Lack of importance in collecting information from small and marginal farmers	175	12
13	All participant farmers don't express their opinion in the FINA session	157	13
14	Lack of proper knowledge about new technology	150	14
15	Inability to understand the FINA discussion meeting due to illiteracy	147	15
16	Lack of adequate places and environment for conducting FINA	130	16

	program		
17	Negligence of BSs responsibilities in conducting FINA	128	17
18	Farmers aren't aware about their needs	126	18.5
19	Irresponsibility of the BSs in explaining the importance of the FINA to the farmers and its justification	126	18.5
20	Lack of coordination of the BSs with farmers in implementing FINA	114	20

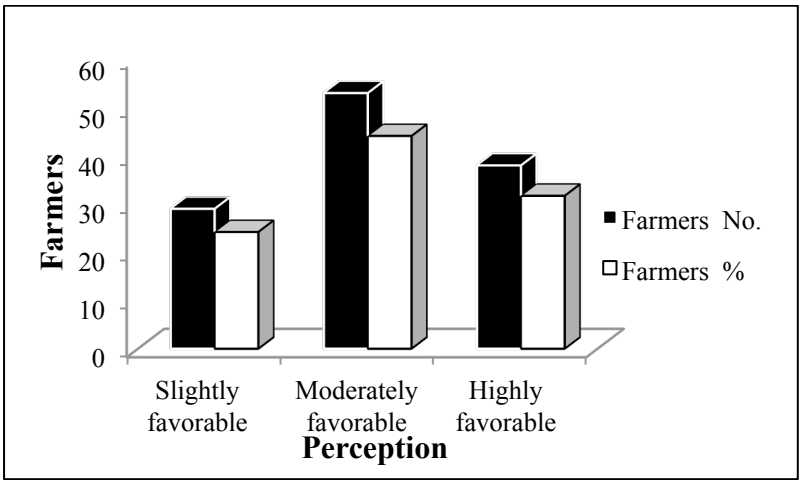

Fig 2: An overall distribution of farmers' perception of the effectiveness of FINA.

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Farmer Innovativeness and Hybrid Maize Diffusion in Thailand

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Abstract

Hybrid maize in Thailand is one example of successful technology dissemination in a developing country. The first hybrid maize variety was released in 1982 by a public research institute, but did not become rapidly adopted until the privatization of the seed market in the early 1990s.Previous studies on the adoption of hybrid maize in Thailand mainly analyzed factors influencing the adoption decision, but none evaluated the timing of the adoption process. This study reveals the diffusion pattern of hybrid maize varieties and categorizes farmers by the time of adoption. It was hypothesized that different categories of farmers would differ in their innovativeness. The results show that the distribution of hybrid maize adoption in Thailand approaches a normal distribution consistent with the literature. Younger and less educated farmers with larger households and farm size tended to adopt hybrid maize faster than others. Furthermore, social activities, extension services, private company promotion programs and access to information on hybrid varieties played important roles in the adoption lag.

Keywords: Technology Diffusion, Technology Adoption, Hybrid Maize, Innovativeness, Communication Channels

Introduction

Maize is an important cash crop in Thailand. Since the 1990s,a substantial increase in domestic demand from the livestock industry and repeated abiotic stresses such as drought have made it more challenging to maintain high productivity in the production of maize. The breeding of high-yielding maize varieties is one of the major means of increasing crop productivity. In 1975, the first successful development of a local high-yielding open-pollinated variety (OPV), Suwan-1, was performed at the National Corn and Sorghum Research Center (NCSRC), a research and field trial unit belonging to Kasetsart University. It became one of the best OPVs in tropical areas and was introduced by the International Maize and Wheat Improvement Center (CIMMYT) in several tropical countries. The production of Suwan-1 seeds was initially led by the public sector, namely Kasetsart University, the Department of Agriculture (DOA), and the Department of Agricultural Extension Office (DOAE). Due to limitations in the public sector, starting in 1979, the production of Suwan-1 seeds opened new opportunities for private companies to participate in the seed market. Several private companies, including the Bangkok Seed Industry Co., Ltd. (currently the Charoen Seeds Group), Cargill Seeds (Thailand), Ltd., and Pacific Seeds (Thailand), Ltd. started to produce Suwan-1 seeds for commercialization, which marked the beginning of privatization in the seed industry in Thailand (Kasetsart University Research and Development Institute, 2009).

Despite the success of high-yielding OPVs, there remained challenges in maintaining production to meet the high market demand in the mid-1990s. The breeding of high-yielding maize varieties has since turned to hybrid technology. Suwan-2301, the first single cross hybrid maize variety in Thailand developed by NCSRC, was released to farmers in 1982 (Kasetsart University Research and Development Institute, 2009). Nearly two tons of these seeds were distributed among farmers within the first year. NCSRC has since encouraged small domestic companies into breeding programs by giving them the access to the public sector's germplasm. Uniseeds and Royal Seeds, with support from NCSRC and CIMMYT, are domestic private companies who perform research on and marketing of public OPVs and public sector hybrids. However, large private companies, including the domestic Charoen Seeds Group (subsidiary of Charoen Phokpan) and multinational companies such as Pioneer Hi-Bred, Pacific Seeds (Advanta/ICI/Zeneca), Novartis (currently Syngenta), and Cargill Seeds (later acquired by Monsanto), use their own germplasm. The collaboration between the Charoen Seeds, a Thailand-based global conglomerate in agribusiness and crop integration, and a U.S.-based DeKalb Seeds, for example, successfully commercialized its first single cross hybrid CP-DK888 in 1991(Ekasingh, Gypmantasiri & Thong-Nam, 2001).

After the release of hybrid varieties during the 1980s, due to the lack of information on and experience with the new varieties, farmers' perception and adoption were limited and slow. The first generation hybrid maize varieties were top-cross, double top-cross and double-cross hybrid varieties that had unstable characteristics and were perceived as not possessing significant advantages over existing OPVs. Lower grain prices and the higher price of hybrid seeds also contributed to the hesitation of farmers to adopt early hybrid varieties. The release of triple-cross hybrid varieties, which are more stable and more resistant to disease and drought, slowly expanded the adoption of hybrid maize, but adoption did not increase rapidly until the release of CP-DK888 by Charoen Seeds in

1991 (Suwantaradon, 2001). Other hybrid seed companies started breeding their own single-cross hybrids, and the increase in competition among seed firms provided farmers with more alternatives. Mergers and acquisitions of seed companies, however, later made the hybrid seed industry less competitive.

In 1994, DOAE launched the single-cross hybrid maize promotion program, covering 39,000 hectares in 18 provinces. It aimed to maintain sufficient maize production by providing farmers with good quality hybrid seeds. The program continued to its peak in 1997, covering 144,480 hectares in 38 provinces and 1,165,000 hectares in 40 provinces in 2000 (Suwantaradon, 2001). In addition, the Bank for Agriculture and Agricultural Cooperatives was an important institute that contributed to hybrid maize adoption. It provided credit to farmers in terms of hybrid maize seeds and fertilizers. It was estimated that the adoption of hybrid maize increased from 20% of the total maize area in 1990 to 49% in 1993 to 60% in 1995, and at least 90% of maize farmers planted hybrid seeds in 1998–1999 (Ekasingh et al., 2001).

Currently, not only has Thailand almost completely adopted hybrid maize, it also is a major supplier of hybrid seeds to other countries in the region. Because the adoption of hybrid maize in Thailand is a good example of successful technology dissemination in developing countries, understanding its diffusion process could have important implications for other agricultural innovations. Although a number of studies have attempted to find the determining factors of hybrid maize adoption in Thailand, like most studies on maize adoption, they only provided a static probability of adoption at a particular point in time. Since each stage of the diffusion process implies different innovation decisions, the adoption cannot be fully understood without understanding the innovative characteristics of farmers and other factors that may influence adoption at different stages of the diffusion process.

Objectives

There were two major objectives of this study. The first was to determine the diffusion pattern of hybrid maize in Thailand and characterize maize farmers by their stage of adoption, following Rogers (2003). The second was to determine the innovative factors that differentiate each group of farmers in the diffusion process. These results could be used to speed up the adoption of new crop varieties and to determine the roles of public and private maize extension programs.

Conceptual Framework

Diffusion of Innovation and Categorization of Adopters

Earlier studies on technology adoption in agriculture focused on factors that affect adoption by individual farmers. However, these studies do not provide information on when the technology will be accepted; in other words, the timing of technology adoption. More recent studies attempted to reveal when farmers start using an innovation and what factors influence the adoption lag (Dadi, Burton, & Ozanne, 2004; D'Emden, Llewellyn, & Burton, 2006). Diffusion, on the other hand, depicts the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 2003), or can be interpreted as aggregate adoption such as a percentage of the farming population that adopts new innovations. Understanding the diffusion of technology and the process of innovation is useful in understanding the dynamics of technological change and how it influences the economy (Feder & O'Mara, 1981; Griliches, 1957; Zhang, Fan & Cai, 2002).

The diffusion of an innovation depends on the rate of adoption, i.e., the speed at which an innovation is adopted by potential users. It is measured for an innovation in a social system, rather than for an individual. An S-shaped rate of adoption implies that the diffusion of the innovation follows a normal, bell-shaped frequency curve or an S-shaped cumulative curve when plotted over time. The study of hybrid corn diffusion by Griliches (1957) was perhaps the first evidence of using S-shaped diffusion patterns in agricultural technology. Based on their innovativeness, adopters may be categorized by the rate of individual adoption, i.e., whether to adopt and when to adopt. Rogers (2003) defined adopters based on the adoption lag determined by their innovativeness into five categories: innovators, early adopters, early majority, late majority, and laggards.

Innovators are the first to adopt an innovation. Their interest in new innovations leads them to play an important role in the diffusion process by launching a new technology into the system. Innovators are expected to cope with a high level of risks and be willing to accept occasional setbacks when a new technology proves unsuccessful. *Early adopters* have the highest degree of opinion leadership. They help trigger the critical mass when adopting an innovation. By being respected by their peers and representing the embodiment of the successful use of innovations, they decrease uncertainties and demonstrate approval of the innovation by adopting it. *Early majority* represents those who adopt new innovations before the average member. Their innovation decision period takes longer than the previous two groups, and they generally follow consciously but rarely lead. *Late majority* adopt new ideas after the average member of a social system. Adoption for them could be both an economic necessity and the result of increasing peer pressure. Their relatively scarce resources make them feel safe when adopting after most uncertainties have been removed. The *laggards* are those whose decisions are frequently made in terms of what has been done in the past. Their resistance to innovations is justified by having limited resources, such that adoption will not take place unless they are certain that the innovation will not fail.

Presuming a normal distribution of the adoption rate, two statistics, the mean ($\bar{x}$) and standard deviation (sd), are used to divide adopters based on their innovativeness into five categories (Rogers, 2003). From Figure 1, about one-third of adopters are the early majority and another one-third are the late majority, while only less than 3% are innovators. This system of classification requires complete adoption which is virtually the case for hybrid maize in Thailand.

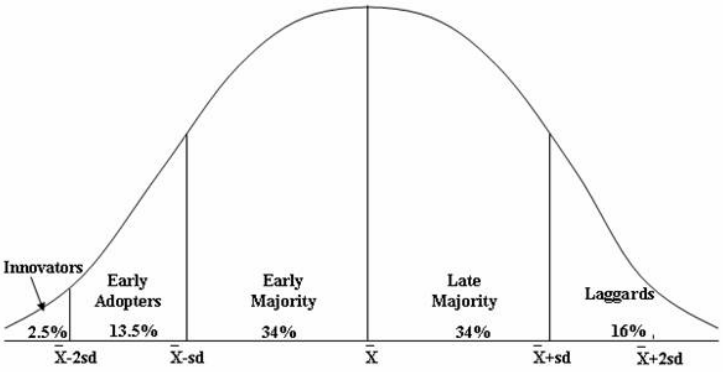

Figure 1.Adopter categorization on the basis of innovativeness
From *Diffusion of Innovations* (5th ed.) (p. 281), by E.M. Rogers, 2003, New York: Free Press.

Attributes of Innovation and Farmer's Innovativeness

Factors influencing adoption have been highlighted in most agricultural technology adoption studies. In the case of maize variety adoption, these include farm and farmer's characteristics such as age (Chirwa, 2005; Simtowe, Zeller, & Diagne, 2009), education (Iqbal et al., 1999; Salasya et al., 2007), household size (Ransom, Paudyal, & Adhikari, 2003; Sain & Martinez, 1999), and farm size (Feder & Omara, 1981; Hintze et al., 2003; Iqbal et al., 1999; Sain & Martinez, 1999; Salasya et al.,2007; Simtowe et al., 2009). In addition, the characteristics of the technology themselves have been found to be influential to adoption. Rogers (2003) suggested that perceived attributes of the innovation such as relative advantage, compatibility, complexity, trialability, observability, the extent of promotion efforts, communication channels, and the nature of the social system are major factors affecting the rate of adoption.

In this study, we put the emphasis on the innovativeness of farmers that influences their rate of adoption, as ultimately this is the factor that distinguishes farmers into different categories. Rogers (2003) summarized three domains of innovativeness: socioeconomic status, personality, and communication behavior. He highlighted that earlier adopters tend to have more formal education, higher social status, a greater degree of social mobility, and larger sized farms than later adopters, but do not necessarily differ in age.

In the context of maize variety adoption, evidence for the impact of age was found by Chirwa (2005), Dadi et al. (2004), and Simtowe et al. (2009), such that younger farmers are associated with greater risk-taking behavior and tend to accept technology more readily than more elderly farmers. Education generally represents a better opportunity to acquire and process information on new technologies. Feder & Omara (1981), Iqbal et al. (1999), Nkonya, Schroeder, & Norman (1997), and Salasya et al. (2007) found that formal education is an influential factor in the adoption of new maize varieties. It is hypothesized that larger families use a greater proportion of their revenue to satisfy vital needs; therefore, they may have greater budget constraints on the acquisition of new technology. As found by Burton, Rigby, & Young (2003) and Sain & Martinez (1999), farmers who have smaller families are more likely to adopt new maize varieties. Farm size is another important socioeconomic factor affecting the adoption of new agricultural technologies (Feder & Omara, 1981; Hintze et al., 2003; Iqbal et

al., 1999; Sain & Martinez, 1999; Salasya et al.,2007; Simtowe et al., 2009). The major hypothesis of this factor is that farmers with larger farm areas will more likely have greater financial assets, and leverage, and be more willing to take risks for new technology adoption. Thus, farmers with larger farms may adopt new varieties earlier than those with smaller farms.

The personality of farmers is one area that most adoption and diffusion studies have overlooked, perhaps due to measurement difficulties. The ability to cope with uncertainty and risk and a favorable attitude toward science are commonly found in earlier adopters more than later adopters. Farmers' attitudes towards new technology, particularly the perception of new varieties, are widely hypothesized to be influential in the adoption decision. Payne, Fernandez-Cornejo, & Daberkow (2003), for example, used expected loss from corn rootworm without treatment as an indication of an expected benefit from adopting corn rootworm Bt seed. Diederen, Meijl, Wolters, & Bijak (2003) used the search for innovation (dummy variable) as an attitude regarding innovation. They hypothesized that farmers adopt earlier if they regard the search for innovation as a permanent rather than occasional activity. Preferences towards new traits are commonly found to significantly affect the adoption of maize variety. Hintze et al. (2003) and Salasya et al. (2007) found that the higher yield and earlier maturity of new maize varieties were the two most important characteristics influencing the adoption decision, followed by grain quality and drought tolerance. In Thailand, Ekasingh et al. (2004) revealed that a lower seed price is the major attribute in the adoption decision of a new maize variety, followed by higher yield, drought tolerance, and good grain quality, respectively.

Communication behavior is probably one of the factors that has been explored most in the extension literature. Extension services by the public sector and the promotion programs of private companies have been used to explain the relationship between channels of service received and new technology adoption. Feleke & Zegeye (2006), Matthews-Njoku, Adesope, & Iruba (2009), Ransom et al. (2003), and Nkonya et al. (1997), for instance, found that more frequent contact with extension officers significantly increased the probability of technology adoption. Furthermore, Dadi et al. (2004) and D'Emden et al. (2006) found that communication with extension officers shortens the decision time to adopt a new maize variety. Matuschke & Qaim (2008) hypothesized that social activities such as more formal meetings with other farmers and knowledge centers, participation in field visits, and informal meetings such as social festivals or local ceremonies allow farmers to get information on the existence and performance of new seed technologies faster and therefore adopt earlier than their less socially active colleagues. In Thailand, there are three sources of communication provided to maize farmers: extension programs from public organizations, promotion programs from private companies, and those from input dealers (Ekasingh et al., 2004).

Methods

Data Collection

A three-stage stratifying random sampling was used to survey maize farmers in Thailand in May and June, 2011. Because the differences in crop intensity could have different levels of extension services and formal social activities regarding maize production, in the first stage, maize producing provinces were categorized into high- and low-intensity production. Thirteen maize provinces were classified as high-

intensity areas, and 15 provinces were classified as low-intensity areas. In the second stage, both areas were stratified by the establishment of research centers, following the hypothesis that a shorter distance from a maize research center increases the access to maize technology and possibly facilitates the adoption of new hybrid varieties. In the last stage, one district from each province was selected randomly. Based on Krejcie & Morgan (1970), assuming a 5% statistical significance level, the sample size was identified as 341 based on a total of 2,997 maize farming households in five selected districts. The number of selected households was proportional to the maize farming households in each district to the total number of maize farming households in the five districts.

Data analysis

To generate the diffusion pattern of hybrid maize, the number of farmers who first planted hybrid maize was calculated from the samples. Although Suwan-2301 was officially released from NCSRC in 1982, it was adopted earlier by some farmers through experimental stations. Thus, to be consistent with the survey data, hybrid maize diffusion started in 1980 when the first hybrid maize became available. Adopters were classified into stages of adoption based on the mean and standard deviation (Figure 1). To differentiate innovativeness among each group of farmers in the diffusion process, analysis of variance (ANOVA)(Anderson, Sweeney, &Williams, 2008), F-tests and Chi-squared tests were used to test innovative variables among the different adopter categories.

Results and Discussion

Figures2 and 3 represent the frequency and cumulative distributions of hybrid maize adoption, respectively. The diffusion pattern approaches a normal distribution (S-shaped cumulative distribution); thus, adopters were categorized by the mean and standard deviation as shown in Figure 1. Table 1 shows the number and percentage of farmers who first adopted hybrid maize by category. It can be seen that, in the first four years after hybrid maize became available, the innovators comprised only about 2% of all adopters. Early adopters accounted for about 20%, which is greater than normal diffusion (13.5%) in this category. This implies that the diffusion of hybrid maize is relatively faster than typical technology.

The early majority and late majority together account for 60% of all adopters and, interestingly, the early majority started in 1990 when private companies started producing hybrid seeds for commercialization. In 1991, when Charoen Seeds released CP-DK888, the adoption of hybrid maize increased, consistent with the findings in Suwantaradon (2001), but declined in the next few years. In 1994, there were only 11 new hybrid maize adopters, but at this time, the DOAE launched the single-cross hybrid maize promotion program. It can be seen that new hybrid maize adopters increased after this promotion program, and the initiation of this program brought in the 25% late majority.

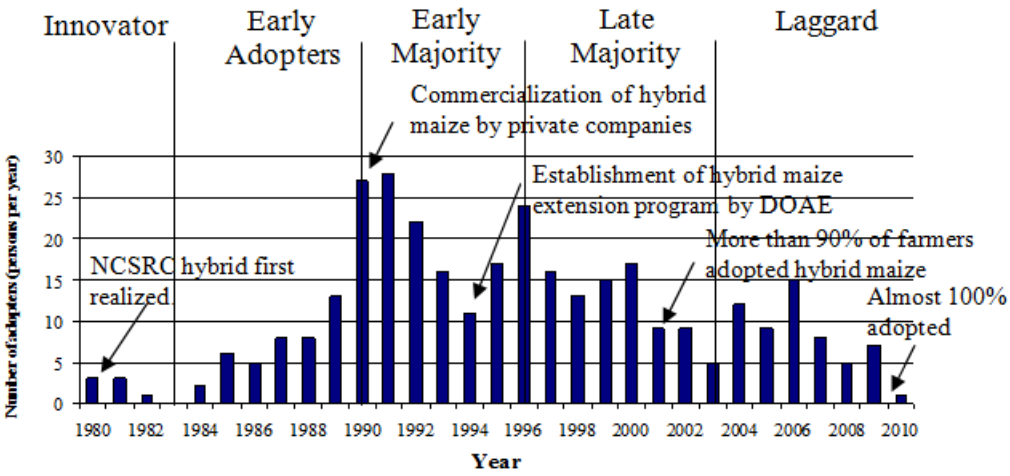

Figure 2.Diffusion and Adopter Categorization of Hybrid Maize in Thailand.

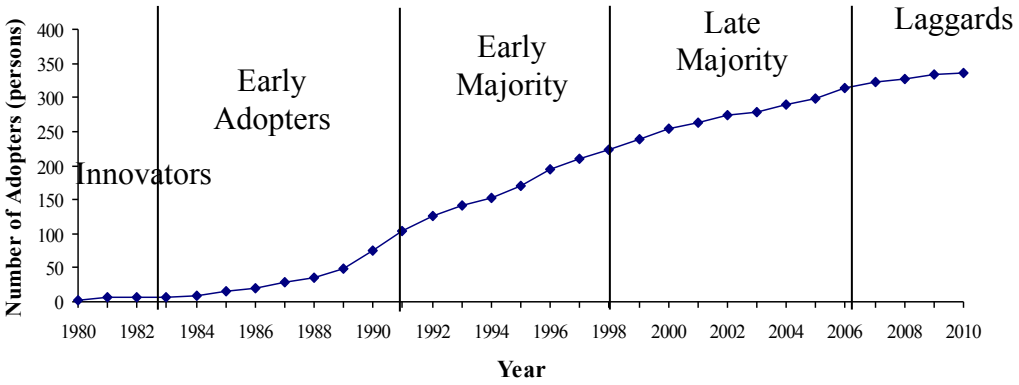

Figure 3.Cumulative distribution and adopter categorization of hybrid maize adoption in Thailand.

Table 1.Categorization of Hybrid Maize Adopters in Thailand

Adopter Categorizations	Year	Number of farmers	%
Innovators	1980-1983	7	2.09
Early Adopters	1984-1990	69	20.60
Early Majority	1991-1996	118	35.22
Late Majority	1997-2003	84	25.07
Laggards	2004-2010	57	17.02
Total		335	100

Table 2 shows the mean (M) and standard deviation (SD) of socioeconomic variables by category. F-tests revealed that adopter categories differed by age, education, household size, and farm size, as expected. Younger farmers tended to adopt maize hybrids faster than the older ones, similar to the findings of Chirwa (2005), Dadi et al. (2004), and Simtowe et al.(2009). In contrast to Burton et al. (2003) and Sain & Martinez (1999), larger families were found to adopt earlier than smaller families. This is inconsistent with our hypothesis that larger families have greater budget

constraints on the acquisition of new technology, perhaps because hybrid maize does not require a large initial outlay of capital like other technology. From the survey data, the majority of maize farmers (74%) are small-scale farmers who have less than eight hectares. These small farmers tend to be later adopters. As hypothesized, it is possible that smaller farmers have less financial asset and leverage; thus, higher price of hybrid seeds than OPV seeds is slowing them from hybrid technology adoption. In addition, small farmers may be more attached to traditional cultures and local varieties, and are less willing to adopt new technology. Less educated farmers tended to be earlier adopters, probably because hybrid maize does not require greater skill, nor is it a complex technology; therefore, maize farmers can easily be influenced by seed agents or extension officers.

Table 3 depicts the attitudes of farmers toward the characteristics of hybrid maize compared to OPVs and local varieties. These are proxies for farmers' opinions regarding new varieties. These results show that farmers in different categories differ in their attitudes towards superiority of hybrid maize in terms of yield, grain weight and shape, drought tolerance, and rust resistance. These different attitudes make a difference in terms of the timing of hybrid adoption. The early adopters and early majority had positive attitudes with regard to the yield, grain quality, and rust resistance characteristics of hybrid maize compared to the late majority and laggards. However, farmers who adopted at different times had in common their attitudes toward hybrids in terms of early maturity, ease of harvest, and the price of maize grain.

Table 2. Socioeconomic Status of Hybrid Maize Adopters, by Category

Adopter	Age (yr)		Edu (yr)		HH size (persons)		Area (ha)	
Category	M	SD	M	SD	M	SD	M	SD
Innovators	29.14	11.09	3.43	1.51	4.28	1.60	8.00	5.88
Early Adopters	31.16	9.16	4.84	2.85	4.58	1.96	11.33	22.68
Early Majority	36.18	11.16	5.22	2.92	4.12	1.51	7.19	8.32
Late Majority	37.24	10.22	5.50	2.63	3.71	1.26	5.39	9.23
Laggards	45.84	12.74	6.03	4.02	3.89	1.27	4.71	8.90
F-test	15.58***		1.70*		3.33***		2.73**	

Note: * = significant at the 10% level, **= significant at the 5% level, *** = significant at the 1% level

Table 3. Number and Percentage of Hybrid Maize Adopters' Attitudes toward the Advantages of Hybrids Over OPVs

Attitudes	Adopter Category										χ^2-test
	Innovators		Early Adopters		Early Majority		Late Majority		Laggards		
	agree	other	agree	other	agree	other	Agree	other	agree	other	
Yield	5	2	63	6	105	13	70	14	41	16	12.28***
	(71.43)	(28.57)	(91.30)	(8.70)	(88.98)	(11.02)	(83.33)	(16.67)	(71.93)	(28.07)	
Maturity	5	2	34	35	64	54	39	45	23	34	4.62
	(71.43)	(28.57)	(49.27)	(50.73)	(54.23)	(45.77)	(46.43)	(53.57)	(40.35)	(59.65)	
Grain	5	2	62	7	103	15	66	18	38	19	15.25***
	(71.43)	(28.57)	(89.85)	(10.15)	(87.29)	(12.71)	(78.57)	(21.43)	(66.66)	(33.34)	
Drought Tolerance	5	2	55	14	86	32	57	27	30	27	11.81**
	(71.43)	(28.57)	(79.71)	(20.29)	(72.88)	(27.12)	(67.85)	(32.15)	(52.63)	(47.37)	
Ease of Harvest	5	2	42	27	86	32	59	25	35	22	4.25
	(71.43)	(28.57)	(60.87)	(39.13)	(72.88)	(27.12)	(70.24)	(29.76)	(61.40)	(38.60)	
Rust Resistance	3	4	44	25	78	40	48	36	23	34	12.10**
	(42.85)	(57.15)	(63.77)	(36.23)	(66.10)	(33.90)	(57.14)	(42.84)	(40.35)	(59.65)	
Price	2	5	30	39	48	70	28	56	18	39	3.26
	(28.57)	(71.43)	(43.48)	(56.52)	(40.67)	(59.33)	(33.33)	(66.67)	(31.58)	(68.42)	

Note: Numbers in parentheses are percentages of the same category
** = significant at the 5%level, *** = significant at the 1%level

Tables 4–6 describe the communication behavior among categories of farmers via different channels. In Table 4, a number of meetings with public and private researchers less than one implies that they rarely met with researchers compared to extension officers. Farmers of all categories had more opportunities to meet with extension officers than public and private researchers. Only the number of meetings with private researchers was significantly different across categories of farmers. The early adopters and early majority had more opportunity to meet with private researchers than the others. This is consistent with the fact that privatization of the seed market and the time of adoption of the early adopters and early majority coincided, which may have led to broad acceptance of hybrid maize in Thailand.

Table 4. Average Number of Meetings between Adopters and Public Officers, Public Researchers or Private Researchers by Category

Adopter Category	Number of Meetings(times per year)					
	Extension Officers		Public Researchers		Private Researchers	
	M	SD	M	SD	M	SD
Innovators	3.28	4.15	0.14	0.37	0.14	0.37
Early Adopters	1.77	2.51	0.42	0.77	0.87	1.16
Early Majority	1.84	2.97	0.24	0.59	0.96	1.65
Late Majority	2.13	3.09	0.19	0.45	0.43	0.84
Laggards	1.75	2.86	0.23	0.56	0.52	0.91
F-test	0.60		1.64		3.15**	

Note: **= significant at the 5% level

Tables 5 and 6 show the comparison of information received from extension services or promotion programs and information on hybrid maize received from different agents at the time farmers first adopted hybrid maize. As shown in Table 5, the different categories of farmers were different in terms of receiving promotion programs from the input dealers and from private extension officers. The early adopters and early majority received more promotion materials from the private sector than other categories, which is consistent with the timing of the release of private hybrid varieties. This might imply that the private sector plays a more important role in hybrid maize adoption than the public sector, particularly for most of the early adopters and early majority. Table 6 shows that farmers of different categories were significantly different in receiving hybrid maize information from all sources. The early adopters and early majority tended to receive more hybrid maize information from input dealers and private extension officers than farmers in other categories. Comparing across sources of information, private extension officers provided more access to hybrid maize information than public extension officers or seed dealers. This result may imply that the privatization of hybrid seed during the 1990s also improved access to hybrid maize information from the private sector, and thus the adoption of hybrid maize. However, the public sector also provided significant hybrid information to the early majority and late majority, probably through the hybrid extension program by DOAE in 1994.

Table 5. Incidence of Receiving Extension Services or Promotion Programs by Type of Agent at the Time of Adoption

Adopter Category	Type of Agent Providing Extension Service or Promotion Program					
	Seed Dealer		Public Extension Officer		Private Extension Officer	
	Yes	No	Yes	No	Yes	No
Innovators	1	6	0	7	2	5
	(14.28)	(85.72)	(0)	(100)	(28.57)	(71.43)
Early Adopters	12	57	7	62	22	47
	(17.39)	(82.61)	(10.14)	(89.86)	(31.88)	(68.12)
Early Majority	11	107	19	99	41	77
	(9.32)	(90.68)	(16.10)	(83.90)	(34.74)	(65.26)
Late Majority	2	82	13	71	14	70
	(2.38)	(97.62)	(15.47)	(84.53)	(16.66)	(83.34)
Laggards	5	52	6	51	15	42
	(8.77)	(91.23)	(10.52)	(89.48)	(26.31)	(73.69)
χ^2-test	10.39**		3.16		8.60*	

Note: Numbers in parentheses are percentage of the same category
* = significant at the 10% level,** = significant at the 5% level

Table 6. Incidence of Receiving Hybrid Maize Information (Info) by Type of Agent at the Time of Adoption

Adopter Category	Type of Agent Providing Hybrid Maize information					
	Input Dealer		Public Extension Officer		Private Extension Officer	
	Yes	No	Yes	No	Yes	No
Innovators	0	7	1	6	2	5
	(0)	(100)	(14.28)	(85.72)	(28.57)	(71.43)
Early Adopters	24	45	10	59	42	27
	(34.78)	(65.22)	(14.49)	(85.51)	(60.86)	(39.14)
Early Majority	31	87	36	82	55	63
	(26.27)	(74.73)	(30.51)	(69.49)	(46.61)	(53.39)
Late Majority	14	70	37	47	31	53
	(16.66)	(83.34)	(44.04)	(55.96)	(36.90)	(63.10)
Laggards	17	40	10	47	22	35
	(29.82)	(71.18)	(17.54)	(82.46)	(38.59)	(61.41)
Independent testing (χ^2-test)	9.52**		21.06***		11.04**	

Note: Numbers in parentheses are the percentage of the same category
= significance at the 5%level, * = significance at the 1% level

Conclusions and Implications

The results from a farm survey in five provinces of Thailand reveal that the diffusion pattern of hybrid maize approaches a normal distribution or S-shaped cumulative distribution. Based on the mean and standard deviation, adopters were categorized into five categories: innovators, early adopters, early majority, late majority, and laggards. The results also show that younger farmers, less educated farmers, and those with a larger household and larger farm tended to adopt more rapidly than the others, perhaps because they tend to accept more risks associated with new technology, and are less detached from traditional local practices. Innovativeness, represented by attitudes toward new technology and communication behavior, distinguished farmers across categories. These results also show that farmers of different categories were different in their attitudes towards new hybrid maize such as high yield, grain quality, drought tolerance and rust resistance, which influenced the timing of adoption. The private sector played an important role in hybrid maize adoption, particularly by seed dealers and private extension officers through promotion programs and by providing information on hybrid varieties. Although the privatization of the seed industry facilitated communication with farmers, public extension officers also influenced adoption when the private sector did not take on a sufficient role.

These findings suggest that, to increase the speed of adoption of an agricultural technology that does not require high investment or skill such as new varieties, policy makers should pay more attention to younger and less educated farmers and those with larger farms, since they tend to accept more risk than others. In addition, providing information on the new technology and encouraging the promotion of new technology could also stimulate adoption decisions.

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Future IPM Trends in Trinidad and Tobago: A Qualitative Study of Farmers' Perspectives

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Abstract

Agriculture plays a fundamental role in the infrastructure of many developing economies. Trinidad and Tobago depends on food imports for over 90% of its domestic food supply making agriculture a politically sensitive sector. Technology adoption, specifically Integrated Pest Management (IPM), is one method used by the government to help enhance food security. The purpose of this study is to evaluate factors affecting IPM program adoption in Trinidad and Tobago, to describe current practices used by farmers, and to identify future perceptions of IPM technology. The theoretical framework for this study was constructed using Rogers' diffusion of innovations as it pertains to agriculture. Twenty-one farmers were purposively selected to participate in this study. Economics, progressive ideology, mixed control methods, pest management practices, traditions, and a holistic approach to agriculture were identified as the key elements of IPM programs by farmers. Practitioners seeking to influence the adoption of IPM in this country should be knowledgeable of IPM program elements. Future research should seek to enhance information communication and dissemination.

Keywords: Diffusion of Innovations, Integrated Pest Management, Small Scale Farmers' Perceptions

Introduction

Agriculture has become an increasingly more important and yet smaller component of the global economy over the past two decades (Swanson, 2006). Population increases, climate change, and economic factors have been cited as primary drivers of agriculture's increased importance (Pretty et al., 2010). Developing countries are particularly sensitive to changes in agriculture as the historic food import/export practices become less reliable (Fritschel, 2003) and jeopardize food security. Many of developing countries have focused domestic policy toward increasing domestic agricultural production and reducing reliance on food imports. A common approach to the problem of food security has been the utilization of technology to enhance production practices.

Hutchins (2009) asserted that an adequate supply of food is paramount to population survival, fundamentally making agriculture a first-level priority. Technology has enabled human civilization to leave the "hunter/gatherer" paradigm of existence and concentrate labor and land to the sole purpose of more efficient food production (Hutchins, 2009). The need for technological development in agriculture was recognized by the United Nations as key in the ability to meet future food needs. An increase in technological use within developing countries will be critical to ensure prosperity and growth (Food and Agriculture Organization of the United Nations [FAO], 2009).

Developing countries typically experience more rapid population growth than developed countries and are also more susceptible to fluctuations in food prices (Rosen, 2008). According to Lutz (2010), the global population is estimated to reach in excess of 9 billion people by the middle of the twenty-first century. Most of the population growth is expected to take place in developing countries. The issue of food security combined with a rapid population expansion makes food security a more acute problem in developing countries. Countries in the Caribbean region have a vested interest in improving agricultural output and sustainability, since most Caribbean countries are classified as developing (Rosen, 2008).

The Republic of Trinidad and Tobago is classified as a developing country in the Caribbean region (International Monetary Fund, World Economic Outlook, 2012). Trinidad and Tobago relies heavily on food imports with current levels in excess of 90% (Ministry of Food Production, Land and Marine Affairs, 2012). Agriculture in Trinidad and Tobago is generally confined to rural areas and is a primary source of revenue for farmers and agricultural laborers in rural households (Rosen, 2008). Currently the Ministry of Agriculture, Land, and Marine Resources is attempting to reduce reliance on foreign imports of food sources by introducing a new National Food Production Action Plan (NFPAP). The NFPAP is an attempt to secure safe food sources that are grown locally in Trinidad and Tobago (Ministry of Food Production, Land and Marine Affairs, 2012). To accomplish this task, the NFPAP identifies target issues in agriculture in order to enact specific programs to target problems. A key element of the NFPAP plan revolves around technology in agriculture (Ministry of Food Production, Land and Marine Affairs, 2012).

One technology that can promote improved sustainable agriculture is Integrated Pest Management (IPM). Wilen, Lazaneo, and Parker (2011) identified IPM as a term that describes the concept of biological and minimal chemical use to control for pests, in a way that would offer the least amount of disruption to ecosystems. One of the primary goals of IPM is to control destructive pests and diseases while simultaneously eliminating or reducing the use of synthetic pesticides (Erbaugh, Donnermeyer, & Kyamanywa, 2002). IPM offers farmers the advantage of a safe alternative to the chemical pest controls. Excessive chemical usage can threaten food and consumer safety, the environment, and also the export of agricultural products to global markets (Erbaugh, Kibwika, & Donnermeyer, 2007). Yorobe, Rejesus, and Hammig (2011) found that farmers utilizing IPM practices experienced significantly lower input costs. Higher commodity prices have also been found to result from farmer IPM implementation (Muller, Guenat, & Fromm, 2010). Research has shown that farmers will transition away from pesticides to an IPM-based management system when commodity prices are low due to economic

factors (Lamine, 2011). Farmers in Trinidad and Tobago currently equate pest management with pesticide use, in the belief that a direct relationship exists between an efficient product yield and the amount of pesticide applied. Access to pesticides is unregulated, with attendant risks of accidental exposure or intentional poisoning (Pinto Pereira, Boysielal, & Siung-Chang, 2007). To achieve more successful IPM implementation, there is a need for further research to facilitate communication of these technologies and management practices.

Members of the Association of International Agricultural and Extension Education (AIAEE) have studied facets of IPM across the globe. Bunyatta, Mureithi, Onyango, and Ngesa (2006) researched the perceptions of farmer field schools on IPM practices on rural farmers in Kenya. Farmer Field Schools were found to be effective in improving farmers' IPM knowledge in Uganda (Erbaugh, Donnermeyer, Amujal, & Kidoido, 2010). Tripp, Wijeratne, and Piyadada (2005) recommended agricultural policy makers ensure IPM practices are supported to improve sustainable agricultural practices and disseminate the information to farmers. Erbaugh et al. (2007) further suggested that farmers' perceptions of IPM practices should be routinely studied to better understand educational and training needs for farmers.

Theoretical Framework

There is a gap in the literature surrounding the transfer of technology from the researcher to the producer in Trinidad and Tobago (Smale, 2009). In his seminal work, Rogers (2003) proposed a diffusion framework that outlines a process through which innovations or concepts are disseminated over time to and through members of a social system. Within Rogers' framework, innovations are evaluated based on the characteristics of the innovation itself, the communication channels used, the time elapsed since the innovation's introduction, and the social setting in which the innovation is being diffused (Rogers, 2003). Rogers (2003) further classified the properties of innovations that contribute to its adoption. Rogers' classifications have been shown to be useful in comparing the costs and benefits of adoption versus non-adoption and thus the likelihood of adoption (Chigona & Licker, 2008). Diffusion framework provided a unique context to evaluate technology transfer in Trinidad and Tobago.

The first component of the diffusion of innovations framework consists of the properties of the innovation itself. Rogers (2003) discussed the applicability of the framework to evaluate technological innovations. Rogers (2003) defined technological innovation as "an idea, practice, or object perceived as new by an individual or other unit of adoption" (Rogers, 2003, p.36) that can mitigate some of the uncertainty in achieving future outcomes. Five key elements identified by Rogers (2003) pertaining to adoption rate and associated with the innovation itself are: relative advantage, compatibility, complexity, trialability, and observability. Relative advantage is a measure of how much improvement an innovation supplies as compared to current practice. Relative advantage can be measured in both social and economic terms. Compatibility measures how compatible an innovation is to existing societal values, experience, and practice. Complexity addresses the degree of difficulty that the adopter has in understanding and using the innovation, while trialability assesses the ability of the innovation to be tried at smaller or incremental scales. Observability evaluates the ability of the results of an innovation to be noticed by others within the social system.

All of the elements outlined by Rogers (2003) are beneficial in effectively evaluating the diffusion of innovations within the context of a developing country as innovations are bounded by a common societal structure. Technology diffusion relies on human interaction. Diffusion requires the individuals to have the inclination to share information with others (Palis, Morin, & Hossain, 2002).

The second element of the innovation diffusion theory revolves around communication channels. A communication channel is the means by which an idea is transmitted between individuals (Rogers, 2003). Communication channels have been shown to revolve around the idea that individuals generally evaluate ideas not so much on scientific validity but moreso on peer opinions and the evaluations of those peers who have already adopted (Rogers, 2003). Peer evaluation relies on two primary attributes: homophily and heterophily (Rogers, 2003). Homophily relates to the similarities between individuals with respect to beliefs, education, social status, and other similar attributes, whereas heterophily describes how individuals are opposite in these regards. Rogers (2003) found that there must be some degree of heterophily between individuals in order for the diffusion process to succeed. Palis et al., (2002) concluded that the individuals relied on group communication in order for knowledge sharing to occur.

The third component in the diffusion process regards time. As defined by Rogers (2003), this component is composed of three elements: the formation of attitudes by the adopter regarding the innovation, the innovativeness of the adopter, and the relative speed at which the innovation is adopted within a system. Adopter attitude is usually classified using the innovation-decision process (Rogers, 2003). Adopter innovation was classified by Rogers (2003) into five general categories that typically follow an S-shaped curve: innovators, early adopters, early majority, late majority, and laggards. According to Lapple and Van Rensburg (2011), farmers do not necessarily adopt technologies at the same time or uniformly. There is an importance to be able to distinguish the characteristics and classification between adopter categories and groups (Lapple & Van Rensburg, 2011).

The final element of diffusion theory revolves around social setting. Social setting refers to a group of individuals working toward a common goal or problem (Rogers, 2003). Social setting is important since the social system in which the innovation is located can influence diffusion (Chigona & Licker, 2008). Social setting relies heavily on the concept of opinion leaders and change agents. Opinion leadership is defined as "the degree to which an individual is able to influence other individuals' attitudes or overt behavior informally in a desired way with relative frequency" (Rogers, 2003, p. 27). Opinion leaders tend to be community leaders, and the respect and credibility that opinion leaders command is fundamental in enabling the leaders to aid in the diffusion process. Change agents are individuals who seek to effect change based on a predetermined direction from an external source (Rogers, 2003). Change agents are often professionals from outside of the community. Having a single repository of information, like the government, has shown to be insufficient for producers to learn new technologies (Hartwich & Scheidegger, 2010). Much like the adopter categories, opinion leaders play a significant role in the diffusion of innovations in developing countries.

Purpose and Objectives

The purpose of this study was to evaluate the adoption of IPM practices by farmers in Trinidad and Tobago.

Specifically the objectives of this study were to:

1. Identify farmers who were practicing IPM,
2. Describe the IPM practices used by farmers at the production level, and
3. Identify farmers' perceptions of future trends in IPM.

Methods

A qualitative research design method was used for this study. Qualitative research was selected due to its ability to provide unique insights into the interactions within a particular context (Patton, 1985**)**. The study consisted of nineteen farmers ($N = 19$) from Trinidad and Tobago. Farmers were selected using a purposive sampling technique parallel with the study's objectives. University and Ministry of Agriculture (MOA) staff assisted in farmer selection based on farmer adoption of IPM practices and farmer roles as opinion leaders within the agricultural community. Purposive sampling allows the researcher to gain a more robust insight into the data by purposely selecting a sample from which the most can be learned (Merriam, 2009).

Farmers were selected based on agricultural experience, job capacity, and the role played in communicating with other producers. Eighteen (n=18) were male and one (n=1) was female. Fourteen (n=14) of the farmers were determined to be progressive, and five (n=5) were classified as traditional farmers. Progressive farmers were defined for this study as agricultural producers who were adopting practices that would reduce or eliminate the use of chemical pesticides, while traditional farmers were defined as those agricultural producers who still used customary chemical applications and cultural practices with no plans to alter the currently used pest control methods.

A semi-structured interview method was employed in this study. Interviews utilized the informal conversational interview as described by Patton (1985) and further refined by Denzin and Lincoln (2008). Semi-structured interviews rely on the natural flow of the conversation, allowing the researcher to be responsive in the conversation and thus collect more contextually rich data (Lincoln & Guba, 1985). The interviews were conducted in the spring of 2012 in the Republic of Trinidad and Tobago. Each interview lasted approximately thirty minutes and was conducted at each individual's farm. Interview data were recorded using researcher field notes.

The constant comparative method was used to analyze data, which consisted of recording conversations through note-taking and categorizing the data. Farmers' names were altered to preserve anonymity (Denzin & Lincoln, 2008).

Trustworthiness of the data was established through persistent observation, data triangulation, and member checking (Tuttle, Lindner & Dooley, 2007). Persistent observation, according to Dooley (2007) is a process that gives the researcher more relevant data. Data triangulation is a method that allows the researcher to assess the validity of the data by examining data for convergence and contrasts (Trindade Leite & Marks, 2005). Member checking was also used during the interview process to ensure accuracy (Merriam, 2009). Given the qualitative nature of this study, the results may not be generalized beyond the described population.

Results

Several fundamental themes emerged from the data. To better achieve the objectives of this study, the data was separated by objective to illuminate the underlying themes characteristic of small-

scale farmers practicing IPM in Trinidad and Tobago. Economic incentives and progressive ideology were the dominant constructs that emerged from the first objective. Farmers' current adoption of IPM practices was best described by the use of mixed control methods, pest management practices, and tradition. Farmer perceptions of future trends in IPM were characterized by a holistic approach to crop production and economic influences.

Significant constructs that emerged from the data identifying farmers currently practicing IPM techniques were *economic incentives* and *progressive ideology*. Farmers' names were altered to preserve respondent anonymity (Lincoln & Guba, 1985).

Economic Incentives

Nine (n=9) of the nineteen farmers indicated that economic incentives were a primary driver in the choice to employ IPM practices. Jack's perception was, "Farmers will not adopt additional practices unless sufficient economic incentives are presented as a viable alternative." Cutler added that, "What drives the farm is what is in the pocket not Mother Nature." Cutler further stated that, "It's not agriculture, it's economics. And at the larger scales, it's too expensive to economically produce." Will added that he believes, "Agriculture can be a viable and sustainable business." Farmers further indicated that higher levels of positive economic incentives would increase the degree of usage. Gillette explained, "Economic incentives were not sufficient to generate IPM compliance among farmers." Davy added, "Of the major issues facing farmers, one of the main ones is the rising input costs, which can be lowered by reducing dependency on imported goods (chemical pesticides)."

Other farmers elaborated on the economic incentives behind adopting IPM practices. Farmers observed that non-adopters had reasons as well. Joshamee commented, "Many farms will not go to IPM because of the cost." Gillette further stated that due to a lack of knowledge, non-IPM farmers will "not grow more than is economically feasible for themselves." Scarlett noted, "Most farmers do not have the capital required to implement the new technologies and are thus resistant to change."

Progressive Ideology

Twelve (n=12) of the farmers identified with the characteristics of a progressive ideology as contributors to the IPM adoption decision. Sustainability was found to be a primary component contributing to IPM adoption. Will noted that, "I believe that I cannot grow more without having to put more toxins in the soil." Bill elaborated, "I am constantly looking for new technologies to learn and try, to preserve the land for the next generation." Cutler added that to avoid contaminating the land with chemicals his farm uses, "organic mulches such as bamboo leaves and newspapers in addition to manure-based fertilizers."

Positive health benefits associated with IPM was another element of progressivism that adopters reported as influencing the adoption of IPM practices. Scarlett added that, "The organic nature of the personal farm stems from the desire to stay healthy and free of chemical contamination-related illnesses." Theodore stated, "I have been phasing out chemicals, because they can cause health problems."

Dominant themes that emerged from the data describing current IPM practices used by farmers in Trinidad and Tobago were mixed control, scientific pest management practices, and traditional practices.

Mixed Control Methods

Eleven (*n*=11) of the nineteen farmers identified the use of mixed pest control methods as elements of the current IPM program. Cutler elaborated on mixed control methods by reporting, "I am utilizing bamboo leaves and newspapers around my crops to keep out weeds, instead of spraying any herbicides. " Jack also added that, "I am constantly turning the soil to prevent weeds from sprouting up and growing." Cutler stated that, "I place plastic bags over the young plants to act as physical barriers; they remain on until the plant is strong enough with thick stems to resist insects." Mullroy said, "I place cardboard down to prevent weeds from emerging." Mullroy was also using plant stacking and succession to maintain constant production, and keep weeds pressure down. Hector said, "I use both mechanical weed control and chemical control."

Crop rotation was another element of control that was used in conjunction with chemicals. Hector, a farmer utilizing crop rotation, said, "The crop rotation that I use will actually improve the soil and also have pest management benefits." Bill added, "I rotate in cabbage and bouti, which is known to improve the soil, and look for new technologies that I can use to help my farm be better." Mullroy stated, "I am using plants such as tamarind, flamboyant, and glyceridia to fix the nitrogen-depleted soil on." Theodore said, "I use crop rotation, planting up the hill each year by type, and then will go in reverse order."

Scientific Pest Management Practices

Twelve (*n*=12) of the nineteen farmers identified knowledge of proper pesticide use as a current IPM practice. James uses a multipronged approach saying, "Insects become resistant to certain sprays, so I have to change out the spray." James also noted that it was possible to "mix sprays together for a better control." Barrett commented that another approach was to, "utilize pest population thresholds I obtain through field transects to determine timing and application rate." Davy stated, "I do not use chemicals on my land, but look for alternative methods to incorporate." Jack was utilizing the method of over cropping.

Traditional Practices

Ten (*n*=10) of the nineteen farmers identified themselves as using methods inherited from previous family generations. Scarlett stated, "Most farmers are traditional growers with traditional methods; they do not like younger, non-farmer individuals trying to tell them how to operate. The younger farmers are the more progressive ones with university or extension experience." Murtogg believed that the perception of farming tradition was a function of farmer age, saying, "The average farmer is between 45 and 60 years old, and this makes them highly resistant to change." Bill explained, "Our family's practice has been to change up plants."

The leading constructs that emerged from the identification of farmer's perceptions toward future trends in IPM were a holistic approach toward agriculture and an economic focus toward production.

Holistic Approach

Five (*n*=5) of the nineteen farmers identified a holistic approach to IPM as an emergent future trend. Hector indicated that adoption is beginning to take place as, "The farm is homogeneously representative of the surrounding valley." Hector further added, "Farmers perceptions are that more is better when related to fertilizer and pesticides, but this mantra can be changed through further education." Davy elaborated this point by noting, "When pesticides are used, people only utilize one or two chemicals without looking at all the options." Cotton

commented that production on the farm is "holistic, and everything is connected."

Economic Incentives

Six (*n*=6) of the nineteen farmers remarked that economic incentives would provide for increased future adoption of IPM practices. Cotton commented that, "We are in agriculture to make money; not all people in Trinidad are willing to pay the money it takes to buy organic." Joshamee further stated that, at current levels, "farmers will not use IPM, because it is too costly." Will opposed the view that farming was exclusively economic indicating that, "I'm adding value to the state land." Will elaborated that "farmers are too worried about profit; they do not see adding value to the environment." Bill said, "I have tried to utilize alternative practices, but they typically cost more money and time."

Conclusions

The data indicated that farmers practicing IPM techniques were focused on maintaining economic viability and held a progressive ideology. Farmers utilizing the IPM technology recognized the importance of economic sustainability for future generations. Progressive ideology characterized the farmers currently using IPM, as well as indicating that farmers continually seek out better practices consistent with operational goals. Farmers employing IPM techniques tended to be more informed and eager to test new theories to accomplish the economic and progressive goals. Farmers also sought to use multiple methods of pest control, ranging from traditional methods to newer IPM techniques. The use of a wide variety of pest management practices indicated a lack of consensus and reflected hesitance in fully adopting IPM. IPM as a technology can thus be regarded as still early in the adoption process in Trinidad and Tobago. Attitudes toward future adoption of IPM suggest that the technology must become more reliable and scalable while maintaining farmer economic profitability and preserving the land.

Farmers in this study depended heavily on the opinions of respected leaders in the community. Government and other external sources of information were found to be held in less esteem within the farming communities. Information flow through the existing channels was identified as inconsistent as a result of the low level of trust exhibited by farmers. Communication barriers between farming communities and outside sources were found to hinder uniform adoption of IPM practices in Trinidad and Tobago. A fundamental knowledge of the basic elements of IPM practices by farmers was inconsistent throughout the study. Knowledge and perception inconsistencies were attributed to a lack of governmental standardization and farmer education. While the qualitative nature of the research limits its generalization to the specific population, the study does provide some insights into the effects of the diffusion framework in developing countries.

Recommendations and Implications

The farmers in this study were found to implement varying degrees of IPM. Based on economic, social, and ideological motivations, the data indicated that the participants characterize many of the adopter categories as presented by Rogers (2003). A high concentration of innovators and early adopters were identified among farmers, indicating that the IPM technology was still in the early phases of adoption. The variation in age and ideology between the farmers in the innovator classification suggested that the innovator profile in Trinidad and Tobago is deviant from Rogers' (2003) classical theory. The data

also indicated that the gap between innovators and late majority is narrow. The narrow gap between the innovator and late majority group implies that a successful implementation by the innovators will lead to a quick adoption through the late majority classification. Faster adoption of the technology by farmers implies a strong relative advantage in using IPM, which is also consistent with Rogers' (2003) findings. The data further indicated that economic incentives were a motivation for IPM adoption, which supports the findings of Lamine (2011) and Muller et al. (2010). The rapid adoption and strong relative advantage suggest that critical mass can be attained more quickly within this bounded system.

Opinion leadership also plays a large role in the diffusion of IPM technology in Trinidad and Tobago. The data concurred with Rogers (2003) in that opinion leadership represents the primary dissemination function within this sample population. As such, the dependence on external sources of information has not developed to the point of efficacy. The results of the study are consistent with the work of Chigona and Licker (2008) as well as the findings of Erbaugh et al. (2010) in demonstrating the influence of social setting on diffusion factors. Farmer reliance on opinion leadership in this study also reinforced the findings of Palis et al. (2002) regarding innovation diffusion within a group setting.

Practitioners of diffusion are recommended to develop a structured educational system that incorporates farmer non-formal education and IPM practices to provide more continuity in IPM application. Direct dissemination of information to farmers can enhance not only the ability of the individual practitioner to impact dissemination but also the consistency of the information being distributed. By enhancing education and awareness, diffusion practitioners will be better prepared to effect change in the agricultural areas of Trinidad and Tobago. Additional hybrid crop development is another area in which practitioners can enhance the impact of IPM technology. The introduction of more targeted hybrid plant species will help to improve the adoption rate of IPM technology while simultaneously preserving the fundamental holistic and sustainable needs of the farmers. An accountability system through which IPM practices can be standardized would enhance the adoption rate of this technology by farmers as well.

Future research in this area should be conducted with a focus on delineating the communication barriers between farmers currently using IPM and viable information sources. By defining the communication barriers, change agents can more effectively develop programs and materials to accelerate the adoption process. Future research should also seek to identify effective information distribution channels. The data suggests that the current information dissemination network relies on opinion leadership and private industry. As the government of Trinidad and Tobago assumes a more active role in the implementation of IPM practices, communication difficulties between the government and farmers may prove a hindrance. Research focus should strive to establish the long-term impacts of an IPM program in Trinidad and Tobago. As IPM becomes more heavily adopted, the sustainability and environmental factors surrounding IPM will have a lasting effect on the country's economy.

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Professional Paper Presentation Abstracts

A Case Study of Best Practices for Study Abroad Programs

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Introduction

Research has shown students derive numerous benefits from study abroad programs (Carlson & Widman, 1988; McCabe, 1994; Kitsantas & Meyers, 2002). Programs that include purposefully led activities before, during, and after the experience lend credibility to program success and impact its long-term effects (Roberts & Jones, 2009; Rodriguez & Roberts, 2011). Rodriguez and Roberts (2011) identified several best practices for study abroad programs. The purpose of this study was to expand upon these best practices in a study abroad program at Texas A&M University.

Methodology

A case study approach was used to examine participants' experiences of a study abroad program. Case study methodology provides a systematic process for looking at actual events, collecting and analyzing data, and reporting the results (Soy, 1997). Case studies describe "real world" situations and can lead to greater understanding of complex problems or issues.

The goals of this study abroad program were to learn and implement agricultural leadership theories and practices, using service-learning concepts, as applied in a developing country's context. Texas A&M University partnered with an in-country nonprofit organization to conduct the program. Ten students and three faculty members stayed almost one complete month in Guatemala. They engaged in community-based, service-learning activities to learn leadership theories, adult education concepts, cross-cultural communication, and agricultural development principles.

Comparative analyses of faculty members' field notes and conversations, using the best practices approach proposed by Rodriguez and Roberts (2011), provided the framework for presentation of the results.

Findings

"Before Experience" best practices proposed by Rodriguez and Roberts (2011) included "addressing concerns about safety, cultural considerations, travel preparation, identifying preexisting knowledge, and preflection" (p. 29). Preflection is "the process of being consciously aware of the expectations associated with the learning experience" (Jones & Bjelland, 2004, p. 963). Prior to Texas A&M University's Guatemala program, students and faculty members met numerous times for "pre-sessions" to prepare for the study abroad experience. These sessions included guest speakers from Texas A&M University's study abroad office and a representative from the non-profit organization (via Skype), course lectures, and country-specific cultural and logistical information. The pre-sessions created cultural awareness, created foundational course subject-matter knowledge, and eased students' fears about travel to Guatemala. Student-initiated presentations on Guatemala's culture and history promoted intellectual relationships, fostered student ownership of information, and increased excitement for program travel.

Rodriguez and Roberts (2011) identified "During Experience" best practices as "course structure, community involvement, extracurricular activities, and reflection" (p. 29). They noted there should be greater emphasis on experiential, rather than classroom learning. The Guatemala experience validated the importance of experiential learning. A majority of students' time was spent in schools and villages working collaboratively with local residents. These experiences helped students practice theoretical concepts. Extracurricular tours and cultural activities were program highlights. Participants interacted with Guatemalans while learning about weaving, tortilla making, preparing family meals, and salsa dancing because of pre-established relationships through the in-country nonprofit organization.

Student reflection during study abroad enhances opportunities to synthesize information (Rodriguez & Roberts, 2011), normally achieved through journaling or group reflection sessions. Students kept reflective journals and each wrote at least one contribution for the study abroad blog. Seven group reflection sessions, led by student teams, were conducted to help them connect subject matter with practical experience in Guatemala.

"After Experience" best practices identified by Rodriguez and Roberts (2011) included "reflection and motivating students for further learning" (p. 30). Program participants were required to attend post-travel class sessions. Course and service-learning project debriefing sessions evolved when students presented their experiences in departmental seminars. Students were encouraged to continue learning through involvement with the nonprofit organization, and by incorporating Guatemala contacts and situations into current course projects and assignments. Social media outlets facilitated continued communication between program participants, faculty, nonprofit organization leaders, and friends in Guatemala.

Conclusion

The outcome of Texas A&M University's study abroad program in Guatemala lent support to the best practices for study abroad programs (Rodriguez & Roberts, 2011). We highly recommend expanding study abroad program "Best Practices" by including supplemental activities, such as using social media interaction (helpful for maintaining familial communication when abroad); increasing contact time with host country families and community activities

(helpful for breaking cultural stereotypes, from several perspectives); and, partnering with a local university or non-profit organization (greatly reduces time needed to establish community relationships). The focus of the Guatemala program was service-learning in an international setting. Guatemalan family and community contact, though course content and service-learning projects, allowed participants to experience an unprecedented level of cultural immersion that produced life-changing experiences.

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A Case Study on Virtual-World Technologies in the Classroom

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Introduction

The use of virtual-world technologies has increased in recent years; more than 500 million people worldwide use them with a large portion of those between the ages of 10 and 15 (Lesko & Hollingsworth, 2010). Virtual-world simulation offers a learning method that is more applied than lecture-based methods, especially within the context of teaching complex tasks. Applied learning is an effective tool for teaching many disciplines and skills (Wankel & Kingsley, 2009). By applying learning into virtual worlds, learners can interact in new settings, address cultural issues, and solve problems (Lesko & Hollingsworth, 2010), thus allowing for new educational experiences. Also, learners who are engaged with virtual lessons tend to show more critical thinking skills and are more likely to incorporate different perspectives into their thinking (Wakefield, Warren, Rankin, Mills, & Gratch, 2012). These important steps are needed for learners to develop cultural and global sensitivities (Banks, 2004).

Second Life is an online virtual-world technology where participants use avatars to interact with their surroundings, other avatars or objects, and "private islands" can be created for different uses. Second Life offers applications in education as well; educators can create lesson plans and apply course content and interaction in their curricula. Second Life enables educators to create lessons based on cross-cultural settings, allowing new learning experiences for geographically-bound learners. Second Life provides heterogeneous learning environments, unlike physical classrooms that often contain learners from similar age groups, socio-economic classes, and belief systems. Second Life allows students to make comparisons between cultural systems to increase their understanding of other cultural perspectives (Ondrejka, 2008).

Purpose

The purpose of this study was to determine participants' perceptions of virtual-world technologies in an educator-based professional development workshop. The research question was "Did participants' comfort levels with virtual-world technologies change after using such technologies in a social sciences workshop session based on socio-cultural issues?"

Methods

The case study approach was used to conduct this study. Merriam (2002) describes a case study as one that "seeks to describe a phenomenon in depth." Participants ($N = 60$) attended a professional development workshop focused on "The Role of Social Sciences in Feeding the World," in October 2012. Texas A&M University conducted multiple sessions on the use of Web-based and virtual-world technologies and their application in the classroom.

Participants completed a series of activities leading up to the Second Life experience. The first exercise was a pen and paper critical thinking exercise and group activity, followed by "The Hungry Decisions" Web-based exercise. Participants then learned how to use Second Life technologies and its applications in raising cross-cultural awareness in high school and university classrooms.

Data were collected from 45 participants at the conclusion of the workshop through an online survey using the post-then-pre method of assessment. The post-then-pre method affords a reflective perspective that produces more accurate self-assessment of skill development by giving an opportunity for comparison by reducing respondents' tendency to over-estimate their original skill levels (Rohs, 1999).

Results

A 75% response rate was achieved from the post-then-pre online survey. Participants' experienced perceptions shifts from "agree" to "strongly agree" for their own and their student's comfort levels using Web-based materials in the classroom and for the level of importance of using Web-based or virtual-world materials to better understand the difficult decisions people make in developing countries. However, the overall perception of participant's comfort level in using virtual-world technologies such as Second Life did not shift from before, to after, the virtual-world technologies workshop session.

Recommendations/Implications

Overall, this workshop helped participants understand the importance of implementing new technologies into their classrooms. It informed them about the importance of creating new opportunities for learners to gain culturally-literate educational experiences. The session informed participants on Second Life's applications for critical thinking and complex task lessons that students may use (Wakefield, Warren, Rankin, Mills, & Gratch, 2012). One factor that may have hindered perception shift for Second Life comfort levels in this particular workshop session was the limited amount of time participants spent in Second Life. Additional time is needed to teach educators how to use Second Life in future workshop sessions. Also, additional focus is needed to teach educators how to apply Second Life to cross-cultural situations in the classroom because research has shown that students who are exposed to more heterogeneous situations will have a better cultural perspective (Ondrejka, 2008).

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A Framework for Analyzing "Best-Fit" Practices in Extension

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Introduction

There are well-documented examples of high returns to investments in extension and advisory services (Alston, Chan-Kang, Marra, Pardey, & Wyatt, 2000). However, there is a large gap between knowing "what works" in extension and how to adapt successful approaches to different conditions. Extension must function effectively in diverse biophysical, socioeconomic, and institutional settings, and there is presently no clear understanding of how to design "best fit" approaches that match changing conditions and local needs (Davis & Heemskerk, 2012). We use the term "best fit" rather than "best practice" to emphasize the importance of context. A practice is usually only effective in particular contexts and more analysis is needed to determine which practices fit different contexts (Birner, et al., 2009). Extension professionals need evidence-based approaches that work best for engaging with specific types of clientele – such as women farmers, rural youth, and small-scale agribusinesses.

Purpose and Objectives

This theoretical piece proposes a framework for analysing extension practices and contexts that will enable the design and implementation of best fit approaches and effective policies. This will lead to more effective and efficient extension services.

Methods

Extension researchers and practitioners formed a working group convened by the Global Forum for Rural Advisory Services (GFRAS). The group consisted of experts from international organizations, projects, and regional extension networks. Relevant literature was reviewed and the group met face-to-face several times in facilitated discussions to discuss and debate the approach and framework in an inductive manner. The discussions built on the original analysis of extension approaches and contexts by Birner, et al. (2009). A provisional framework for selecting examples of extension approaches (cases) and analyzing them was agreed, and will be

further validated by presenting and testing it with field-level extension managers and extension agents.

Products

Researchers devised a structured "Framework for Case Selection and Analysis" to guide systematic analysis of the effectiveness of selected extension approaches under differing country-specific contexts.

The framework has five dimensions that attempt to describe the key aspects or characteristics of advisory services (Birner, et al., 2009). These dimensions include: a) governance structures, such as the level and source of financing, how and by whom services are provided, the degree of decentralization, and the prevalence of partnerships and linkages among actors; b) the policy environment, such as whether there are specific policies on advisory services and what these entail; c) capacity and management, including staff numbers and levels of expertise, performance appraisal systems, and organizational cultures and staff motivation; d) advisory methods, for example the use of information and communication technologies or learning centers; and e) crosscutting factors, such as gender, youth, nutrition and health, and environmental concerns.

Within each dimension, important extension topics can be assessed using case studies that provide country-level examples of how particular organizations implemented a given theme in different contexts (e.g., socioeconomic, political, organizational, agro-ecological). By comparing experiences in implementing extension approaches across different contexts, the framework can be used to draw conclusions about how and why the degree of effectiveness varies among different settings and different types of clientele.

Educational Importance, Application, and Implications

The framework is intended for use by a) policy makers, b) managers, c) practitioners, d) farmer organizations, and e) educators and trainers involved in extension. Extension providers (including governments, NGOs, farmer organizations, and private sector entities) and development projects will benefit from the framework as a tool for evidence-based decision making about best-fit approaches in different contexts. To the extent that such decision making rests on factual information and analyses, extension organizations that serve (or are meant to serve) resource-poor smallholder farmers will be able to do their jobs more effectively, which will in turn have positive impacts on reducing hunger and poverty. In addition, universities and colleges that provide training for extension professionals will be able to do a better job of strengthening human resource capacity.

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A Snapshot of the Membership: Examining AIAEE Members' Agricultural Paradigms

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Introduction

Sustainable agriculture has been gaining in popularity for decades, and is demanded on a global scale (USDA, 1999). The AIAEE membership represents Extension and agricultural educators worldwide, a segment that is critical in the facilitation of sustainable agriculture (Allahyari, Chizari, & Mirdamadi, 2009). This research was framed by the theory of individual perceptions as a function of the organization. An understanding of the attitudes held by those who make up an organization is critical to understanding the entity's stance towards their outwardly stated goals. Previous research has recognized that individuals' values may be independent of the organizations to which they belong (Eveland, 1986; Minarovic & Mueller, 2000) and thus, it is important to understand individual paradigms. Just as understanding "global mindedness of Extension agents" (Smith, Jayaratne, Moore, Kistler, & Smith, 2010, p. 59) and understanding Extension faculty attitudes toward globalizing programs (Lewis & Gibson, 2008) are important, understanding agricultural paradigms is critical.

Purpose and Objectives

The purpose of this study was to describe AIAEE members and explore their attitudes towards conventional and alternative agricultural paradigms. The objectives that guided this study included (a) describe AIAEE members' demographic and background characteristics, and (b) document AIAEE members' agricultural paradigms.

Methods

The authors distributed an updated Alternative and Conventional Agricultural Paradigm (ACAP) scale to all members of the AIAEE membership, excluding themselves (n=203). In a previous study, this instrument was found to effectively discriminate between agricultural paradigms, and was found to be reliable, as indicated by a Cronbach's alpha value of .871 (Sanagorski, 2012). The instrument consisted of 24 paired Likert-type responses designed to represent views between conventional and sustainable agricultural paradigms. This instrument generated a Sustainability Score, which could range from 24 to 120, with higher numbers indicating more sustainable paradigms. Data collection lasted 36 days and included an initial survey distribution followed by two reminder emails, as recommended by Dillman, Smyth, and Christian (2009).

Results and Conclusions

The researchers collected study data in August and September of 2012. They determined that 54 surveys were usable, for a response rate of 26.6%. Response rate is expected to be fairly low for Internet-based surveys (Archer, 2008); however, nonresponse error was controlled through a comparison between early and late respondents as recommended by Lindner, Murphy, and Briers (2001), and Miller and Smith (1983) in order to generalize findings to the study population. An independent t-test for equality of means was non-significant ($t = 0.75$, $p = 0.39$), and therefore the researchers were able to extrapolate findings to the AIAEE membership (Lindner, Murphy, & Briers, 2001).

The average age of respondents was 47 years. The responding sample was composed of more men (n = 37, 63.8%) than women; most held either Doctoral (n = 38, 65.5%) or Master's (n = 13, 22.4%) degrees. Many (n = 37, 63.8%) had attended a land grant university in the United States. A majority of the membership (n = 39, 67.2%) indicated that they are active in facilitating sustainable agriculture in their country. More than half (n = 33, 56.9%) of the respondents indicated themselves as supporters of both sustainable and conventional agriculture, while 39.7% (n = 23) identified themselves as supporters of sustainable agriculture.

The Sustainability Score mean for the respondents was 73.37, which is slightly above the median value of 72 between the most sustainable (120) and most conventional (24) potential scores. The range of Sustainability Scores for all respondents was 58 to 84.

The majority of respondents (n = 38, 70.4%) were from the United States. The authors compared Sustainability Scores between AIAEE members from the United States and those from other countries. Based on an independent *t*-test for equality of means, the authors concluded that there was no difference based on country ($t = 1.11$, $p = 0.91$). The final research presentation will discuss the instrumentation process in further detail and reveal the findings gleaned from this study at a greater depth.

Recommendations and Implications

The researchers determined that the AIAEE membership as a whole aligns most strongly with a Moderate agricultural paradigm, supportive of both sustainable and conventional agricultural practices, as defined by Sanagorski (2012). The baseline data collected provides a framework for future studies. Individuals involved in agricultural extension and education activities are critical change agents. It is only through an increased understanding of change agents' perspectives about conventional and sustainable agriculture that one can truly develop effective training programs that meet the needs of the organization.

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A Study Of Perceptions Of The Value Of Mentoring Among 4-H Extension Educators: A Phenomenological Study

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Keywords: Evaluation, training, youth educators, mentoring, work environment

Introduction

New employees often experience a great degree of stress. This is especially true for beginning youth educators who are responsible for various roles and high expectations. Stress levels are so extensive that researchers have started to examine the relationship between resilience among educators and abilities to effectively reach youth and remain active in their roles as professionals (Thieman, Henry, & Kitchel, 2012).

Mentoring among youth development professionals is one way to combat significant stress levels and high turnover rates. Beginning educators are facing difficult challenges in their positions working with youth and need strong support (Foor & Cano, 2012). Mentors are in crucial positions to affect the outcome of a novice educator's career, and there are several factors that affect mentor-novice relationships (Peiter, Terry, & Cartmell, 2005).

Mentoring is especially important for youth educators who are specialized and responsible for program development and delivery of educational programming. It is challenging for youth educators to plan, implement, and evaluate programs and educational experiences for youth in current times. The rapidly changing and intensifying context in the lives of youth requires dynamic youth educators who have opportunities for the development of professional knowledge and relationships for career enhancement.

Purpose and Objectives

The study was developed to take a thorough look into mentoring relationships for 4-H youth educators through through the eyes of beginning employees and guided by the following research questions: How do Extension educators perceive the value of mentoring Extension educators in Louisiana? How do Extension educators perceive the value of formal and informal mentoring programs in Louisiana?

Methodology

A descriptive qualitative design based on Kram's (1988) mentor role theory was used to explore and describe the perceptions of the value of mentoring for Extension 4-H youth

educators. A phenomenological approach was selected to gather a profound description of the phenomena within the context being researched.

Participants were selected from across the state to capture detailed accounts from various regions with diverse demographics and educational programming. Interviews provided rich descriptions of lived experience for youth educators in the context of their work adding to the value of information gathered.

Data analysis occurred simultaneously with data collection beginning in the early stages to contribue to careful data management and appropriate presentation of participants' accounts. The van Kaam method (Moustakas, 1994) was used for data analysis and synthesis during the study. Horizonalization was used throughout the research process while conducting interviews for greater authenticity and objectiveness.

Results/Conclusions

Interviews with seven 4-H youth educators provided an in-depth look into mentoring and details regarding tendencies to find informal mentors during early years. Personal and professional accounts provided by beginning youth educators highlighted several components that were lacking in the formal mentoring program.

Youth educator roles require flexibility and willingness to learn about the demands of the position. An openness to learn from others who have served and learned countless lessons working with youth as educators is vital to the success of a beginning youth educator. It was concluded there is a desire among beginning youth educators to have a richer experience with a formal mentor. Several barriers were in the way of a more in-depth experience and relationship between mentors and mentees. Among these barriers are time, distance/geography, incentive/budget, personality, program area, formal/informal, and understanding.

A model was developed based on the findings of this study. The model captues essential components for an effective and efficient formal mentoring program for 4-H youth educators during the first year of assignment.

Recommendations/Implications

A focus must be placed on formal mentoring among youth educators. The demand is strong for administration, leadership, and organizations who serve the public to focus on programs that positively contribute to the professional development of their employees. External challenges from economic times and rapid deepening of complexity among social environments only increase the demand for progressive programs – especially a formal mentoring program – focusing on the development and support of beginning youth educators. The implementation of a formal mentoring program is one grounded method for employee growth.

It is important to provide an avenue for youth educators to share expectations and needs. Formal mentoring programs offer novice youth educators this opportunity for expression of anxieties, hopes, questions. Formal mentoring programs can be complex. However, the leadership of organizations must focus on decreasing the effects of the abovementioned barriers and increasing the support network offered to beginning youth educators through tailored mentoring programs.

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Acceptance and Use of Twitter in Disseminating Agricultural Statistics to Mexican Banks

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Keywords: Food security, Twitter, Mexican banks, agricultural loans, Ministry of Agriculture

Introduction

The role of food is a key component in Mexicans' identity and culture (Dooley, Dooley, & Carranza, 2008). Nearly 75% of Mexican families in rural areas experience food insecurity throughout the year (Rosas et al., 2009). Wilde and Peterman (2006) reported the lack of food security has led to variable individual weight change for rural Mexicans.

Mexican banks have the responsibility to assess and disperse loans, in a timely manner, to farmers in order to assist in feeding the local community (Bátiz-Lazo & Wood, 2001). The Mexican Ministry of Agriculture provides Mexican banks agricultural statistics in order to assist banks in evaluating, processing, and distributing agricultural loans to farmers. Strong and Dooley (2012) recommended Twitter dissemination of the Ministry's agricultural information to Mexican banks be studied in order to determine the potential role of the dissemination approach in addressing food security.

Venkatesh, Morris, Davis, and Davis (2003) developed the unified theory of acceptance and use of technology (UTAUT). The UTAUT helps to describe an individual's perceptions of the extent a technological system may improve job performance, the system's ease of use, the level of importance versus other systems, and the infrastructure needed to utilize the respective technological system. Stockwell (2008) indicated individual acceptance evolves at different speeds with new technology.

Purpose and Objectives

The purpose of this study was to assess the acceptance and usage of the Mexican Ministry of Agriculture's Twitter information by Mexican banks to assist with the processing and distribution of agricultural loans. More specifically, the study sought to:

1. Describe Mexican banks degree of acceptance with the Ministry's information onTwitter; and
2. Describe Mexican banks use of the Ministry's information on Twitter.

Methods

This study employed a qualitative research design in order to address the research objectives. The fourteen ($N = 14$) agricultural loan administrators of the primary Mexican banks composed the population in this study. A semi-structured interview guide was utilized with participants to address the study's objectives. Interviews took place via Skype™ with the researchers and each individual agricultural loan administrator. Data from interviews was triangulated to accomplish trustworthiness (Lincoln & Guba, 1985). The researchers implemented member checks as each participant was emailed a transcription of their remarks for confirmation. 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. The results should not be generalized to Ministries of Agriculture and lending institutions in other countries.

Results and Conclusions

Due to space limitations of the abstract, a summary of the qualitative data is presented. All fourteen participants (100%) followed the Ministry's Twitter feed. Twelve ($n = 12$) of the fourteen participants indicated the Ministry's tweets assisted in acquiring agricultural statistics faster and decreased the time banks spent evaluating and processing agricultural loans. Ten ($n = 10$) participants believed the Ministry's Twitter feed led to a greater relationship between staff at the Ministry and Mexican banks. The majority of participants ($n = 12$) indicated they followed the Ministry's Twitter feed weekly.

The Ministry of Agriculture's Twitter feeds of agricultural statistics were accepted and used by agricultural loan administrators. Loan administrators reported the Twitter feeds assisted in distributing the appropriate loans to farmers faster. The Ministry of Agriculture utilized Twitter to create an accessible and effortless information conduit (Venkatesh et al., 2003) for bankers using technology. The readiness of information (Stockwell, 2008) has increased the performance of loan administrators as they now can make more informed decisions regarding loans to farmers.

Recommendations, Educational Importance, Implications

The Ministry of Agriculture used Twitter to quickly disseminate commodity information to banks. Banks utilized the information to determine the approval and value of loans paid to farmers in a timely manner. Twitter can be used to let a bank know the particular value of a commodity in real time thus being able to inform not only their financial decisions but inform farmers seeking loans.

Farmers acquired loans quicker and planted crops to sell in local Mexican communities. The Ministry of Agriculture's Twitter feeds improved performance and communication and while requiring little effort due to the ubiquitous nature of the information and the technology medium which drove use (Strong & Dooley, 2012). The acceptance of and use of Twitter to disseminate agricultural information to mitigate food security in other countries should be studied. The information could expand the knowledge base and potential collaborations for AIAEE members. Twitter provided an innovative approach in the outgoing fight to enhance food security in Mexico.

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An Assessment of Students' Perceptions of Knowledge on Select Crisis-Related Skills, Tasks, and Activities: A Critical Look at Second Life™ Training

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Introduction

Communication strategies have been determined to be important in international development (Charalambous-Snow & Ingram, 2011); however, little research has been conducted regarding crisis communication in these settings. Crisis communication management is important to the agricultural industry for a multitude of reasons that stem from agriculture's foundational status for human existence. When issues arise preventing the success of agricultural practices, communication professionals must be prepared to manage the informational processes that facilitate decision-making and human behavior with the end goal of reducing negative impacts.

The potential for the use of technology to facilitate learning continues to expand and virtual education activities has become an important component. Leggette et al. (2012b) reported that the use of Second Life™ (SL) (a virtual environment) was able to encourage experiential learning. Although literature regarding the educational value of SL is limited, much potential exists with the technology (Leggette, Rutherford, Sudduth, & Murphrey, 2012a).

Purpose and Objectives

The purpose of this study was to assess students' perceptions of knowledge on select crisis-related skills, tasks, and activities in order to determine the potential effectiveness of a SL simulation. Objectives included a pre- and post-assessment of the following: (1) determine graduate students' perceptions of knowledge on select crisis communications competencies and

(2) determine graduate students' perceived expectancy performance on select SL tasks used to enhance crisis communications competencies.

Methods and Procedures

The population of the study consisted of students enrolled in a crisis communications course at Texas Tech University during fall 2011 ($N = 15$). Prior to curriculum being taught students completed a questionnaire regarding perceptions of knowledge on skills, tasks, and activities related to crisis communications. After completion of the course and after participating in a virtual crisis simulation using SL, students completed a post-assessment of knowledge perception on the same competency areas. Questionnaires referenced critical crisis communication topics and skills as identified in a Delphi study involving crisis communication experts throughout the U.S. and Canada (Edgar, Edgar, McGuire, Rutherford, Doerfert, & Murphrey, 2012). The instrument consisted of seven constructs including: Knowledge, Communication Skills, Contingency Plans, Supplies and Tools, Learning and Training Needs, Area of Expertise, and Personal Traits. SL Performance Expectancy was also assessed. Individual items for each construct were scaled statements ranging from either "no experience/knowledge" (1) to "expert" (6). All data for selected constructs were summated and inferential analyses were performed using SPSS 20.0. Mean differences between the pre- and post-data were calculated and resulting standard deviations and effect sizes were noted.

Results and Findings

Students' responses after instruction completion were significantly different than before the implementation of the treatment (crisis communications course). Mean differences between pre and post perception of knowledge competencies needed in crisis communications were calculated and resulting standard deviations and effect sizes were noted. In all seven competency areas, large effects (Cohen, 1971) between mean differences were found.

Participants identified their SL Performance Expectancy based on 18 specific items using a Likert-type scale that ranged from "strongly agree" to "strongly disagree". The largest positive effect size was noted in "I intend to use Second Life in the next 12 months" ($M^a = 3.00$, $SD = 1.00$, $d = 3.00$) while the smallest effect size was "Using Second Life takes too much time from my normal assignments" ($M^a = 0.00$, $SD = 1.22$, $d = 0.00$).

Conclusions and Recommendations

A large effect size found for each of the seven crisis communications competency areas assessed indicated a significant increase in each competency between pre- and post-tests. While participants did not indicate a certain intention to use SL in the next 12 months, participants did increase in knowledge, ability, and skill level on items associated with effectively managing a crisis.

This research demonstrated virtual education as an effective tool in training communicators. Additional research should explore virtual educational platform usage at other universities and should focus on the value of virtual simulations and how technology selection and acceptance impacts learning. The value of virtual training methods for crisis communication education should be explored in relation to assessing perceptions, knowledge, and skills of participants, especially those involved in disseminating information to the public.

The significance of this study for international agricultural and extension education relates to the potential to use technology effectively to deliver crisis communication training.

Arming individuals with skills in crisis communication enables effective communication in times of dire need especially in international settings. This study provides key findings to enable agricultural and extension educators to understand the importance of crisis communication and methods to achieve related training.

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Assessing Pluralistic Extension Systems: Bangladesh, Liberia, Rwanda and Tajikistan

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Keywords: Pluralistic, donor-driven, supply-chain extension systems

Introduction

This paper will outline the role and key functions of the different extension service providers in selected countries of East and West Africa, and Central and South Asia. Each country is very different, in terms of the public, private and non-governmental organizations (NGOs) that are providing advisory services to different categories of farmers (size and gender), as well as the strategies they are implementing.

Purpose and Objectives

The purpose of this paper is to outline the key strategies being carried out by these different extension and advisory service providers, the clientele being served and the sustainability of these different organizations and approaches.

Methods

The methods used in carrying out this study was first to analyze key documents that outline these different service providers in each country and then each of these service provider were visited to define and determine the strategy being followed. Then, the task was to determine the effectiveness and impact of services being providing to these different groups of farmers (small, medium and large, as well as gender) by these different service providers.

Results, Products and Conclusions

There are many differences between these four countries, in terms of the different extension and advisory service providers. First, the pluralistic extension and advisory systems in each country will be briefly summarized and then there will be a comparative analysis in each country, including both the advantages and constraints of these pluralistic extension systems. The countries to be assessed include:

- Bangladesh
- Liberia
- Rwanda
- Tajikistan

Included in this analysis will be an overview of the different donors who are attempting to strengthen the pluralistic extension systems in each country. It is obvious that the donor community follows different paths in strengthening pluralistic extension systems, but few are willing to make needed investments in public extension, which is why public extension isn't working very effectively at the present time.

Recommendations

Pluralistic extension systems are important and essential in every developing country. Over the long-term, private sector firms will largely take over the provision of good advisory services for

the products they sell to farmers, especially medium and larger farmers. Non-governmental organizations (NGOs) are rapidly expanding in most countries, largely due to donor-funded projects that focus on "value-chain" projects. For example, USAID limits most of their projects to 4 value-chains, especially staple food crops. However, if small-scale men and women farmers are to increase their farm income, as well as improve the nutrition of their children, they will need to learn how to intensify and diversify their farming systems into specific crop and livestock products that can be sold to local, regional and even national markets. Limiting this option to 4 value-chains will only serve about 5-10% of the rural population, especially the more progressive, larger male farmers.

To serve the rural poor, both countries and donor agencies need to put more attention on strengthening the pluralistic extension system in each country, with a focus on decentralization (i.e. only specific crop and livestock products can be grown and sold in specific villages, sub-districts and districts), farmer-led (groups of men and women farmers getting organized at the village and sub-district level, so they can start articulating their concerns and interests) and market-driven (farmer access to markets depends on location, roads, type of land and the size of each farm). Each organization has its own capability, including NGO, especially in organizing producer groups; private sector firms, especially in providing good advisory services to farmers who purchasing their products, and public extension organizations that can give specific technical and market information to these different groups of small-scale men and women farmers that want to start producing these different types of high-value crop and livestock products, including giving them good market information.

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Assessment of the Agricultural Curriculum in Nigerian Schools: Implications for Sustainable Food Production

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Introduction

The problem of food insecurity in most developing countries and the recognition of agriculture as central to its solution made governments to formulate policies aimed at awakening young people's interest in agriculture and food production activities. Despite the renewed attention given to the youth, majority of young people are not pursuing livelihoods in agriculture (Leavy & Smith, 2010). Reasons for lack of interest in agriculture among the younger generation include lack of basic infrastructure, wrong perception of agriculture by youths, lack of incentives from the government and inadequate training and extension services (Akinyemiju & Torimiro, 2008; Aphunu & Atoma, 2010; Onuekwusi & Ottah, 2006).

Teaching of Agriculture in Nigerian schools started with formal education in Nigeria. Agricultural Education in schools started as Nature Study in the primary schools, and has since gone through different names such as Gardening, Rural Science and Agricultural Science (Egun, 2009). It was later introduced as a subject which is taught and examined at the secondary school level in the General Certificate of Education usually conducted by the West African Examination Council. Agricultural Science as a subject was later listed as optional at the introduction of 6-3-3-4 system of education. A student was expected to choose from a list of vocational subjects at the Senior Secondary School. However, with the incessant strike and purported failure of public schools, many private schools were established. The schools hardly make provision for teaching of agriculture as a subject in the curriculum. At the primary level, some schools included agriculture in the basic science. At the diploma, sub-degree and degree levels, many of the courses taught to students of agriculture were still as inherited from the colonial masters. This eventually called for a review of the curriculum so as to positively impact young people's perception of agriculture as a livelihood choice.

Purpose and Objectives

The specific objectives of the study were to:

1. Trace the history of agricultural curriculum being used in Nigeria.
2. Review the content of agricultural curriculum in the primary, secondary and post-secondary education in Nigeria.
3. Identify gaps in the curricula of primary, secondary and agricultural training institutions as well as human resources dedicated to the teaching of agriculture at various levels.
4. Suggest the revision of curricula to enhance the attitude of youths towards agriculture for sustainable food production.

Methods or Data Sources

The education policy document of Nigeria, scheme of work in Agricultural Science as a subject at the primary, secondary and post-secondary institutions were collected and subjected to content analysis. Four rural and four urban primary, secondary and tertiary schools were targeted for the study. Key informants interview were held with the students and teachers in the schools. In addition, Colleges/University handbooks were collected and reviewed to determine the adequacy of agricultural extension course work in the agricultural training programme. Content analysis was done with the intention of assessing the relevance, effectiveness and efficiency of the curriculum.

Results and Conclusion

Evidence from the analysis revealed that the content of the curriculum at the primary level was mostly void of local inclusion. The importance of agriculture is downplayed in the primary school syllabus. In most primary schools, agriculture is offered under a broader subject called Basic Science. The curriculum lacks the practical aspect of the subject. School gardens were not established to complement classroom description. Local food crops were not given the required emphasis in the curriculum. The same was noted in the post-primary school curriculum. Most of the privately owned schools do not teach Agricultural Science as a subject but rather as topics under Basic Science. In most cases, professionally trained and qualified Agriculture teachers were not employed to teach the subject in primary and post-primary schools. The curriculum in post-secondary schools differed and had some local content element included. Although, agricultural extension component was grossly deficient as emphasis was not placed on communication, demonstration plots and group dynamics as expected. Farmers led extension methods and community-driven development were not included. When critically probed, evidence abounds that the curricula were not regularly reviewed to meet changing societal needs and keep pace with changes in the agricultural sector.

Recommendations

It is recommended that the Ministry of Education should organize curriculum development conferences and training workshops to ensure that the capacity of teachers and instructors in Agricultural Science are built such that they could inject local content into agricultural curriculum. There is also the need to employ qualified and experienced graduates to teach Agriculture in primary schools because of the vital role played by teachers in the lives of pupils. Teachers in private and government schools, should be re-trained from time to time so that they would gain more knowledge and be able to perform optimally. Establishment of school gardens where students could see and get better hands-on training to promote their interest should be made a condition for issuance of operating licenses to privately owned institutions.

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Attitudes of Agri-science Teachers in Trinidad towards Information Communication Technologies

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Introduction

Trinidad and Tobago is an island nation located in the Caribbean Region working to reach developed nation status by 2020 (UNESCO, n.d.). One component of this goal is agricultural development, which includes developing sufficient human capacity to meet current and future needs (Rivera & Alex, 2008). In Trinidad and Tobago, Ramdwar and Ganpat (2010) purported that secondary agri-science education is essential for developing skilled agriculturists. One skillset likely needed by future agriculturists involves information communication technologies (ICT). ICTs are a wide variety of technologies that allow for communicating, creating, storing, and sharing of information (Gulbahar & Guven, 2008).

Secondary agri-science education programs offer an excellent platform for developing ICT skills. However, teachers must have favorable attitudes towards these technologies (Roberts & Kitchel, 2010). Since 2010, all students entering secondary schools are given a laptop computer and schools are being prepared to facilitate ICT use. Will the use of ICTs be embraced by teachers? The current attitudes of agri-science teachers towards ICTs are not known. Such knowledge could guide teacher education programming.

Purpose/Objectives

The purpose of this study was to describe the attitudes of agri-science teachers in Trinidad towards ICTs.

Methods

This study used survey methodology to collect the data. The population was all secondary agri-science teachers in Trinidad ($N = 90$). A census of the population was attempted. Data were collected in September 2012 and 60 teachers responded, representing 50 schools. The instrument

used in the current study was adapted from the work of Gulbahar and Guven (2008). It collected personal data and 18 attitudinal statements with four agreement/disagreement options.

Results and Conclusions

As depicted in Table 1, agri-science teachers have positive attitudes related to using ICTs in developing and finding educational materials. Teachers had the least positive attitudes towards connecting with students using ICTs.

Table 1
Attitudes of Agri-Science Teachers Towards ICTs

Statements	SA	A	D	SD	Mean (*SD*)
I think that using computer-based instructional technologies makes it easier to prepare course materials (assignments, handouts etc.).	45	50	5	0	3.4 (.6)
I think that using technology makes it easier to reach instructional resources.	41	56	3	0	3.4 (.6)
I am aware of the opportunities that computers offer to my profession	37	55	7	1	3.3 (.7)
I think that technology supported teaching makes learning more effective.	37	56	7	0	3.3 (.6)
I think the use of computer based instructional technologies increases the interest of students toward courses.	38	55	7	0	3.3 (.6)
I think the use of computer based instructional technologies increases the quality of my teaching	30	55	15	0	3.2 (.7)
I think I prepare materials for class faster with the use of computers.	42	40	16	2	3.2 (.7)
I am sufficiently computer-literate to use computers effectively in my classes	25	60	13	2	3.1 (.7)
Instructional technologies allow me to handle different learning preferences of my students who have different learning styles	25	56	19	0	3.1 (.7)
I think using instructional technologies makes me more productive as a teacher.	27	56	15	2	3.1 (.7)
I think technology makes effective use of class time.	27	59	14	0	3.1 (.6)
I am quite able to use computers in instructional environments	17	66	15	2	3 (.6)
I can use instructional technologies in class activities more effectively day by day.	15	58	25	2	2.9 (.7)
I would welcome assessments about my instructional technology use by any other professionals.	22	53	20	5	2.9 (.7)
I use computers as much as other resources (books, overhead projectors etc.) for instructional purposes	25	41	32	2	2.9 (.8)
I believe that tools like e-mail, discussion forums, and online chats will make communication with my students easier.	15	61	24	0	2.9 (.6)
Computers are my first-use choice over the other resources	18	30	48	4	2.6 (.8)
I can answer any question my students ask about computers	3	37	51	9	2.4 (.7)

Recommendations and Implications

The positive attitudes are a good entry point for further teacher development related to ICTs. Professional Development programs should focus on how ICTs could be used to increase

interaction with students and how to develop content that is more acceptable for younger persons. Teachers must be prepared immediately to fully embrace ICTs and to lead students in the effective use of these technologies. Positive attitudes are not sufficient, good practices must follow. Additional research should examine the actual behaviors of teachers.

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Attributes Associated with Diffusing ICTs to Advance Agricultural Education at Tertiary Institutions in Developing Countries: Perceptions of Future Faculty

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Keywords: Adoption, agricultural education, higher education, information communication technologies (ICTs)

Introduction/Theoretical Framework

The Internet enables the world to access, disseminate, and use information, training, and education in and about agriculture as never before. Information Communication Technologies (ICTs) have transformed education in developed countries more than could have been imagined a generation ago, e.g., distance education (DE) to accommodate individualized learning needs (Loxley & Julien, 2004). However, important tools for transferring technologies to agricultural students and farmers in developing countries, including ICTs, are underutilized (Erbaugh, Donnermeyer, & Amujal, 2010).

This study relied on Rogers' (2003) diffusion of innovations model for understanding the behaviors of potential adopters. As individuals contemplate new technologies, their perceptions of an innovation's attributes stand to influence whether they adopt or reject (Rogers, 2003). Per Rogers' model (2003) for understanding the diffusion of innovations, five attributes, as perceived by a potential adopter, hold the most sway as the innovation-decision process unfolds: relative advantage, compatibility, complexity, observability, and trialability.

Purpose & Objectives

This study sought to describe the perceptions of international graduate (IG) students from developing countries in the College of Agricultural Sciences and Natural Resources (CASNR) at Oklahoma State University on the diffusion of ICTs to advance agricultural education (AE) at colleges and universities in developing countries. ("Agricultural Education" was operationalized as learning that encompassed the different academic disciplines found in most colleges or faculties of agriculture worldwide.) Four objectives guided the study: 1) determine selected characteristics of the IG students; 2) describe IG students' perceived levels of *innovativeness* regarding their use of ICTs for academic learning; 3) describe IG students' views on attributes associated with the diffusion of ICTs to advance AE in developing countries; 4) describe relationships between IG students' characteristics and their perceptions of attributes associated with the diffusion of ICTs.

Methods & Data Sources

This was a descriptive-correlational study. The target population included IG students from developing countries enrolled in CASNR at Oklahoma State University during the Fall

semester of 2010. The college's administrative units provided the sampling frame (120 students); 72 or 60% responded to a survey questionnaire.

The 20 item questionnaire elicited IG students' perceptions on Rogers' (2003) five attribute constructs. It was modified from Li's and Lindner's instrument (2007) used to describe the perceptions of faculty on the use of web-based, DE at an agricultural university in China. Students rated the statements using a five-point, summated response scale: *1 = Strongly disagree, . . . 5 = Strongly agree.* They also indicated their level of innovativeness regarding the use of ICTs for tertiary level learning in AE.

After a field test with IG students in another college, a few revisions were made to improve the instrument's clarity and readability. A panel of experts ensured the instrument's content validity. As determined *post-hoc,* the attribute constructs revealed Cronbach's alphas ranging from .717 to .915. Twenty questions were also asked to describe students' characteristics. Data were analyzed descriptively.

Results/Conclusions

A majority of participants were male, 30 years of age, and had 3.43 years of professional experience. Many were from Asia and about one-half anticipated working in tertiary institutions. About one-half had not experienced a course using ICTs, and a similar number were *uncertain* about whether they would recommend such a course to others. The students perceived their levels of innovativeness regarding ICTs for academic learning were between *unpersuaded* and *persuaded* (Rogers, 2003). Their perceptions overall regarding the five attribute constructs were in the range of *agree*. They held a *neutral* view of the constructs observability and trialability. As the students' perceptions of their innovativeness regarding the use of ICTs increased, so did their ratings of agreement with the attributes, and the more likely they were to recommend ICTs to others. These relationships were moderate, positive, and statistically significant ($p < .05$). Further, as respondents' perceptions of agreement with the attributes increased, their ratings for the strength of barriers regarding the use of ICTs decreased. This relationship was low, negative, and statistically significant ($p < .05$).

Implications/Recommendations/Educational Importance

If ICTs are to be adopted widely for teaching agriculture at tertiary institutions in developing countries, their attributes must be perceived and understood well by the faculty members expected to use such (Harder & Lindner, 2008; Li & Lindner, 2007). Faculty in the college studied should make it a priority to introduce their IG students to ICTs for the purpose of instruction as well as research and outreach. This practice could move the IG students' *neutral* perceptions regarding the observability and trialability of ICTs into the *agree* range, and thereby increase the likelihood of adoption occurring.

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Awareness and Adoption of Purdue Improved Cowpea Storage (PICS) Technology by Women Farmers in Kano, Katsina and Jigawa States, Nigeria

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Introduction

Cowpea is an important leguminous crop in Nigeria processed and consumed in various forms and use for multiple purposes. However, post-harvest insect pests of cowpea degrade the nutritional quality and economic value of the grains thereby causing serious losses to farmers (Jackai & Daoust, 1986). Alternative cowpea storage device (triple bagging technique) has been developed and popularized to the Nigerian farmers by the Purdue University in the United States through the International Institute for Tropical Agriculture (IITA) Nigeria with a view to reduce the heavy losses recorded at storage.

Purpose and Objectives

The study was undertaken with the main objective of assessing the level of awareness and adoption of the Purdue Improved Cowpea Storage (PICS) technology by women farmers in Kano, Jigawa and Katsina states of Northern Nigeria. The specific objectives were; to determine the socio-economic characteristics that influence the adoption of PICS technology by the respondents; determine the level of awareness and adoption of the technology; identify different traditional cowpea storage methods used by the respondents; assess how the technology diffuses among farmers in the study area, and describe the major constraints to the adoption of PICS technology.

Methods and/or Data Sources

Data were collected from primary source using structured and pre-tested questionnaire supported by oral interview. A total of 600 women farmers (300 in Kano, 180 in Katsina and 120 in Jigawa) were randomly selected and interviewed. The sample was drawn from the 40 demonstrated villages in the states. In addition 100 respondents (40 in Kano, 30 in Jigawa and 30 in Katsina) were also randomly selected and interviewed from 10 control (Non-PICS) villages. The elicited data were analyzed using descriptive statistics and multiple (logit) regression models.

Results, Products, and/or Conclusions

The results indicated that the age range of the respondents were between 16 and 80 with a mean age of 39 years. About 92.3% were married with a mean household size of 9 persons. Majority (86.3%) of the women had acquired some form of Islamic education. The results also indicated that the participation of women in PICS demonstration was found to be significant ($P \leq 0.01$). Also, contact with extension agents, membership of association, age; level of education, main occupation and area under cowpea production were found to significantly ($P \leq 0.1$) influenced the adoption of PICS technology. It was also revealed that the contributions of the above mentioned variables in influencing adoption were to the tune (likelihood) of 66.59%. Furthermore, the results revealed that majority (65.5%) of the women were aware of the PICS technology and participated in the village demonstration. Before the introduction of PICS technology however, 42.10% of the women stored their cowpea using insecticides and 57.9 used other storage methods. With the introduction of PICS, 28.70% of the women used PICS bags to store their cowpea. The major constraint reported by the women included poor accessibility of the PICS bags (57.7%) and low level of awareness (90.0%) at the grass root level. In conclusion, the willingness of women farmers to adopt and adapt the use of PICS technology is not in doubt. However, accessibility to the bags and low level of awareness on how to use them predominantly affected the level of adoption of the technology by the women.

Recommendations, Educational Importance, Implications, and/or Application

It is recommended that further awareness be created regarding the importance and usage of PICS technology to women groups and the accessibility of the PICS bags need to be further enhanced by extending the supply chain of PICS bags downward to communities and rural markets in the study area so that the women can access and use them to store their produce for a healthy and wealthy living.

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Capacity-Building Needs of Farmer-Based Organizations in Mali and Nigeria

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Introduction

Farmer-Based Organizations (FBOs) have been perceived as a mechanism for improving farmers' access to agricultural services, for realizing the scale economies of their produce, for building steady relationships with inputs suppliers or traders, for generating resources to invest in transport or processing operations, and for selling commodities. In addition, FBOs also can become more active participants in adding value to their production. For the past two decades, this view has guided the design of many programs of assistance to smallholders in Africa (Stringfellow, Coulter, Lucey, McKone, & Hussain, 1997). In the same scope, the Sasakawa Africa Association (SAA) / Sasakawa Africa Fund for Extension Education (SAFE) group, founded and supported by the Nippon Foundation of Japan, has been assisting smallholder farmers to fight against poverty and to attain food security in East and West Africa. From their field experience, they discovered that the FBOs with whom they collaborated still needed more capacity building because of their low performance (SAA, 2010). This fact was supported long before by Stringfellow et al. (1997), who indicated that, "there is growing evidence, however, that projects promoting farmer cooperation do not always lead to the emergence of viable farmer groups" (p. 2). Therefore, a need existed for program planners to analyze and understand factors that contribute to successful farmer cooperation.

In 2012, the SAA / SAFE group initiated an organizational and managerial capacity building program for farmers' organizations in Mali and Nigeria. The objective of this study was to understand the structure, mode of operation, management, level of leadership, and describe the factors affecting their viability and identify the needs for capacity building of the FBOs.

Methodology

In the first two quarters of 2012, purposeful sampling was used to select 40 FBOs in Mali and 43 in northern Nigeria. Two questionnaires were administered to FBOs' leaders and members. Focus group interviews were conducted to get an in-depth understanding of the management and leadership issues and opportunities provided to FBOs. Additional data were collected by content analysis of selected official documents related to national FBOs' policies, monitoring procedure of FBOs, management guide for FBOs, cooperatives' repertoires, and other evaluation reports of FBOs. A pilot test of the instruments allowed the reformulation of some questions. SPSS (version 16) was used to analyze the quantitative data.

Results

The study revealed that the FBOs can be divided into different categories in Mali and Nigeria, including associations, cooperatives, mutual associations, unions, and microfinance institutions (Mercoiret, 1988). These organizations were, male, female, or mixed, and were involved in production, commercialization, processing, and micro-lending.

As related to the functioning of FBOs, the study showed that all investigated FBOs held general assemblies or meetings at different frequencies. Although the general meetings were held, many communication problems were perceived by the study's participants in relation to members' adherence to cooperative principles; members' capacity building needs; and institutional communication with partners. Institutional formalization and leadership problems were also identified as the shortcoming for some FBOs. The study indicated that factors affecting the viability and sustainability of FBOs encompassed institutional**,** administrative, and financial management; definition of an optimal size in line with good management; ownership of FBOs by its members and their active participation in the socio-economic activities, existence of FBOs management bodies; gender considerations; owning working capital; socio-economic services delivery to FBOs' members; existence of viable business plans; respect of FBOs' objectives; and existence of training plans adapted to FBOs members' needs.

Educational Importance

The analysis and understanding of the socio-economic structure of FBOs and the factors affecting their performance and viability are capital for planning an extension advisory program to address their needs. Assistance should consider reinforcing good communication practices with FBOs members, their partners, and all service providers.

Conclusions/Recommendations

This study described FBOs that are located in SAA intervention areas, and it showed they still need assistance to be performant and sustainable. This support should enable them to be better restructured formally, to be more autonomous, and to excel in their field of activity. The researchers recommend that the intervention of SAA be more specific and focused on communication skills development, value chain analysis, training and information provision, and evaluation to illuminate the way forward for the FBOs to excel and serve the needs of their members better.

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Challenges Facing the Agricultural Sector in Trinidad and Tobago: A Comparison of Stakeholder Perspectives

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Introduction

Expanding the agricultural sector is central to Trinidad and Tobago's economic development strategy (Caribbean Community Secretariat [CARICOM], 2006). Currently, agriculture contributes only 0.4% of the GDP (US State Department, 2012), the sector employs just 88,000 of 1.3 million people, and farmland is merely 25% of the nation's total area (Ministry of Agriculture, Land, and Marine Resources [MFPLMA], 2012). The majority of agricultural production is exported while food imports are increasing, creating a $4 billion deficit in 2011 (CARICOM, 2006; MFPLMA, 2012). However, strengthening the agriculture of Trinidad and Tobago first requires identifying challenges faced by individuals within the sector.

Purpose/Objectives

The purpose of this study is to explore the perspectives and beliefs of farmers, extension officers, governmental and non-governmental organization personnel, and university-based agricultural educators regarding the major challenges of the agricultural sector in Trinidad and Tobago. The objectives are: (1) to identify the limitations facing agriculture in Trinidad and Tobago, and (2) to explore how these limitations can be addressed.

Methods

This study was conducted during a 10-day study abroad experience in March 2012 designed to explore Trinidad and Tobago's agriculture. A team of four researchers used convenience sampling, obtained informed consent, and conducted semi-structured interviews with agricultural stakeholders (n=27) at agricultural cooperatives, extension facilities, schools and universities, agricultural experiment stations, and farmers' markets across the country (Flick, 2009). Data were gathered using a researcher-developed instrument, of which one question formed the basis of this study. Hand-written notes were taken during the interviews, responses were member-checked with respondents, and data were triangulated with representatives of the host institution, the University of the West Indies (UWI) at St. Augustine (Merriam, 1998). The constant comparative method was used to identify emergent themes (Lincoln and Guba, 1985; Merriam, 1998).

Results

Three main themes emerged from the data. First, respondents discussed the connection between oil and agriculture, noting the nation's oil wealth had created a culture where consumers were content buying rather than producing food. In one case, a respondent described his switch to permaculture as "uncoupling himself" from oil dependence (R15). Another respondent predicted huge changes in post-oil Trinidad and worried his farm would be overrun by hungry people when the reserves were exhausted (R13).

The need to reduce food imports by increasing domestic production was also discussed. Respondents cited high (80%) ratios of staple crops (R01) and discussed governmental plans to reduce food importation and "create a food secure nation" (R18). However, respondents suggested that the government "talks the right talk" but fails to create a climate that stimulates local production and reduces imports (R08).

Respondents also cited labor insufficiency as restricting agricultural expansion. Low agricultural wages caused skilled laborers to pursue more lucrative jobs while unskilled laborers opted for social programs that paid less but allowed more free time (R09). The Community-Based Environmental Protection and Enhancement Programme (CEPEP) was disparagingly called "Continuous Employment, Painting Every Pebble" for the work done by participants (R20). Respondents cited low interest in agriculture among youth, and how "young people didn't see the value in food or care where it [came] from" (R13). No UWI students had registered for the agricultural extension diploma for years (R14), and a young extension officer described how he had chosen extension only due to lack of other opportunities (R22).

Recommendations

Several recommendations exist for addressing the challenges facing Trinidad and Tobago's agricultural sector. Extension and school-based agricultural education programming could help improve public opinion on the importance of local agriculture. Extension marketing could refocus on the economic and health benefits of domestically-grown foods to make the sector more appealing and stimulate public interest in local production versus importation. School curriculum can help generate youth interest and involvement in agriculture, which was described as "the best hope for fixing Trinidad's agricultural issues" (R10). UWI and the formal education system could also redouble efforts to recruit and financially support students in agricultural programs. These efforts, coupled with policies allowing agricultural wages to compete with social programs and other sectors, could improve opinions, increase the workforce, and ultimately develop the agricultural sector.

While the results of this study discuss only Trinidad, similarities to other Caribbean contexts may allow the findings to have larger implications to the knowledge base. Themes of competing economic sectors, food importation, and labor issues are common across the region. Replication of this study using similar data collection and analysis methods in other Caribbean nations would allow findings to be compared, further contributing to the profession and enhancing the educational value of this study.

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Consumer Attitudes about the Fruit and Vegetable Source in Trinidad and Tobago

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The gap is widening between producers and consumers. With an increasingly urban consumer base and a decreasing number of producers, the exchange of information has become near obsolete (Sharp, Imerman, & Peters, 2002).

Iraini, Sinclair, and O'Malley (2001) found that personal factors (i.e., culture) influence consumer acceptance and perception of agricultural innovations and systems. Understanding personal factors help producers forecast potential product markets (Iraini, Sinclair, & O'Malley, 2001). Further, it will help producers understand the expectations of the customers.

In Trinidad and Tobago, the agricultural work force made up 8% of the total labor force in 2005, most produce on less than 2.47 acres of land, and agriculture contributed approximately 0.65% to the total gross domestic product in 2006 (Lovendal, Jakobsen, & Jacque, 2007). With a booming economy and increasing inflation rates and food prices (Lovendal, Jakobsen, & Jacque, 2007), producers in Trinidad and Tobago must better understand their consumers to sustain and grow.

Purpose Statement and Objectives

This is the initial study to understand the expectations of the producers and consumers in Trinidad and Tobago. The purpose of this study was to describe consumer attitudes about their fruit and vegetable (produce) food source in Trinidad and Tobago. The objectives of this study were to describe consumer attitudes about produce: (a) origin, (b) growing methods, and (c) pricing.

Methods

An instrument was developed to measure consumer attitudes of their produce sources. As described by Trochim and Donnelly (2007), a five-point summated scale was used to indicate consumer level of agreement (1=Strongly Disagree, 2=Disagree, 3=Neither Disagree or Agree, 4=Agree, 5=Strongly Agree) with 24 statements. The instrument was reviewed by two country and language experts to ensure face and content validity and it was pilot tested to determine reliability; reliability was estimated by calculating Cronbach's alpha (Fraenkel & Wallen, 2006). The instrument was determined to be reliable for each construct: origin (9 items; r=0.82), growing methods (8 items; r=0.75), and pricing (7 items; r=0.86).

The participants in this study represented a convenience sample (Fraenkel & Wallen, 2006); they were chosen based on their presence in a market in Trinidad and Tobago and their willingness to complete a questionnaire. The questionnaire was administered in the markets; no identifying information was collected to ensure confidentiality.

Results

Descriptive statistics were used to determine respondents' attitudes about the origin, growing methods, and pricing of their produce (see Table 1). A total of 289 instruments were completed.

Table 1

Construct Means and Standard Deviations of Consumer Attitudes About the Origin, Method of Growing, and Pricing of Their Produce in Trinidad and Tobago

Construct	*n*	*M*	*SD*
Produce growing method	289	4.07	.55
Produce pricing	289	3.72	.71
Produce origin	289	3.65	.58

Note. N=289.

Respondent attitudes about the origin of their produce (*M*=3.65, *SD*=.58) received neutral scores, in general, but did indicate that "buying locally grown fruits and vegetables stimulates the local economy" (*M*=4.30, *SD*=.74). The lowest score in this construct indicated that locally grown fruits and vegetables may not be more consistently available than imported (*M*=3.19, *SD*=.97).

Respondent attitudes about the methods used to grow their produce (*M*=4.07, *SD*=.55) earned the overall highest scores. Respondents indicated a preference for produce grown without chemicals (*M*=4.37, *SD*=.77); they also indicated that those grown with chemicals may be more consistently available (*M*=3.87, *SD*=.85).

In the construct about consumer attitudes about the pricing of their produce (M=3.72, SD=.71), respondents indicated a willingness to pay more for healthy (*M*=4.08, *SD*=.75) produce and they are neutral about the origin of their produce in the context of pricing (*M*=3.00, *SD*=1.12).

Conclusions

It can be concluded from the findings of this study that the consumers in Trinidad and Tobago are realists when assessing their produce. They agree that locally grown produce stimulate the local economy and are fresher than imported produce. They also desire their produce to be grown without chemicals, but recognize the uniformity aspect and availability benefits of the alternative. Consumers indicated that they are willing to pay more for healthy and fresh produce, but are neutral about aesthetics and origin in the context of pricing.

Recommendations and Educational Importance

The researchers recommend further studies be conducted to determine any correlation between the constructs in this study and other factors of consumer attitudes. Similar studies in like-countries should also be completed to compare the findings and create greater implications for the field.

Educational importance is embedded in Extension efforts. Extension's educational programs may extrapolate this information to the informational and educational content they develop for farmers and consumers to bridge the information gap.

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Defining Sustainable Agriculture Based on Input from Individuals Involved in International Agricultural and Extension Education

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Introduction

Sustainable agriculture has been offered as a solution to "global integration, economic consolidation, and environmental degradation" (Feenstra, 2002, p. 99) and has been identified as an enduring agricultural paradigm (Sanagorski, 2012). While numerous definitions exist, most include aspects of economic, environmental, and social balance, and the preservation of natural resources (Feenstra, 1997; Hanson & Hendrickson, 2009; Ikert, 1998; Rodriguez, Molnar, Fazio, Sydnor, & Lowe, 2009; USDA, 1999). Specifically, sustainable agricultural must be profitable and beneficial to the community, while protecting wildlife and natural resources. The social component suggests that this paradigm supports local jobs, fair trade, and good working conditions, while the economic component indicates the importance of profitability (Rodriguez et al., 2009; USDA, 1999).

The very act of defining sustainable agriculture has been discussed and disputed over the past two decades. Lack of a singular definition and general ambiguity of the term are frequent criticisms (Hanson & Hendrickson, 2009; Jayaratne, Martin, & DeWitt, 2001), and may even be "inhibiting cooperative progress toward long-term minimization" (Keeney, 1990, p. 281) of environmental, social, and economic effects of today's agriculture. "Sustainable agriculture is a complex, site-specific, not well understood system" (Hanson, Kauffman, & Schauer, 1995, p. 155) and because of this, "precise definitions are impossible" (Pretty, 1995, p. 1247). With this in mind, this study sought to explore AIAEE members' definition of sustainable agriculture.

Purpose and Objectives

The purpose of this study was to explore AIAEE members' perceptions of the definition of sustainable agriculture. The objectives that guided this research included (a) identify AIAEE members' agreement or disagreement with a prescribed definition, and (b) document AIAEE members' additions and comments about one specific definition.

Methods

The authors distributed an electronic survey instrument to all AIAEE members excluding themselves (n = 203). The instrument presented one definition of sustainable agriculture: "an agriculture that can evolve indefinitely toward greater human utility, greater efficiency of

resource use, and a balance with the environment that is favorable both to humans and to most other species" (Harwood, 1990, p. 4). Respondents were asked to indicate agreement with the description or to explain why they disagreed, and to offer what was missing.

Data collection included an initial survey distribution followed by two reminder emails, as recommended by Dillman, Smyth, and Christian (2009). The survey was closed after 36 days. The researchers imported data into SPSS for analysis, and coded open-ended responses so that themes could be identified.

Results and Conclusions

Study data were collected in August and September of 2012. A total of 54 surveys were completed adequately, for a response rate of 26.6%. Nonresponse error was controlled by comparing early and late respondents as recommended by Lindner, Murphy, and Briers (2001), and Miller and Smith (1983), in order to generalize findings to the population.

A majority of the sample (n = 48, 82.8%) agreed with the definition provided. Of the recommendations provided by the membership, the most common element that was suggested as missing was that of economics and profitability to the grower. The second most common theme was that of technology adoption. Other important points that emerged included the element of supplying enough food to support a growing population, the social element of sustainable agriculture, and the need to emphasize that this paradigm is site-specific. A few respondents indicated discomfort with the very act of defining sustainable agriculture.

Recommendations and Implications

The authors concluded that the majority of the AIAEE membership agreed with the prescribed definition, which stated that sustainability in agriculture should include evolution, human utility, preservation of resources, support of human and other species, and environmental balance; however, they added that profitability and technology adoption must accompany these themes. Many researchers, including the current authors, acknowledge that sustainable agriculture is fluid and site-specific, and that a clear definition may never be identified. According to the USDA (1999), a "lack of sharp definition has not lessened its authenticity" (p. 14). This study provided a view of AIAEE members' attitudes about the definition of sustainability in regards to agriculture, and documented critical elements that should be considered in relation to sustainability. The authors agree with Ikert, who stated that "we may never have a generally accepted definition of sustainability, and perhaps, we don't need one" (Ikert, 1998, para. 2). The authors emphasize that it is the intention of this practice, and not its definition, that it most important to those served by our membership.

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Determinants of Role Performance Effectiveness among Facilitators in the Second National Fadama Development Project in Nigeria

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Keywords: Determinants**,** role performance effectiveness, facilitator, national fadama development project, Nigeria

Introduction

Much of the recorded failure to transform Nigeria's agriculture can be attributed to the weak extension delivery system, and the weak linkage between research and extension (Idachaba, 2001). Many interventions through extension systems and approaches have been attempted to turn around the agricultural fortunes and fast-track agricultural productivity.

The World Bank and the African Development Bank are collaborating in funding the Second National Development Project at the total indicative project cost of US$160.56 million with the World Bank contributing US$25.37 million while the ADB is contributing an equivalence of US$35.19 million. The project is on going in 18 states of Nigeria and is expected to terminate in 2009. While the Third phase of the programme started in 2008. The sector goal of the Fadama II Development Project is to reduce poverty by improving the living condition of the rural poor, contribute to food security and increase access to rural infrastructure (World Bank, 2003).

In the Second National Development Project the facilitator is the link between the Fadama Development Project Management and beneficiaries. Facilitators relate with the beneficiary communities to implement project financed initiatives as part of the paradigm shift by the Fadama Development Project (Kolawole, 2001). Facilitators form an important component of the link between research institutes, universities, private research organizations, NGOs and Fadama Community Association (FCAs) and their constituent Fadama Users Groups (FUGs). They function as information managers for the purpose of monitoring, screening, indexing, cataloguing, packaging and storing useful information for later use and dissemination to FCAs and FUGs (Nweze, 2004). They have the responsibilities of shaping the course of the project, relating directly with the beneficiaries at the community level (Ingawa, 2004). Selection of community facilitators is done through an open bidding process (World Bank, 2003).

After three years of implementation of the project preliminary lessons learnt indicate that the quality of facilitation support to FCAs is low especially in the technical field. This poor facilitation is manifested in inadequate sensitization of the FCAs, low-level comprehension of the project approach and the associated guidelines by the FCAS and low quality of Local Development Plans, LDPs, (Fadama III Zero Draft, 2005).

One way of guaranteeing effective performance of field agents is through proper selection (Madukwe, 1989). Consequently, attention needs to be given to more directly

specifying the characteristics needed for effectiveness of facilitators and recruiting against such regimes to ensure role performance effectiveness and sustainability of the project . Therefore, considering the pivotal role the NFDP-II facilitators have to play, the effective performance of facilitators is pertinent for the success of the Second National Fadama Development Project.

Purpose and Objective

As a result of the not so cheery performance of the facilitators in the NFDP-II the question now relates to the selection of appropriate criteria for the effective role performance of facilitators in the Second national Fadama Development Project. Which facilitator variables discriminate between effective and ineffective facilitators? This study provides answers this question.

Materials and Methods

The study area is Federal Republic of Nigeria. Nigeria is situated between latitude 4^0N and $13^0 50^{'}$ N of the equator and longitudes 13^0E and 15^0E of the Greenwich Meridian. A multistage random sampling technique was used in the selection of respondents comprising 118 valid facilitator responses and six community development officer respondents. Using the factor analysis procedure 66 facilitators were grouped as effective while 52 were grouped as ineffective. Using the step wise discriminant analysis techniques on these two groups, 27 proxy variables identified as representing socio-demographic variables of facilitators were captured.

Results and Discussion

Six variables were significant in determining if a facilitator belongs to these two groups. These are highest educational qualification (*d*=-0.46), years of experience in facilitation work (*d*=-0.50), number of in-service training attended (d=-0.34), empathy (*d*=-1.08), honesty (*d*=-0.92) and reliability (*d*=-2.07). The result showed that these variables determine role performance effectiveness of facilitators.

Recommendations and Implications

It was recommended that candidates for the position of facilitator should possess a high educational qualification, at least, Higher National Diploma or University Degree in Agricultural Extension or Rural Sociology or social science, a number of years of experience in facilitation work, and must have attended many in-service trainings.

The policy implication of this finding is that a policy measure should be put in place in the organization, namely, a due process mechanism to ensure that facilitators selected meet these criteria to ensure the selection of potentially effective facilitators in the Second National Fadama Development Project in Nigeria.

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Determining the Problems, Impacts and Potential Solutions for the Agricultural Industry of Belize: A Needs Assessment

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Introduction

Agriculture is vital to the economic well-being and continuity of Belize as it provides a domestic source of food and fiber and employment for a large majority of the population. The open, private sector-led economy of Belize centers around three main industries: agriculture, industry, and tourism/services (U.S. Commercial Service, 2012; CIA, 2012). As of 2011, agriculture accounted for 40.2% of the country's total exports, which represents a steady decline from 2008 (43.0%), 2009 (51.8%), and 2010 (44.6%) (U.S. Commercial Service, 2012). When compared to the other main economy sectors, agriculture accounted for only 9.7% of total gross domestic product (GDP), while industry accounted for 19.8% and services accounted for 70.5% (CIA, 2012).

A review of literature identified several issues that hinder the agricultural industry of Belize from becoming more competitive in a global economy, which include a lack of accessible roads, inconsistent utilities, food safety concerns, cost of bringing products to market, lack of a modern food-testing laboratory, and plant diseases within the citrus industry (IICA, n.d.; U.S. Commercial Service, 2012; Belize Citrus Growers Association, n.d.). Therefore, it was determined that research should be conducted to identify a more explicit list of the country's agricultural education needs.

Purpose and Objectives

There is a lack of knowledge pertaining to the educational needs of those involved in the agricultural industry in Belize. The purpose for this study was to conduct a needs assessment in

order to determine the areas of research that should be focused on so that future educational programming and collaborative work in the form of workshops, internships, and grant proposals can be created. The research was guided by the following objectives:

1. Determine what barriers prevent the agricultural industry of Belize from being more successful.
2. Determine what the agricultural industry, as a whole, needs in order to be more successful.
3. Determine what the educational needs are for the agricultural industry of Belize.

Methods

For this qualitative study, a needs assessment was conducted. A variety of needs assessment techniques were used to collect data: individual interviews, group interviews, and observations. Case study methodology was employed to answer the study's research objectives. The researchers traveled to Belize and met with representatives from the citrus, banana, poultry, tourism, and shrimp industries, as well as with government officials from a Belizean agricultural health authority and the Inter-American Institute for Cooperation on Agriculture (IICA). The interviews were based upon a pre-determined set of questions specifically written toward each sector of the agricultural industry. All interviews were digitally recorded and observational notes were taken of the operations toured. The interviews were then transcribed into a Word document and were analyzed for common themes with the use of NVivo 10.

Results, Products, and/or Conclusions

The results revealed several major themes that spanned across the entire agricultural industry. For Research Objective 1, the barriers identified for the Belizean agriculture industry were related to government, energy, oil, boat transportation, disease, weather, illiteracy/lack of technology, and unemployment. For Research Objective 2, general agricultural needs were identified for the citrus, beef, poultry, restaurant/tourism/agritourism, banana, and shrimp industries, and also the agricultural health authority for Belize. For Research Objective 3, several agricultural education needs were identified: the need for a link with other universities, the need for more government assistance in terms of education, the need for better collaboration with the Mennonite culture, the need to focus on extension education more, and the need for a better information dissemination system.

Educational Importance, Implications, and/or Application

Since there is no current baseline study pertaining to the agricultural education needs of Belize, this research will provide the necessary baseline that will in turn allow for future research to be conducted relating to this topic. Based upon the results of this needs assessment, action can now be taken to provide education and future collaborative work so that the rural communities of Belize can gain a more stable economy and an improved quality of life.

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Development and Validation of Liberia's National Policy for Agricultural Extension and Advisory Services

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Keywords: Africa, agricultural extension, policy, reform, process

Abstract

Singularly few African nations have current policies specific to their Extension and Advisory Services (EAS). This is recognized in the 2011 Nairobi Declaration—an instrument emerging from the *Innovations in EAS International Conference*—which calls on governments, farmers, the private and civil society sectors, donors, and other stakeholders to develop clear policies for EAS in a participatory manner (Pye-Smith, 2012). The challenge is how to efficiently and effectively respond to this call. Liberia, a post-conflict West African country now rapidly recovering from decades of mismanagement and 14 years of brutal civil war, has successfully taken on the EAS policy challenge.

Informed by policy development analytical frameworks (Cafcass, 2007; Sutcliffe & Court, 2006), the purpose of this paper is to detail the process Liberia applied to develop and validate its national-level policy on agricultural EAS, describe the results and follow-up of the process, and capture lessons learned. The paper features key actions taken and decisions deliberated to move Liberia's policy from inception through to preparation for legislative review and onward.

Liberia's process was led by a multi-disciplinary Ministry of Agriculture (MOA) appointed Task Force, whose first task focused on reviewing Liberia's 2009 draft EAS policy. Backstopped by donor technical assistance, a set of learning activities followed, designed to expedite the process by leveraging lessons learned from previous extension reform and policy development efforts. This included review of global trends in EAS and of several EAS policies from African and Asian countries.

Liberia's process was highly participatory involving a wide-array of stakeholders. Stakeholder input to the policy was gathered through individual and group interviews, e-mail surveys, and field visits with public, private, and civil society actors including producers and their organizations, agribusiness owners, extension staff, legislators, and representatives from the agricultural education, non-governmental organizations, finance, and donor communities.

Extensive dialogue among the Task Force and other stakeholders resulted in identifying the critical issues to be addressed by the policy. The policy articulates the vital characteristics of Liberia's EAS system, envisioned as pluralistic, decentralized, demand-driven, market-oriented, and sufficiently flexible to address priority cross-cutting issues such as gender, nutrition, and natural resource management. The policy identifies EAS stakeholders and geographic coverage and discusses EAS content, approach, and methods. Particular emphasis is afforded roles and

responsibilities of various stakeholders and mechanisms to be utilized to ensure coordination and consultation among them. As a result of deliberations, the policy provides less emphasis on finance, staffing, and capacity development than on these other elements. The policy does not include an implementation strategy because the decision was made to design an implementation strategy as a separate activity embodied in a separate document.

The primary result of the policy development process was a draft policy. The draft policy was validated through a stakeholder workshop where numerous stakeholders provided additional input. Liberia's final *National Policy for Agricultural Extension and Advisory Services* (MOA, 2012) receives the full support of the MOA.

Follow-up recommendations emerging from the development and validation process focus on initiating formal adoption of the policy by the Government and on developing and implementing an Outreach Campaign to create greater awareness and understanding of the policy, particularly in rural areas. Developing the policy implementation strategy, as a matter of priority, is strongly recommended as is preparing plans for and initiating implementation of selected components of the policy (e.g., designing and implementing a professional development program for extension staff).

Given the renewed interest in EAS and the acknowledged need for explicit EAS policies, Liberia's experience contributes a practical approach to policy development and validation. Liberia's lessons learned are of potential use to other countries intending to design EAS policies and they can inform policy capacity development efforts in the classroom and elsewhere. Key lessons from the Liberia experience center on Task Force activity, stakeholder input, and policy process phases. The importance of a high-level Task Force of committed experts—well-versed in the social, economic, and political situation of the country, who are given the mandate, time, and resources to focus on the policy process—cannot be over emphasized. Task Force learning, particularly via review of other country policies, facilitates the process and proves a valuable use of Task Force time. Allocating sufficient time and resources to obtain stakeholder input is of high priority to be carefully considered in initial planning. Discussion and understanding of all phases in the process (e.g., development and validation including agenda setting and formulation, adoption, implementation, and evaluation), is instructive for high-level planning purposes, even if the process is to be addressed phase by phase.

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Educational Comparison: Teacher Preparation Programs in Finland and the United States

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Keywords: Teacher preparation, International comparative education

Introduction

Finland's education system began attracting attention in the year 2000 when it emerged as the top-scoring nation in the Organization for Economic Co-operation and Development (OECD) on the Program for International Student Assessment (PISA). High levels of educational achievement and attainment have regarded Finland as one of the world's leading models of educational comparison. In contrast, with an average score of 496 on the 2009 PISA, the United States' scored considerably less than Finland's averaged score of 544, allowing Finland to rank first in this assessment (PISA, 2009).

Many attribute Finland's success to the effect of high quality classroom teachers (Simola, 2005). Understanding the success of Finland's education through examining their teacher preparation programs may offer design improvements that could be beneficial in building capacity in agricultural education teacher preparation programs in the United States.

Purpose/Research Questions

The purpose of this study was to examine teacher preparation programs in Finland and the United States in order to identify successful approaches to preparing future agriculture teachers. The following research questions were developed to guide the study.

1. What aspects of Finnish teacher preparation programs contribute to the development of effective teachers?
2. What are the similarities and differences between Finnish teacher education programs and teacher preparation programs in the United States?

Methods

The impetus to this study was based on the researcher's Scandinavian study abroad experience. Advanced searches of Google Scholar and the ERIC database were utilized to examine the literature. Only empirical studies specifically examining the components of teacher education programs in Finland, as well as scholarly articles providing a complete background of the teacher preparation process of Finland were included. Other data sources such as TIMMS, PISA, UNESCO, and Finland's Ministry of Education and Culture website were employed for a thorough search of resources.

Due to the varied array of teacher preparation programs and educator licensure policies found across the United States, only one state, Missouri, was used for comparison. Interestingly,

Finland and Missouri are similar in population with 5.4 million people (Kaiser, 2005). Data pertaining to teacher preparation programs in Missouri were gathered from the Missouri Department of Elementary and Secondary Education's website (DESE).

Findings

Research Question One

Structurally, the Finnish teacher education student will study educational theory, content, and subject specific pedagogy, but will also complete a master's thesis on a topic significant in the field of educational practice (Sahlberg, 2011). It is during the pedagogical studies that future teachers learn the basics of teaching, support of varied learners, and the latest research results and methods (Niemi & Jakku-Sihvonen, 2011).

Pedagogical practice and research-based teacher education emerged as contributing to the development of effective teachers in Finland. Sahlberg describes the Teacher Training Schools where pedagogical practice occurs. Here, future teachers observe lessons by experienced teachers, practice skills observed by supervisory teachers, and deliver independent lessons to different groups of students (2011). The second distinguishing factor of Finnish teacher education programs is the involvement in research-based teacher education. According to Toom et. al. (2010), the purpose is to educate independent and reflective teachers who are capable of using research in their teaching and can be defined as pedagogically proficient thinkers.

Research Question Two

Similarities found between teacher preparation programs in Finland and Missouri included the use of pedagogical practice, academic course requirements, as well as similar pedagogical curriculum. Both Finland and the United States require future teachers to enroll in academic and pedagogical coursework.

Differences identified between teacher preparation programs in Finland and Missouri include a high level of research-based education as seen in Finland that is not a focus in Missouri programs. A further difference is the Master's degree requirement in Finland, which is not the case in Missouri. The final difference is seen in the structure of licensure.

Recommendations

The data suggest that Finnish teacher preparation programs offer unique attributes in the development of effective teachers, with the most unique being successfully linking theory and practice. Agricultural education teacher preparation programs should consider engaging students in action research. The second step would be allowing students to execute the findings of the research through pedagogical practice.

With a strong link between the quality of the teacher and the success of the student, Finland is doing something right in building the capacity of their teachers. Whether or not the teacher is the only reason for the student success, the design and implementation of Finnish teacher preparation programs have achieved the desired results. Further research is needed regarding the connection between teacher preparation programs and student success.

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Effectiveness of Extension Program Delivery Methods as Perceived by Central Vietnamese Farmers

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Key word: Effectiveness, Extension Program Delivery Methods, Farmers, Relationships,

Introduction

Extension programs such as agricultural production diversification program and beef cattle production program have been delivered to farmers by using a variety of extension methods in Central Area of Vietnam. A wide range of extension methods have been used such as on-farm demonstration, farmer-to-farmer extension, lecture, workshops, farm and home visits. Diversifying use of extension methods aims at transmitting information to farmers and helps working with them more effectively (Ban, and Hawkins, 1996). Effectiveness of extension methods as perceived by farmers in Vietnamese context, is however, not clearly understood (Truong, Rundquist, et al., 2010). Success of extension programs depends partly upon appropriateness of extension delivery methods used. It can be argued that if we know what extension methods are appropriate to specific farmers, then it possible to deliver extension programs that meet farmers' needs and also help bring about changes - knowledge, skills, attitudes, and practices of farmers (The World Bank, 2007; Nguyễn, Nguyễn, et al., 2006; Jadalla, Abu, et al., 2011).

Purpose and Objectives

The overall purpose of this study was to determine the effectiveness of extension program delivery methods as perceived by program participants in Central Vietnam. The specific objectives of the study were:

Describe the demographic profile of extension program participants;

Determine effectiveness of extension methods as perceived by program participants;

Determine relationships, if any, between participants' demographic characteristics and select extension program delivery methods.

Methods and Procedures

Population and Sample

This study used a cross-sectional survey research design. The subject of this study comprised all farmers who participated in the agricultural diversification program (N= 120) conducted in Central Area of Vietnam.

Instrumentation, Data Collection and Analysis

A two-section questionnaire was developed to collect data. The first section consisted of nine extension program delivery methods measured on a five-point Likert scale which ranged from 1= *strongly disagree* to 5= *strongly agree*. The second section gathered demographic information such as age, gender, education level, etc. The questionnaire was reviewed by a panel of experts for face and content validity. The questionnaires were self-administered. A total of 80 participants completed the questionnaires (66.67%). Data were analyzed using descriptive and non- parametric tests (De Vaus, 2002).

Findings

Objective One – Demographic profile

Approximately 61% were male and 39% were female. Over 32% of participants were 45-54 years old, followed by 21% (35-44 years), 20% (55-64 years), 15% (65 years and over), and 10% (18-24 years). Most participants reported completing of high school (33.8%), followed by junior high (30%), primary school (22.5%), no school (5%), trade qualification (2.5%), and certificate/diploma (2.5%).

Objectives Two- Effectiveness of Extension Methods

Participants perceived that the most effective extension methods were: 1) mass media *(M*=4.46, *SD*=0.71*),* 2) farmer-to-farmer extension *(M*= 4.39, *SD*=0.73), 3) farmers field school *(M*=4.12*, SD*=0.86*),* 4) training and visit *(M*=3.95, *SD*=0.92*),* 5) service provider for farmers *(M*=3.79, *SD*=0.97*),* and 6) trial and demonstration *(M*=3.56, *SD*=0.88*).* In contrast, somewhat ineffective extension methods were lecture *(M*=3.13, *SD*=0.98*),* followed by visit farmer's field and farmer visit to extension office *(M*=3.34, *SD*=0.91*),* and field workshops *(M*=3.44, *SD=0.*91*).*

Objective Three- Relationships

A statistically significant relationship existing between extension method of "training and visit" and participants' age (Chi square=9.05, Phi=0.336, p= <0.05) and gender (Chi square=4.88, Phi=0.246, p=<0.05).

Conclusions and Recommendations

In general, participants perceived that methods such as mass media, farmer-to-farmer extension, farmers field school, training and visit, and service provider, as most effective for delivering information, acquiring knowledge, and skills. Participants, however, perceived that lecture and field workshops as "somewhat not effective" methods to deliver extension programs.

A higher proportion of participants (58.9%) in the age group of 35-54 years "strongly agreed" that training and visit system, as most effective method compared to other age groups. Similarly, male participants (55.4%) "agreed" that training and visit system, as more effective than female participants (44.6%).

Findings of this research should be shared with extension workers, extension educators to identify most appropriate extension methods for delivering extension program in Central Area of Vietnam.

More research should be conducted to know why some extension program delivery methods are not effective so that appropriate delivery methods can be used to improve effectiveness of extension programs.

Demographic characteristics of farmers such as age, gender should be considered when selecting Extension methods to deliver programs.

This study should be replicated in other areas of Vietnam to better understand the appropriateness of delivery methods used. Such an understanding will help to develop a national strategy for delivering Extension programs in Vietnam.

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The Effects of Human Resource Management and Socio Demographic Characteristics on Performance of Extension Agents In Kwara State Of Nigeria

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Keywords: human resource management, extension personnel, job performance, capacity building and socio-economic characteristics

Introduction

Rural farmers in Nigeria depend on the agricultural extension personnel employed by Agricultural Development Projects (ADPs) for knowledge, skills and enlightenment to improve on food production. The management of extension personnel to perform their duties effectively is therefore important for improving agricultural production. Management of the extension personnel include the selection, training and rewarding of personnel aimed at achieving the goals of extension organization (Buford, Bedeian, & Lindner, 1995). An effective Human Resource Management (HRM) in extension is critical to the performance of extension personnel (Halim & Ali, 1988; Rivera, 2006). The central objective of HRM policy in extension is to ensure that the service is ran by people whose training, experience, motivation and mental state of mind are positively aligned to the needs and aspirations of the government and the people. There is a growing body of evidence supporting the association between highly committed HRM practices and various measures of organizational performance (Guest, 2011). Employee performance has also been shown to have a significant positive effect on organizational performance (Collis & Montgomery, 1995).

Purpose and Objectives

The study of HRM and performance has been done mostly in the business world in the developed countries. The purpose of the paper is to highlight the case of service organization in a developing country and to assure that an effective capacity building for extension personnel is achieved in Nigeria. The main objective of the study was to determine extent to which HRM process and background of extension personnel contribute to job performance. The specific objectives were to: describe the socio-economic characteristics and human resource (HR) background of extension agents; establish the level of job performance (knowledge and skills) of extension agents; relate the socio-economic characteristics and the HRM process (recruitment, training and reward) to job performance; and finally determine the best predictors of job performance.

Methods and/or Data Sources; or Theoretical/Philosophical Themes

The study used a survey-correlational design. A content-validated and self-administered questionnaire was used to collect data from 70 respondents selected randomly from a population of 120 extension personnel from Kwara State ADP in Nigeria. The Director of ADP rated extension personnel on 24 job performance indicators which were constructed with the personnel and the Director. Means and standard deviation were used to describe the data while Pearson

product moment correlation (*r*) was used to identify the relation between the variables. A multiple regression model was used to predict job performance from the socio-economic characteristics and HRM variables.

Results, Products, and/or Conclusions

The analysis of socio-economic characteristics revealed that respondents were mainly designated as extension agents and enumerators (86.8%). Moreover, they have varied experiences with an average of 6 years working experience. The personnel were youthful (mean age is 38 years) with the males outnumbering the females. The salary level of personnel was very low ranging from ₦ 4000 to ₦ 5200 per month. Job performance of extension agents was considered to be high (Mean =4.61; s.d. = 0.82 on 6-point scale). Except work specialization and academic level, there was a positive and significant relationship (*r* ranged from 0.32 to 0.57 and *p*-values < 0.005) between job performance and current position, experience of extension agents, age and average monthly salary.

Job performance related positively and significantly (*r* ranged from 0.26 to 0.47; and *p*-values < 0.005) with motivational factors (level of salaries, days of sick leave, praises received from supervisors, rate of promotion and physical working condition and self respect). On the other hand, job performance was not significantly (p-value > 0.005) related to types of training received in the last two years, job orientation and mentorship programmes. The best predictors of job performance were average monthly salary (β=0.49, t-value=2.63 and p-value = 0.012); annual leave (β=0.32; t-value =2.74 and p-value = 0.008); conditions of work (β=0.322, t-value=3.330 and p-value = 0.001).

Recommendations, Educational Importance, Implications, and/or Application

The study concludes that extension's HR is youthful, male dominated with varied working experience. This implies that ADP should invest in training of HR since it stands to benefit agents in the long run. Any capacity building for HR should target female extension agents and improve on salaries of personnel.

Capacity building to enhance job performance should focus on background of extension agents and motivational factors. Specifically, the salary, annual leave and conditions of work should be improved and related to the job of extension personnel. The types of training for extension should be reviewed to contribute directly to the performance of extension personnel.

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Engaging Women through Common Initiative Groups in Cameroon

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Keywords: Gender, food security, Cameroon, agriculture, groups

Introduction

Food security is being threatened all over the world. Women are especially susceptible, particularly in developing countries. Patel (2012) stated "gender is key to food insecurity and malnourishment, because women and girls are disproportionately disempowered through current processes and politics of food's production, consumption, and distribution" (p. 2). Agriculture is an integral part of Cameroonian family life, acting as a safeguard for the family's food security, health, and children's education (Fonchingong, 1999). Women play a vital role in meeting the nutritional and food needs of their families through agricultural production, access to food, and ensuring proper nutrition of family members (Okoli, 2001). Women represent up to 50 percent of the agricultural labor force in Sub-Saharan Africa (SOFA Team & Doss, 2011). Despite their contribution, women are constrained by poverty, illiteracy, lack of access to credit, capital, extension services, lack of land rights and gender discrimination (Bryson, 1981).

Purpose and Objectives

The purpose of this presentation is to illustrate one practitioner's experience working with women's common initiative groups to address food security. The objectives of this presentation are to examine:

- Methods to identifying group needs
- Work plan creation
- Evaluating outcomes
- Lessons learned and transferability to other projects

Methods

The data for this presentation came from the author's experiences as an agro-forestry Peace Corps volunteer serving the North Region of Cameroon. It is presented as a case study. Merriam (1998) described a case study as an in depth description of a phenomenon within its real life context. Data were collected through participant observation. Upon identifying a group of women, the lead author designed a training program to address the needs of the group. There were 33 women in this group with whom the lead author worked for seven months. The women were from one village in the North region. The women were of two main ethnic groups: Guiziga and Mafa. The ages of the women varied from approximately 20 to 40, however exact ages were

difficult to assess due to lack of records. Specific aspects of this project are outlined in the logic model below (Figure 1).

Inputs	Outputs		Outcomes – Impact		
	Skill Development	*Activities**	*Short*	*Medium*	*Future*
Focus group discussion to identify prior knowledge of group work implementing activities such as daily calendars and priority mapping.	1. Working in groups 2. Communication 3. Time management 4. Leadership 5. Identifying group leaders 6. Action plan development 7. Long term goals	1. Helium stick 2. Telephone 3. Daily schedule 4. Leading the blind 5. Visions of grandeur 6. Road mapping 7. Looking to the future *All activities were designed or adopted by the lead author.	Changes in knowledge and attitude. The women: • Learned about group dynamics • Became more aware of time management of their everyday activities • Learned the importance of looking towards the future and goal setting.	Changes in behavior. The women: • Made references to the activities to emphasize a need to address • Communicated more freely with one another • Group relations improved.	The future objectives of these trainings are: • Women can become leaders within household and community. • Women work as a group to increase potential for income generation. • As a group, they can work towards reducing food insecurity within their families and communities.

Assumptions: Based on the inputs and outputs, women will be able to form a common inititative group and be recognized by the Government of Cameroon. They will then be eligible for funding opportunities. The women will benfit financially and personally from this group formation and activities thereafter performed.

Barriers: Barriers encountered were: illiteracy, mulitple languages, family obligations, illness, death, relocation, planting season contraints, and lack of capital.

Figure 1. Logic model outlining the project.

Conclusions

Women learn many valuable skills working as a common initiative group. Skills developed though the trainings were: group work, communication skills, time management skills, leadership skills, and long term planning skills. Working in groups, women are able to increase their opportunities for income generation, have access to potential funding through the government, and receive recognition within their communities.

Implications

Empowering women to work in groups and providing them with skills for success can address many development problems such as food insecurity. Women's roles in food structures within communities can be strengthened through leadership training and lowered gender disparities. Through capacity building, women will be further equipped to meet the agricultural needs of their families thus enabling nutritional security and access to food (Okoli, 2001). Future volunteers could use this training to further rural women's capacity.

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Evaluating Community Impacts of an Extension Program Targeting Limited-Resource Farmers in Dominican Republic "A Success Story"

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Keywords: Woman in Agriculture, Rural Development, Greenhouses

Introduction

Evaluating extension programs is a challenge for many extension professionals. Program indicators that are not clearly stated can make it difficult to evaluate qualitative or quantitative program impacts. Evaluating international programs can be even more difficult due to time constraints, language barriers, and lack of data. For international efforts, it is important to develop work plan strategies before traveling to the project country. Good preparation will help overcome local obstacles such as vague extension plans of work or insufficient data. Our survey study will present the insights, methodology, and results of an international program evaluation conducted on a project targeting limited-resource farmers in San José de Ocoa, Dominican Republic. The study addresses a rural community development project based on agricultural diversification, and focuses on the impact of establishing greenhouses as an alternative technology to improve family incomes for limited-resource farmers.

Purpose and Objectives

The purpose of this survey study is to evaluate the economic impact of a greenhouse project on family incomes of limited-resource farmers. The survey will also identify extension program success story indicators by analyzing how the community is responding to the extension program. The objectives of the survey study include: to evaluate the farming systems of limited-resource farmers involved in greenhouse production; to assess the family income of project beneficiaries; to measure the additional income provided by greenhouse production enterprises; to evaluate the financial capacity and loan management of project beneficiaries; to evaluate agriculture knowledge gained as a result of technical assistance provided by local extension agents; to evaluate the level of satisfaction among project beneficiaries with respect to the local extension service as well as technical assistance provided by international experts invited by this extension program.

Theoretical Framework and Methods

The greenhouse project of San José de Ocoa is based on the assumption that agricultural diversification will improve the family income of project beneficiaries. The establishment of greenhouses is part of the project strategy for production diversification and increased farm productivity. A farm economic analysis should demonstrate if the proposed greenhouse production is a feasible approach to sustain a long term economic impact on small farmers in San Jose de Ocoa. The survey study was designed to ascertain if greenhouse production enterprises

are producing additional net income to participating families. A questionnaire was conducted on thirty (n = 30) small farmers located in nine rural areas in the valley of San José de Ocoa in Dominican Republic, and secondary data were acquired through conference calls, interviews with extension agents and project managers.

Results and Conclusions

Three different farming system "groups" were identified in the study based on their total available agricultural land, production yields, and gross income. All three farming system groups typically cultivate vegetables, beans, and maize in open field plots. Greenhouse crop production is primarily focused on green peppers (capsicum annuum). Farmers in group 3 and 2 had higher production yields, more land in production and better family income. Group 1 farmers were found in extreme poverty levels and with limited resources. Results of the survey indicate that all three farming system groups are earning additional income from their greenhouse operation, but with some limitations within group 1 farmers. For group 1 farmers, the study found that by reducing the number of ownership members per greenhouse and increasing the length of the loan will improve their cash flow and financial capacity. Other survey findings demonstrate that farmers improved their financial stability by paying off their agricultural loan for their greenhouses. The survey study found that of 43 agricultural loans 37% (16) were paid by woman farmers. This leadership development and good farm management skills have improved the economic and farming status of woman in this rural development project.

Recommendations and Implications

Developing strong partnerships with local institutions helps to successfully overcome time constraints and lack of data issues. It is important to mobilize basic data collection (production yields, equipment inventories, economic cost/return data, etc) prior to the arrival of international extension collaborators. These preliminary efforts will provide the framework to design the work strategies required to achieve successful evaluation results. Securing financial resources is an increasingly challenging prospect, thus evaluation reports should emphasize to potential donors the economic impacts enjoyed by project beneficiaries and their surrounding community. Furthermore, evaluation reports should demonstrate that recommended technologies are producing both short-term and long-term economic benefits to the target clientele. Finally, extension programs that focus on marketing dynamics are essential in order to secure adequate prices, realize profits, and ensure project sustainability.

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Exploring Cultural Adaptation of College of Agricultural and Life Sciences Students on a Short-Term Study Abroad Program

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Keywords: Cultural Adaptation, Short-Term Study Abroad, College of Agricultural and Life Sciences

Introduction

The Longview foundation (2008) posited that higher education must strive to expose students to globalized curricula in an effort to develop people to effectively operate in a global society. One of the most commonly used methods of globalizing undergraduate curriculum has been through the use of study abroad programs (Zhai & Scheer, 2002). Students participating in agricultural study abroad programs experience culture throughout the duration of their program (Bruening & Frick, 2004). In 2009, the National Research Council charged agricultural study abroad facilitators to incorporate cultural learning into their programs. Existing models of cultural adaptation do not adequately describe the cultural adaptation process for students studying applied science concepts on short-term study abroad programs.

Purpose and Objectives

The purpose of this study was to explore how College of Agricultural and Life Sciences students at the University of Florida reacted to the culture during a short-term study abroad program.

Methods

Seventeen students from the College of Agricultural and Life Sciences at the University of Florida participated in a seven day study abroad program in Paris, France. A qualitative case study methodology was used. Data were collected through the use of pre-travel questions, post-experience questions, reflective journaling, photographs with captions, and participant observation. All data were transcribed verbatim and subjected to open coding, axial coding, and selective coding (Corbin & Strauss, 1990). Trustworthiness was ensured through prolonged engagement, persistent observation, triangulation, the use of referential adequacy materials, member checking, thick description, and the use of a methodological journal (Dooley, 2007).

Results

Upon analysis, eight stages and 34 sub-stages of cultural adaptation emerged and are presented in the following figure.

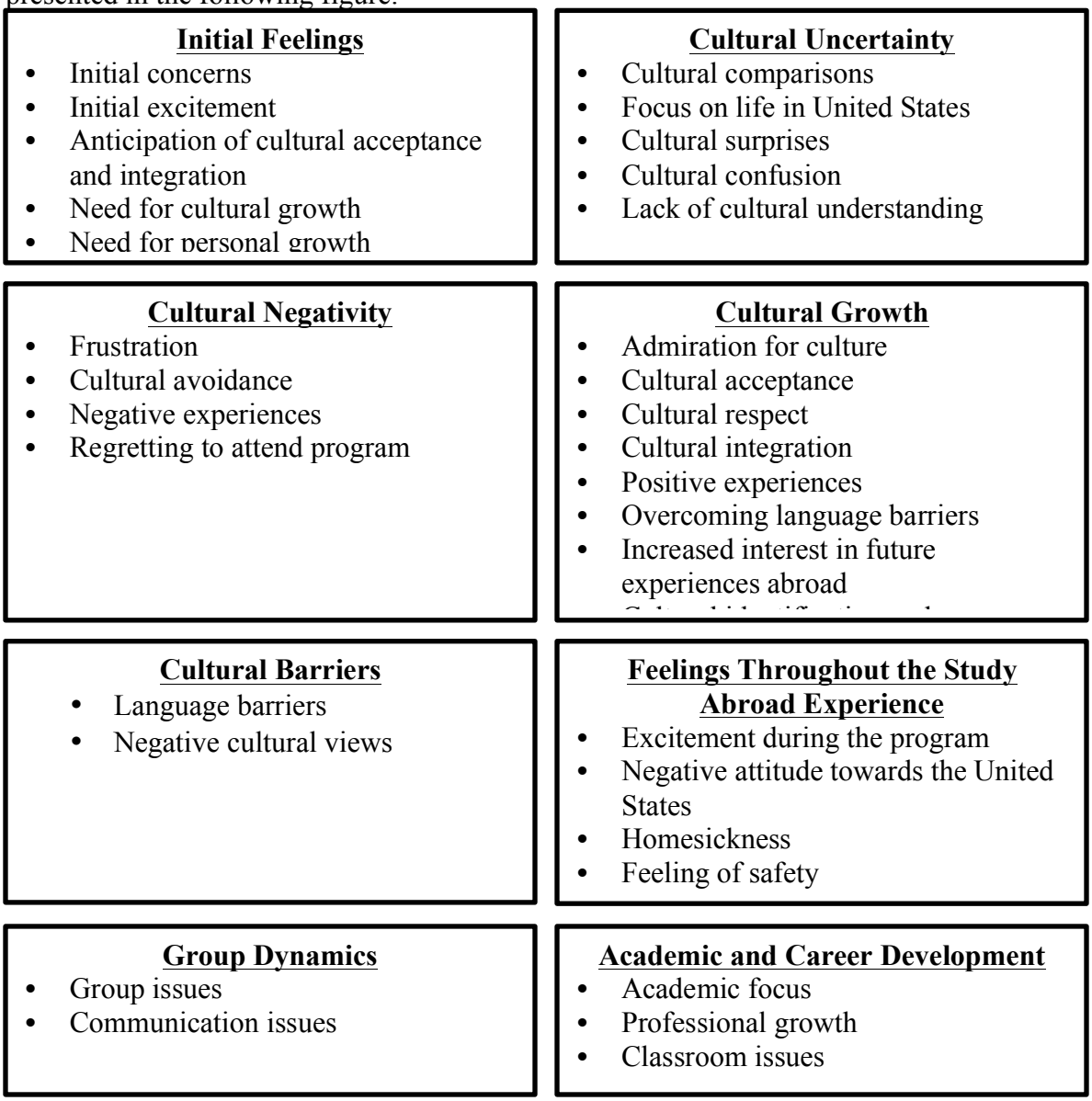

Figure 1. Stages and sub-stages of cultural adaptation for college of agricultural and life Sciences Students on a short-term study abroad program

A sample of the findings is presented below. Participants went into the study abroad program with preconceived feelings and cultural preconceptions. Many of the participants believed the people in Paris were going to be rude to Americans (1; 2), yet other participants experienced excitement and focused on their need to learn about Parisian culture (3; 5). Many participants experienced cultural uncertainty and spent time comparing Paris to the United States. Participant 4 expressed frustration due to businesses being closed on Sunday. She felt that business hours should mirror business hours in the United States. Participants continued to encounter frustrating moments which led to the avoidance of cultural interactions. However, some students overcame cultural barriers by attempting to speak French. Participant 6 found that

many Parisians were willing to speak English if Americans attempted to speak French. In addition, participants focused on academic and professional development throughout the program and were affected by the dynamics of the study abroad group.

Recommendations

Participants experienced the various stages of cultural adaptation throughout the study abroad experience (Bruening & Frick, 2004) through a non-linear fashion and did not always achieve cultural acceptance or integration. Cultural barriers prevented some participants from experiencing all stages of cultural adaptation. Facilitators should use the suggested stages as a guide to inform students about how they may experience their study abroad program. Cultural information and opportunity for discussion prior to the experience should be incorporated into the program. This will help to alleviate any anxiety and concerns that the students may have prior to the program and to debunk any cultural misconceptions. In addition, the facilitator should continue to guide the students through cultural experiences during the program. Facilitator initiated discussion will provide time for students to reflect on their experiences and allow for cultural learning to take place. It is the responsibility of the facilitator to provide cultural experiences and to help guide the students through the experiences in a way that provides the opportunity to learn through cultural interactions.

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Extension Solutions for Global Childhood Obesity

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Keywords: global childhood obesity, extension programs, behavior change, schools

Introduction

Association of International Agricultural and Extension Education members have studied extension's role in enhancing food security in a variety of countries (Acker & Gasperini, 2008; Swanson, 2006; Tobin, Bruening, Brennan, & Olson, 2012). Childhood obesity has become an increasing issue of importance in global societies. More than 42 million children under age five across the globe are suffering from obesity, with nearly 35 million of these living in developing countries (World Health Organization, [WHO] 2010). Childhood obesity affects both developed and developing countries without prejudice. In the United States approximately 17% of youth ages six to 17 are considered obese (Arnold & Schreiber, 2012). In developing regions, North Africa had the highest prevalence in terms of percentage of obese children, yet Southeast Asia has the highest number of young children facing this chronic problem (Hendrick, 2010). The study presented here sought to examine an extension approach to increase knowledge and induce behavior change on issues that influence childhood obesity.

Objectives

Food scarcity and food insecurity often makes access to nutrient rich foods challenging for children in developing countries (World Health Organization [WHO], 2009). Food scarcity and insecurity has resulted in part due to population growth, diminishing access to farmlands, adverse policies, and political unrest (J. Jayaratne, personal communication, August 29, 2012). The primary objective of a school based child nutrition program is to implement in politically sensitive and policy appropriate ways to address nutritional needs of children and their parents. From this information, the children can inform their parents of the information they received, thus creating behavioral change in their diet and the amount of physical in which children engage (North Carolina State University, 2012).

Theoretical Themes

Unhealthy environmental factors make healthy food choices increasingly difficult for children to make. The worldwide increase of technology has been a significant culprit in the obesity epidemic. Computers and electronic devices have not only replaced physical activity, but are also the sources of advertisements for food targeted to youth. Children are more sedentary and less physically active as life becomes more urbanized and automated. An increase

in calorie consumption and the modern food industry, offering pre-packaged, convenience and fast foods, have offset a child's interest in eating nutrient rich foods (Centers for Disease Control and Prevention [CDC], 2012).

Application

In-school special interest nutritional programs are an important way in which children can be exposed to healthy eating habits and the significance of a healthy diet. North Carolina State University's Steps to Health program provides Supplemental Nutrition Assistance Program (SNAP) education to preschoolers, kindergarteners, 2nd grade students, 3rd grade students, adults, Latino families, and older adults eligible for the food assistance program. An elementary school that has 50% or greater of their population receiving free or reduced lunch qualifies for the program. Extension agents build partnerships with qualified schools that enroll in the program. "Color Me Healthy" is the program for preschool and kindergarten aged children (4 and 5 years of age), and is also available as a "train the trainer" version for childcare providers.

The in-school programs adhere to the North Carolina Department of Education Essential Standards, and consist of 9, 45-minute sessions. Sessions include an educational activity and a taste test. The programs were delivered beginning each January through the end of the school year by county extension agents throughout North Carolina. The Steps to Health SNAP-Ed program is a partnership funded by the United States Department of Agriculture and the North Carolina Department of Health and Human Services. Evaluation results are tabulated each fall based on pre and post surveys presenting county and state behavior and knowledge change (North Carolina State University [NCSU], 2012).

Conclusions

Childhood obesity leads to adult obesity, diseases, and issues such as heart disease, stroke, high cholesterol, diabetes, and high blood pressure. Musculoskeletal disorders such as osteoarthritis and certain types of cancer can also result from early onset obesity (World Health Organization [WHO], 2010). Preventative methods provided through extension education could curtail this issue from expanding further. Trained extension professionals could provide standardized research based programs, responsive to local needs, to schools globally in partnership with their formal K-12 educational systems. Association of International Agricultural and Extension Education members could employ structured educational programs through extension systems and research centers similar to the in-school nutritional education programs developed and put into practice by North Carolina State University's Cooperative Extension Service in countries where in child nutritional guidance is needed. Implementation of these programs would be instrumental in the global fight against childhood obesity, while offering knowledge that would enable countries to achieve food security.

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Extension Agents' Perception of the Operations of Farmers' Groups in Trinidad: Implications for Agricultural Development

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Keywords: extension agents, farmers, agricultural development

Introduction

Farmers' groups in Trinidad are steadily increasing within various agricultural communities in rural Trinidad. A long tradition in extension is group promotion and group organization, and FAO's commitment to these purposes is well known (Rivera et al., 2001). The formation of these groups has an impact on the agricultural extension agents' approach to performing their duties. Some argue that extension can most effectively carry out its mandate, not by working directly with individual farmers but by working indirectly with and through farmers' groups or organizations (Byrnes, 2001).

Currently, there is a high ratio of farmers to extension officers in Trinidad which computes to an average of 568 farmers to one extension officer in an environment where there exist limited support facilities with which to conduct extension work (Kissonsingh, 2005). Increased efforts to organize farmers into groups has been demanded by policy makers, however increased demands for extension agent's service in this current scenario would likely predispose them to stress and frustration (Kutilek, Conklin & Gunderson, 2002). How extension agents' view working with existing farmer groups has not been explored in Trinidad and needs to be understood as it has implications for their technical capacity building and service delivery approach.

Purpose/Objective

The purpose of the study was to describe extensions agent's perception of farmers' groups and to identify the issues related to their satisfaction with the operations of farmers' groups in Trinidad.

Methods

This study used survey methodology to collect the data. The instrument consisted of twenty-two (22) closed ended questions using a five (5) point agreement scale. The population was agricultural extension agents in public and private agricultural institutions (N= 132). The

instrument was delivered to various agricultural institutions to participants in an attempt to obtain a census of the population. The Ministry of Food Production in Trinidad and Tobago approved this project. Ultimately, 123 extensions agents responded, representing a response rate of 93%. Data were analyzed using appropriate descriptive statistics.

Results and Conclusion

The majority (91.8%) of the respondents indicated low to moderate agreement with "Satisfaction of the operations of farmers' groups in Trinidad". Some 78.7 % of the respondents indicated moderate to strong agreement that "it was difficult to work with farmers' groups". The majority of the respondents had moderate to strong agreement with the concern related to "farmers' groups being used as political tools" (94.3%), the competition that existed within groups (94.2 %), poor leadership style (96.7%), the dictatorial style of group leaders (84.6%) and the threats to land security (79.7%). There was low to moderate agreement among the respondents that government did not support and encourage farmers' groups in Trinidad (76.5%) and similar level of agreement for the perception that farmer' groups only existed for "existence sake" (86.2%). Data showed that extension agents had the perception that farmers' groups were purposefully functional rather than merely existing. The issues which were significantly associated ($p \leq 0.05$ level) with satisfaction with the operations of farmers' groups were (i) the perceived threats to farmers' land security and (ii) the need for monitoring the operations of farmers' groups. Extension staff has serious concerns with the operations of farmers groups in Trinidad. It appears that farmers' groups are also in need of some development intervention by authorities.

Recommendations and Implications

Extension staff will never be able to meet farmers' educational needs given current ratio of staff to farmers and there must be increased efforts in using the group approach. The perceptions identified in this study point to the need for training of staff in several areas well as capacity development to treat with the obstacles facing extension agents with respect to engaging farmers' groups. The extension agent's perception of satisfaction as it relates to working with farmers' groups has implications for the sustainable development of farmers' groups. Training farmers in the areas of team building, monitoring and evaluation, democratic principles among others can equip them with the necessary skills to effectively create more sustainable farmers' groups. The cooperative department of the Government which has oversight of groups should be engaged by the Extension department and a holistic plan for the development of farmers' groups should be developed and implemented.

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Factors Associated with Integration of Global Agricultural Issues in 4-H Programs

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Keywords: 4-H, international agriculture issues, globalization of agriculture

Introduction

Educators have been discussing global education for over 40 years. As the globalization of agriculture continues to increase, employers have been demanding employees with global perspectives (Acker, 1999). In order to remain competitive in a global marketplace, agriculture students, future employees, must understand the international system of politics, institutions, and economies, and cultures other than their own (Schuh, 1989). The integration of international perspectives in a 4-H program can increase students' understanding and cultural awareness, and help them comprehend the magnitude of these global agricultural problems (Shoulders & Myers, 2010). Future agriculture workers may often be reached through youth agriculture organizations, such as 4-H.

In 2010, 4-H had a total of 6,330,612 participants from kindergarten to post-high school, (U.S. Department of Agriculture (USDA), 2010). With such high participation, 4-H has the ability to educate thousands of youths on global agricultural issues.

Agricultural education has a responsibility to prepare students for employment in the globally aware workforce. The first step to preparing these students has been determining factors associated with extent of internationalization of educational activities. This study assessed the knowledge and attitudes of 4-H agents towards international agriculture issues in the hopes that this information could later be used to increase the amount of internationalized instruction that students receive. Additionally, the agent was asked to indicate how often they incorporated international agricultural issues into their educational activities, in order to assess the current level of integration.

Purpose and Objectives

The purpose of this study was to ascertain the current level of international agricultural issues integration and the attitudes and beliefs held by 4-H agents in the U.S. regarding the integration of international perspectives into their educational activities. The objectives of this study were to determine the:

- Extent of internationalization nonformal agricultural programs;
- Perceptions 4-H agents towards international agricultural issues;
- Knowledge of 4-H agents of international agriculture issues;
- Relationship between agents perceptions and selected demographics;

- Relationship between extent of integration of international agricultural issues and selected demographics;
- Relationship between extent of integration of international agricultural concepts and agents' knowledge of international agricultural issues; and
- Relationship between extent of integration of international agricultural concepts and educators' perceptions.

Methods

The variables of interest in this study included agent knowledge, attitudes, and beliefs regarding global agricultural issues. The research method was a non-experimental quantitative design using descriptive survey methodology. The survey was modified from Wingenbach et al.'s (2003) International Agricultural Awareness and Understanding Survey, reviewed by a panel of experts, and pilot tested. Section one of the survey used 20 multiple choice questions to assess agent knowledge about global agricultural issues. Section two was made up of 36 six-point Likert scale items designed to measure attitudes about global agricultural issues. Section three used 20 six-point Likert scale items to assess beliefs about global agricultural issues. Section four collected demographic data about the agent. The instrument was distributed through the website Qualtrics .To collect data, 1000 4-H agents were randomly sampled from the 2769 agents in the NAE4-HA database and contacted using the email they had on file. A prenotice email was sent from the researcher's personal email address, in order to alert agents that future emails would be sent by Qualtrics.

Results

Scores for participants who attempted all questions on the knowledge section ranged from a high score of 15 of 20 questions correct, to a low of one question correct. The average score for section one was 43%, or 8.6 questions correct. The average score overall for attitudes towards global agricultural issues, measured in section two, on a scale of one (strongly disagree) to six (strongly agree), was 5.11, with a standard deviation of 0.434.. For section three, which measured agent beliefs regarding global agricultural issues on a scale of one (strongly disagree) to six (strongly agree), the average was 4.75, with a standard deviation of 0.495. The Cronbach's alpha for section two was 0.926, and 0.834 for section three.

Implications

Knowledge of international issues knowledge has been found to increase feelings of relevance, and personal relevance increased the motivation to "expand knowledge and increase participation" (Navarro, p. 40, 2005). Despite the low average knowledge scores for 4-H agents, they had positive attitudes and beliefs regarding global agricultural issues. However, qualitative data asking how often agents integrate global issues into their work with youth demonstrated the need for increased agent knowledge and availability of curricula. In order to prepare youth in 4-H for careers in agriculture, more must be done to educate agents an assist them with finding appropriate resources.

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Factors Influencing the Attitude of High School Agricultural Science Students Towards Agricultural Education and Training, the Case of KwaZulu-Natal Province, South Africa

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Introduction

Agricultural Education and Training (AET) plays a major role in agricultural development by producing an efficient, skilled workforce that can strengthen primary production, agro-processing, research and policy-making processes (Department of Agriculture, 2005). Effective implementation of AET at high school level, therefore, will contribute significantly to building the future human resources required in the agricultural and related development sectors (Vandenbosch, 2006). In South Africa, agriculture as a high school subject has one of the highest failure rates, and declining numbers are registering to study agriculture at tertiary level (Naido, 2011). Among the many potential causes of this, one contributing factor is that there is insufficient information on the perceptions of current pupils in the South African high school system about their agricultural education.

Purpose and Objectives

This study investigated what factors influence the attitude of high school students towards AET. More specifically, the study sought to determine whether the identified factors would have a positive or negative effect on student attitudes. Knowing and understanding what influences student perspectives regarding AET would assist AET planners and educators develop and deliver AET programs that improve the image of agriculture as a career and encourage higher registration numbers at tertiary level.

Methods and Data Sources

To isolate those parameters impacting student attitudes towards AET offered by South Africa's high school sector, the research was organized in nested concurrent mixed sampling designs. The study area was KwaZulu-Natal, one of South Africa's nine provinces. Four rural, four urban, and two dedicated agricultural schools were purposively selected (Johnson & Christensen, 2012). The sample population was identified using probability sampling. The sample population was 375 pupils from the selected high schools distributed equally across the selected schools. A survey was conducted using a pre-tested, structured interview schedule and questionnaires with both structured and unstructured questions. The collected data was coded,

described and interpreted for analysis using descriptive statistics and the Tobit model. Tobit was employed to estimate linear relationships between variables. For dependant variables the relevancy test was conducted using Cronbach's alpha. The reliability coefficient result was found to be 0.8. Relevancy coefficients of the independent variables were selected based on relevancy determined through a panel of experts.

Results

The results showed that family size, student racial background, and discussion with other people about AET had a significant and positive ($P \leq 0.01$) effect on students' attitudes towards AET. The student family access to farming land had a significant and positive ($P \leq 0.1$) effect on students' attitudes towards AET.

Conversely, the absence of discussion about agriculture with other informants and absence of family access to farming land both had a significant and negative ($P \leq 0.01$) effect on the attitude of students towards AET. Unexpectedly, having a mother with high school education also had a significant and negative ($P \leq 0.05$) effect on the attitude of students towards AET. Also, students' family monthly income had a significant and negative ($P \leq 0.01$) effect on the attitude of students towards AET.

Recommendations and Educational Implications

The findings suggest that the various bodies responsible for the governance of AET should create community and student awareness of agriculture and its importance using different means. This will support creating community awareness of the importance of AET and its job prospects considered in both the local and global context. It is also recommended that responsible parties should ensure access to farming land for all to develop the interest of school pupils in agriculture. Early detection of factors that could influence the success of the AET will help the agricultural training system to function effectively and this would enable the system to produce trained manpower at different levels and functional requirements.

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From Output-based to Process-based Monitoring of Agricultural Extension Project: Lessons from Bangladesh

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Introduction

In the 21st century, the rapidly changing agricultural development milieu is confronting numerous challenges associated with social, economic and environmental performance, as well as growing concerns about collaborative learning and knowledge management processes. The classical concept of agricultural innovation as a process of diffusion or getting access to new ideas and tangible products is changing. The classic concept of innovation does not suffice to interpret extant agricultural development contexts since the drivers, conditions and processes of development are dependent on heterogeneous actors operating across different scales, rules, perceptions, identities and social relationships that govern their interdependencies as well as unintended and unforeseen interactions (Hall, 2006; Pant & Hambly Odame, 2006; Leeuwis & Aarts, 2011). Agricultural innovation is increasingly a dynamic, multi-stakeholder approach that summons ideas, and resources from both public and private domains, and engages formal and informal institutions and knowledge circulation processes. The nonlinearity of innovation in today's world places specific demands on monitoring arrangements that go beyond product or output tracking towards the analysis of organizational networks, performance and dynamic and unexpected outcomes that act as inputs for adapting an intervention within a specific context (A. Hall, Dorai, & Kammili, 2012). Many low-income countries have long been attempting agricultural reform initiatives that allow reflexive and learning-oriented change processes that support both technical and institutional innovation. Yet, changes to agricultural extension services have been difficult, especially for public sector organizations, which are often struggling to retain any existing competencies while navigating the bigger structural shifts occurring within the innovation system that often bring new players and rules to the field of extension (Sulaiman & Hall, 2005; Spielman, Ekboir, Davis, & Ochieng, 2008).

Bangladesh has a strong public service extension system that is built on its legacy of the Training & Visit (T&V) System. Several reforms initiatives were tried out in 1990s to transform the roles of public-sector extension organization in the new landscape of interactive agricultural development. This implicates for the public extension organization such as, the Department of Agricultural Extension (DAE) which is responsible for implementing the crop extension services in Bangladesh. DAE is challenged with monitoring how effectively its actions provoke capacity

development including networking among relevant stakeholders and negotiating changes to established roles within the extension. Scholars are critical about the capacity of public extension organization in reinventing their roles in the new landscape of agricultural innovation (Islam, Gray, Reid, Kelly, & Kemp, 2011).

Purpose/Objective

The paper intends to analyze how the public sector extension organization shifts its roles in monitoring extension project towards facilitating technical and institutional innovations.

Methods

Using a case study approach, and mixed-methods (key informant interview, focus group discussion, participant observations and secondary sources) the data were collected from different stakeholders (project partners, farmer group members, nursery owners, input dealers, and commission agents) of the North-west Crop Diversification Project (NCDP) in Bangladesh. The DAE implemented the project between 2001 and 2008 with partnership of several Non Government Organizations (NGOs) and public-sector agricultural research and development organizations. The field research was conducted between August and December, 2006 in Bogra – a north-western district located about 220 km away from the capital Dhaka.

Results

The results indicate that the public extension organization focused on tracking tangible impacts. There was less attention, motivation and incentives for the front line of extension agents and project partners to learn how to identify and make necessary adaptations to institutional arrangements or processes. There was rigidity and reluctance to admit mistakes and confront reasons for failures. The project management emphasized generic impacts and considered the failures as '*exceptions*'. The monitoring system was best characterized as a paternalistic process which allowed little scope for joint learning and reflection. There is scant evidence that management facilitated relation-dynamics that would account for innovation in terms of improved human/institutional practices (both clients and extension agents) and technological changes.

Recommendations/Implications

The study implies that the intention to learn is shaped by context factors and it is difficult to ensure learning in a project context that accentuates anything except outputs. The paper urges for an evolutionary process of capacity development for implementing learning-based performance management approaches and pro-appreciative inquiry rationale for consideration by extension practitioners (Ngomane, 2010) in order to make a shift from output-based to process-oriented monitoring approaches in a project context.

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Future IPM Trends in Trinidad and Tobago: A Qualitative Study of Farmers' Perspectives

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Introduction

Developing countries are sensitive to changes in agriculture as the historic food import/export practices become less reliable (Fritschel, 2003; Swanson, 2006) and jeopardize food security. One approach to solving the problem of food security has been utilizing technology to enhance sustainable production practices (Erbaugh, Donnermeyer, & Kyamanywa, 2002). A technology that can promote improved sustainable agriculture is Integrated Pest Management (IPM). Erbaugh, Kibwika, and Donnermeyer (2007) suggested that farmers' perceptions of IPM practices should be routinely studied in order to better understand educational and training needs for farmers.

Theoretical Framework

Rogers (2003) proposed a diffusion of innovations framework that outlines a process through which concepts are disseminated over time to members of a social system. Within this framework innovations are evaluated based on the innovation's, the communication channels used, the time elapsed since the innovation's introduction; and the social setting in which the innovation is being diffused (Rogers, 2003). Rogers (2003) suggested that opinion leadership played an important role in social settings. Rogers' framework is useful in comparing the costs and benefits of adoption versus non- adoption and thus the overall likelihood of adoption (Chigona & Licker, 2008). Regarding technology transfer in Trinidad and Tobago, Rogers' framework provided a context within which IPM adoption could be evaluated. IPM adoption is defined as a decision to utilize an IPM practices (Rogers, 2003).

Purpose and Objectives

The purpose of this study was to evaluate the adoption of IPM practices by farmers in Trinidad and Tobago. Specifically, the objectives of this study were to:

4. Identify farmers who were practicing IPM;
5. Describe IPM practices used by farmers at the production level; and
6. Identify farmers' perceptions of future trends in IPM.

Methods

A qualitative research design method was used for this study. The study consisted of nineteen farmers ($N = 19$) from Trinidad and Tobago. Farmers were selected using a purposive sampling technique parallel with the study's objectives. The sample was selected based on recommendations from local professionals. A semi-structured interview method was employed in this study. Interviews were conducted in the spring of 2012, at each individual's farm, and lasted approximately thirty minutes each. Data was recorded using researcher field notes and verified with respondents using member checks and triangulation.

Results

Farmers' in this study were found to use economic viability and progressive ideology as motivators for adopting IPM, which were the dominant constructs that emerged from the first objective of the study. Economics and progressivism suggested that farmers were concerned about profits and also had a desire to improve farm productivity using new ideas. Farmers' use of mixed control methods, pest management practices, and tradition were the themes produced from the study's second objective. By using traditional methods of control in conjunction with new techniques farmers were able to maximize pest control while maintaining their cultural practices. A holistic approach to crop production and economic influences were the topics generated from the third objective. Holistic attitudes demonstrated farmers' desire to preserve and improve the land while farmer emphasis on economics underscored a need to remain profitable.

Conclusions

The data indicated that farmers in Trinidad and Tobago are conscious about preserving and improving farmland in the community while remaining economically productive. Pest control has traditionally been difficult and as a result farmers have begun adopting newer techniques to minimize pest damage. Farmers' perceptions indicated that chemical control was less desirable due to consumer needs. Consequently progressive farmers have an increased adoption rate of IPM. The data suggests that opinion leaders play an important role in IPM adoption within Trinidad and Tobago as existing communication avenues are considered unreliable by farmers.

Recommendations and Implications

This study built upon the recommendations of Erbaugh et al. (2007) to further study farmer perception of IPM. Farmers' reliance on economics and progressivism in this study expanded Rogers' (2003) findings regarding the characteristics of an innovation, implying that a strong relative advantage can leverage diffusion. The data also supported the findings of Rogers (2003) and Chigona and Licker (2008) that opinion leadership represents the primary dissemination function within a social setting.

Diffusion practitioners are recommended to develop a structured educational system to provide continuity within the field. Hybrid crop development is also recommended for practitioners to improve effectiveness. A standardized accountability system to preserve a holistic approach may enhance the adoption rate of IPM.

Future research in this area should focus on communication barriers between farmers and existing information sources to identify effective information distribution channels. Research should also seek to quantify longer term impacts of IPM in Trinidad and Tobago.

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Globalizing Curriculum from the Perspective of Secondary Educators

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Introduction

It has long been said that today's college graduates need to be prepared to work in an increasingly global society (Bruening & Shao, 2005; Irani, Place & Friedel, 2006; NASULGC, 2004; Snyder, Lamm, Brendemuhl, Irani, Roberts, Rodriquez, & Navarro, 2011). However, it is just as salient that today's high school students also have a global perspective. Exposing today's students to global issues at the secondary level will assist in providing fundamental knowledge necessary to excel in both college and future careers. One primary way for high school students to begin developing a global perspective is through exposure in formal and non-formal situations.

Educators are instrumental in the internationalization of their own curriculum. While there is a significant amount of research concerning globalizing courses in higher education, there is limited research similarly regarding secondary teachers. Still, it is useful to consider the influences on educators within higher education. Bull (1996) found that faculty members who participated in international travel integrated more internationalization into their courses. It has also been suggested that faculty experience abroad will enrich their cultural sensitivity and understanding (Fung & Filippo, 2002; Gouldthorpe, Harder, Stedman & Roberts, 2012). Clearly, faculty participation in international educational experiences has significant potential for both faculty development as well as for development of their students.

At the University of Kentucky, efforts to assist secondary educators in internationalizing their curriculum have been occurring in the College of Agriculture. As educators go through the curricula development process, it is expected they would also experience their own learning and skill development. For this reason, this study was informed by Mezirow's (1991) principles of

transformative learning, which describes learning as a process that is at times dynamic, disorienting, personally meaningful, critically reflective, iterative and integrative for the individual.

Purpose & Objectives

The purpose of this study was to highlight the thoughts, feelings and reflections of those educators engaged in developing class curricula and activities with an international focus, with the intent of enhancing agriculture education at the secondary level. The guiding research question for this qualitative study was:

RQ1: What were the educators' thoughts and attitudes relating to the process of globalizing their own formal and non-formal curriculum?

Methods

Participants in this qualitative research study were six high school and Extension educators selected to participate in the *Globalizing Agricultural Education: Sustainable Agriculture, Food, and Rural Development* project. Individual, structured phone interviews were undertaken to answer specific questions designed to address the guiding research question. After transcription, the researchers conducted a detailed contextual and thematic document analysis on participant reflections. In an effort to ensure research validity and reliability, both researchers worked independently, thus allowing for a triangulation of all data.

Results

Data indicated study participant attitudes toward globalizing education were relatively progressive. A majority of educators revealed being motivated by a desire to make global issues relevant for their students; furthermore, they believed integrating international aspects into their curriculum would increase student awareness of global issues and enhance the overall learning process. Many respondents expressed concern about how to successfully implement a globalized curriculum within the time constraints of their classrooms and developing effective activities with an international focus.

All participants shared concerns as well as enthusiasm in regards to the upcoming professional development trip to Indonesia. Specific concerns expressed included: getting sick, managing the language barrier, offending the host culture, and dreading the long flight. Data revealed that all respondents would be traveling to Indonesia for the first time. Alternately, respondents also expressed their enthusiasm for meeting local people and experiencing the natural environment.

Prior to departure, respondents were involved in a workshop highlighting how to globalize curriculum and preparing them for international travel. While it was indicated the workshop was helpful, participants shared that developing globally focused lesson plans were difficult, but learned how to share international experiences in the classroom. Overall, respondents emphasized an importance of developing a cohort with whom they could collaborate about their ideas, attitudes, and beliefs.

Conclusions & Implications

Overall, professional development for secondary educators should continue within the arena of internationalizing curricula. At the high school level, it is apparent there is a lack of internationally-focused curricula, both in formal and non-formal situations. Still, there is a desire

by educators to learn and acquire the skills needed to globalize their classrooms. It is especially important to recognize this is also a learning process for the educators, and to provide appropriate structures (including a cohort) to help ensure success.

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Impact Analysis and Evaluation of a Capacity Building Project in Peru: Increasing the Teaching and Research Competencies of Selected Faculty

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Introduction

According to the United Nations, building a country's capacity "encompasses the country's human, scientific, technological, organisational, institutional, and resource capabilities" (United Nations Environment Programme, 2002). University faculty are increasingly expected to enhance their teaching and research abilities to compete for students on an international scale. This competition is becoming especially important for universities in developing nations, as their most capable faculty and students choose U.S. and European institutions (Altbach & Knight, 2007; Marginson, 2006). Grindle and Hilderbrand's (1995) study of public institution capacity building projects in six developing nations stressed the need to improve communication, management skills, and build organizational cultures.

Purpose

The impact analysis and evaluation's purpose was to examine participants' perceptions of how the capacity building project impacted their teaching and research competencies.

Methods

In support of the U.S. Peru Trade Promotion Agreement, the *Universidad Nacional Agraria La Molina* (UNALM) received training by faculty from U.S. universities to improve faculty research and teaching competencies. UNALM, located in the capital city of Lima, is recognized as Peru's most prestigious agricultural public university. One of the intermediate objectives of the project was for UNALM faculty and staff to acquire critical knowledge, update technical skills, and engage in collaboration endeavors. Participants were placed in a teaching or research cohort through the advice of UNALM administrators. Project leaders used Borich's

(1980) needs assessment methodology to plan follow-up training addressing the 10 most important teaching competencies and 20 of the most important research competencies. Project leaders used pre and post assessments, face-to-face workshops, asynchronous and synchronous on-line activities, and an active webpage repository to engage the participants.

This qualitative study was conducted at the conclusion of the two year project. Participants were given the opportunity to share their perceptions of how the project impacted them through a project evaluation. The evaluation instrument consisted of six open-ended questions asking participants about the perceived impacts the project had on their teaching and research practices, how the project changed university policy and practice, what the participants would like to see UNALM's legacy be in 2025, and a section to submit general comments. The constant comparative method was used to analyze and interpret data through open, axial, and selective coding procedures (Corbin & Strauss, 2007; Glaser & Strauss, 1967).

Results

Seven themes were identified as being central to the project evaluation and the participants' perceived impact. Three were negatively focused themes. First, participants were concerned that the UNALM administration would not support them in implementing the skills and knowledge they had developed during the capacity building workshops. Second, participants frequently mentioned lacking technological and financial resources that would further limit their ability to practice the skills and knowledge they recently acquired. When evaluating the project, the participants reported a lack of perceived planning and organization on the part of the facilitators.

There were four positively focused themes. Participants reported an increase in research and teaching skills and abilities. Participants described perceived increases in feelings of collaboration, trust, and motivation towards faculty outside of their department. They conveyed increased motivation to conduct, or improve upon, their teaching and research capacities. Finally, participants' foci of designing student-centered, active-learning classrooms were elevated in this project.

Discussion and Recommendations

Among the skills and knowledge they acquired, participants noted they gained the ability to make better tests, use virtual online learning, portfolios, Endnote®, apply the clinical case study technique, and how to write scientific articles for publication. The large number of responses listing newly acquired (or strengthened) skills and abilities provides evidence that project personnel achieved the intermediate objective of the project.

Participants' report of increased skills in communication, trust, and collaboration with faculties of different departments should not be underemphasized. Several studies of agricultural higher education programs in Africa have documented the benefits of intra- and inter-institution networking (Erbaugh, Crawford, & Adipala, 2009; Patel & Woomer, 2000; Spielman, Ekboir, Davis, & Ochieng, 2008). Furthermore, Eicher (1999, p. 5; 2004, p. 6) argued for taking the systems approach to improve a nation's "agricultural knowledge triangle" of research, extension, and agricultural higher education. As such, successive capacity building projects in Peru, and in other nations, should strive to emphasize collaboration, communication, and trust. A follow-up evaluation should be conducted with UNALM participants to capture if, and how, their newly acquired skills and abilities affected their institution's reputation as Peru's teaching and research facility in the agricultural sciences.

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Implementing New Techniques to Deliver Extension Information: A Content Management System Approach

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Introduction

Extension information delivery and channels of information are constantly changing. Private industry information delivery has evolved from primarily advertising to one of news laced with advertising being delivered daily to clientele. University of Florida/IFAS (UF/IFAS) Extension county extension faculty in the Florida Panhandle have pioneered use of information technology to deliver educational information (Vergot, Cherry, Friday, & Stevenson, 2010) to their clientele. They have won numerous national awards for their innovative delivery methods of web based newsletters, and creation of a Subscription Management System (Vergot, Friday, & Xin, 2011) which supports multiple digital platforms. To meet the challenge of private industry's use of digital channels of information, UF/IFAS Extension changed their basically "static" web based delivery to a "Content Management System" (CMS) approach. This new digital delivery system allows for web based interactive discussion and integrates with social media to provide immediate information access and feedback (Vergot, 2010). These digital "conversations" enhance service to Extension clientele globally.

Purpose and Objectives

The purpose of this project was to meet the ever changing demands from Extension clientele to get information when they want it, how they want it, and as close to the time of knowledge discovery as possible. The objectives were to develop a process of information exchange enabling Extension agents to use new digital channels of delivery that allows for near real time distribution of peer reviewed information. In addition, the new channels must allow for web based interactive discussion and integrate with social media to provide immediate access and feedback to address Extension clientele needs.

Methods

Working with the District Information Technology (IT) specialists, Extension faculty converted all 16 Extension District's county websites to *WordPress* (a CMS) to publish newsletters, agricultural content, blogs, and current events using both traditional and mobile technologies (Blackberry, iOS, and Android devices) and to integrate with social media to provide immediate information access and feedback to better serve Extension clientele.

WordPress was selected as the new content management system as it has the desired criteria to meet our project outcomes. This new channel of information:

- Provided a CMS that was easier to use than the old web authoring systems of Adobe Contribute, and FrontPage,
- Developed a way to quickly publish pictures and brief updates using mobile technologies,
- Provided for tight integration with social medias such as Facebook, YouTube and Twitter,
- Provided for the ability to get feedback and interaction with our clientele on our websites
- Allowed for Extension faculty to be able to blog from their current websites.

Results, Products, and Conclusions

UF/IFAS County Extension agriculture faculty and specialists post educational articles related to agriculture production and land management. From January 2012 to present, a total of 108 email messages were delivered reaching 135,684 clientele from the Panhandle Ag WordPress website. County Extension faculty have posted 216 articles since January of 2012, initiating 180 online conversations, and 4,604 reads from clientele since May of 2012. Panhandle Ag social media sites were developed and are gaining interest with 61 "Likes" in Facebook, 37 followers in Twitter and eight subscribers in YouTube.

WordPress provided a powerful, highly customizable and cost-free interactive web based delivery system. There are WordPress "apps" (applications software for mobile devices) available for all major mobile technologies including Blackberry, iPhone, iPad, and Android devices. These apps allow Extension agents to use their mobile devices to quickly update their website as a whole or to add pictures or issues that they encounter in the field while serving clients. WordPress allows for integration with Facebook and Twitter accounts using the built-in Rich Site Summary (RSS) feeds, allowing the information to be published once and viewed on different digital platforms.

Feedback and interaction with Extension clientele is accomplished using the WordPress, Facebook, and Twitter comment features. Extension clients can ask questions and quickly receive feedback on articles, pictures, and blogs that our agents post. Finally, WordPress' primary function as a blogging software provides the ideal avenue for our agents to continuously provide fresh and targeted information for our clients.

Recommendations, Implications, and Applications

Implications of this CMS for International Agricultural Extension include the capability to use globally available digital platforms upon which to share information between Extension faculty and between Extension faculty and clientele internationally.

To remain relevant in this information saturated world, this CMS approach and its various platforms encourage "digital" conversations. It is another tool for Extension faculty to build "relationships" based on providing research based and relevant information to clientele.

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The Influence of Selected Socio-Cultural Practices on Agricultural Development in Benue State, Nigeria

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Keywords: Agricultural development, socio-cultural factors, funerary practices, alcohol consumption, polygyny, socio-sensitive extension.

Introduction

The study was carried out to determine the influence of selected socio-cultural practices on agricultural development (conceptualized as expansion in the yield of crops and livestock that results in the well-being of farm families) in Benue State. It is true that in the short term increased production might lead to positive impacts on poverty (Adebayo & Okuneye, 2005). However, certain social dynamics within the society work to mitigate any gains that may result from application of improved technology, and defeat the goals of sustainability. The sustainable adoption of any technology will depend on what happens to the surplus generated by its initial adoption. In many cases, such adoption may have been facilitated by loans, which must be repaid. The surplus should be able to fund loan repayment and at the same time guarantee the purchase of inputs for further production in order to expand the enterprise.

The technocentric orientation of extension efforts fails to capture socio-cultural practices that may affect the outcomes of those efforts in very significant ways.
The selected socio-cultural practices included burial rites, alcohol consumption and polygyny. Burial rites in the study area which has one of the highest poverty rates have become very expensive in recent times (Mnda, 2004; Tokula, 2006)

Purpose and Objectives

1. The major objective of this study was to determine the influence of selected social factors on agricultural enterprises in Benue state. The specific objectives of this study included to:
2. Characterize burial rites, alcohol consumption and polygyny among farmers in Benue state.
3. Determine the influence of burial rites, alcohol consumption and polygyny on the use of fertilizers, herbicides and pesticides.
4. Determine the influence of burial rites, alcohol consumption and polygyny on food security of farmers.
5. Determine the influence of burial rites, alcohol consumption and polygyny on indebtedness of farmers.

The hypotheses tested included:

1. Farmers' use of inputs (fertilizers) is not significantly related to selected social practices: burial rites, alcohol consumption and polygyny.
2. Food security is not significantly related to selected social practices: burial rites, alcohol consumption and polygyny.
3. Indebtedness is not significantly related to selected social practices: burial rites, alcohol consumption and polygyny.

Methods

Descriptive statistics were used to describe the socio-economic characteristics of the respondents and to characterize the socio-cultural practices. Focus Group Discussions were also used to characterize the socio-cultural practices. Chi-square analysis and logit analysis were used to test the relationship between socio-cultural variables and selected development variables.

Results

The results showed that burial rites had changed drastically from what used to obtain in pre-colonial times, and the elite was at the vanguard of this change. The mean expenditure on burials in Benue State was N21, 650.40. Majority of the respondents had to either borrow money or sell their produce in order to bury relatives. Up to 55.5% of respondents consumed alcohol, with *burukutu* and beer being the preferred drinks. Fifty-eight percent of the respondents drank occasionally; 55.7% drank between 2-3 drinks per sitting. Polygyny, as a marriage type, was found to be on the decline as there was no incidence of the practice in the 15-24 age group, and the quest for more children continued to be the most important reason for the practice. Results of tested hypotheses indicated a significant relationship between burial rites and use of fertilizers. chi-square ($\chi^2 = 5.536$, $df = 1$, $p = 0.019$); logit analysis also showed burial rites had significant influence on fertilizer use (Sig. = .011, Exp. (B) = 2.962). The results of the Chi-square test ($\chi^2 = 3.939$, $df = 1$, $p = 0.047$) indicated that alcohol consumption influenced food security. The logit analysis, however, did not confirm this. Chi-square also revealed significant influence of burial rites on indebtedness ($\chi^2 = 9.464$, $df = 1$, $p = 0.002$); logit analysis confirmed this (Sig. = .007, Exp. (B) = 2.774).

Conclusion and Recommendation

It was concluded that in a transitional society like Benue State caught up between tradition and modernity, socio-cultural change has a tendency to take dysfunctional forms. This makes it imperative that social engineering strategies be employed to direct change along desirable paths. This requires appropriate sociological training for extension agents to enable them identify and deal with social factors that may be dysfunctional to extension efforts. It was recommended that special taxes be instituted for expensive tombs and caskets and legislation be made to restrict access to chemicals used for embalmment, and to discourage the proliferation of funeral homes. It was also recommended that community sports be developed for rural communities to compete with burial ceremonies, which have become some sort of entertaining break from the drudgery of rural life.

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International Service-learning: A Case Study in Chajul, Guatemala

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Keywords: international service-learning, study abroad, critical reflection, relationships

Introduction

Service-learning courses in higher education have increased over the past two decades (Bringle & Hatcher, 2011). These experiences can provide "a rich text from which academic lessons are learned through the interplay between theory and practice" (Bringle, Phillips, & Hudson, 2004, p. 5). One unique area for educators to implement service-learning is through an international service-learning project, while students participate in a study abroad program (Woolf, 2008) or internship (Authors, 2012).

More students are studying abroad today than ever before (Chow & Bhandari, 2011). The combination of service-learning and study abroad adds value to each (Bringle & Hatcher, 2011; Honnet & Poulsen, 1989). This partnership helps engage students in a different culture, challenging and diverse settings that test the application of course content in new situations, contribute to the community of the host country, and expose them to new, unfamiliar issues and ideas (Bringle & Hatcher, 2011; Bringle et al., 2004).

Texas A&M University emphasizes the need for international educational experiences to enhance the student experience through critical thinking, community interaction, and social/global awareness (Author, 2010; Woolf, 2008). An international service-learning project can encourage students to expand their knowledge base and grasp "learning as a lifelong process" (Hickcox, 2002, p. 124).

Purpose

The purpose of this study was to investigate a unique international service-learning experience created between two non-government organizations and a college of agriculture.

An international service-learning study abroad program was developed at Texas A&M University. The program was developed using components of Ash, and Clayton's (2009) service-learning model, which emphasizes that service-learning happens through a combination of academics, relevant service and critical reflection.

Methods

This study used qualitative research methods to analyze data from a case study. Merriam (2009) defined case study to be "an in-depth description and analysis of a bounded system" (p. 40). Guba & Lincoln (1981) suggested that case study is the best form of qualitative research because it provides "information to produce judgment. Judging is the final and ultimate act of evaluation" (p. 375).

Students were required to take two courses (Survey of Leadership Theory and Leading and Training Adults) to participate in the program. Nine undergraduates and one graduate student participated in the service learning experience during June 2012. Three professors from Texas A&M University were joined by two cross-cultural leaders from a non-government organization (NGO).

Data were collected via observations and written artifacts completed during and after the service-learning experience program. Observations were made by three participant observers. The written artifacts used in this study included a field log documenting all activities for the service-learning project, and a reflection paper, written after the project was completed. The paper's topic was to describe 3-5 most fundamental and powerful concepts learned from the project.

Written artifacts were analyzed using inductive data analysis that includes two sub processes: coding and categorizing (Lincoln & Guba, 1985). Trustworthiness of the research was established through a prolonged engagement with participants during the trip (Klenke, 2008; Lincoln & Guba, 1985), peer debriefing (Klenke, 2008), and member checking (Klenke, 2008; Manning, 1997), to confirm accuracy of findings.

Results

After analyzing service-learning field logs and reflection papers, several fundamental and powerful concepts were revealed, resulting in five major themes: adaptation, culture, collaboration, communication, and value of knowledge.

Students experienced adaption through openness, flexibility, and improvising to meet the needs of the cohort, community and service-learning project. The international service-learning program enabled students to experience a culture other than their own. Partnerships with NGOs provided students with unique hands-on experiences similar to those found by Authors (2012) and collaboration with rural community members through the service-learning projects. Communication was identified as a language barrier, as described in students' field logs and reflections. Students' value of knowledge was noted as the importance of foundational knowledge, which could be actively implemented into the service-learning project.

Recommendations/Implications

The results are useful for informing policies and practices of international service-learning and study abroad programs. Students recognized the benefit of conversations with Chajul agricultural experts for their project. Localized communication strategies should be maintained in future programs. Students recognized the value of applying academic knowledge to practical projects, thus creating a true service-learning experience (Ash et al., 2009; Bringle & Hatcher, 2009).

This study accounted for one case that occurred during a 25-day study abroad program with one group of students; therefore, the findings cannot be generalized beyond the cohort. Future research should investigate students' perceptions of Texas A&M University's

collaboration with NGOs to advance the practice of international service-learning and study abroad programs.

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Investigating Women's Perspectives on Agricultural Extension

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Keywords: agricultural extension, educators, feminist theory, interviews

Introduction

Women are participating in agricultural extension on both ends of the information continuum—as farmers and as extension educators. Currently, the University of California agricultural faculty workforce consists of only 24.7% women (University of California Office of the President, 2009), many of whom are not involved in agricultural crop production but work in areas such as child development and nutrition. In the 33 years since women began working in agricultural extension in California, there has been little research that highlights female extension educators and attempts to understand their unique contribution to agricultural extension. Similarly, little research has been conducted with female extension educators in developing countries. I begin the investigation by interviewing women in extension education. This study serves as a springboard for further international extension education research centered on social justice and socio-cultural learning.

Purpose and Objectives

This study explores female views on extension education. Currently, other studies have identified acceptance by male peers, family/workplace balance, and administrator acceptance as the top barriers facing women in agricultural extension education (Foster, 2001; Seevers & Foster, 2003). Building on those findings, my primary research questions are:

- Do these women employ unique strategies to successfully work in agricultural extension?
- What informs their work in this male-dominated field?
- How do they view themselves and their success in agricultural extension?

Theoretical and Methodological Framework

Recent feminist theory has been shaped by minority feminist writings (Hooks, 2007; Lorde, 2003; Rich, 2007). These theorists encourage us to look beyond "white, well-to-do housewife" feminism and consider women with differing standpoints - those with different racial and ethnic backgrounds and others who face disability or class struggles. While fully realizing that the women of this study are white and highly educated, I believe that there are lessons that can be drawn from the multicultural and standpoint theorists that are important to women working in agriculture as agriculture in the United States is still viewed as men's work and most extension educators are men.

It is also important to take a critical look at women as scientists. Shiva (2008) urges us to rethink science and to consider feminist study from a different view. It is important to rethink science in a more inclusive way and to include the voice of women in our work. Fergusen (1994)

highlights that while women are heavily involved in agriculture and while they have instinctual ties to sustainable development, their voices are seldom heard. Through interview, I shed light on science through ten women's voices.

Interviews were conducted in 2012 with ten women. Our fifty- to sixty-minute interviews were open-ended (Weiss, 1995) which allowed the women to speak in an unconstrained way while allowing me to adjust the questions as needed as our conversation progressed. The interviewees were solicited from all women working in extension education in agricultural crops in California. The final ten interviewees were selected from the respondent pool to ensure a variety of ages and experience. Interviews were conducted in quiet settings, recorded with handheld recorders, transferred to computer, and transcribed. I coded the transcripts through an open coding scheme followed by narrowing of the broadly coded themes (Strauss, 1987). After reviewing the marked sections of the transcript, I regrouped the sections into smaller themes (Weiss, 1995).

Result, Conclusions, and Recommendations

After analyzing the interviews, I found four themes. First, most of the women entered agriculture in a holistic and thoughtful way with many of them commenting that the impact agriculture has on the environment and on people drove them to work in agriculture. Second, the women each had strong, articulate, and empathetic role models. Third, most of the women realize that agriculture is dominated by male clients and male colleagues and have adjusted their work to be effective as women instead of recreating themselves to be more like men. Finally, many of the skills they use to educate are feminine in nature reflecting a view of social justice and equality.

While these ten women only represent a small sampling of the women working in agricultural extension in California, their stories meld together as one and point to some of the struggles and rewards of working in agricultural extension. Their standpoints as women are informed by their ability to listen and approach their work through considerations of the interconnectedness of agriculture and humans. Information gleaned from these interviews informs future studies in developing countries where a push to hire female extension educators is evident (Saito & Weidemann, 1990).

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Kenyan Farmers' Participation in Farm and Church Groups, and Diffusion of Agricultural Innovations

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Keywords: Kenya, groups, diffusion, innovations

Introduction

There has been in recent years a movement away from the training-and-visit model of extension in Sub-Saharan Africa. Its replacement is a more diversified, pluralistic approach to training farmers and to disseminate improved agricultural methods and technologies (Davis & Place, 2003; Birner et al., 2006). One element has been increased interest in the role of farmer groups in innovation systems (Davis, 2004; Juma, 2011; Miller & Shinn, 2012). The present study examined this and related issues among farmers of the rural Twiga community in the Moiben area of the Uasin Gishu North district of Kenya.

Purpose and Objectives

The overall purpose was to study the association of selected demographic characteristics with the effectiveness of farmers in diffusing agricultural innovations. The specific research objective in this paper was to identify and describe relationships between farmers' participation in both farm and church groups with their implementation and dissemination of improved practices after receiving training.

Methods and Data Sources

The research team collected data from three convenience samples of farmers living within a 10-kilometer radius of Twiga Demonstration Farm. Each sample consisted of farmers who attended a seminar at the farm. Three seminars took place from November, 2011 to January, 2012 (dairy-management, $n = 32$; poultry-keeping, $n = 30$; bee-keeping, $n = 28$). Interviewers obtained demographic information from seminar participants. There were two follow-up interviews with each participant, one focused on adoption of recommended practices and the other on diffusion to others. The primary theoretical framework was the Diffusion of Innovations model (Rogers, 2003).

The two demographic characteristics discussed in this paper were membership in a farmers' group and the frequency of participation in the activities of a local faith community. The study used correlational analysis to explore associations between these characteristics and

five criterion/outcome variables: adopter/non-adopter, extent of adoption (by number of innovations), diffuser/non-diffuser, extent of diffusion (by number of innovations), and extent of diffusion (by number of secondary adopters). When assumptions for parametric tests were met, Pearson's *r* was calculated. The majority of the data was nominal or ordinal in nature. Considering the relatively small sample sizes, Kendall's *tau* was used when a non-parametric test was indicated (Field, 2009).

Results and Conclusions

There were small to medium-sized (.10-.49) positive associations found after training in all three samples between membership in a farmers' group and adoption of recommended practices. The study found the same strength-range of relationships for group membership and successful dissemination to other farmers. Associations between frequency of involvement in church activities and the criterion variables were in the negligible to small range (.00-.29) across the three samples. All were positive in direction except for relationships involving the three diffusion-related variables in the first sample.

A first conclusion was that a slightly to moderately greater proportion of farmers'-group members in the samples adopted recommended practices after training and disseminated them to others, in comparison with non-group members. Second, the study concluded that a slightly larger proportion of farmers in all samples who participated more frequently in activities of their local faith community than others also implemented recommended innovations after training. A third conclusion was that in two out of three samples a slightly greater proportion of those with more frequent church involvement also diffused innovations to others, in comparison with those who participated less frequently in church activities.

Implications and Recommendations

Implications of the study include a number of interesting possibilities for further research and application to the evolution of extension in Kenya and perhaps elsewhere in Sub-Saharan Africa. First, the utility of group membership in farmers' diffusion of innovations may be associated not only with agriculturally oriented groups, but also with other kinds of groups, though to a lesser degree. This would suggest the value of further research into whether or not farmers' simultaneous participation in multiple groups of various kinds may be associated with incremental increases in diffusion activity.

Second, if there is even a small association between farmers' activity in a local faith community and diffusing agricultural innovations, how can key factors be identified and optimized? Further investigation could include qualitative approaches for developing a contextually rich understanding of influential constructs. Third, this study suggests potential benefits of actively including church-based groups that also have an agricultural focus when planning extension strategies in Kenya (e.g., church women's poultry- or bee-keeping groups). A final recommendation is for more intentional collaboration at the community level among agricultural/extension and religious networks, centered on common concerns for issues of food security and economic development.

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Learning Methods – Inquiring Extension Educators for Professional Development Needs

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Introduction

Extension is a teaching-learning process that aims at improving lives focusing on issues and needs of communities. The Cooperative Extension Service involves clients in learning activities through various educational programs. Clients' learning from participation in such programs followed by change in their practice largely depends on the Extension educators' ability to involve them in a successful learning experience (Boone & Boone, 2005; Pratt & Bowmen, 2008). However, these educators often have little or no formal pre-service training or experience in teaching and learning competencies needed to provide a successful learning experience to their program participants (Seevers, Graham, & Conklin, 2007). Once hired as Extension agents/educators, they are given the responsibilities to educate the community on their own, by trial and error.

Franz et al. (2009) stated that little research has been conducted in the Cooperative Extension Service regarding how successful learning transfers new knowledge and skills and promotes change in behavior. They also noted that Extension educators often lack learning competencies needed in the workplace. Taylor (2007) stated that educators in nonformal education systems usually lack opportunities for developing competencies in learning methods.

Purpose

This study aimed to determine Extension educators' knowledge and skills in learning methods and their needs for further training in this area.

Methods

A census of 2497 Extension educators in 12 states of the North Central Region (USA) served as the sample for this study. The data-collection instrument was a closed-form questionnaire that included nine competencies in the areas of learning methods; Match learning to practical application, create a motivating learning environment, recognize learning styles of clientele, use group leaning techniques, identify factors that influence learning, use a learner-centered approach, use principles of learning, match learning objectives to individual learning needs, use techniques to develop problem solving skills of clients.

Participants' knowledge and skills and their further training needs in given competencies were measured using a five-point Likert-type scale (1= very low, 2 = low, 3= moderate, 4= high, 5= very high). Instrument's reliability was derived from a pilot-study. The questionnaire was e-

mailed to participants using Survey-Monkey and three reminders messages were sent to non-respondents. The response rate was 30% (n = 752).

Results

For each of the nine competencies, Extension educators generally assessed themselves as having 'moderate' knowledge and skills and indicated a 'moderate' need for further training in this area. The Agriculture and Natural Resource Extension educators had significantly lower means score for their knowledge and skills, and had higher means score for further training needs in stated competencies than that of 4-H and Youth Development, Family Living and Consumer Science, and Community Economic Development educators. The highest proportion of most likely audience to participate in professional development was found for the following competencies: 'recognize learning styles of clientele', 'use techniques to develop problem solving skills of clients', and 'use a learner-centered approach'.

Educational Significance

Findings have implications for Cooperative Extension Service developing policies and guidelines for in-service trainings in learning methods. Findings could provide guidelines for colleges and universities designing curriculum that can foster the learning competencies of students pursuing to develop their career in the field of Extension education.

International Implications

In developing countries, agricultural ministries that provide extension service to public and agricultural universities and colleges that produce agricultural graduates for extension are two different entities. Evidence suggests that extension staff in these countries are inadequately trained in the area of teaching-learning processes required for successful extension programming (FAO, 1997; Maiangwa et al., 2010; Swanson & Rajalahti, 2010). The government owned extension training centers lack pre-service training curriculum for new recruit agricultural graduates in learning methods and their training focus has remained largely technical subject matter (Omoregbee & Ajayi, 2009). Results of this study can be useful for developing insight on how the agricultural extension system in the developing world could enhance learning capacities of their extension agents.

Recommendations

Based on the findings, the following are recommendations for the North Central Region (USA) Cooperative Extension Service and the related land-grant universities. The universities and colleges with academic Extension education programs should review their curricula to make sure that future Extension educators are trained well to effectively deliver educational programs using appropriate teaching-learning processes. Offering a learning methods course is recommended especially for colleges of agriculture.

The Cooperative Extension Service should make sure that new Extension agents possess competencies related to the learning process when entering the organization. Periodical assessment of Extension education courses being offered by land-grant universities is recommended. New agent training should begin as soon as the agents are hired and before they are involved in educational program implementation. The current study should be replicated in other regions of the United States to verify whether the findings are consistent and valid at the national level.

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Learning About Other Countries and Their Agriculture: Students' Perceived Personal and Professional Benefits

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Introduction

As the world of agriculture becomes more global, colleges of agriculture continue to develop and refine strategies to provide an internationalized curriculum. Efforts generally focus on the integration of international dimensions into the operational (grouping of students, time, and place, teaching and learning methods) and formal (materials, content, and structure) aspects of the curriculum (Navarro, 2004). The interaction, nature, and intensity of contribution of five different groups have a significant influence in the quality and scope of internationalization at each institution. These five groups include organizational units (American Council on Education, 2000), senior administrators (Harari, 1992), faculty (Childress, 2008) students (Mazon, 2010), and other stakeholders (Green, 2002). To best determine the strategies that can be used to engage each group in curriculum internationalization endeavors, it is crucial to understand the particular sources of their motivation.

Purpose and Objectives

The purpose was to explore the motivation of students to participate in an internationalized agricultural curriculum. The objectives were to quantify the personal and professional value that students attribute to learning about other countries and their agriculture, and to analyze qualitatively their motivation for participation in internationalization programs.

Methods and Data Sources

The research was non-experimental and descriptive. A paper and pencil questionnaire was used to gather data. The quantitative data corresponded to a demographic question and two statements to assess whether or not students considered that learning about other countries and their agriculture was valuable to them (personal value) and to their education and professional development (professional value). Students were asked to rate these statements from strongly disagree (0) to strongly agree (7). The qualitative data corresponded to an open-ended question about student motivations to participate in internationalized agricultural curricula.

The questionnaire was given to students at the beginning of the semester in three agriculture courses, "Plants, pathogens, and people," "Fungi, friends, and foes," (non-internationalized courses) and "International agricultural development" (internationalized course). The questionnaire was completed by 31, 66, and 36 students respectively, with 85% response rate or more per course. The quantitative responses were analyzed using descriptive statistics. The

qualitative data were coded, analyzed, and interpreted using methods described by Strauss (1987).

Results, Discussion, and Conclusions

Table 1 summarizes student quantitative responses. Students in the two courses that were not "international" in nature had less experience with study abroad (26% and 20% respectively) than the students choosing the "internationalized" course (50%), hinting to a self-selection of students whereas students who choose to study abroad are also more likely to choose "internationalized" on-campus courses.

The construct "value" (combined personal and professional) had a mean of 5.77, 5.97, and 6.52 respectively. For the two "non-international" courses it corresponded to a response at the "agree" level. For the "international" course, it corresponded to a "strongly agree" level. In all cases, the values were higher than expected. The comparison of the distribution of responses between the personal and professional values indicated that while most students appreciated more the "personal value," the "professional value" was quantified at a similar level, surprising to the authors, given the common assumption that many students do not understand the value of an international curriculum to their academic major, education, and professional development.

Table 1.
Summary of Student Responses Regarding Perceived Personal and Professional Value of Learning about other Countries and their Agriculture

	Students		Number of students responding:							
				Strongly disagree		to indifferent		to Strongly agree		
Course	Total	Study Abroad		0	1	2	3	4	5	6	7
Plants, path., people	31	8	Personal 0	0	0	1	5	2	7	16
			Professional 0	1	2	0	6	3	6	13
Fungi, friends, and foes	66	13	Personal 0	1	0	1	4	11	18	31
			Professional 0	1	0	1	6	13	18	25
International Development	36	18	Personal 0	0	0	0	1	1	8	25
			Professional 0	0	1	0	1	4	5	25

Regarding the analysis of the qualitative data, students explained in many different ways why they valued learning about other countries and their agriculture. Major themes included cultural and social issues, academic preparation and professional advantage, curiosity about globalization, and personal enjoyment. The students who rated the value of internationalization at the lower levels expressed that their disinterest was more about their lack of need for agriculture than for international knowledge.

In conclusion, many efforts to internationalize the agricultural curriculum focus on mobility opportunities. However, discipline-specific on-campus internationalized courses are seldom developed in part because faculty assume that students are not interested. The results of this paper show that students attributed higher value than expected to learning about other countries and their agriculture, and they understood better than expected the professional need for internationalized curricula.

Recommendations, Educational Importance, and Implications

Internationalization champions should reanalyze the motivations, values, and knowledge of students in their campus to assure that decisions are made according to the situation of their students in their university rather than conferring to wrong assumptions based on research from several decades ago.

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Measurable Changes in Pre-Post Test Scores for Iraqi 4-H Volunteer Leader's Knowledge of Animal Science Production Principles

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Keywords: Animal Science, Iraq 4-H, Pre-Post Tests

Introduction

As Iraq emerged from war and family incomes increase, so did the demand for meat protein in the Iraqi diet. In 2010, Iraqi 4-H and the USAID-*Inma* Agribusiness Program established youth-driven 4-H sheep clubs (livestock production businesses) as a means to meet the growing consumer demand while generating income for rural families. USAID-*Inma* entered into partnership with the Iraq 4-H organization to create agricultural business (livestock production) opportunities for youth and widows through the development of the 4-H sheep production program. The volunteer 4-H youth development program was a new concept for the culture of Iraq, traditionally youth and adults did not participate in agricultural community organizations in Soviet-style dictator driven countries (Banajanian, B. 2005; Kock, T. 2010).

Today Iraqi adults are serving in volunteer leadership roles working with club members from all sectors of Iraqi culture, but these volunteers lacked the animal production skills needed to educate youth in profitable livestock businesses management (USAID-*Inma* Agribusiness Program, 2010). These adult leaders, many of whom had never worked with livestock, served the role of business consultants for the youth-driven 4-H clubs. Therefore, the USAID-*Inma* program conducted basic three-day animal science courses for the adult volunteers and *Inma* field staff working with the 4-H clubs.

Purpose of Study

The purpose of the study was to describe the knowledge change among the participants of the animal science training courses.

Objectives of the Study

For this study, the objectives were:

1. To measure the level of animal science knowledge of participants before the training course.
2. To measure the level of animal science knowledge of participants after the training course.

Methods

The methodology implemented for this study was a pre-post test research design. An instrument containing 12 multiple choice questions regarding animal science (nutrition, physiology and health) was designed by the researchers and evaluated by a panel of experts (Iraqi and American) for content and translated into Arabic. The panel of experts compared the instrument to course syllabus to ensure that questions asked were covered in course content, thus not asking questions outside of the training program. A 100% response rate was achieved; all fifteen participants completed both the pre and post instruments in spring 2012. Descriptive statistics was used to analyze the data allowing researchers to draw percentages of correct and incorrect responses between both tests.

Results

Data indicated that the majority (83%) of the respondents answered all 12 questions incorrectly on the pre-test instrument. Moreover, pre-test data indicated the majority of respondents answered incorrectly on six questions (2, 5, 7, 10, 11 & 12), while 65-80% of respondents answered pre-test questions, 1, 4, 6 and 9 correctly. Those questions covered such topics as gestation periods of livestock, heat detection and length of heat cycle.

However, post-test data indicated 83% of respondents answered the majority of the 12 questions correctly. All respondents answered questions five correctly and 60% answered question 12 correctly. Moreover, data gleaned post-test respondents continued to answer questions 2, 5, 10 and 11 incorrectly. Data also shown all respondents (100%) answered question four correctly, 87% for question one, 80% for question six and 73% for question three.

Recommendations, Educational Importance and Implications

Based on the findings of this study, most participants (volunteers) lacked basic animal science production principles, which would make it extremely difficult for the volunteers to advance the knowledge of 4-H youth livestock producers. However, after completing the animal science short-course participants understanding of livestock production increased significantly. Although participants completed the course, four areas remained difficult for participants to grasp. Participants continued to answer questions 2, 5, 10 and 11 incorrectly, leading the researchers to realize more training was needed in age identification of sheep, determining the length of gestation period for ewes, creep feeding lambs and best injection site location for pharmaceutical application. These four areas are important in livestock production; producers need a solid understanding of all animal science aspects to ensure to better flock management.

Research conducted by (VanWinkle, Busler, Bowman and Manoogian, 2002) indicated volunteers recognize their need for training and value the opportunity. Hoover and Connor (2001) concluded it is important that volunteers are provided professional development opportunities which enhance their ability to be more effective. However, the *Inma* Program ended in 2012 and the 4-H volunteers are on their own to advance their production skills. Training is an important aspect of sustainable development; it provides participants the skills needed long after funding sources are gone (Kock & Turnbull, 2011). The researchers certainly hope this is the case in Iraq.

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Monitoring and Evaluating Adoption Behavior and Integration after an Educational Training Program in Hazaribag, India

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Introduction

"Getting a new idea adopted, even when it has obvious advantages, is difficult" (Rogers, 2005, p. 1). This is often the case because of limited access to proper inputs and technologies (Moriba, Kandeh & Edwards, 2011), but can be alleviated with consistent support. The rural poor of Hazaribag suffer from vitamin A and iron deficiencies because of a lack of access to nutritious foods, and knowledge about proper nutrition. Therefore, this study followed 24 women after a three-day training program on using avocados and drumstick leaves/pods to address malnutrition in Hazaribag. The women were monitored and evaluated to understand their level of adopting four behaviors taught during the extension workshop. The four behaviors were (a) eating and feeding the avocados to their children that they were given every week; (b) increasing their weekly consumption of drumstick leaves and pods; (c) caring for the grafted avocado tree planted near their homes and (d) planting the seeds of the avocados they consume. Using prolonged engagement (Guba & Lincoln, 1989), the process of adopting the behaviors was monitored and evaluated for four months beginning on August 13th, 2012 and culminating on December 7th, 2012.

Purpose

The purpose of this study was to study 24 women who participated in a training program to understand their rate of and reasons for adopting the four behaviors that they learned.

Methods

This study utilized a phenomenological design methodology to conduct an organized, disciplines, and systematic study of the process of adoption. According to Rogers' *Diffusion of Innovation* theory (2005) the rate of and reasons for adoption are judged by the members of a social system based on the perceived benefits of the innovation, including five attributes, which are relative advantage, compatibility, complexity, trialability and observability (Rogers, 2005).

In addition to the observations and interviews, five data collection instruments were utilized. The first was the willingness to adopt survey that asked the women to rate their willingness to adopt the new behaviors learned during the training session. The second was the SOCRATES stages of change readiness and treatment eagerness scale to measure the women's understanding of their diet problems and eagerness to address these problems (Miller & Tonigan, 1996). The third was the 24-hour food recall survey, which asked the women to record all the

food and drink consumed in a 24-hour period. The fourth collected frequency data on the amount of times each week the women cared for their trees and ate the avocados and drumstick leaves/pods. The fifth asked the women questions using Rogers' five attributes of adoption to better understand their perception of the behaviors.

Results

Results show that the women did adopt the majority of the behaviors, with 100% eating or feeding avocados to their children; 60% eating more drumstick leaves/pods; 90% caring for the grafted avocado trees and 50% planting avocado seeds. According to Rogers' adopter categories, there were no laggards among the 24 women, meaning that none of the women were completely adverse to the new behaviors. There was one woman in the late majority category, meaning she was skeptical and was late to embrace some of the behaviors because she preferred her more familiar and proven food choices. There were six women in the early majority category who were slower to adopt because of their low social position and lack of resources. There were eleven women in the early adopter category meaning they embraced at least three of the four behaviors and devoted more time to changing their lifestyle. These women had more social standing and held great influence over others outside the program. Finally, there were six women in the innovator category, who embraced all four behaviors from the beginning and not only implemented the lessons learned from the training program but fully integrated them into their daily lives.

Conclusion and Recommendations

Eating avocados and drumstick leaves/pods became habitual as all 24 participants were eating and feeding them to their children. The adoption of the avocados also led to the women taking special care of their grafted trees so they would grow strong and quickly bear fruit. The participants also perceived that eating the avocado and drumstick leaves/pods improved their health and resulted in their children falling sick less often. With the high level of adoption among the participants and perceptions of improved health, additional studies could be done using avocados and drumstick leaves/pods to gain definitive evidence on the potential of these foods to address malnutrition in rural Hazaribag.

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Needs Assessment for Effective University Outreach Programs to the Neighboring Community: Chuka Kenya

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Keywords: needs assessment, community, outreach

Introduction

Chuka University was established in 2004 as a constituent campus of Egerton University in Kenya. The University is located in a rural community where farming and small business ventures are the main economic activities. The University recognizes the importance of working together with the neighboring community to foster university/community relationship. The University is committed to the mission of the university which puts emphasis on working with other stakeholders to provide, promote and coordinate life-long education, training and research for sustainable development and responsible citizenry (Watkins, West, & Visser, 2012).

During the eight years of existence of Chuka University, there has been no study conducted to determine community needs in which the University could effectively offer outreach programs. This is the problem that was addressed in this qualitative study. The methodology involved use of questionnaires to collect qualitative data from neighboring community.

A needs assessment survey provides information useful in planning and implementing relevant outreach programs which are participatory, impact-driven and sustainable (Soriano & Fernando, 1995). The University intends to improve the effectiveness of its outreach programs by ensuring that felt needs of the neighboring community form criteria for prioritizing projects to be implemented in the community with the help of the University (McMahon, 1970).

Purpose and Objectives

The purpose of this study was to determine the felt needs of the community that neighbor's Chuka University in order to help the University to plan effective outreach programs. The study aimed to establish social economic needs, concerns and expectations of community members that neighbor Chuka University. The specific objectives that guided this study were;

1. to establish community expectations of Chuka University;

2. to investigate the socio-economic challenges faced by the neighboring community; and,
3. to determine the contribution/benefits of Chuka University to the community.

Methodology

The target population for this study was small and medium-scale farmers, private housing providers for University students and small scale entrepreneurs around the University. The study was conducted using a cross-sectional survey research design. Purposive sampling was used to ensure adequate representation of the different categories of the members of the community based on their economic activities, age and gender. A sample of 120 community members were randomly selected using a simple random method.

The data were collected using a questionnaire. This instrument was validated by a panel of three faculty members from Chuka University and two experts in community development who are government employees. The instrument was pilot-tested for reliability with 20 respondents drawn from outside the research area. A Cronbach's reliability coefficient of 0.76 was realized.

Results

The findings of the research study are reported according to the objectives that guided the study. The community members indicated that they expect educational benefits from the University as the priority. The second ranking priority was provision of employment. The neighboring community members expected the University to offer employment to them. The third ranked expectation was business expansion. Students and university workers were expected to provide a larger customer base.

Results indicated that unemployment was the major challenge to the neighboring community. The research study revealed that with the establishment of the university in the neighborhood, there is an increase of residents from outside the community leading to rise in the cost of property, housing and other commodities. Occasional theft cases associated with the youth was also reported. The third ranked socioeconomic challenge was moral decadence. The findings indicate that the neighboring community felt that the level of inappropriate social behavior is on the increase in the area. They gave examples as inappropriate dressing, alcohol consumption, drugs and promiscuity.

On the contribution of the University to the neighboring community, the findings indicate that the neighboring community members had benefitted with educational opportunities in the university. The findings ranked employment as the second contribution of the University to the neighboring community. The results also indicated that the University offered facilities for social gathering to the neighboring community. This was due to the beautiful sceneries in the University.

Conclusions

The community members neighboring the Chuka University have high expectations from the university and believe their expectations should be met overtime. The community members were aware of their felt needs and were able to point out causes of the identified problems. Chuka University has created positive impact in the neighboring community through provision of education, employment and recreational amenities.

Recommendations

The University should work closely with the neighboring community members since they have high expectations of the university to help change their lives to the better. There is a need to urgently address the issue of insecurity and the perceived increase in antisocial behavior associated with incoming new residents. This would enhance responsible citizenry. There is a need for the University to plan short term need based educational programs for capacity building among neighboring community members.

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Obstacles of Agricultural Extension Work in AL-Diwaniyah Province, Iraq

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Introduction

Agricultural extension faces a number of obstacles that limit its effectiveness in achieving agricultural development. Numerous studies have been conducted to determine the obstacles of agricultural extension work in many countries around the world. In Bhutan (Tshering et. al., 2007) found that the most important obstacles are the lack of a standardized monitoring, evaluation and feedback system, inadequate resources and facilities, and insufficient support from local government bodies. (Hosseini & Niknami, 2009) classified challenges facing the agricultural extension service in Iran into six types of challenges, namely organizational, technical, financial, social, regulatory, and those related to human factors. (Nazarzadehzare et. al., 2012) added the use of uniform methods of educational for teaching educational content courses by extension workers.

In Egypt, (Shalaby et.al. 2011) found that the main obstacles are lack of extension workers to appropriate education, and capacity building programs are not available for women extension agents**.** In Iraq, (Amin, 2012) found the following obstacles: The vast majority of extension workers (80%) non-specialists in agricultural extension, commissioning extensionists to administrative duties more of the extension duties.

Objective of the Study

The objective of this study was to identifying the obstacles of agricultural extension services in AL-Diwaniyah Province, Iraq from the point view of the agricultural extension agents.

Research Methodology

The target population of this study consisted of all 60 extension agents employed at AL-Diwaniyah Province, Iraq who work in the extension training center with (15) extension units spread over areas of the province. From these (60) extension agents (10) were chosen for the purpose of open questionnaire, and the same for the purpose of questionnaire stability, the remaining 40 agents comprise the research sample. Because non-attendance one of them during the data collection period, our final sample consisted of 39 extension agents. Face to face interview schedule was used and data collected personally by the researchers' visits to extension agents to their offices during 1- 18 September, 2012. The data collected for this study was analyzed using frequency, percentage, and weighted arithmetic mean.

Results/Conclusion

The result showed that (89.7%) of the respondents were males, while the rest (10.3 %) were females. The findings revealed that 17.9% of the respondents hold bachelor degrees of agricultural extension, 66.7% hold bachelor degrees other than agricultural disciplines, 10.3% hold agricultural secondary high school, and 5.1% hold trade secondary high school. Majority of our sample, (82%) of the respondents were do agricultural extension duties more than other duties, while (64%) were work on administrative duties more than extension duties. In term of years of experience, the average years of experience in agriculture extension were (17.5) years. Also, the average number of training courses in which they participated is (5.2).

The study revealed that there were 16 strong obstacles faced the agricultural extension services at AL-Diwaniyah Province, Iraq: decrease in the number of agricultural extension agents, weakness in the level of preparation and training of extension agents, mandated agricultural agents with administrative and office work more than extensions work, widening the geographical area under the responsibility of extension agent, lack of understanding of some rural residents to the role and duties of the agricultural extension , limited the role and influence of agricultural media, weak relationship between the agricultural extension system and scientific and research institutions, centralization in planning agricultural extension programs, non-participation of extension agents in planning of extension program, lack of understanding of many agricultural officials to the nature and functions of extension work, lack of understanding of the beneficiaries to concept and philosophy of agricultural extension, low salaries and material incentives granted to workers in the agricultural extension, no specific policy to the plans, programs and extension activities, shortage in the number of female extension workers, assigning people non-specialist to carry out agricultural extension tasks, and not taking the opinion of the beneficiaries when planning extension programs.

Recommendations

The number of extension agents in the province, private females should be increased. Curricula should be reconsidered in preparing and training agricultural extension workers in Iraq, and may provide a benefit from the experiences of other countries in this area. Extension agents administrative duties should be minimized. The role of agricultural media should be activated to assist in the definition of the importance and the role of agricultural extension. Extension should reduce the centralization in extension work and involvement of extension agents when planning to programs and extension activities. A comprehensive study should be conducted to identify the obstacles of agricultural extension in Iraq.

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Overcoming Barriers to Participatory Extension and Development

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Keywords: participatory methods, inclusionary practices, community issues

Introduction

Since the 1980s, extensionists often viewed participatory extension as the panacea for the failure of top-down extension models (Ledwith & Springett, 2010; Masters & Tuttle, 2010). While participatory extension programs seemed like the answer to problems with top-down strategies, issues arose that created barriers to program implementation. These barriers include: gender gaps, dependency, insufficient leadership skills, resistance to new ideas, and inadequate time or money to conduct projects (Tuttle et al., 2010). However, we can overcome obstacles to participation using methods of inclusion, promoting self-reliance over dependency.

Research Purpose and Question

The purpose of this paper is provide an analysis of research findings of global participatory methods to provide a better understanding and approaches to improving inclusionary practices that increase the involvement of marginalized clientele in community development while addressing critical community issues.

Methodology

The researchers employed literature review from two international journal abstracts, a practical program guide, and eight books that explored participatory extension. They used qualitative analysis of data (Glaser, 1965) that explored participatory extension in two frameworks-theoretical and applied. As a part of a larger research project, researchers chose two of the eight categories, inclusion and dependence vs. self-reliance, as most relevant to overcoming barriers to international extension projects.

Results and Conclusions

In contrast to centralized, top-down extension models, participatory models should aim for inclusion: use local knowledge, and include poor and marginalized people: women, the elderly, and the disabled as well as others. To encourage inclusion, extension personnel should also avoid "rural tourism bias," and be willing to conduct projects outside of the 9 to 5 work hours, in remote areas, and in all seasons (Cooke & Kothari, 2001; Ledwith & Springett, 2010).

In a project in India, the Bhoomi Senda labor group desired to learn from each person and village. They used key outsiders to facilitate learning, and to help make decisions that affect quality of life (Kahn, 2009). Masters and Tuttle (2010) showed that participatory extension in Africa encourages the integration of the wealth of villagers' creative and analytical abilities. Vincent (2004) encouraged extension staff in Peru to help locals plan their own lives.

Tuttle et al. (2011) and Kumar (2002) explained participatory methodologies/techniques that foster inclusion: individual interviews, focus groups of local men, women, and children; community mapping; ecological transects; oral histories; and time schedules of men and women. Community-based health organizers in the Appalachian region of North Carolina, U.S.A., comprehended that material and non-material cultural elements were vital in health maintenance. They used community cultural information to formulate health maintenance strategies-"residents defined their communities as small neighborhoods, based on traditional kinship ties and landholdings" (Plaut, Landis, & Palmour Trevor, 2003, p.235).

Top-down extension often creates dependency, whereas participatory programs promote self-reliance – locals change from being dependant, and augment their awareness and self - confidence. Open systems in methods, behaviors, and processes of participation allow us to better depict participants' realities than quantitative data (Kumar, 2002). Participatory projects should foster self-reliance while linking local social capital to outside resources (Cook, 2003). A self-help project in the Philippines promoted independence by financing a loan for a tractor through a local bank (Bodentstadt, 1975), and the Bhoomi Senda group in India coordinated activities between many villages through locals, not outsiders (Khan, 2009). Developing leadership in local participants is important, to hand over the project to the participants. Platt et al. (2003) describe how the Community Health Advisory Board in North Carolina utilized nominal group process to divide the Board into smaller units to discuss and prioritize needs. Later, this local group became the Community Health Coalition, and worked out problems between doctors and emergency personnel by finding grant funding for 911 emergency systems and diabetes education.

Educational Implications

Top-down extension programs tend to include a selected, easily accessible population while neglecting the input of more marginalized communities. As extension systems move from top down organization to more participatory methods, extensionists at universities and field staff worldwide must learn how to use participatory methods to create inclusion and self-reliance for communities. Overcoming barriers of a participatory system may also require a paradigm shift for extensionists, to focus on relationships with locals, and to integrate into the community's way of life. In our work with Native Americans in Arizona and New Mexico, we often facilitate participatory methods. Our programs integrate cultural elements, such as traditional gardening crops and techniques, to help tribes regain their cultural heritage, and to increase self-esteem in youth through the life skills of responsibility, teamwork, and self-reliance.

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Participants' Views of Training to Improve Communication on Issues of Food Security in East Africa: A Project Assessment

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Introduction

The need to improve food security in Sub-Saharan Africa is an enormous problem. In East Africa, Kenyans and Ugandans are no strangers to the devastating effects of food scarcity. Nearly four million Kenyans and more than two million Ugandans require food assistance regularly (USAID, 2008, 2009).

The project assessed sought to improve food security in Kenya and Uganda by providing professional development for three key stakeholder groups whose collaboration stood to amplify their collective impact on food insufficiency: community leaders, media specialists, and policymakers. They were the project's Food Security Fellows (FSFs). The project proposed to improve communication flow among and between these groups by their and U.S. counterparts participating in two-way, reciprocal exchanges. It was funded by the U.S. Department of State.

The training model was designed to facilitate the flow of communication between these groups while stressing food security policy and its impact on communities. The presentation will report on aspects of the project's summative assessment (Popham, 1993).

Conceptual Framework

Ajzen's (1991) theory of planned behavior posits that "a relation between a person's salient beliefs about the behavior and his or her attitude toward that behavior" (p. 192) exists. Ajzen called this association an individual's *belief salience* for a given behavior and theorized it

influences how and what is perceived, which, in part, determines one's *intentions* or *planned behaviors*. Therefore, the FSFs' views on knowledge gained as a result of the training and its impact on future communication practices were conceptualized as indicators of *planned behaviors* (Ajzen, 1991) in regard to communicating about food security.

Purpose/Objectives

This study assessed the perceptions of professionals who participated in educational training to improve their understanding of and how to communicate effectively about food security issues. Three objectives guided the study: a) describe FSFs' perceptions of change in their knowledge regarding communicating on issues of food security, post-training; b) determine FSFs' perceptions of the training's impact on their understanding of effective communication for improving food security; c) determine FSFs' perceptions of the training's impact on their developing professional practices related to improving food security.

Methods & Data Sources

This descriptive study used a mixed-methods approach (Creswell, 2008) to collect data: survey questionnaires and focus group interviews (Krueger, 1994). The data were provided by 13 Kenyans and 13 Ugandans who participated in the project's training in the United States during 2011 (12 in April; 14 during September-October). Fifteen males and 11 females participated ranging from 28 to 54 years of age. Their education varied from "some college" to master's degrees. The three targeted participant groups were uniformly represented.

The FSFs rated their levels of knowledge on communication and food security – before and after the training – using a five-point, response scale (four items): *1 = Strongly agree . . . 5 = Strongly disagree.* The same scale was used to rate their agreement with 10 statements describing the training's impact on their understanding effective communication practices to improve food security and developing such professional practices. The quantitative data were analyzed descriptively.

An outside evaluator moderated the focus group interviews (Krueger, 1994). A series of open-ended questions were asked to assess the FSFs' views on their training experiences. The responses were recorded using audio and video recording equipment and later transcribed and analyzed for dominant themes.

Results/Conclusions

The FSFs' views on their knowledge in regard to communicating about food security issues changed from *neutral* before the training to *agree* after (all items). The largest perceived change was for "knowledge of food security challenges." The FSFs *strongly agreed* the training impacted their understanding of effective communication practices for improving food security and their developing such practices. Of the 10 statements, "useful in professional development" had the highest mean score ($M = 1.04$; $SD = .20$). The themes emerging from both focus groups regarding the training were consistent, e.g., the need for community level social change to improve food security.

Implications/Recommendations/Educational Importance

Röling (2004), regarding *communication for development*, stated "[i]nnovation is not the end-of-pipe result of a linear process but the emergent property of interaction among multiple stakeholders . . . ," i.e., "a network of actors" (p. 18). He asserted further, "the network is based

on shared perceptions with respect to the issues at stake" (p. 18). This project operationalized Röling's position by bringing together diverse actors around the theme of improving food security in hope these actors begin a discourse to identify issues and solutions regarding food security in East Africa. Such communication among network actors could lead to improvements in the social, industrial and/or political factors regarding food security. The findings imply Participants' views of their experiences supported the project's premise and approach. Others charged with providing training on complex problems should include participants of seemingly disparate groups who hold similar aims.

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Perceptions of Public Extension in a Pluralistic Extension System in Trinidad and Tobago

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Introduction

Trinidad and Tobago (T&T) does not produce enough food to sustain its population and is working to become a food secure nation by implementing The National Food Production Action Plan 2012 – 2015. The country's food imports comprise approximately ten percent of the total imports (Ministry of Food Production, Land and Marine Affairs (MFPLMA), 2012). The MFPLMA (2012) envision the capacity building of farmer organizations, improving extension service delivery to farmers, and partnering with non-governmental organizations and the private sector as critical strategies. Achieving the status of a food secure nation will also require increased production from the many small farmers comprising T&T's agricultural sector, but education will be a key component for making this happen.

Purpose

The purpose of this study was to describe the perception of stakeholders (farmers, non-governmental organizations, farmer organizations, input suppliers / agro-dealers, extension personnel, and University of the West Indies (UWI) Faculty of Agriculture and students) on the services provided by public extension in Trinidad and Tobago.

Methods / Data Sources

A basic qualitative design was used (Merriam, 1998). Convenience sampling of agricultural stakeholders in Trinidad and Tobago was drawn, where farmers (n=17) formed the basis of this study (Flick, 2009). Semi-structured individual and small group interviews were conducted in March 2012, and detailed hand-written notes were taken. Data was analyzed with the constant comparative method to search for recurring themes related to perceptions of public extension in a pluralistic system (Merriam, 1998). Triangulation occurred by cross-referencing notes with the other three members of the research team, while member checking with respondents was used to increase trustworthiness (Lincoln & Guba, 1985).

Results / Conclusions

All farmers interviewed knew of the public extension service; however, only five either used extension as a source of information or knew the extension officer assigned to their area. All indicated the input suppliers as the first source of information and not extension because of lack of timeliness and relevance. However, although farmers were quick to acknowledge input suppliers as their first source of information, they were concerned about the high cost of inputs to produce a crop. The possibility exists that farmers may be purchasing unneeded products when less expensive organic methods or even changes in cultural practice could suffice. Another concern noted by farmers was that many of the officers were "fresh out of college with no practical experience" and they would have to teach the officer.

According to Dowlath (2012), Director of Extension, extension in T&T is pluralistic with 16 groups providing information to farmers. The main players in order of importance were input suppliers, farmer organizations, and public extension. Dowlath (2012) indicated the high ratios (200:1 to 300:1) of farmers to officers; large geographic areas to cover; many regulatory duties assigned to officers; frequent assessments needed for items such as flood damage and invasive species; and sudden changes in ministerial directives all present challenges impacting the effectiveness of public extension. Respondents from farmer organizations and UWI faculty interviewed expressed concerns with the system's inadequacies citing many of the limitations identified by Dowlath.

Many of the organizations providing extension service in T&T operate in isolation, leading to the potential for farmers to receive conflicting information. Two farmers interviewed, both using a different agricultural principle, were frustrated that neighboring farmers were not adopting the practice they were promoting. Also, many terminologies were being used, such as sustainable farming, ecological crop management, permaculture, and good agricultural practices that might be confusing to farmers due to the similarities between all these terms.

A senior lecturer (2012) in the Department of Agricultural Economics and Extension at UWI, indicated that extension "officers tend to interact more with groups rather than with individual farmers," and recommended "each farmer joins an organization in order to gain access to the services" offered through public extension. Leadership within the farmer organizations indicated they provide regular training for their members and do not rely on public extension.

Recommendations / Implications

The government of T&T needs to reassess its role in the delivery of extension services, and public extension should facilitate collaboration between organizations. Okorley, Gray, and Reid (2010) recommended all parties in a pluralistic system meet on a regular basis to identify the issues that need to be addressed and the capabilities and role of each agency. Monitoring the information provided is also necessary to ensure that farmers are not receiving conflicting information.

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Performance of Supervised Enterprise Projects (SEPs) Conducted by Sasakawa Africa Fund for Extension Education (SAFE) Students of Bayero University Kano, Nigeria

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Keywords: supervised enterprise projects, capacity building, extension staff

Introduction

Agricultural extension system in Nigeria especially at the grassroots level constitutes a very weak point in the country's agricultural development efforts. To this end, an alternative and unique educational training programme is designed by the Sasakawa Africa Fund for Extension Education (SAFE) and other partner institutions in Africa (Suleiman, Mohammed, & Daneji, 2008). The programme emphasizes hands-on experiential learning as its central theme and is aimed at producing qualified and more practice oriented frontline agricultural extension staff with up-to date theoretical and practical knowledge that enables them meet the challenges of an ever increasing and complex issues in agricultural development. To achieve this, the Supervised Enterprise Projects (SEPs) which is a participatory problem solving approach based on the needs, yearnings and aspirations of the target communities became the nerve centre of SAFE programme. (Zinnah, 1997). It therefore became imperative to examine the roles of various stakeholders in the conduct of SEPs.

Purpose and Objectives

The main objective of the study was to examine the performance of Supervised Enterprise Projects (SEPs) conducted by SAFE graduates of Bayero University, Kano (BUK), Nigeria and specifically the study had the following specific objectives. To describe the socio-economic characteristics of BUK SAFE graduates; to assess the types of SEPs conducted by the students; to assess the role of stakeholders in the conduct of SEPs; to examine the sustainability of SEPs in the location of conduct and the BUK; to assess the perception of SEPs beneficiaries, and to evaluate the strengths, weaknesses, opportunities and threats (SWOT) of the SEPs.

Methods and/or Data Sources

A census of SAFE graduates (2008/09 and 2009/10) was conducted and random sampling technique was used for the study and covered four categories of respondents (the graduates, the beneficiaries, the supervisors and the employers). Data were collected from 265 randomly selected respondents (15employers; 55graduates; 165 beneficiaries and 30 supervisors) using structured questionnaires and interview schedule. The data were analyzed using descriptive statistics and chi-square analysis.

Results, Products, and/or Conclusions

The results revealed that the SAFE graduates, participating beneficiaries, and supervisors were middle aged, with mean ages of 38, 42 and 44 years respectively. Majority (77.60%) of the participating beneficiaries, 94.50% of the graduates and 90.00% of the supervisors were male. Also, 81.82% of the participating beneficiaries were married with 12 mean years of experience in main occupation. Majority (57.00%) of the participating beneficiaries had religious education while hundred percent of graduates and supervisors had at least one post secondary certificate. Sixty-three different types of SEPs were carried out with about 44.44% crop based and 28.57% livestock based. It was also found that all the stakeholders played one or more roles in the conduct of SEPs. The results of chi-square analysis of factors that determine the sustainability of SEPs among participating beneficiaries indicated that there were significant (p<0.001) relationship between the performance of stakeholders and sustainability of SEPs.

However, participating beneficiaries perceived that there was significant (p<0.001) relationship between their agriculture and rural development needs with the type of SEPs conducted. The results of SWOT analysis across stakeholders showed that assistance of material resource; technical assistance; research skill, field work experience and linkage facilitation; information dissemination, increase in agricultural production; group work motivation; availability of target beneficiaries were the internal and external favourable factors in the conduct of SEP. Insufficient fund, low coverage of SEPs, inadequate monitoring and supervision and poor patronage of local/hosting community, poor linkage among stakeholders, inadequate mass mobilization and awareness campaign, seasonal nature of agricultural activity and incompatibility of government policies were the internal and external unfavorable factors that affect smooth conduct of SEPs in Bayero University Kano and the location of conduct.

It was concluded that the SEPs conducted has helped to address agriculture and rural development needs of the participating beneficiaries and the stakeholders performed their expected roles.

Recommendations, Educational Importance, Implications, and/or Application

It is recommended that emphasis should be placed on increasing stockholder's strength and opportunities to overcome their weaknesses and threats through individual and collective interventions.

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Qualitative Research Methodology in Program as Assessment: A Longitudinal Case Study

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Keywords: Qualitative Methodology, Case Study, Study Abroad, Service-Learning, Assessment

Introduction

The focus of this study is the use of qualitative research methods in the assessment of a study abroad program that incorporated an extension-like component where students worked with rural Maya agricultural communities in Mexico. The program combined two very significant learning pedagogies; study abroad and service-learning.
By nature, service-learning can result in a very unstructured learning environment (Forsyth, Lu, & McGirr, 1999) and the international setting of that environment can compound the complexities. Consequently, understanding how students describe and internalize the impact of the program can be equally complicated. The situation is as described by many experiential education scholars who consider learning, or the accumulation of knowledge, is the result of one's own experiences within a context or social setting (Dewey, 1902; Kolb, 1984). Qualitative inquiry assumes a subjective reality whereby individuals construct knowledge from their experiences within the context of a social setting and is ideally suited as a research methodology for this study.

Purpose and Objectives/Theoretical Foundation

The purpose of this case study was to describe the qualitative research methodology and techniques used when evaluating a long-term study abroad program. The methodology included the coding and analysis of student journals utilizing NVivo software program.
Oftentimes, researchers attempting to understand the human condition, and especially the inner workings of the human mind, tend to take the scientific approach and isolate one specific aspect of the brain. However, the human brain is far too complex to completely isolate a single variable in any realistic, ethical fashion (Klein C. V., 2007). Qualitative research methodology is ideally suited to making sense of a complex situation with multiple variables. It is also particularly suited to answering questions such as "what" and "why" by gathering a wealth of information that provides more in depth and insightful data rather than statistics that responds to a specific hypothesis (Lindlor & Taylor, 2002) (Cresswewll, 1998) (Gall, Gall, & Borg, 2007).

Methods and/or Data Sources

The context of program is the Community-Based Ecotourism in Yucatán course that has been offered as a summer study abroad class from 2005 through 2010. The primary data set was 59 student journals from six study abroad programs. As part of the traditional service-learning reflection activities, students were required to keep journals in which they wrote essays in response to pre and post-reflection prompts. It is important to note that there were never more than 11 students participating at any one time, yet, as is typical with qualitative research, the data provided considerable depth and richness.

Analysis of the student journals used Krathwohl's five levels of the affective domain to understand changes in student's attitudes and perceptions. This process was utilized in other similar studies and was found to be effective (Boyd, Dooley, & Felton, 2006; Klein & Lawver, 2007). The analysis was conducted using NVivo software which provided the ability to manage a large amount of data using a process known as coding/re-coding. The students' writing was first categorized, or coded, to identify the prominent themes. The themes were then re-coded into one of Krathwohl's levels. A third analysis of the data compared the differences between the students' writing from the pre- and post-essays within the five levels of the affective domain. Research rigor addressing the qualitative aspects of credibility, transferability, dependability, and conformability (Creswell, 1998, Guba, 1981) was established through techniques such as member checks, triangulation, low-inference descriptors, reflexivity, peer review and, informant interviews.

Results, Products, and/or Conclusions

Analysis showed that student journaling in response to pre- and post- reflection prompts shifted toward the higher level of the affective domain at the conclusion of the program. Further analysis indicated that the inclusion of the service-learning activity enhanced that shift. Finally, a comparison of the student journals with specifics of the service-learning activities indicated that close interaction with the client played an important role. NVivo's coding query and graphing functions helped visualize these phenomenon with a three-dimensional charting function.

Recommendations and Educational Importance

The use of qualitative research methodologies can be very informative when dealing with studies involving a small number of participants as well as complex, interactive social phenomenon. The sheer volume of information can at times be overwhelming but its management and analysis can be greatly enhanced with the use of NVivo software. The program can also be used to help establish research rigor. However, like any assessment tool, computer software is not a substitute for the logical and knowledgeable use of the qualitative paradigm.

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Rebranding Caribbean Extension: An Analysis of a Key Panel Discussion

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Keywords: Extension rebranding, panel analysis, training

Introduction

This paper analyses a panel discussion on the topic of rebranding agricultural extension in the Caribbean. The discussion occurred at a roundtable discussion at the Caribbean Week of Agriculture (CWA) held in Grenada, October 2010. The panel consisted of key extension leadership, and the audience was a responsive collection of lead farmers, practitioners, media personnel, consultants, government personnel and representatives of local and international organsiations. The two succeeding CWAs did not address agricultural extension. It is important to understand the perspectives of this discussion, which can guide future extension effort.

Purpose and Objectives of the Paper

Caribbean extension faces enormous challenges. There is currently low staff morale, weak or absent policy, unclear definitions about extension's role and a lack of farmer involvement. From an enabling perspective there are minimised programme budgets, the challenge to integrate with health and education and a range of issues, from natural global issues like climate change to economic ones like marketing and trade. The paper's objective is to eke an understanding of how leadership thinks about an extension resolve.

Lindner and Dolly (2009) had conceived a continued role for Extension to facilitate agricultural development. They argued that it is not a question of if, but how. Likewise in searching for an answer, Swanson (2008) felt that nontraditional entities are overtaking Extension's role within the agricultural sector. He suggested that Extension must integrate with new entities in partnerships. This view concurs with the idea of a pluralistic extension approach, which Rivera (2001) had earlier advocated.

Data Source

The author used the original transcript of a panel discussion at CWA 2010. The panel consisted of Directors of Extension from Antigua and Barbuda and the Commonwealth of Dominica, the head of the Extension services of the National Agricultural Marketing Company of Trinidad and Tobago (NAMDEVCO), a representative of the regional University of the West Indies and a director of a major agricultural input supply company. The chairperson controlled

the discussion throughout three hours of interaction. Members of the audience then made individual rebuttals and new contributions to the head table's analysis.

Technical staff of the Inter American Institute for Cooperation in Agriculture (IICA), Saint Augustine, Trinidad and Tobago transcribed the entire discussion verbatim. This study analysed the discussions.

Results and Conclusions

At the onset, the organisers made the case that in recent years there is much criticism of the extension services of the ministries and departments of agriculture despite restructuring and modernisation strategies. They also recognised that the private sector firms which supply farm inputs engaged in extension services, duly implying that other forms of Extension services are operative. These observations guided the panelist in their own thoughts about the topic of extension in 21st century Caribbean agriculture.

The panel summarised dissatisfaction with the traditional and typical government based Extension service as the demands for extension has changed. There is need for continuous training of officers and their clients. The panel concluded that ICTs will enhance communication initiatives. The panel expects that ancillary extension services will facilitate specialist options For example commodity value chain application and a diverse range of livelihoods and occupations will now become part of the priority. Therefore Extension can be of service to Organic Farming, Food Standards, Good Agriculture Practices, Agribusiness and Marketing. In the rebranding strategy there must be joint focused approaches among the stakeholders.

Recommendations, Educational Importance and Application

The panel concluded that rebranding Extension is a priority. Any format of rebranding must have a strong educational intervention. There must be wider stakeholder participation in extension effort. The next study will use a more expansive sample of extension stakeholders who can verify consensus and contribute to the design of distinct elements of a rebranded portfolio for Caribbean extension.

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Self-Perceived Outcomes of Students During a College of Agricultural and Life Sciences Short-term Study Abroad Program

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Introduction

Increased interconnectedness of the world's economy has led to a world in which people routinely interact with people from all over the world (Anderson, Lawton, Rexeisen, & Hubbard, 2006). International exposure, knowledge, and experience have become critical to an individual's professional success (Open Doors, 2006). One method of providing international experiences and knowledge to help prepare individuals for future careers has been through undergraduate study abroad programs (Bruening & Frick, 2004). Enrollment in study abroad programs has been on the rise and has gained recognition as a learning experience that provides experiences not adequately provided in the home classroom (Vande Berg, 2009). Additionally, Vande Berg communicated a need for study abroad educators to facilitate learning before, during, and after the study abroad program.

Purpose and Objectives

The purpose of this study was to explore the self-perceived outcomes of a short-term study abroad program within the College of Agricultural and Life Sciences at the University of Florida.

Methods

During the spring of 2012, thirteen College of Agricultural and Life Sciences students participated in a week long study abroad program in Costa Rica. All thirteen students were invited to complete four post-experience questions and email their responses to the researcher. This abstract focuses on a case study of five of the students. Pseudonyms were used to protect the identity of the participants. A basic or generic methodical approach was used for this study because it allowed for the interpretation of the data through the emergence of themes (Merriam, 1998). The data was analyzed using the constant comparative method in accordance with the procedures outlined by Lincoln and Guba (1985). Referential adequacy materials and peer debriefing were used to help ensure trustworthiness (Dooley, 2007).

Results

Seven themes emerged from the data: gratitude, social awareness, cultural awareness, economic awareness, environmental awareness, professional growth, and maturation. Upon completion of the study abroad program, the participants showed appreciation and gratitude for having the opportunity to participate in the program. Sara said, "I am so grateful for having the opportunity to experience this study abroad trip. I feel lucky, happy, captivated, and all good thoughts about the experience." The study abroad program was an eye opening experience for the participants. Tim noted that the stigma towards poverty in Costa Rica was different than it is in the United States, and "despite the poverty, the locals managed a happy life." Despite abundant poverty (Tim; Chris), Chris realized that the economy in Costa Rica depends on tourism. Chris realized that the economic dependence on eco-tourism has led to an increase effort and focus on conservation and sustainability efforts within Costa Rica.

The study abroad program allowed the participants to grow professionally through exposure to conservation efforts and eco-tourism that has been taking place in Costa Rica. Tim stated, "I came away with a better understanding of field work and how natural science is actually conducted." One participant has aspirations of becoming a doctor and she felt that the program allowed her the opportunity to visit with injured people and perform first aid.

The entire program was a maturation process for the participants. Tim realized that traveling abroad presents many cultural challenges and barriers and that it often requires much effort to learn when you are submerged in a different culture. Mary recognized that it would have been beneficial for her to learn Spanish prior to attending the program. Sara stated, I felt like I grew up a lot during this trip and learned that I can push myself more than I ever thought". The study abroad experience exposed the students to new cultures and ways of doing things, which helped to expand the participants view and push them to mature rapidly (Sara).

Recommendations and Implications

In accordance with Bruening and Frick (20004), participants in the study abroad program felt that they were experiencing professional growth that would help prepare them for future careers. In addition, the participants experienced social, cultural, and economic awareness that may not be fully experienced in the home classroom (Vande Berg, 2009). Individuals charged with developing and facilitating study abroad programs should recognize that student learning may happen through social, cultural, and academic interactions. Learning opportunities should not be overlooked due to the academic focus of the program. It is important for facilitators to intervene throughout the program and guide the students through a positive learning experience (Vande Berg, 2009) that allows for individual growth and maturation.

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Integrating Teacher's International Experience into High School Agriculture Education Curriculum and Its Effects on Student Perceptions

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Introduction

Awareness of globalization is increasing, and students are being encouraged to prepare to enter a more internationalized job market. The agriculture industry is no exception (Sharp & Roberts, 2011). If agriculture students are going to be competitive in the internationalized job market, they must understand the role that globalization plays in the agriculture industry (Ibezim & McCracken, 1994). Studies have indicated deficient knowledge of high school and college undergraduate students regarding international issues, agricultural policies, people and cultures (Connors, 2004; Sharp & Roberts, 2011; Wingenbach, Boyd, Lindner, Dick, Arispe, & Haba, 2003).

A need for the development of high school international agriculture curriculum has been identified (Sharp & Roberts, 2011). Important steps in the development of this curriculum include understanding students' current perceptions of international agriculture and effective ways to influence students' perceptions.

Purpose and Objectives

This study sought to identify high school students' perceptions of international agriculture. The purpose of this study was to determine the effect of curriculum integrated with vicarious international experience on students' perceptions of international agriculture. Specific research objectives were: 1) determine students' perceptions of international agriculture before experiencing internationally integrated curriculum 2) determine students' perceptions of international agriculture after experiencing internationally integrated curriculum, 3) describe any significant changes in students' perceptions of international agriculture.

Methods

Social learning theory indicates that learning can occur through vicarious experience (Bandura, 1977). A high school agricultural educator in [*state, country*] participated in an international professional development experience in Tbilisi, Georgia. He used his experience to develop internationally integrated curriculum. The curriculum was implemented in a secondary agriculture education course. A census of the students present in the class was used for pre-test/post-test data collection. A survey modified by Sharp and Roberts (2011) was used to assess students' perceptions of international agriculture and its relevance to them. Ten questions were measured using a five point Likert-type scale (1 = strongly disagree, 5 = strongly agree). A summated score was calculated for each participant, with a possible range from five to 50.

Results and Conclusions

Questionnaires were collected in such a way that analysis could be conducted on matched pairs. On the pre-assessment, mean scores ranged from 2.86 (SD = .94) regarding the statement "I am prepared to enter into a global workforce" to 4.36 (SD = .66) regarding the statement "I believe world events will have an impact on American agriculture". The summated score mean for the pre-test was 37.64 (SD = 4.23). On the post-assessment, students' mean scores ranged from 3.91 (SD = .60) to 4.74 (SD = .45). Again, the lowest mean score was the students' perceived preparedness to enter a global workforce; while the highest mean score was students' perception that world events impacted American agriculture. The mean of the summated scores on the post-test was 44.14 (SD = 2.05).

A paired samples t-test indicated a significant difference in the pre-test and post-test summated scores. As indicated by the mean scores, the post-test summated scores were significantly higher than the pre-test summated scores, $t(21) = -10.04$, $p < .01$. A Pearson coefficient indicated a large effect size, $r = 0.91$. This suggests that students' perceptions of international agriculture were positively impacted by the internationally integrated curriculum.

Implications and Recommendations

While none of the individual item means on the pre-test indicated students' disagreement with the statements, the research still showed movement of all item means further toward "strongly agree" on the post-test. This suggests that even one integrated lesson may further convince students' of the importance of international agriculture and its relevance to them.

The results of this study indicate that high school curriculum integrated with vicarious international experience can positively impact students' perceptions of international agriculture. Therefore, development of international agriculture curricula should be encouraged and increased. This is supported by recommendations from previous research (Radhakrishna, Leite, & Domer, 2003; Sharp and Roberts, 2011).

The integrated curriculum in this study was developed as a result of an international professional development opportunity experienced by a high school agriculture instructor. Therefore, a prudent way to encourage and increase the development of internationally integrated curriculum may be to provide international experiences for instructors which they can then utilize in lesson development.

Finally, it should be recognized that time constraints limited this study to analysis of the effects of one integrated lesson on students' perceptions. It is recommended that research also be conducted on student knowledge of international agriculture. Additionally, it is recommended

that research be conducted on the sustainability of an increase in students' perceptions regarding international agriculture.

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Students' Awareness, Use, and Perceptions of Biodiesel: An International Perspective

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Introduction

Liquid biofuels have received renewed interest among the public, government, and industry due to diminishing reserves of easily-extracted petroleum, increasing energy demands, the geographical concentration of known petroleum reserves, and concerns about the environment (Koonin, 2006; Rojey & Monot, 2010). Consumers in Europe are the largest consumers of biodiesel globally and 3,041 million gallons of biodiesel were produced (EBB, 2010) as compared to the US where 315 million gallons were produced (NBB, 2012). However, many potential consumers, globally, may not have adequate knowledge of and hold negative perceptions of biodiesel.

Purpose and Objectives

Specific objectives were to determine: (1) awareness of biodiesel and if awareness differed by university; (2) use of biodiesel and if biodiesel use differed by university; and (3) perceptions of biodiesel and if perceptions of biodiesel differed by university.

Methods

The population for this study was comprised of students enrolled in an introductory agricultural economics course at the University of Arkansas (US) and an introductory chemistry course at the University of Ghent (EU) during the fall 2011 and fall 2012, respectively. At the US, 89 of 105 (84.8%) students enrolled were present and provided usable responses, and at the EU, 119 of 120 (99.2%) provided usable responses.

The survey instrument was developed by the researchers based on a review of the literature related to consumer awareness, use, and perceptions of biofuels (Kinsey, Peterson, & Haines, 2003; Kulscar & Bolender, 2011; Popp, Van de Velde, Vickery, Van Huylenbroeck, Verbeke, & Dixon, 2009; Selfa, Kulscar, Bain, Goe, & Middendorf, 2010; Skipper, Van de Velde, Popp, Vickery, Van Huylenbroeck, & Verbeke, 2009; Vogt, Cantrell, Carranza, Johnson, & Peters, 2008; Xue, Grift, & Hansen, 2011).

The test-retest procedure was used to determine instrument reliability (Gall, Gall, & Borg, 2006). The coefficients of stability were 1.0, 0.81, and 0.99, for sections one, two, and three, respectively. Data were analyzed using descriptive and inferential statistics.

Results and Findings

Undergraduate students enrolled at the University of Arkansas (n = 89) (US) and at the University of Ghent (n = 119) in Belgium (EU) were surveyed during the fall semesters of 2011 and 2012, respectively. A significantly ($p < .05$) higher percentage of EU students (60.3%) reported owning or driving a diesel vehicle than did US students (16.8%). At 100%, awareness of biodiesel was significantly ($p < .05$) higher for EU students than for US students (85.6%). Despite EU students being more likely to own or drive a diesel vehicle and being more aware of biodiesel, there was no significant difference in the percentages of EU and US students who had ever purchased biodiesel (4.3% and 5.4%, respectively).

Overall, EU students were significantly ($p < .05$) less positive about engine performance with biodiesel than were US students. EU students were less likely to agree that diesel engines would run properly on biodiesel and more likely to agree that use of biodiesel would increase maintenance and repair costs. Similarly, EU students were more likely to agree that they would never use biodiesel and less likely to agree that use of biodiesel was better for engines. EU students were significantly ($p < .05$) more likely than US students to agree that global warming was real and exhaust emissions contribute to global warming.

Conclusions and Recommendations

With a greater majority of students (EU) having previous knowledge about biodiesel and utilizing diesel more commonly, it was interesting to note that EU students were less positive about biodiesel. When this is compared to biodiesel production statistics in Europe (EBB, 2010) and the US (NBB, 2012), there was an inverse relationship between production and acceptance. Further research is needed to identify factors contributing to EU students' more negative perceptions of biodiesel.

Overall, the differences between the two groups were apparent. It is recommended that education programs for both EU and US students should be developed to increase their knowledge about biodiesel and its effects on engine performance and emissions. Furthermore, education in EU settings should also specifically target the environmental impacts of biodiesel.

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The "New Extensionist": Roles and Capacities to Help Reduce Hunger and Poverty

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Introduction

Extension and advisory services (EAS) play an important role in agricultural development and to reduce hunger and poverty (Davis, 2008; Sulaiman & Hall, 2003). However, these services need new capacities to address the current challenges in agriculture and to contribute better to agricultural innovation.

To do so, EAS should collectively perform a wide range of roles. These include developing networks; organizing producers; facilitating access to credit, inputs, and output services; convening innovation platforms; promoting gender equality; and disseminating new knowledge through training and demonstrations. To play these roles, EAS needs new capacities at the individual, organizational, and system levels.

Purpose and Objectives

The broad objective of the "New Extensionist" concept was to increase clarity on the important role of EAS within agricultural development. This paper is based on a follow-up process to several international forums on extension that discussed the role of EAS in agricultural development. Specifically, the objective was to produce a position paper on the roles and capacities needed, using a process of global dialogue to validate the concepts and recommendations in the paper.

Methods

Based on a literature review, a position paper was developed detailing the role of advisory services; the need for enhanced capacities for EAS at individual, organizational, and system levels; capacity constraints at national, regional, and global levels; and recommendations to strengthen the capacities and role of EAS. The paper was peer-reviewed by a panel of experts from different sectors. A two-page summary of the paper was created and sent to international agricultural list servs with an invitation to an online survey. The survey consisted of seven questions with Likert scale or yes/no responses, with the option of giving open-ended responses. Over 200 global respondents took part in the survey, and many joined the in-depth electronic

discussion, enabling dialogue and validation of the concepts and recommendations. Finally, the paper underwent validation exercises at global meetings of extension stakeholders and stakeholders from the entire agricultural sector.

Results

The position paper stated that at the individual level, EAS need staff with understanding of technical knowledge plus skills to manage social processes. At the organizational level, EAS need capacities to put in place systems and procedures to manage human and financial resources, institutions to facilitate partnerships and learning, and frameworks to deal with institutional, legal, and regulatory issues. At the system level, capacities for interaction, learning, and adaptation are important. To develop new capacities in EAS, actions must be initiated at the national, regional, and global levels by different actors.

Overall the response to the position paper was positive and the concept and recommendations were validated. Experts agreed that the paper was useful for raising awareness of the importance of EAS.

Survey respondents came predominantly from development agencies, research, education, and public advisory services. While they came from all over the world, areas such as Australia and the Caribbean were underrepresented. The core roles suggested were mainly supported, except for that of mediating conflicts. Most of the capacities suggested to fulfill these roles were considered essential and in need of further development. On the whole there was agreement that the recommendations at the three different levels (national, regional, global) were actionable and clear.

Following up on comments from the survey and experts, the electronic discussion debated further on the need to focus on gender issues, the role of private and civil society EAS, and the use of information and communication technologies (ICTs).

Recommendations, Educational Importance, and Implications

There is much global interest surrounding the role of EAS and how to strengthen the capacities of these institutions to contribute to innovation and the reduction of hunger and poverty. The validated position paper made 12 recommendations for national-level capacity strengthening, 5 for the regional level, and 7 for the global level. These recommendations also detailed which actors should take part. For international agricultural extension and education, these actors include universities and research centers, advisory services organizations, non-governmental organizations, and training institutions. Agricultural education programs are needed to further strengthen the roles and capacities of extension to better contribute to agricultural development.

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The Role of Agricultural Extension in Post-Conflict Zones: Transforming Leadership Impacts in Iraq

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Introduction

An International Institute at a Land Grant Institution undertook assessment, planning and implementation of agricultural development in Iraq. From June 2008 to September 2009, four multi-disciplinary teams spent 154 person-months in 14 Iraqi provinces, facilitated by respective multinational forces. Funded by the Department of Defense (DoD), the teams were embedded with the military units at forward operating bases (FOBs). The Provincial Reconstruction Teams (PRTs), USDA/FAS, and occasionally USAID in-country projects co-operated (Shinn & Briers, 2009).

This case study focused on the joint extension-reconstruction efforts undertaken by the US Army Tenth Mountain Division and Team Borlaug in 8 provinces of Iraq. Extension projects included establishment of farmers' market, promoting leadership to mitigate conflict, installation of infrastructure, interacting with community leaders to design rural development projects, starting 4-H clubs, improving fish brood stock and other activities. This research project investigated the impacts of combined leadership roles of the US Armed forces and a team of policy makers and researchers working in a conflict zone, Iraq, as a case study.

Purpose and Objectives

The purpose of this research was to develop a theoretical understanding of global leadership roles undertaken by the team members, responsible for reconstruction in Iraq. The first objective was to develop an integrated model of leadership efforts of global leaders and impacts of their public policies in zones with a history of political violence and conflict (Shannon & Keller, 2007). The second objective was to introduce a leadership approach that motivates the forces engaged in violence to take part in peace-building in a conflict-laden society.

Method

The study was based on a qualitative methodological paradigm in the context of a post-conflict reconstruction. Using a grounded theory approach, the basic leadership style applied in Iraq was analyzed to study the future demands of transformation of the leadership

responsibilities in similar contexts (Glaser & Strauss, 1967). The theoretical structure for this study was contingent upon Bass' transformational leadership, Hersey's situational leadership and House's path goal theory of leadership.

A purposive sample of 13 key informants out of a population of 15 individuals of Team Borlaug, ranging from senior professors, researchers, military personnel, development professionals, student leaders and administrators were interviewed individually and in focus groups (Chalofsky, 1999).

To ensure transferability of the data, a diverse sample with at least one individual from each category was interviewed. The highlighting method was utilized to categorize data. The data sources were the coded interviews, field notes, project reports and technical summaries provided by the team.

The confirmability and dependability of the transcribed data were ensured by the audit trails prepared after the interview sessions by comparing with the Final Report published in May 2009 by the Borlaug Institute Iraq Advisory Group. Triangulation of documents, field notes, reports involving Iraqi technical leaders and in addition, focus group and individual interviews and feedbacks of the team leaders as peer debriefing and member checks ensured credibility of the findings (Lincoln & Guba, 1985).

Results

The findings of this study propose a model of integrated leadership approach in post-conflict zones from the coded experiences of Iraqi and Borlaug team leaders, based on transitioning from violence to mitigating it from Iraq, extending the situational leadership aspect proposed by Shinn and Briers (2009). This model incorporates the outcomes of the combined impacts of leadership styles on reconstruction of post-conflict zones like Iraq, and the characteristics of leader-follower behavior and factors affecting these. The new model instills an understanding of the expectations of role-model agricultural extension workers.

Several themes emerged from this study, which reveal that post-conflict leadership is an integrated form and not a singular approach, considering social unrest, political non-governance in these challenging and unpredictable conflict zones, making them more situation-oriented. This model may be understood against a background of leader-follower characteristics and Iraq's infrastructural weaknesses in lieu of autocracy, terrorism, exploitation and war. The need for trust, relationship, focus and capacity building in a post-conflict zone is a product of the two factors- leader characters and post-conflict reconstruction expectations. The model supports the fact that success in extension work in post-conflict zones is dependent on the ability of a directive, supportive, adaptive leader (team) to make the followers (Iraqis) realize the value of their work through performance evaluation, for which relationship, trust and capacity building are necessary as well.

Recommendations

This leadership model, one of the first attempts in academia to connect leadership roles with reconstruction, is to formulate a leadership criterion for post-conflict peace-building. Similar integrated leadership approaches may prove to be effective in various post-conflict areas like Afghanistan and Bangladesh. A lot of existing research by social scientists addresses the operation of emerging principles to be followed by global leaders, under conditions of political

violence and conflict; however, most of the models perhaps have not attempted to construct a leadership criterion for conflict zones. This research highlights that in presence of effective global leaders, the forces engaged in conflict can be transformed for progress in the International agricultural development sector, thus contributing to restoring the socio-economic infrastructure of the nation. Applying this model may enable extension workers to improve not only governance, education, youth development, gender issues and resolve conflict, but also to appropriately transform violent forces into a resourceful, peace-building mass.

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Utilizing Interactive Lessons to Incorporate Global Social Justice Issues into the Classroom

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Keywords: global awareness, social justice issues, education, interactive lessons, teacher learning

Introduction

Societies and cultures are becoming more integrated and the need for teachers and students to improve their global awareness and multicultural literacy is increasing (Banks, 2004). To heighten global awareness and create global citizens, educators should help learners progress through the six stages in Bennett's (2004) developmental model of intercultural sensitivity (DMIS). Learners should move from ethnocentrism to ethnorelativsm, gradually growing in their understanding and appreciation for the uniqueness and interconnectedness of other cultures (Bennet, 2004)

One solution for improving global awareness is to incorporate interactive lessons on global social justice issues in the classroom. According to Barry (2005), social justice issues encompass the fair "distribution of rights, opportunities, and resources" (p. 18). It is not enough for learners and educators to simply have knowledge about the issues; to become culturally literate, they must develop communication and critical thinking skills necessary for formulating feasible options of addressing these issues and implementing change (Banks, 2004). Also, by teaching these issues in the classroom, learners are encouraged to develop a passion and commitment to action for changing the world (Banks, 2004).

Purpose

The purpose was to determine participants' awareness of global social justice issues related to the role of social sciences in feeding the world. The research question guiding this study was "Did participation in workshop sessions on global social justice issues increase participants' awareness of those issues?"

Methods

The "Role of Social Sciences in Feeding the World" workshop began with roundtable discussions in which participants ($N = 60$) were divided into ten small groups and assigned case studies detailing different global social justice issues. Groups were instructed how to use the nominal group technique, an effective method for encouraging group discussion, to analyze the issues and how they might incorporate them into their classrooms (Diep et al., 1997). Each group created a priority list and shared their top ideas with the larger group.

As part of the workshop, participants were also required to attend four different breakout sessions, one of which focused on "Utilizing Interactive Lessons in Global Social Justice Issues." During this session, participants took part in an interactive role-play activity to learn different teaching strategies, tools, and techniques that could be used to encourage ethnorelative perspectives and facilitate discussions about social justice issues in their classrooms.

At the conclusion of the workshop, participants completed an online evaluation survey composed of 11 Likert-type questions that were designed using appropriate research methods (Frankel & Wallen, 2009). Survey questions assessed participants' awareness of various global social justice issues and the importance of including these topics into their curricula. Data were collected using the post-then-pre method of assessment to reduce response shift typically resulting in pre-posttest assessments by reducing the tendency of respondents to over-estimate their original skill levels. The post-then-pre method offers a reflective perspective that shows a more accurate self-assessment of skill development by giving an opportunity for comparison (Rohs, 1999). In total, 51 participants completed the survey, yielding an 85% response rate. Survey participants consisted of high school social studies teachers, community college educators, and Texas A&M University faculty, staff, and graduate students. Data were analyzed using descriptive statistics.

Results

Results showed participants strongly agreed that the workshop met their expectations and that the content was relevant to their jobs. Participants' perceptions shifted from agree to strongly agree for the importance of discussing global social justice issues (gender inequality, lack of medical care, lack of education, world hunger, and population explosion) in their classrooms. Regarding human trafficking and local Texas social justice issues, no perception shifts were observed, although the majority of participants agreed that these were important issues to discuss in their classrooms. Participants' perceptions shifted from agree to strongly agree for the importance of having one's own global perspective, creating global perspectives for learners, and capability of incorporating and discussing global social justice issues in their classrooms.

Recommendations/Implications

This workshop helped raise awareness about global social justice issues by informing participants about such issues. It encouraged them to discuss these issues with their peers. The workshop provided participants' with tools and frameworks for incorporating such issues into their curricula. These processes are valuable because they promote an environment where teachers are engaging in active learning and using critical thinking skills (Liberman, 1995). This approach helps teachers become more invested in such issues, which is essential to reforming educational approaches in the classroom (Liberman, 1995). More teacher-based professional

development workshops related to global social justice issues should be held to promote global social justice issues awareness and proactiveness among educators and learners.

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Views of Stakeholders on eLearning as an Alternative Mode of Delivery of SAFE Mid-Career Training

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Keywords: e learning, mid-career students, technology, universities, stakeholders

Introduction

Fulfilment of the increasing thirst of people in sub-saharan Africa especially Nigeria in the last one or two decadesfor formal (university, technical and vocational) training continue to be stunted by limited access, time and funds of prospective students, using the existing conventional modes of education delivery. This has activated calls fornon-conventional education delivery modessuch as e-learning, as an alternate/alternative mode, described byHedge and Hayward (2004) as an innovative approach for delivering electronically mediated, well-designed, learner-centered and interactive learning environments to anyone, anyplace, anytime through internet and digital technologies, and as the use of ICT to acquire knowledge and improve skills at times and on terms defined by each learner in an interactive and engaging environment (Dutta, Mosley, & Akhtar, 2011). E-learning which is currently being used to teaching some subjects in various universities around the world including Nigeria isbecoming popularin the field of agricultural extension.

For over two decades Sasakawa Africa Fund forExtension Education (SAFE) has been invoved in agricultural education programsin Sub-Saharan Africa, but has witnessed low level female participation and low private sector involvement. SAFE's interactive workshops and need assessment organised primarily with female mid-career professionals in public and private sectors to find out reason for low participation and employers` prefered mode of delivery revealeda desire for more flexible modes of delivery than the conventional modeespecially for participants from the private sector. In Nigeria, two SAFE collaborating universities (Ahmadu Bello, Zaria and Bayero Kano) are hosting the mid-career training programme and in order to improve accessibility of mid-career staff into the programme, adopting alternative modes of delivery are being considered.

Purpose and Objectives

This study examined views of stakeholders on e-learning as an alternative mode of delivery of SAFE programmes in Nigeria.

Methods and Data Sources

Primary data sources were all mid-career students currently involved in training programme in the two universities (114), 12 lecturers each from BUK and ABU, and 34 officials of agricultural development programmes (ADP) in Kano and Kaduna States. Secondary data were from academic records of the two universities. Questionnaires were designed for students, employers and university lecturers. focusing on socio-demographic characteristics of current mid-career students, current mode of delivery and level of convenience for students, lecturers

and employers, preference for e-learning and modes of instruction and, e-learning delivery mode challenges.

Results, Products, and/or Conclusions

Mid-career students were mostly men (about 82%), all married professionals with (96%)from public and (4%) private sectors and a mean age of 42 years in ABU, and 39.5 years in BUK.78% of students and 92% of employers rated the present full time intensive mode of delivery as inconvenient. Students' family reponsibilities, high travel time and costs for off-campus students , inability to select learning materials that meet their knowledge level and interest, restriction to mainly classroom setting and students'inability to operate self-paced learning modules, employers not willing to release staff over a long period of time,were some of the issues. All the repondents prefered e-learning because it offers wider access to education generally but specifically University education because it:

1. ensures equality of educational opportunities (78%)
2. enhances education for all and life-long learning (74%)
3. facilitates the entrenchment of global learning culture(72%)
4. provides instructional resources via intensive ICT usage (64%)
5. offers flexible, but qualitative education (61%)
6. reduces cost, inconvenience, hassles of and access to education and its delivery (60%)
7. can cope well with job, family/social reponsibilities and training (92%)

Recommendations, Educational Importance, Implications, and/or Application

SAFE should graduallyintroduce e-learning within the regular mode of delivery in the two universities so as to learn and evaluate its effectiveness as a partial mode of delivery. Extensive research should be conducted on learner's access, cost and other considerations before introducing advanced ICT into SAFE programmes as well as garner experience from or explore the possibility of collaborating with the already existing Open University Programme (OPU). Contextual considerations are essential when introducing e-learning in a country like Nigeria. This study will make knowledge available to the consortium of Univeristies involved in the SAFE Programme in Africa and other educational bodies in their quest for issues for consideration in the development of a framework for more suitable modes of deliveryfor mid-career professionals.

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Village Animal Health Worker Training in Nepal: A Follow-up Study

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Keywords: training evaluation, trainees' perception, knowledge and skills, impact of training

Introduction

Most farmers in Nepal raise livestock. Providing veterinary services in rural Nepal however remains a great challenge. Experts believe that poor show of the public service delivery system and financial constraints have hindered the access of farmers to veterinary services (Sen & Chander, 2003). To address an increasing demand for the veterinary services, Government of Nepal in 1983 initiated the Village Animal Health Worker (VAHW) training. The VAHW training has been offered for over thirty years and sizeable resources have been invested in it. Funders and beneficiaries alike expect training providers to be prudent in conducting trainings and expect trainings to impart positive changes in trainees' knowledge, skills and attitudes. However, there has not been any systematic assessment of the VAHW training yet and how the VAHW training was conducted and how beneficial this training has been to the alumni is not clear.

Purpose and objectives

The purpose of the study was to evaluate the effectiveness of the VAHW training. The objectives were to: i.) Assess the trainees' perception of the training quality, ii.) Ascertain the theoretical and practical competencies gained from the training, and iii.) Examine the economic benefits resulting from training.

Methods

Alumni could offer valuable input to improve the training program (Suvedi & Heyboer, 2004). The population for this follow-up study included all 863 trainees who received VAHW training between 2005 and 2010. The list of VAHW trainees was received from training center records. A survey instrument was developed for this study consisting of dichotomous, multiple choice, and open-ended questions. The instrument was reviewed by a panel. It was translated into Nepali language.

A survey was mailed to the population in June 2012. The first mailing included the survey instrument along with a self-addressed, stamped return envelope. The second mailing was a gentle reminder. The third mailing was sent only to non-respondents and included the instrument and self-addressed, stamped return envelope. As of September 2012, a total of 467 usable surveys (62 percent response rate) were received. Participants' perceptions regarding training quality, behavioral changes and economic impact of the training were measured.

Cronbach alpha coefficients were calculated to assess reliability of constructs pertaining to perception of quality of training, and competencies.

Results

Table 1.
Trainees' Perceptions of Training Effectiveness

Statements	*N*	*M*	*SD*
Training quality*			
Appropriateness of the teaching methods	411	4.16	.68
Adequacy of the training facilities	419	3.85	.69
Opportunities for hands-on learning	436	3.78	.94
Knowledge and skills competency**			
Theory—Laboratory works	376	3.06	.92
Theory—Treatment and/or animal care	331	3.43	.71
Practical—Laboratory procedures	352	2.92	.93
Practical—Treatment and/or animal care	301	3.31	.73

*Scale: 1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree, and 5 = strongly agree
** Scale: 1 = very low, 2 = low, 3 = average, 4 = high, 5 = very high

The VAHW tended to strongly agree that the training program utilized appropriate teaching methods and followed the schedule. They tended to agree that training facilities such as hostels and classrooms were adequate. The trainees least liked the way practical sessions were handled (Table 1).

Findings revealed that VAHWs had difficulties articulating the theory into practice. Trainees struggled with laboratory processes such as fecal examination, sample collection, and dispatch. About two third of the respondents indicated that they were utilizing their VAHW training for employment. Paired sample t-test showed VAHWs had higher post-training annual income (M=52,472 Nepalese Rupees (NRs), SD=48,562) (1$US=86.61NRs) than pre-training income (M= 28,582 NRs, SD= 28, 881). A statistically significant increase in annual income was found, $t(179) = 10.322$, $p<.05$.

Respondents indicated unavailability of the veterinary equipment and difficulty to get advisory services as very important problems in their work as VAHWs. Overall, the trainees have liked the training; training has helped them acquire basic veterinary skills; and they were able to work as VAHWs post-training.

Recommendations

Curriculum revision to accommodate more hands-on sessions and letting trainees engage in real-life scenarios are important in making training more effective and VAHW service more efficient. We advise Department of Livestock Services to assign a point person (technical staff) whom VAHWs can contact for advice.

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What Job-Related Competencies Employers Perceive are Needed by Entry-Level International Development Consultants

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Abstract

According to the United States General Accounting Office (2003) and (Kock & Weeks, 2011), since the 1990s the United States Agency for International Development (USAID) has decreased the number of staff. Therefore, USAID began contracting aspects of development to contract staff to manage its day-to-day overseas activities. This change created an avenue for many non-governmental agencies (NGOs) to become implementing partners in aid-supported development projects, thus creating employment opportunities for college graduates who have an interest in international agriculture and extension education. According to Irigoin, M., Whitacre, P., Faulkner, D., & Coe, G., (2002) some colleges and universities are in a position to effectively design curricula that prepare graduates for careers in international development by understanding the competencies needed by possible employers.

The purpose of this study was to describe employers' (NGO Administration) perceptions of job-related competencies for entry-level international development agents. Nine constructs were derived from the research: conflict management and resolution, cultural diversity, management responsibility, personal and professional development, personal skills, program planning and evaluation, public relations, staff relations, and work habits. An internet-based questionnaire was used to collect data and a 35.4% response rate was achieved. Employers rated all nine constructs as important, moreover, when asked to rank the constructs in order of importance, NGO participants ranked work habits and personal skills as the most important followed by management skills, staff relations and program planning and evaluation.

Keywords: Competencies, educators and international development agents

Introduction

Over the last fifty years, funding agencies, such as USAID and USDA, are relying more on non-governmental organizations (NGOs) and universities in addressing poverty-related issues (Duffy, S., Toness, A., & Christiansen, J., 1998). These funding agencies lack the manpower for implementation and see local governments as ineffective as implementing partners (FAO, 2004). Therefore, NGOs have taken on a larger role in development and hire consultants to implement the projects.

This shift has created employment opportunities for college graduates in implementing aid-supported development projects. Based on the human resources needed in international development, it is important to understand what competencies are needed by entry-level consultants.

Purpose of Study

The purpose of the study was to describe the competencies desired by management of international NGOs who employ entry-level international development agents.

Objectives of the Study

For this study, the objectives were:

3. To describe the perceptions of employers, (NGO administrators) who hire entry level consultants for careers in international development.
4. To investigate rating differences of the nine constructs between the management positions held in NGOs and length of time participants worked in foreign countries.

Theoretical Framework

The theoretical framework for this study was grounded in the human capital theory. The theory indicates as people expand their knowledge through avenues of formal education human capital advances (Shultz, 1961). Students come to colleges and universities to acquire the knowledge and job skills demanded in the job market. The same may be said of employers, they look to institutions of higher learning to prepare students. Therefore, it is important for educational institutions to know what is needed in the job market in order to effectively prepare students for careers after graduation (Becker, 1993; Quiggin, 2000 and Shultz, 1961).

Methods

The methodology implemented for this study was a criterion group survey research design conducted in the winter 2009 and spring 2010. To address the international logistics of some participants, an electronic questionnaire implemented. A 35.4% response rate was achieved and reliability coefficients for the constructs ranged from .64 (conflict management) to .92 (staff relations). Descriptive statistics were used to determine the importance of competencies needed for success. To achieve the research objectives, the researcher tailored a preexisting Internet-based instrument on competencies needed by Extension Educators in the United States Cooperative Extension Service.

Results

Data revealed that both groups of the NGO sample perceived all of the nine constructs important, mean scores ranged from 3.57 to 4.39, none were perceived as very important. The lowest score for any construct was public relations and the highest score was work habits. Participants also ranked the level of importance of the constructs; one being least important and nine being most important. NGO participants ranked work habits as the most important followed by personal skills and management responsibilities. The least important constructs perceived were public relations and cultural diversity.

To broaden the understanding of the NGO participants' perception of the constructs, the researchers investigated the management position help in the NGOs by dividing the NGO participants into two subgroups. Vice Presidents/Project Directors (D.C.-based management team) and Chiefs of Party and Deputy Chiefs of Party (field-based management team) rated all

the constructs somewhat important or important. Again to delve deeper into an understanding of the NGO population, the researcher investigated the length of time participants spent working in countries other than the country in which they hold citizenship. The researcher used the mean score of the number of years (11) to divide the population; 11 participants had worked more than 11 years in foreign countries, while 16 had 11 or less years of experience in a foreign country. Data indicated that all participants rated the constructs as somewhat important or important. There were no differences between the two groups.

Recommendations, Educational Importance and Implications

Based on the findings in this study, employers put more importance on work habits and management responsibility than on cultural diversity and conflict resolution, whereas, educators place more importance on program planning and cultural diversity (Kock & Weeks, 2011). That finding is supported by research conducted by Cooper and Graham (2001), Hassel (2004), Vulpe et al. (2001) and the United Nations (2005). As funding agencies extend aid (human or financial) to developing countries, the need for properly trained development agents to implement those projects will remain. Understanding what competencies are desired by employers may help educational institutions in creating courses designed to better prepare students for careers in international settings. Irigoin, et al., (2002) purposed identifying competencies should include individuals working in the field.

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Women Farmers' Experiences with Extension Education in Turkey: A Qualitative Study

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Introduction

Turkish women farmers make significant contributions to agriculture and are the backbone of the farm labor. Further, considering the entire female workforce in Turkey, it was estimated one out of two women work in the agricultural sector (Gulcubuk, 2010). Although rural women play an important role in different venues of the agricultural sector like crop production, and livestock production, they have insufficient access to resources, agricultural extension education services, and the latest technical knowledge and information sources (Butt, Hassan, Mehmood & Muhammad, 2010). As it is the case in other developing countries, Turkish women farmers do not have equal opportunities to access agricultural information from government extension services.

The Food and Agricultural Organization (FAO, 2010) report pointed to a need for closing the gender gap in agriculture, which would generate significant gains for the agriculture sector and for society. If women had the same access to productive resources as men, they could increase yields on their farms by 20 to 30 percent (FAO, 2010). Unfortunately, women, especially in developing countries, are confronted by difficult constraints that block their active participation in extension education. Kizilaslan (2007) reported that there were major factors limiting the females access to extension education in Turkey: (1) insufficient time, (2) lack of training, (3) social structure and (4) poverty. In her research, she also concluded that the time and sources reserved for women farmers in ongoing agricultural extension services in Turkey are limited. Further, there is definitely need for sensitivity on the social and cultural barriers that may inhibit women's participation in agricultural activities.

When examining closely the female role in farm management and crop production, and consequently their involvement in day-to-day decision makings, the outcomes are not very encouraging. As an example, a findings of study carried out by Meares (1997) highlighted the stereotyped gender-roles and responsibilities not only within the farm but also within the household and in the agriculture movement at large. Basically the study contrasted that men involvement continues to steer, if not dominate, the decision makings while females were adapting to the roles of movement supporter, occasional farm workers, and of course as the typical household major player.

Purpose and Objectives

The purpose of this study was to explore the extension education needs for Turkish women farmers in Turkey, specifically women living in one Mediterranean farmer community and two Central Anatolia farmer communities. To fulfill the intentions of this purpose, the researchers sought to identify the demographic characteristics of these women farmers, describe their experiences and responsibilities in working on the farm, and describe their educational experiences with extension.

Methods

Phenomenological inquiry in the qualitative tradition was used to achieve the purpose of this study. The two regions in Turkey previously identified were selected because of the importance of agriculture in these farming communities and the researcher's familiarity of the regions. In-depth, semi-structured interviews were conducted with ten women farmers regarding their small-sized farming procedures. Interview questions related to the three aspects associated with the purpose of the study aforementioned. Interviews were conducted face-to-face, audio recorded and transcribed in Turkish, then translated to English for coding. Data were analyzed through a feminist lens (Sachs, 1983) using open codes to identify major themes in the data. The coding was done in an iterative process designed to identify common and recurring themes.

Results and Conclusions

As a result of this study, eight themes were emergent from the study. These included: extension education experiences; deciding what to produce on their farm; labor distribution on the farm; financial decisions; approval of new techniques to improve farming; barriers to attending extension education programs; types of information and educational programs sought; and spousal support of attending extension education. It was evident that these women played significant roles in the decision making and production of agricultural goods, which was similar to the findings of Al-Rimawi (2002) in his study of Jordanian women farmers. Further, Turkish women farmers had limited experience with extension sources, but pointed out insufficient time to attend extension meetings because of workload.

Recommendations

This study reinforces common knowledge regarding women farmers' extension education needs in developing countries. Findings may assist women extension education programs in Turkey by better serving their specific requests. More research will be needed to explore the best approaches and times to provide women farmers with extension programs and materials while making it easier for them to attend.

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Participatory Rural Appraisal: Understanding Gender Roles among Rwanda Pyrethrum Farmers

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Introduction

Participatory rural appraisal is a qualitative research method that has gained popularity since the 1990's with its focus on learning about rural life from and with participants (Chambers, 1994). Angstreich and Zinnah (2007) suggest that new agricultural development professional learn competencies that will help them listen to and learn from clients. The purpose of the study is to conduct participatory rural appraisal techniques in two pyrethrum cooperatives in Rwanda to learn about gender roles and responsibilities among farmers. The information gained will be used in the USAID-funded Rwanda Pyrethrum Project to design interventions to address gender disparities.

Research Methodology

Two assessments were conducted in Rwanda using different techniques. The first assessment was conducted with a group of 20 farmers (N=20) from a pyrethrum cooperative in northern Rwanda; 10 women (n=10) and 10 men (n=10). The researchers separated the men and women into two groups, and each group created a community map that identified houses, fields, water and firewood supplies.

The second assessment was conducted at a different pyrethrum cooperative. Nineteen farmers participated in the survey (N=19); eight women (n=8) and 11 men (n=11). The researchers kept the men and women together while conducting a gender analysis. The participants identified crops and production activities related to each crop, and the researcher asked about the gender role for each activity.

Results

The first assessment resulted in two community maps, one by men and one by women. The men's map placed the cooperative buildings in the middle with fields and homes fanning out

from the center with detail given to distances. The women's map also had the cooperative at its center, and the women spent more time detailing specific crops.

Men and women actively participated in the second assessment to assign gender descriptions to farm activities. The women were not shy to speak up or disagree with the men. Both researchers noted an unspoken awareness in the group of the large role of women in both farm and household activities.

Conclusions and Recommendations

The researchers had some idea of the inequality between men and women's roles in farm activities before the study. The information shared by the participants provided more detail and context into the daily lives of the men and women. Gender interventions planned in the future should address gender perceptions of both men and women.

The limited time available to the researchers did not allow for time to build rapport with the participants. More time would also allow researchers to use multiple techniques with the same group to add layers of detail to the data, leading to a rich description of the farmers' lives and work.

The process of participating in a group discussion about a sensitive topic like gender roles could be considered an intervention in itself. Further interviews after a few weeks might reveal that the gender-themed discussion has changed participant perceptions about gender roles.

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Professional Poster Presentations

825 Steps: Exploring the Merits of Rogers' Posit on *Strength-of-Weak-Ties* as a Winrock International (WI) Volunteer in Mali

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Keywords: Farmer-to-Farmer, Mali, strength-of-weak-ties, volunteer

Introduction/Conceptual Framework/Need for Innovation

Weak ties are individuals who serve as "*bridge links*" to connect "two or more groups" or "cliques"; "[h]eterophilous links of low proximity . . ., while rare, play a crucial role in the flow of *information* about an innovation" (Rogers, 2003, p. 340) into a social system. Such links connect individuals who would not usually communicate due to social or geographical distance, or language. The volunteer, i.e., an Anglophonic American, and a Francophonic school owner/manager in Mali were heterophilous with low proximity. The school's students were training mainly in a four-year, *brevet de technicien* program in the agricultural sciences. The school enrolled 378 students and employed 26 teachers (WI, 2012a). The volunteer was requested to conduct a needs assessment, including interviews of students, teachers, internship providers, and employers, comment on the curriculum, and prepare a final report on ways to improve the school (WI, 2012a).

How the Innovative Program Works

The volunteer technical assistance [VTA] program called 'Farmer-to-Farmer' [FtF] is an agricultural extension program funded by USAID . . . aiming to facilitate the exchange of experiences of US experts . . . with producers and entrepreneurs in developing countries in order to boost the economic growth. (Kassambara & Sissoko, in press, para. 1)

Mali's FtF program "is managed by [a] consortium of four entities," including WI (Kassambara & Sissoko, in press, para. 4). US officials mobilize volunteers and in-country staff support their efforts while abroad (WI, 2012b). WI's mission extends to providing VTA to schools involved in developing human capital for Mali's agricultural system.

Results

Recommendations ranged from ways to improve the school's "learning climate" to enhancing teacher performance. Recommending an advisory group (AG) for the school actualized Rogers' (2003) posit regarding the influence of *strength-of-weak-ties*. An AG was considered innovative because it was perceived as new or different by the potential adopter (Rogers, 2003). Moreover, the Sikasso region's USAID-supported office, the Integrated Initiative for Rural Economic Growth in Mali, was only *825 steps* from the school (< 1 kilometer). But it was during an interview with the office's coordinator that the school's owner first met him (theretofore low proximity) and they discussed the similarity of their missions and opportunities to collaborate, including AG membership. Other potential AG members were identified during interviews: agribusiness owners and government officials. The volunteer was a *bridge link* in this regard.

Recommendations/Implications

The influence *strength-of-weak-ties* plays in contexts considering the adoption of an innovation should not be underestimated. To facilitate linkages between actors who are heterophilous with low proximity, change agencies may need to initiate "intermediate" *bridge links*. These dynamics will be discussed during the poster's presentation as will the volunteer's recommendations. WI will conduct an impact study within one year.

Costs

The volunteer's travel expenses were paid in advance; lodging was direct billed to WI; health insurance and in-country transport were provided; and $100 was advanced for supplies. The assignment's cost was ~$4500 excluding in-country transport and insurance. The beneficiary contributed to the cost, as negotiated with WI.

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Applying U.S. Military Counterinsurgency *Logical Lines of Operation* to Achieve Progress in Wheat Production in Afghanistan: A Model for Agricultural Extension Educators Working in Post-conflict Areas

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Introduction/Need for Innovation

Counterinsurgency (COIN) doctrine, as described in U.S. Army Field Manual FM 3-24 (Petraeus & Amos 2006), allowed U.S. forces and coalition partners to achieve progress in Iraq and Afghanistan. COIN involves fighting a "war" existing primarily in the minds of the population. Progress in such conflicts requires different methodologies than conventional warfare. Work is conducted via *Logical Lines of Operation (LLO)* increasing the likelihood of achieving a desired "end state" favoring U.S. and coalition actors. Because agricultural extension for development involves changing the perceptions of farmers to adopt new technologies and ideas (Rogers, 2003), applying the *LLO* methodology was ideal for achieving progress in Afghanistan.

How the Innovative Program Works

Logical Lines of Operation is an organizational approach that first identifies the connections between the interrelated problems and objectives, enabling goals, action plans, and resource allocations to be developed and executed more efficiently thereafter. The 1-45th Agri-Business Development Team, 3rd BCT, 101st Airborne DIV, sought to improve post-harvest storage in the Paktia province. Therefore, they considered current conditions, such as lack of electrical power

and grain elevators, and adopted *LLO* intended to increase the likelihood of improving wheat production. This included a train-the-trainer program for agricultural extension directors on the use of grain storage bags developed for smallholder farmers and building cool storage facilities for temporary storage.

Results

Using *LLO* facilitated communication with military officials, who were not familiar with agriculture but were well versed in using *LLO* tactically, allowing them to assist in project implementation. *LLO* for wheat production extension in Paktia included improvements in wheat varieties, soil fertility, irrigation, and grain storage as well as the introduction of appropriate mechanization and conservation tillage using small, two-wheeled tractors. Adoption of *LLO* improved extension educators' abilities to deliver services to local farmers.

Conclusions/Implications

The advantages of *LLO* planning includes unity of effort between organizations working towards similar objective(s), consideration of all factors needed to achieve success, rapid refocusing of limited resources towards more important *LLO* or *LLO* needing more work to succeed, and a built in mechanism for evaluation. By including local partners in planning (Christiansen, 2000), emphasis was placed on building local capacity so the 1-45th could "work itself out of a job."

Recommendations for Practice

It is important all partners meet before planning; be open to new partners identified after work has begun; and recognize organizations may establish ancillary objectives that differ. The synergy of combining efforts, therefore, is maintained without impairing the ability of partners to pursue complementary interests. Finally, it is important to retain records, including local partner(s') and resource supplier(s') contact information, and progress evaluations, increasing ease of transfer to other actors for project continuation.

Resources

Logical Lines of Operation do not require increased funding. Rather, they are a way of organizing resources on hand already more efficiently within and between organizations. The only "cost" is increased planning time at the outset and during project execution because all partners should meet frequently to evaluate progress, implement changes, and refocus resources, as needed (Hafer, Shinn, Briers, & Lawver, 2011).

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Assessing the Views of Multiple Stakeholders to Understand the Learning Experiences of Agro-pastoralist Students in Mali: Implications for Improving a School's Performance

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Keywords: action research; advisory group; assessment

Introduction/Need for Research

This study emerged from the researcher's service as a Winrock International (WI) volunteer.

> The volunteer technical assistance [VTA] program called 'Farmer-to-Farmer' [FtF] is an agricultural extension program funded by USAID . . . aiming to facilitate the exchange of experiences of US experts . . . with producers and entrepreneurs in developing countries in order to boost the economic growth. (Kassambara & Sissoko, in press, para. 1)

Mali's FtF program "is managed by [a] consortium of four entities," including WI (Kassambara & Sissoko, in press, para. 4). WI's mission extends to providing VTA to schools preparing human capital for Mali's agricultural system. Most students attending the *Ecole de Formation Agropastorale Wayerma* were training in a four-year, *brevet de technicien* program (upper-/post-secondary) in the agricultural sciences. This private school enrolled 378 students

and employed 26 teachers (WI, 2012). Students were required to complete internships appropriate to their career aspirations. The volunteer, by request of the school's proprietor, conducted a needs assessment with special attention to agribusiness training (WI, 2012) and students' internships.

Conceptual Framework/Research Methodology

As a form of *action research* (McKernan, 1991), a "needs assessment/situational analysis" (p. 317) was conducted. "John Elliott has defined action research as 'the study of a social situation with a view to improving the quality of action within it'" (as cited in McKernan, 1991, p. 312). A qualitative, *researcher-as-instrument* method was followed whereby the researcher observed the school's environment, interviewed a key informant (Popham, 1993) to identify relevant interviewees, developed semi-structured interview guides, and served as the interviewer. Teachers (10), students and recent graduates (9), and internship providers (6) were interviewed. Curriculum documents were another data source (Stake, 1995).

The interviewees were Francophone and the researcher Anglophone, so a WI facilitator, who was Francophone, translated the interview's questions and answers. The researcher's efforts at triangulation (Creswell, 2008), to confirm his interpretations, included debriefings with the translator (Krueger, 1994), "member checking" (Stake, 1995) by presenting preliminary recommendations to a forum of interviewees, including their feedback, and interviewing individuals of different groups invested in the phenomenon (Stake, 1995; Yin, 2009). Nine "*focused interviews*" (Yin, 2009) were conducted using researcher-developed questions and probes.

Results/Conclusions/Emergent themes

- Internship providers were unanimously critical of the students' knowledge and abilities.
- Students, as a group, were *neutral* regarding internships meeting their expectations.
- Neither teachers nor students expressed much knowledge of agribusiness, e.g., value addition and value chains.
- Although students were provided opportunities to practice agricultural skills, their teachers were seldom involved directly.
- A paucity of learning resources existed (no library or computer lab).
- Students' French language skills – written and oral – were lacking.

Recommendations

Suggestions along 10 themes including 33 recommendations were reported to WI and will be detailed during the presentation. Standing to have the most impact was the recommendation to increase the involvement of agribusiness and government officials in the school by their serving as invited presenters, evaluators of students' internship presentations, internship providers, advisory group members, and advocates for the school overall.

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Best Practices: Using Mobile Technologies for Data Collection in a Developing Country

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Introduction

The worldwide use of web-capable mobile devices, such as tablet computers (i.e., iPads) and smartphones has increased (Peytchev & Hill, 2009); likewise, so have the uses of web-based surveys. Web-based surveys have been found to be a "valid and reliable method of conducting social science research" (Ladner, Wingenbach, & Raven, 2002, p. 49), and they can be easily administered using mobile technologies (Peytchev & Hill, 2009).

Purpose

The purpose of this poster is to visually depict the effectiveness of mobile technology as a data collection method in a developing country. The research objectives were to observe participants completing a media-based survey and to determine best practices for survey administration based on the observations.

Methodology

The purposive sample was chosen based on their enrollment at the University of Namibia Ogongo campus and participation in an on-campus survey (Merriam, 2009). The participants were asked to complete a questionnaire administered on an iPad; each was observed by graduate student researchers participating in the Texas A&M University Agricultural Communications and Technological Change study abroad program. Each researcher recorded field notes. The observers were coded O1-O5, and the participants were coded P1-P13 to ensure confidentiality. The emerging concepts were unitized, organized, and recorded, in accordance with Glaser and Strauss' (1967) constant comparative method, as major themes in administering an instrument using mobile technology in a developing country. Trustworthiness was established through credibility, dependability, and confirmability. Credibility was established through triangulation

of documents and peer debriefing. Dependability and confirmability were established with an audit trail (Lincoln & Guba, 1985).

Findings

Data analysis revealed three themes: perceived ease of use, terminology, and survey length. Ten of the 13 participants were observed to not have an initial perceived ease of use. "P5 did not feel comfortable typing [on the iPad]" (O3) and "P10 often looked confused" (O4) when using the technology.

Terminology used on the instrument was observed as unfamiliar to participants. O5 made the observation that "students asked a lot of questions about [survey terminology]." Specific terminology identified as difficult for participants to understand included course management systems and Second Life™ (O3).

Survey length was also a found theme in the data. "Over 50 students showed up at the beginning; most students left after seeing how long it took their peers to complete a survey" (O5). Surveys took longer than 30 minutes for many to complete and participants "had a lot of questions that extended the time" (O3).

Conclusions and Recommendations

It can be concluded that when developing a mobile-based survey for developing countries, the instrument should be administered on a medium that the respondent has experience with or has been trained. When a device is a cultural novelty, it is a distraction rather than an effective tool.

Survey terminology should also be considered before administration. Face and content validity should be assessed by asking a language and content expert to review the instrument. Survey length should be a primary concern when engaging in a situation where people are unfamiliar with the provided technology.

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Building Student Capacity for an International Career: Experience of Teaching an On-line International Development Graduate Course at Oklahoma State University

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Keywords: development practice, learning spiral, capacity, development, curriculum

Poster Abstract

A small but growing number of undergraduate and graduate students graduating from U.S. Land Grant Universities intend to embark upon an international career in agricultural and rural development. Because of this there is a growing demand for degree programs and courses that provide theoretical grounding and practical skills in international development. Oklahoma State University responded to this demand by offering a Masters of International Agriculture degree in the College of Agriculture and a Masters of International Studies degree in the School of International Studies. A need was expressed by stakeholders in these programs for the development of a graduate online course that would focus on best practices of international development.

In response to this expressed need a course was developed and taught during the spring semester of 2012. The course was titled "International Development: Principles & Practice." The intention of the course was to guide students into an understanding of how development issues are being approached, what methodologies are effective, and how to apply the tools of development in diverse settings. The challenge for the instructor was designing curriculum in such a way that students would be taught principles and application of these practices.

To meet the challenge the sixteen week curriculum was designed around a development principle known as "learning spirals" which consist of four phases in the following sequence: action > reflection > learning > planning (Fowler, 2000). As the graduate student goes through the process each week they practiced a learning process that applies to individuals, projects, and organizations as a whole. This was the conceptual framework that grounded the course in development best practice as much as possible within the limitations of an on-line format.

Seven graduate students who intended to work internationally enrolled and completed the course. Learning was gauged by synthesis papers of development stances, weekly quizzes of essential principles, on-line discussions to mimic development working group meetings, and a development project proposal that matched actual project requests from international development organizations. These varied graded activities engaged students in predominately higher level thinking skills of analyzing and synthesizing. According to feedback from the

students the strengths of the course was exposure to a "basket" of possible tools for different situations and the opportunity to problem-solve varied development problems. A drawback to the class was the lack of face-to-face interaction in order to practice participatory methodology.

Familiarity with effective patterns and development practices is an essential part of success in initial job postings in international development. This course built student capacity by allowing them the opportunity to practice effective patterns and practice so they have a greater chance of success in their first development position. It is recommended that the next semester this course is taught that adjustments be made so that the student is involved with a development organization from the first week using VOP technology like Skype. The resources needed for this course included 30 hours of preparation and about 5 hours of preparation and teaching per week for 16 weeks.

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Challenges and Opportunities for Agricultural Extension in Timor Leste

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Keywords: Agricultural extension, Timor Leste, challenges, opportunities

Timor Leste's agricultural sector contributes 30% of its GDP and employs 80% of the workforce, although low production, poor food security, and annual famine periods remain common (Lopes & Nesbitt, 2012; World Bank, 2011). The Ministry of Agriculture (MAP) has turned to extension to address these issues, improve technical capacities of farmers, increase agricultural production, and create national food security (MAP, n.d.). However, identifying the challenges and opportunities facing the extension system is needed. This study identified: (a) the current constraints and challenges of agricultural extension in Timor Leste, and (b) the opportunities that exist for strengthening agricultural extension in Timor Leste.

This study utilized a generic qualitative design (Merriam, 1998). A purposive sample (n=8) was drawn to include the national director and vice director, one district director, one sub-district coordinator, and four field-level officers using maximum variation sampling (Patton, 1987). Viqueque district and Lacluta sub-district were selected due to the researcher's prior experience and developed trust in the region (Flick, 2006).

Researcher-developed questionnaires and semi-structured interviews were used (Flick, 2006), and data collection occurred in-person in the respondents' native language. Interviews were audio recorded, member-checked to establish trustworthiness, and data was triangulated with MAP and USAID-Timor Leste (Leite & Marks, 2005). The constant comparative method was used in data analysis to identify emergent themes (Merriam, 1998).

Six challenges and constraints emerged from the data. Field-level officers possessed capacity deficiencies and received insufficient in-service training. "There is no training for extension officers in the field, and we are never called to new trainings," stated one respondent. Officers instead relied on prior education and experience to teach farmers.

Salaries were considered insufficient to cover living and job-related costs. The national office's process for funding local projects was also considered too complicated and time-consuming, causing projects to be delayed or not attempted. Officers placed away from home reported cultural and linguistic differences that limited effectiveness, lack of housing or land to conduct activities, and spending more time commuting than working. Other themes were poor internal coordination/communication, negative opinions of agriculture, and farmers' perceived lack of value of extension services.

Seven opportunities exist for strengthening the system. Requests for increased training and high officer motivation for capacity building were found. "In the future we need more trainings so we can learn and understand more about extension," one respondent stated. Allotting government-owned land for officers to live and conduct demonstrations, providing printed

technical information, improving information dissemination to clients, and developing evaluation strategies were also reported.

Lack of training, inadequate salaries, and other "maintenance factors" can threaten job satisfaction and performance in extension, despite high officer motivation (Herzberg, 1968). Minor systemic changes could increase effectiveness: rethinking the placement of officers, providing basic job-related materials, and streamlining internal communication and financial processes. Involving NGOs in extension programming and capacity building could benefit both clients and officers (Amudavi, 2003), while circumventing the logistical/financial challenges faced by MAP (Land O' Lakes, 2009). Future evaluations of the challenges and opportunities should also be conducted in greater depth.

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College Students' Perceptions of a Work-Related International Study Tour Experience

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Keywords: Agricultural Communications, International Study Abroad

Introduction

As the general public becomes increasingly removed from the farm, reliance on media channels for information becomes stronger, thus adding to societal globalization. Because globalization and cultural diversity issues have gained attention in higher education (Zhai & Scheer, 2004), there is a need to offer international, agricultural experiences (Edgar & Edgar, 2009; Irani, Place, Lundy, & Friedel, 2004).

Purpose of the Study

Global perceptions of agricultural communication students will shape public understanding and the industry's future. The purpose of this study was to add insight into the potential benefits for intensive work experiences for students studying abroad. The study described students' feedback with regard to perceptions of barriers, cultures, factors inhibiting travel, and personal and professional gains from international study.

Methodology

International perceptions of agricultural communication students from four land-grant universities were studied. All students participated in a three-week intensive study tour in Ghent, Belgium. Their study goal was to assist the Institute for Agricultural and Fisheries Research, and the University of Ghent, to host an open-house event designed to reinforce public awareness of food production through critical science. Students toured food and animal production facilities and participated in weekend trips to Ghent, Brugge, Paris, and London.

Students participated in pre- and post-reflection assessments to identify travel barriers, beliefs, and opportunities. Instruments were transcribed and analyzed to identify emergent research themes through keywords (Creswell, 1998). Credibility, trustworthiness, and dependability were achieved as described by Lincoln and Guba (1985). The constant comparative method was used for data analysis (Lincoln & Guba, 1985).

Results

Money was a common concern for students pre- and post-travel. Other barriers included homesickness and language. Students overcame barriers to gain skills or to experience new

cultures. Post-reflection assessment revealed that students changed initial perceptions of Belgium and the culture. Changes to their attitudes/beliefs included acceptance of cultural differences in food, lifestyle, and awareness of research practices. Participants disliked European public transportation and lack of punctuality, however, liked the fact that Belgians spoke English and were welcoming. Data indicated a need to increase scholarship and funding opportunities for international experiences, decrease language and cultural barriers between students and Belgian natives, and increase student experiences and exposure to international practices, people, and culture. The majority of students were willing to participate in another international experience while the remaining students still found the overall experience meaningful.

Conclusions and Recommendations

This research indicated that work-related, international experiences provide opportunities for students to modify perceptions and become more accepting of other cultures and practices. Previous research recommended increasing students' experiences of international agriculture through real life experiences by students in international settings (Edgar & Edgar, 2009; Irani et al., 2004; Zhai & Scheer, 2004), which was supported by the findings in this study. Increasing student knowledge of international agricultural communications through travel abroad proved valuable and is recommended. This research is significant for international agricultural and extension education because it outlines important considerations when placing students in intensive, work-related international settings.

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Cooperative Extension Service Digital Media Training: Lessons Learned and Future Direction

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Keywords: Digital Media, Technology, Agricultural Communications

Introduction / Theoretical Framework

Cooperative Extension personnel must be technical experts, and professional development helps agents achieve the level of excellence needed to maintain statewide, national, and global impact (Stone & Coppernoll, 2004). Educational training activities for Extension personnel are critical to improve professional competence and increase learning and application of new knowledge. Rogers' (2003) diffusion of innovation noted the importance of using key players in the adoption and diffusion of a new technology. Cooperative Extension personnel can serve as the catalyst for innovative diffusion of digital media.

Purpose and Objective

Three faculty from the University of Arkansas developed and administered the five day intensive Extension Digital Media Academy (EDMA) training conference that focused on the following instructional digital media areas: social, video, photography, professional networking, collection, publishing, and file sharing. The purpose of this study was to assess the skill and usability level of Extension personnel in specific electronic communication competencies used to create and promote educational programs. The study research objective was to determine participants' perceived skill, usability, and value of specific technology.

Methodology

Key Extension personnel (N=23) were selected by [State] Cooperative Extension Service staff to participate in the conference. A pre- and post-assessment were used to determine skill, usability levels, and technology perception. The post-test, administered at the end of the workshop, also assessed the effectiveness of the conference and gathered participant demographic information. Data were analyzed using descriptive (means, standard deviations, and percentages).

Results and Findings

Upon completion of each unit of instruction, Extension personnel participated in hands-on learning exercises to contribute to their understanding of concepts and the development of digital media products that would enhance participants' program areas. Participants were asked to rate their technology use on a 4-point Likert-type scale ranging from "Advanced" to "Not at

all" for fourteen categories. Participants felt their greatest ability to use (*M*=1.30; *SD*=.47), actual use (*M*=1.05; *SD*=.22), and expected future use (*M*=2.39; *SD*=.72) of technology was the Internet. When asked their technology literacy self-rating, 70% of participants rated themselves as "Intermediate". Participants gained the greatest enjoyment from the Photography Media section (*M*=1.70; *SD*=.88), and the least enjoyment from the Professional Networking Media section (*M*=2.13; *SD*=.63). Workshop content areas were also assessed for relevancy to job duties. Only 17% of participants reported high interest in teaching technology to their clients, but rated their likelihood of using media as part of a digital media integration plan as "Very Likely" for six of the seven media presented.

Conclusions, Discussion, and Recommendations

Participants perceived their use of the Internet as their highest digital media technology ability for use, actual use, and expected future use. Participants noted the least amount of value overall in the Professional Networking Media section of the training. Extension personnel must be technical experts (Stone & Coppernoll, 2004) and be key leaders in the diffusion of innovation (Rogers, 2003). Findings from this study should be used to increase Extension agents' awareness, use, and training opportunities in technological areas that can improve educational and programmatic efforts.

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Enhancing Digital Extension Information Using WordPress and Social Media

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Introduction

Extension information delivery, or channels of information, are constantly changing. Private industry information delivery has evolved from primarily advertising to one of news laced with advertising being delivered daily to clientele. To meet the challenge of private industry's use of digital channels of information, University of Florida IFAS (UF/IFAS) Extension faculty changed their basically "static" web based delivery to a "Content Management System" (CMS) approach. This new digital delivery system allows for web based interactive discussion and integrates with Social Media to provide immediate information access and feedback (Vergot 2010). These digital "conversations" enhance service to Extension clientele globally.

How the Innovative Program Works

Step 1 -Extension faculty, working with the District Information Technology (IT) specialist converted all 16 Extension District's county websites to *WordPress*, a CMS, creating "Panhandle Ag", http://nwdistrict.ifas.ufl.edu/phag/.

Step 2 – Weekly, Extension faculty electronically upload or "post" educational articles and pictures related to current issues observed during field visits and discussed during clientele office calls, onto the Panhandle Ag *WordPress* site.

Step 3 - The "posts" are peer reviewed by editors who work with the Extension agent on content and format, including adding hyperlinks to additional UF/IFAS research-based publications.

Step 4 – The peer level editorial team publishes the posts to the "Panhandle Ag" WordPress site, which automatically is shared on each of the 16 county extension web sites. These posts are also automatically posted to social media sites on Twitter "@PanhandleAg" and Facebook https://www.facebook.com/FlaPanhandleAgriculture.

Step 5 - The lead editor sends an email to subscribers who have stated an interest in "Panhandle Ag" using a subscription management system reaching clients statewide, nationally, and internationally.

Step 6 – Finally, feedback and interaction with Extension clientele is accomplished using the WordPress, Facebook, and Twitter comment features. Clientele ask questions via these social media platforms and quickly receive feedback from our agents.

Results to Date

From January 2012 to present, a total of 108 email messages were delivered reaching 135,684 clientele from the Panhandle Ag WordPress website. County Extension faculty have posted 216 articles since January of 2012, initiating 180 online conversations, and 4,604 reads from clientele since May of 2012. Panhandle Ag social media sites were developed and are gaining interest with 61 "Likes" in Facebook, 37 followers in Twitter and eight subscribers in YouTube.

Conclusions and Implications

Feedback and interaction with Extension clientele is accomplished using the WordPress, Facebook, and Twitter comment features. Extension clients can ask questions and quickly receive feedback on articles, pictures, and blogs that our agents post. Finally, WordPress' primary function as a blogging software provides the ideal avenue for Extension faculty to continuously provide fresh and targeted information for agriculture clients.

Implications of this CMS for International Agricultural Extension include the capability to use globally available digital platforms upon which to share information between Extension faculty and between Extension faculty and clientele internationally.

Costs/Resources

All software used in the project including WordPress and Social Media are free for use.

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Exploring Chilean Elementary Teachers' Beliefs Regarding Agriculture as an Educational Context to Enhance Student Learning in Natural Sciences

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One of the goals of the Chilean government is to be considered one of the most important producers of food in the world by 2030 (Foundation for Agricultural Innovation, 2011). Even though agriculture is one of the industries with a higher percentage of the Chilean task force, its contribution to the Gross Domestic Product (GDP) has been declining since 2003 (Central Bank of Chile, 2010). For Chile's agriculture to remain competitive in the global context, Chile needs to consider investing in science and technology for agriculture (Foundation for Agricultural Innovation, 2011).

Moreover, in the Chilean educational system, the national curriculum regarding natural sciences promotes the development of inquiry learning approaches over traditional teaching methods for elementary schools (Ministry of Education of Chile, 2012). The literature shows that a low percentage of the teacher training programs regarding elementary education integrate didactics of science (Vergara & Cofré, 2008 cited by Cofré, 2010, p. 8), and suggests that elementary science teachers struggle with the inquiry approach that the national curriculum states. Therefore, integrating agricultural literacy into the K-12 curriculum may contribute by benefiting not only science education but also the agricultural industry. To accomplish integration, it is priority to explore teachers' views regarding agricultural science literacy in curriculum.

The purpose of this study was to explore a selected group of Chilean elementary teachers' views of teaching natural science in the classroom, using agriculture as an educational context to enhance student learning in natural science within the Santiago area. The participants consisted of three elementary Chilean teachers who taught 5th to 8th grade students.

This qualitative study consisted of a semi-structured interview (30-90 minutes) using open-ended questions as the research method (Creswell, 2009). Phenomenography (Marton, 1981) was the theoretical framework and the Chilean national curriculum for natural sciences (Ministry of Education of Chile, 2012) was the conceptual framework that guided the research. There were two salient results of this study. First, teaching methodology, context and personal experiences described the views that Chilean elementary teachers had about teaching natural science/mathematics in the classroom. And second, Chilean elementary teachers believed that

agricultural concepts could be integrated into some areas of the curriculum such as nutrition and healthy food.

One of the implications of this study is that elementary science teachers might benefit from developing curriculum materials that integrated inquiry and agricultural contexts. It is recommended to identify key variables that would help teachers make learning more authentic using agricultural examples. Additionally expanding the mentoring relationship of science elementary teachers with experts in the field, as recommended by Appleton (2008) and Gustafson et al. (2002) would benefit not only teachers but also students, who would be able to learn from the daily experiences that scientists face every day.

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Extension's Response to Consumers' demand for Improved Quality and Choice: the Case of Tomato in Trinidad, W.I.

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Keywords: Consumers, Alternative commodities, Willingness to pay, Extension education

Introduction

The Trinidad market is reflective of a highly diverse and rapidly evolving consumer base. Local farmers are yet to take advantage of such an emerging market by offering differentiated agricultural commodities. Tomato is a popular vegetable among Trinidadians however, tomato farmers continue to serve consumers a homogenous product; the differentiation that takes place in the tomato is based only on size. In many developed countries, consumers are demanding choices and higher quality produce and Trinidad consumers are following this pattern. An opportunity exists for local tomato farmers to produce and sell organic tomatoes.
If consumers are willing to pay a premium price for organic tomatoes in Trinidad, farmers will respond and Extension services will have to re-strategize and adjust their programmes and strategies to meet the changed educational needs of these farmers.

Purpose

This paper seeks to determine consumers' willingness to pay for organic tomatoes, and the implications for extension programme development and delivery.

Objectives

1. To determine the premium amount consumers' are willing to pay for organic tomatoes and the factors affecting such a choice.
2. Discuss the implications of consumers demand for improved quality and choice for the Extension services.

Methods

A survey research method was used in this study. Data were collected via a structured questionnaire administered in a face to face interview process. A convenience sampling method

was used to collect data from 210 consumers at major supermarkets and municipal markets in all the major towns of Trinidad. Logistic Regression results and other descriptives are reported.

Results

Results showed that 63% of consumers were willing to pay more for organic tomatoes. In general, consumers were willing to pay approximately a 20% premium for organic tomatoes over regular open field (non-organic) tomatoes.

Results of the logistic regression revealed that gender, age, location, income, and perceived health benefits were significant variables ($P<0.05$ level) that influenced consumers' willingness to pay for organic tomatoes. Results also indicated that females, younger persons, individuals residing in Central Trinidad, high income earners, and persons who perceived organic tomatoes as healthy were likely to pay more for organic tomatoes.

Implications and Recommendations

Consumers are ready and willing to pay more for organic tomatoes over the regular tomatoes. Since its formation, the Public Extension service has focused on traditional production systems and the time has come for them to acknowledge alternative products and production systems in the marketplace. The tomato market in Trinidad is a case in point.

1. Extension managers will have to conduct situational analysis/needs assessment with consumers to understand their needs and preferences and factor these into future programme development.
2. Extension must recognize consumers' changing preferences and develop training for staff to equip them with the knowledge to successfully produce alternative commodities based on consumers' demand. Specialized training in organic production of fruits and vegetables for all staff at the general level and an extension subject matter specialist in the area may be needed.
3. Develop awareness programmes for farmers to educate them on the market potential for alternative commodities.

Faculty Abroad Programs: Addressing Local Problems and Curricula Development

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Introduction

The use of faculty abroad programs has become a popular means of professional and curricular development over the past years (Dooley & Rouse, 2009). Universities are calling for the internationalization of the curricula and new teaching methods that include the use of high-impact educational practices to develop the "knowledge of human cultures and the physical and natural world" (p. 4) through service learning and community-based learning (Kuh, 2008); faculty programs may also include such practices. Recent faculty abroad programs have involved the creation of reusable learning objects (RLOs). Reusable learning objects (RLOs) are context-rich, self-contained, digital learning units that can be delivered in a variety of ways, such as online or in a classroom (Koohang & Harman, 2007). RLOs allow for sharing of curricular materials that could reach a multi-institutional level.

The faculty from Texas A&M University and University of the West Indies, St. Augustine and Cave Hill campuses, collaborated to create solutions to address childhood obesity in Trinidad and Tobago and Barbados. Through a combination of a high-impact experience and RLO creation, faculty were engaged in a unique situation occurs where learning, serving, and teaching came together at the local level.

Purpose

The purpose of this poster is to visually depict the use of faculty abroad programs to address the problems of the local people in a host country, collaborate with like-faculty in a host country to create solutions to identified problems, while still creating educational materials to improve curricula content at the home institution.

Major Points

Participating faculty from Texas A&M University represented expertise in the area of childhood obesity; faculty were chosen based on their expertise in childhood obesity, human development, and education. Faculty were engaged with the local culture to create potential solutions for childhood obesity. They also were required to gather information and create a RLO around the topic. The completed RLOs will be used in the faculty's classrooms as an educational tool and will be available for free at an online repository. This experience served as a means of professional development, curricula development, and international relationship building for the participating faculty. This innovative program is funded by a USDA Higher Education Grant.

Conclusion and Educational Importance

A team of faculty from Texas A&M University participated in an abroad experience to collaborate with faculty at University of the West Indies, St. Augustine and Cave Hill campuses, to create solutions surrounding childhood obesity and RLOs to internationalize their curricula. Long-term, collaborative research and educational relationships were an outcome of this program in addition to childhood obesity solution approaches in Trinidad and Tobago and Barbados. This study provides a model for AIAEE members to use their skillsets to collaborate with interdisciplinary peers in order to address the pervasive global issue of childhood obesity regardless of location. AIAEE is an organization of diverse members that provide expertise from an array of content areas for the greater good of decreasing childhood obesity in our global society.

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Free Fuel for Remote Locations: Construction of a Biodigester

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Keywords: Biodigester, Biogas, Fuel, Methane, Rural

Introduction

Earth University, located in Guacimo, Costa Rica, was created in 1985 as a partnership between Costa Rican leaders, the W.K. Kellogg Foundation and the United States Agency for International Development. Earth University's mission is to "Prepare leaders with ethical values to contribute to the sustainable development of the humid tropics and construct a prosperous and just society." The authors participated in an Extension study tour of Costa Rica, in March of 2012, hosted by Earth University. While on the tour the authors completed a community service project constructing an anaerobic biodigester for a rural farm. The poster visually demonstrates how to construct a low cost biodigester that produces methane gas for family cooking, water heating, lighting or other farm needs.

Methodology

Animal manure and vegetable wastes are channeled to a large poly bag where decomposition takes place. The decomposition process produces methane and hydrogen sulfide gas, and ammonia and carbon dioxide. The gases rise and move into a poly pipe. An iron scouring pad functions as a sulfur scrubber to remove the harmful sulfur gas. The methane gas then moves through the poly pipe to where it is used for cooking or other functions. The sludge collected from a drainage outlet is rich in nutrients and can be used as a fertilizer for crops. Bicycle tire inner tubes, plastic buckets and other materials that would otherwise become refuse are recycled and used in the production of the biodigester.

Results

Hundreds of biodigesters have been installed in rural areas of Costa Rica through Earth University programs. Rural farms are effectively able to use organic waste in a sustainable way. Biodigesters prevent the release of hydrogen sulfide and ammonia responsible for acid rain. Biodigesters reduce polluted runoff, generate compost for enriching soil and provide a no-cost fuel source not readily available in rural areas. (Viquez *et al*, 2008) Cooking with biogas eliminates smoke and ash in kitchens, reduces respiratory infections due to smoke inhalation and frees up wood collection time for home and community activities. Rural women can look forward to longer, healthier lives. (Wilke, 2012)

Recommendations

Longevity of biodigesters could be improved by protecting them from roaming animals and environmental elements that result in deterioration. Mixing of sulfide gas with methane could be reduced by providing written or pictorial instructions on how to and how often to replace the iron scouring pad. Local laws and regulations would need to be examined for use in non-rural areas.

Cost/Resources

A biodigester for a small farm costs about 200 dollars to install and may last many years. A typical family saves about 40 dollars a month in fuel cost alone. A payback period of five months is well worth the investment for improved lives and contributing to Costa Rican sustainability.

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Globalizing the Secondary Agricultural Education Curriculum through Undergraduate Study Abroad Experiences

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Introduction/Need for the Innovation

Producing food and fiber is a global industry with inputs and products being imported and exported around the world. To be successful in tomorrow's agricultural industry, students must be prepared to work in a globalized industry (National Research Council, 2009). Students need to understand agriculture on a global scale (Ibezim & McCracken, 1994). However, research shows that high school students and college undergraduates lack knowledge in international agricultural issues (Wingenbach, Boyd, Lindner, Dick, Arispe, & Haba, 2003). A common approach to help college-aged students develop a globalized perspective has been study abroad experiences. But, how can the impact be transferred to younger students, namely those students studying agriculture at the secondary level? This abstract describes an innovative approach to globalize the secondary agricultural education curriculum through undergraduate study abroad experiences.

How it Works

Step 1 is to encourage preservice agriculture teachers to participate in study abroad programs. Most universities offer a plethora of different programs that could meet a wide variety of individual needs. Teacher-educators can provide academic advising that will show the student how such an experience can fit into a degree program.

Step 2 is to work with the preservice teacher prior to the study abroad experience to identify specific aspects of the experience that will likely have educational significance to secondary students. It is also advisable at this time to develop some broad learning objectives and decide on the types of information to gather (photos, video, artifacts, etc.) while on the experience.

Step 3 is the actual study abroad experience. During this phase, the teacher educator should attempt to maintain some level of communication with the preservice teacher to provide guidance and advice.

Step 4 occurs after the experience and involves developing a curriculum based on the experiences and things learned by the preservice teacher. The examples presented here have been for a 1-week unit of instruction that balances the agriculture and culture of the destination country.

Step 5 is implementing the curriculum in a secondary school setting. This could be done as an independent early field experience, or as a part of the student teaching internship. As a part of this step, secondary students should be asked to provide reactions and their knowledge gains should also be assessed.

Step 6 is to refine the curriculum based on results of the implementation and then post the materials in a location that is widely accessible to a larger audience of agricultural education teachers.

Results to Date

To date, this methodology has been used twice. In the first example an undergraduate preservice teacher participated in a 3-week study aboard experience to Costa Rica. Following that experience she developed a curriculum that focused on sustainable agricultural practices in the tropics. The second example is a graduate preservice teacher who participated in a 2-week study abroad experience to Korea in the summer of 2012. This student is currently in the development phase of her curriculum and plans to implement the curriculum during her student teaching internship in the Spring of 2013.

Conclusions & Implications

Preliminary results show that this methodology is a feasible approach to reach a larger group of younger students. In the first example, the preservice teacher implemented the curriculum to a 9th grade introductory agriscience course with positive feedback from students and positive knowledge gains from the students as well. Although not widely generalizable, these results are positive and justify continuation of this effort.

Recommendations for Practice

The key thing is to proactively encourage students to participate in study abroad experiences. In the experiences of the author, most preservice agricultural education teachers have not considered a study abroad experience and may not recognize the value of such an experience.

Costs/Resources

Depending on the nature of the experience and the duration, this can range from $2,000 to $10,000. The two student examples mentioned in this abstract spent approximately $2,500 in program fees. Other resources needed include the time invested in creating the curriculum and a willing secondary teacher to allow implementation of the curriculum.

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Putting Research to Work: Developing a Curriculum Framework for University Students Studying Agricultural Communications in Mali

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Introduction/Need for Research/Conceptual Framework

More than 80% of Mali's population is engaged in farming and fishing (Central Intelligence Agency, 2012). Ouedraogo (2008) indicated Mali's farmers need information and communication to organize, manage, and market their enterprises. Universities in Mali, however, do not offer agricultural communications (AGCM) as a degree program even though a large demand exists for communicating about agriculture. Therefore, the need existed to identify competencies required of university graduates in AGCM to be successful and effective media professionals in Mali. A primal source of valid information in this regard could be the views of media specialists in Mali knowledgeable about agriculture. Cornachione and Daugherty (2008) indicated the most valuable investment is that made in people, including resources to provide formal education. To that end, this study was underpinned by the human capital theory (Cornachione & Daugherty, 2008).

Purpose/Objective

A study conducted by Maiga in 2011 determined the competencies needed by university graduates of AGCM in Mali, as perceived important by media professionals. From that work, a conceptual foundation emerged for a university curriculum in AGCM. This poster will expand on Maiga's work (2011) by presenting a curriculum framework of proposed courses and topics for an AGCM program of study and provide examples of the knowledge, skills, and attitudes (KSA) (Popham, 1993) university students would learn and demonstrate.

Research Methodology

Maiga's (2011) study used a snowball sampling technique to describe the views of media professionals on the competencies needed by university graduates in AGCM. His study identified eight constructs: layout and editing, broadcasting, ethics, knowledge of agriculture in general, technology, writing, general communication, and Mali's agriculture.

The Borich (1980) needs assessment approach was used to rank the constructs regarding their importance. The constructs with the highest mean weighted discrepancy scores (MWDS) were identified as the most important areas for curriculum development.

Results/Conclusions

See Table 1 for a sample frame, as concluded from Maiga's (2011) highest ranked construct. The curriculum framework for six other constructs will be detailed during the poster's presentation.

Table 1

Sample Curriculum Framework for Teaching AGCM to University Students in Mali

Competence /Construct	Course Title	Course Topics	KSA
Layout and Editing*	Layout and Design for Agricultural Publications	○ News reporting in the agricultural context ○ Writing for agricultural publications ○ Grammar and word usage in journalism ○ The editor's eye ○ Photography for agricultural publications	○ Report and write accurately for publications ○ Knowledge of appropriate grammar and words (French) ○ Use appropriate grammar and words (French) ○ Select and edit images for publication ○ Create and edit a variety of communications materials appropriate for the agricultural sector in Mali ○ Demonstrate ethical attitudes regarding the layout and editing of agricultural publications

**Note*. Construct with the highest MWDS.

Recommendations/Implications for Practice

Developers of curriculum for AGCM are urged to consult the framework proposed, as derived from Maiga's (2011) findings, e.g., faculty at Mali's newly established University of Ségou. This framework may also be useful at other universities in West Africa, especially in the 12 Francophone nations.

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Revisiting Rogers' Theory for Understanding the Diffusion of Innovations: Students' Voices on Using Case Method to Critically Examine the Model and Their Learning Experiences

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Introduction/Need for Research

Everett Rogers' (2003) *Diffusion of Innovations* is considered an essential reference by many agricultural and extension educators (AEE). A graduate course taught by one researcher relies heavily on Rogers' (2003) posits. Reference to his work as a theoretical basis also appears in related scholarship, e.g., in *JIAEE*. Rogers (2003) maintained "Nine Major Diffusion Research Traditions" (p. 44) existed; rural sociology, education, and communication resonate with AEE.

Rogers (2003) was not *conceited* regarding his model. He posited, "when a scientist follows a theoretical paradigm, a set of intellectual blinders prevents him or her from seeing certain aspects of reality" (p. 106). He devoted a chapter to critiquing the theory: "Contributions and Criticisms of Diffusion Research" (pp. 102 – 135). His admonition, as extended to teachers of change theory who rely on the model, motivated an action research study on students' learning experiences in such a course.

Conceptual Framework

"John Elliott defined action research as 'the study of a social situation with a view to improving the quality of action within it'" (as cited in McKernan, 1991, p. 312). The *it* could be a course and analysis of students' experiences therein for course improvement. Further, McKeachie (2002) indicated the case method was a "problem-based method" that "contextualized learning" (p. 198). The course relied on cases from Rogers (2003), instructor-provided cases intended to expand students' understanding, and required students to synthesize diffusion literature by developing two interpretive case study papers.

Methodology

The researchers were interested in students' views on the usefulness of cases (McKeachie, 2002) for learning and critiquing Rogers' model. A focus group interview with seven students was conducted as part of the course evaluation. Focus groups are important when "consumer feedback about services and programs is desired" (Patton, 2002, p. 388). Students' [* University] course evaluations provided a measure of triangulation (Creswell, 2008).

Results

Students expressed course highlights and suggestions for improvement. They agreed cases helped them engage in the content and stimulated "an emotional connection." Their most frequent emotion was *discouragement*, however, "especially on something [an innovation] that should have been adopted but wasn't." Students especially liked the way cases helped them learn: "[t]hey [cases] told a story, which is powerful"; "they [cases] served as mini history lessons," and allowed people to learn from others' mistakes. Students stressed the need to update some of the cases. A student also opined, "[c]hange [per Rogers' cases] was applied to developing countries where change is very basic. How does change occur here where things are much more advanced?" The students' summated, evaluation ratings overall were $M = 3.86$ (instructor) and 3.71 (course). (4.00 = *Very high*.)

Implications/Conclusions/Recommendations

Students perceived cases were an effective method for learning Rogers' theory. Findings supported McKeachie (2002) on the value of *contextualized learning* and that presenting a problem through a case stimulates meaningfulness. Students appreciated Rogers' theory for developing world contexts but desired more examples of developed world cases. The course ratings supported what students voiced. It is recommended cases be used to teach diffusion theory.

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Self-Perceived Educational Needs of Small Farmers in Trinidad and Tobago

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Keywords: Trinidad and Tobago, agricultural Extension, farmer program planning, small farmers

Introduction and Need for Innovation *or* Research

Trinidad and Tobago's (T&T) small farms struggle to be profitable due to price increase, decline in labor, competitive imports, unpredictable weather, and marketing (Economic Commission for Latin America and the Caribbean, 2011). Small farmers get limited extension information from the Ministry of Agriculture (Renwick, 2010). Farmers rely on traditional knowledge, informal meetings among themselves, meetings from agricultural societies, and garden shops for farming (Renwick, 2010). Understanding the perspective of small farmers will help government-led extension sustain agriculture within the Caribbean region (Závodská & Dolly, 2009).

Research Methodology and Theoretical/Conceptual framework

The purpose of this study was to identify small farmers' educational needs beyond traditional farming practices. A qualitative approach was conducted in March 2012 to gather information from farmers about their educational needs. Data were collected through semi-structured personal interviews with 18 farmers of different social classes and communities from T&T. Data analysis used the constant comparative method (Lincoln & Guba, 1985). Findings were then organized by emergent themes drawn from the responses. Trustworthiness was increased through data triangulation and member checking (Lincoln & Guba, 1985; Merriam, 1998).

Results

The interviewed small farmers' most commonly identified educational needs were in postharvest handling, business training, and assistance in land tenure. They stressed the need to learn more about quality control of crops and new ways of packaging produce for market. Some farmers expressed interest in: gaining insight on how to "market their produce" that is sustainable, evaluating market trends for the crops they grow or can grow, and learning the marketing and infrastructure for processing and distribution of local food.

In addition, many farmers wanted to learn "new farming technology," such as sustainable farming, to reduce imports, and increase food production. Other needs included learning how to resolve tenure issues and landlessness. Finally, a couple of farmers wanted to learn how to recruit labor for their farms as they compete with unemployment social programs, which provide

equivalent pay for half the day's work on a typical farm. The shortage of labor also has led to occasional, substantial loss of crops.

Conclusion/Implications

The small farmers who were interviewed showed interest in increasing their knowledge outside of traditional farming practices in order to pursue new opportunities that would allow them to increase their revenues and decrease costs.

Recommendations for practice and/or research

Government-led extension should consider planning programs that focus on adding financial value to small farm production, such as postharvest handling, marketing opportunities, and strategies for sustainable farm/ranch businesses. The lack of land tenure for the agricultural sector in T&T must be resolved through legislative policy, but extension officers can help small farmers by ensuring legislators are accurately informed about the issues. Additional research is needed to understand the pervasiveness of the needs identified by this study across the larger population of farmers. By being responsive to small farmers' needs, extension can help small farmers gain the knowledge they need that may ultimately improve rural livelihoods.

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Sharing an Idea to Help Internationalize Curriculum Using Spatial Educational Software (ISEE) for Crop Science Disciplines

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Introduction

The National Research Council's report (2006a), *Beyond Mapping: Meeting National Needs through Enhanced Geographic Information Science*, was conducted at the request of several government agencies concerned about professionals developing the skill set for geospatial skills. Combined with the other National Research Council report (2006b) *Learning to Think Spatially: GIS as a Support System in the K-12 Curriculum,* compelling arguments for the need to incorporate critical thinking to help develop spatial thinking and spatial technologies throughout our curricula have been made (Downs & DeSouza, 2006). Mitzman, Snyder, Schulze, Owens, & Stowell-Bracke (2011) reported a pilot study on how they incorporated an educational software package called "Integrating Spatial Educational Experiences- ISEE" for an introductory Crop Production course. The findings demonstrated the potential to increase the ability of our students to use geospatial information to understand how and why soils and landscapes vary spatially at scales ranging from individual fields to a region as large as the state of Indiana. Often professors have the opportunity to exchange and share curriculum with international colleagues. Having had the opportunity to utilize ISEE from 2008 to 2012 (XX, personal communication 2012) within a crop science classroom, several homework and group assignments were created, which in turn could be adapted for international use to help internationalize curriculum of other universities based on the case study of Midwest agricultural practices.

Purpose and objectives

The purpose of this poster abstract is to share ideas on how to incorporate already existing curriculum within the discipline of Crop science to help internationalize curriculum of other international universities. The goal is to help increase our students' understanding as to how the spatial distribution of soils and landscapes impacts the spatial distributions of crops, cropping systems, land use, and environmental and natural resource.

Methods

Descriptive teaching methods where developed in order to share to an international community of scholars. This study describes what was written and utilized in an USA classroom and how it can be utilized internationally.

Results

Students who have utilized the ISEE website in the past were asked to report if they learned something new and 84.3% of students found the ISEE website a valuable tool to use. The results of this study indicate that the use of ISEE in the curriculum can be usually to help increase participants' knowledge of maps and computer technology, as well as, limitations and success of cropping systems in the Midwest.

Conclusions/Implications/Recommendations

This project could help internationalize curriculum by using developed resources as a case study. It introduces a set of thinking skills and approaches to conceptualizing and solving real-world problems that will serve them well throughout their careers. The website, ISEE, provides a rich set of material that can facilitate learner-centered instruction (Schulze, 2010). The website, ISEE, can serve as a model of how geospatial information can be used in teaching and learning. The ISEE web application provides a wide variety of digital maps that allow individuals to understand the landscapes, soils, crops, agriculture, and natural environment of countries.

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Student Constructions of Organic and Sustainable Agriculture

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Introduction/Need for Research

The rise of the organic farming methods in recent years fosters the questions of 1) whether demand will continue to increase or start to decline, and 2) whether a concomitant proliferation of university programs in organics can be expected. Initially popularized in the 1970s, organic and sustainable agriculture have realized significant gains in brand recognition and market share. In 1995, the National Organic Standards Board established criteria that must be observed to label and market goods as organic. Consumers rationalize their organic purchasing behavior in myriad ways. This includes perceived improvements in safety, nutrition, and environmental quality. Despite this, formalized university instruction in organic and sustainable agriculture has lagged considerably behind consumer ideology. Recent data indicates that thirteen US institutions offered baccalaureate degrees in agroecology, sustainable/organic agriculture, or some derivative thereof. Ten institutions offered concentrations, specializations, or emphases in these fields, while eight offered minors (AASHE, 2010).

Purpose

The purpose of this poster abstract is to report the findings on student perceptions of organic and sustainable agriculture. Three objectives were used to help look at student perceptions: 1) gauge student familiarity of sustainable and organic agriculture practices; 2) assess future supply and demand asking about student receptiveness to produce and purchase organic and sustainable agricultural produce; and 3) understand the constraints in agriscience education in the preparation of future curricula.

Methodology

Eighty-four students at XX, XX, and XX were recruited for a survey that assessed their knowledge, attitudes, and opinions on the incorporation of curricula on organic and sustainable agriculture. Subjects were asked to self-report basic demographic information and address a series of open-ended short answer questions developed by the investigators. These questions asked about concepts of organic and sustainable agriculture and general crop production systems. In order to measure student opinions and attitudes, meaning units conveying a concept or belief were categorized from resulting answers and tabulated (Lachapelle, McCool, and Patterson, 2003).

Results/Findings

Students provided a range of words and phrases that defined their perceptions of organic and sustainable agriculture. Thematically, student responses demonstrated some different variations of organics, but were largely congruent. However, definitions of sustainable agriculture were more ambiguous. A prevailing view did not emerge from the data, with 13% reporting "do not know." Within the cohort, the qualitative responses speculated that organic agriculture will increase in the future (40%). The remaining students' perspectives speculated that organic agriculture will not change (4%) or will remain a minority in agriculture (11%).

Conclusion, Recommendations, & Implications

The results of this survey denoted a role for organic and sustainable agriculture in the curriculum. Since the USDA just started a campaign called "Know Your Farmer, Know Your Food", future surveys should try to incorporate questions that gauge student interest surrounding organic and local food system markets. Present data indicates shortages in meeting the demands of educational curriculum in the areas of organic and sustainable agriculture (ERS, 2009). These survey results demonstrate that such trends may continue to manifest as the students surveyed accept roles of consumers and producers.

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The Relationship Between Organizational Climate and *Salmonella* Prevalence in a Federally Inspected Beef Packing Plant in Veracruz, Mexico

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Introduction

Food borne illnesses have increasingly become a growing human health and economic problem and have become more prevalent since 2001 (Recourt, 2003). In 2004, the World Health Organization reported 2.9 million deaths of children age 0-14 caused by diarrheal disease, which results primarily from contaminated food and water sources (World Health Organization, 2012). Workforce training in the food industry is imperative for increasing food safety awareness and reducing food borne illness.

Organizational climate has been shown to influence individual and organizational outcomes (James et al. 1990; James & Jones 1974; Kopelman et al. 1990) and is as a key factor in determining worker behavior (Ball et. al, 2010). Organizational climate must be assessed so that agricultural educators may develop training that will effectively increase desired food-safety related behaviors. This project intends to evaluate the food safety culture in Mexico for this purpose.

Purpose and Objectives

The purpose of this study was to determine the relationship between organizational climate and food safety as measured by *Salmonella* prevalence in a federally inspected packing plant in Veracruz, Mexico. The objectives were as follows:

1. Describe food safety climate at a predetermined packing plant in Veracruz, Mexico in fall of 2008.
2. Describe research initiated workforce education interventions over a four year period between the fall of 2008 and fall of 2012.
3. Quantify *Salmonella* prevalence at packing plant in Veracruz, Mexico over a four year period between the fall of 2008 and fall of 2012.
4. Quantify the relationship between organizational climate and food safety at packing plant in Veracruz, Mexico.

Methods

A survey instrument consisting of 50 scale items was adapted from a similar instrument developed by Ball (2010). Response options were based on a 7-point Likert-type scale. The instrument was divided into five constructs including food safety training, work unit commitment, infrastructure, personal understanding, and behavior. The research team traveled to Veracruz, Mexico, over a period of four years to collect carcass samples for *Salmonella* data and administer the climate instrument.

Results

The instrument was administered and completed by all available employees at the plant in 2008 and 2012. Constructs were summarized, and means and standard deviations were calculated. Anova analysis was used to determine where significant differences existed between the constructs. It was determined that over the four-year period significant increases occurred in multiple climate constructs, indicating improved climate regarding food safety. *Salmonella* testing at various points along the production line indicated a reduction in pathogen prevalence at each data collection point.

Recommendations

Organizational climate has implications for worker behavior and for educators' ability to alter that behavior in a desired fashion. This research indicates that not only is climate related to behavior, but in turn, is related to the quality of the final product. Results will be used at the plant to improve food quality through continued training. In addition, because climate is a reflection of leadership, researchers will implement leadership workshops for plant managers and continue research on this topic.

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The Influences of Transactional Distance Theory to Learners for Taking Online or Distance courses in National Chung-Hsing University (NCHU) in Taiwan

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Keywords: transactional distance theory, interactions, technology, online learning, distance education.

Introduction

Do students receive equal satisfaction, quality, and learning from distance courses as traditional classes? This poster will visually depict the effects of vicarious learning on student satisfaction, quality of instruction and learning outcomes. Students' barriers of taking distance courses are the problems of time, space, expression or material understandings, and lack of human interactions (Dooley, Lindner, & Dooley, 2005). Transactional distance theory attempts to explain the relationships that exist in distance learning environments (Moore, 1997). There are four kinds of interactions in the transactional distance theory model: learner's interaction with other learners, with the instructor, with the course content and with the course technology (Moore, 1989; Gunawardena, Hillman, and Wills, 1994). Seidel (2012) found that there are significant relationships between four interactions and students' distance learning. Dooley et al. (2005) provide examples of technologies which may enhance the four interactions of transactional distance theory. In this study, students' attitudes and opinions toward those technologies can help us to understand how diverse technologies influences students' learning via distance course.

Research Methodology and Theoretical Framework

The instrument was followed the Moore's transactional distance theory model (Moore, 1989; Hillman, et al., 1994). Data of this descriptive and correlational study was collected with a questionnaire distributed online. The population for this study was undergraduate and graduate students who study in agriculture related majors in National Chung-Hsing University (NCHU) in Taiwan.

Results

- Collaborative documents, social sites, and instant messaging are effective technologies that enhance learner's interaction with other learners.
- Lecture, online editing and feedback, and email are effective technologies that enhance learner's interaction with the instructor.
- Case studies and interactive video are effective technologies that enhance learner's interaction with the course content.
- Electronic libraries, search engines, and online instructions for downloading plugins are effective technologies that enhance learner's interaction with the technology.
- Learners tend to use different technologies to enhance their each interaction.
- There are high agreements that the importance of the interactions with other factors in distance education.
- There are high agreements that diverse technologies have different level of influence on interactions.

Conclusion and Recommendations

Effective technologies can enhance the four interactions of transactional distance theory, and increase learners' satisfaction, quality, and learning during taking distance courses (Seidel, 2012). Using diverse technologies not only reduces the problems of time and space but also enhances learner's interactions with other learners, instructor, course content, and course technologies. Results of effective technologies in this study are different from former researches. Culture differences and education methods are important factors. It means that different group students tend to use diverse technologies for learning. Instructors have to use appropriate technologies for the specific learners to create distance or online classes materials.

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Using Facebook Page to Educate and Market Directly to Consumers: A Case Study of Yanyang Farm in Taiwan.

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Introduction

This poster will visually depict how small scale farmers in Taiwan can use Facebook to market directly to consumers. Small scale farmers face many challenges when selling their products. They often do not have advantages on price when competing with large scale farmers. The average farm size is only about 2.47 acres per family (Council of Agriculture, 2012). Prices of agricultural products are lower when small scale farmers sell directly to wholesalers compared with selling crops directly to consumers. Direct marketing is an alternative way for small scale farmers to sell their agricultural products for a higher price. Small scale farmers are seeking to sell their agricultural products on the Internet. Social media is popular. Facebook has become a new communication and marketing platform for farmers. Facebook has nearly thirteen million users in Taiwan. Approximately eighty percent of Taiwanese online users have a Facebook account (Checkfacebook, 2012). According to Nielsen Wire (2012), Facebook is the top social media in Taiwan. Small scale farmers can create a Facebook page for their farm to tell the farm's story and share their farming experience. They can update the farm news and answer readers' questions to interact with potential consumers.

How the Innovative Program Works

Yanyang Farm is located in the central Taiwan. The major crops are tangerines and coffee beans. The main harvest season is from mid-October to late January. The farm space is about four acres. The chief sales channels for Yanyang Farm are U-pick and repeated consumers. The farm owner created the Yanyang Farm Facebook page in 2011. The goal of the page was to raise domestic agriculture awareness. He also aims to communicate with consumers and increase U-pick customers and online orders via Facebook page. Post content contains the farm's story, the farmer's experience, farm news and photo, agricultural product photo, and videos. The most common posting language posting is Mandarin. Some short messages and photos contain Mandarin and English captions. The updating frequency is once every two weeks during non-harvest season and once per week during harvest season. This case study focuses on figuring out what types of farm messages can achieve a higher reach rate. The study will examine the amount

of online orders and U-pick customers created by the Yanyang Farm Facebook page messages during the 2012 harvest season to evaluate whether the Facebook page is an efficient education, communication, and marketing tool for small scale farmers.

Results

- Agricultural product photos with a short caption are the most popular type of message.
- Long articles are a less attractive of message.
- The amount of online orders and U-pick customer increased during 2012 harvest season because of the attraction of Yanyang Farm Facebook messages.

Implications

The results could lead to other small scale farmers to creating their own Facebook page to increase customers and income.

Recommendations for Practice

The study could be extended over several years to see if long-term education and communication via Facebook can build stable relationships with repeated consumers and attract new customers.

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Water Resources Development and Management through Education: Experiences from Ethiopian Institute of Water Resources

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Introduction

Most development problems in Ethiopia are water related. This is not due to scarce water resources but due largely to lack of institutional capacity and workforce expertise. This indicates a need for empowering Ethiopian professionals in water sector. To meet this need, a collaborative project of one U.S. and five Ethiopian universities focused on sustainable water resources development and management was funded by the United States Agency for International Development and the Higher Education for Development offices. This project established Ethiopian Institute of Water Resources (EIWR) for building capacity of Ethiopian professionals by offering graduate education, research and outreach activities.

Purpose

The purpose of this poster is to share the achievements of EIWR in education, research and outreach engagement in the last one year.

Methodology

EIWR was established in 2011 with a vision to develop this institute as a multidisciplinary knowledge hub for water resource development in Ethiopia. This will be achieved by capacity building, research and community engagement. EIWR will be built in

three phases over 10 years. U.S. institutions will offer services even after 10th year through externally-funded projects, but it is envisioned to graduate sufficient PhD students by that time to staff Ethiopian universities to attract funding to sustain EIWR.

Results

Different graduate programs were initiated. Curricula for Water Resources Engineering and Management (WREM) and Water and Health majors were developed through a participatory process involving various stakeholders. WREM currently has 40 students: 23 MSc (graduating in December 2012) and 17 PhD students. Fifty students are currently enrolled in Water and Health program, of which 50% are females. Course delivery and thesis advising are conducted jointly by Ethiopian and U.S. faculty. The U.S. faculty were drawn from 20 institutions. Graduate students in WREM participated in a three week workshop where U.S. scientists trained them in identification of research areas. Field campaigns were also organized for these students to learn research methods with field experience.

EIWR engaged in many community outreach activities. The defluoridation project in Afar Region in Ethiopia is one example, which addressed high fluoride content in groundwater to make it safe for domestic use. EIWR trained 40 development agents from water and agriculture sectors to improve living situations of water users. A high school water science summer camp was organized to engage students in outreach and encourage pursuing studies in water sector. Over 150 undergraduate students were involved in summer-long community outreach programs. In Ethiopia, female students do not have equal access to education as male students, and this was addressed by having good representation of female students in the above mentioned projects.

Implications

Initial results from this international collaborative project reiterate the importance of capacity building of existing and future professionals in developing countries to address their own problems. Achievements and learning experiences from EIWR may help in designing similar collaborative efforts in other development areas. Sharing these results may also open up opportunities from those having similar interests.

Abstract Presentation Awards

2nd Runner-Up Abstract Presentation Student Division (tie)
Student Perceptions of International Agriculture: The Effects of Vicarious International Experience Integration in High School Agriculture Education Curriculum
Laura Lemons, Candice Caraway, Todd Brashears, Scott Burris, & Joe Barbour
Engaging Women through Common Initiative Groups in Cameroon
Mary Rodriguez & T. Grady Roberts

1st Runner-Up Abstract Presentation Student Division
The Role of Social Sciences in Feeding the World: utilizing Interactive Lessons to Incorporate Global Social Justice Issues into the Classroom
Anna McGucken, Melanie Balinas, Orry Pratt, Stephanie Curs, & Gary Wingenbach

Outstanding Abstract Presentation Student Division
Monitoring and Evaluating Adoption Behavior and Integration after an Educational Training Program in Hazaribag, India
Meghan Luckett & Kim Dooley

2nd Runner-Up Abstract Presentation – Professional Division (tie)
Investigating Women's Perspectives on Agricultural Extension
Amanda Crump
A Framework for Analyzing "Best-fit" Practices in Extension
Kristin Davis, Steven Franzel, Eric Boa, Dannie Romney, & Tiffin Harris

1st Runner-Up Abstract Presentation – Professional Division (tie)
Learning about Other Countries and their Agriculture: Students' Perceived Personal and Professional Benefits
Maria Navarro
The Influence of Selected Socio-Cultural Practices on Agricultural Development in Benue State Nigeria
Adolphus Naswem & Egri P. Ejembi

Outstanding Abstract Presentation Professional Division
How Can Agricultural Extension Services in Nepal be Improved?
Murari Suvedi

Poster Presentation Awards

2nd Runner-Up Poster Presentation – Student Division (tie)
Implementation of Agricultural Communications Curriculum and Technology into Schools
Carley Calico, Leslie Edgar, Don Edgar, & Hayley Hogan Jernigan
The Relationship between Organizational Climate and Salmonella Prevalence in a Federally Inspected Beef Packing Plant in Veracruz, Mexico
Shawna Newsome, Todd Brashears, Mindy Brashears, Haley Porter, & Eli Shahab

1st Runner-Up Poster Presentation – Student Division (tie)
Putting Research to Work: Developing a Curriculum Framework for University Students Studying Agricultural Communications in Mali
Assoumane Maiga, Dwayne Cartmell, Craig Edwards, & Shane Robinson
Improving Agriculture and Nutrition Awareness through an Educational Training Program in Hazaribag, India.
Meghan Luckett & Kim Dooley

Outstanding Poster Presentation – Student Division
Challenges and Opportunities for Agricultural Extension in Timor Leste
Austen Moore

2nd Runner-Up Poster Presentation – Professional Division (tie)
Free Fuel for Remote Locations: Construction of a Biodigester
Susan Haddock, Daniel Culbert, Terry DelValle, Sheila Dunning, Eleanor Foerste, Rebecca Jordi, Teresa Olczyk, Kathleen Ruppert
Assessment of SIWES Programme done by Agricultural Extension Students in Nigeria
C.C. Ifeanyi-obi, A.C. Agumagu, O.M. Adesope, U. R. Etuk, R.N. Nwakwasi

1st Runner-Up Poster Presentation – Professional Division
Enhancing Digital Extension Information Using Wordpress and Social Media
Pete Vergot, Judy Ludlow, & Doug Mayo

Outstanding Poster Presentation – Professional Division
Globalizing the Secondary Agricultural Education Curriculum through Undergraduate Study Abroad Experiences
T. Grady Roberts

AIAEE 2013 Award Winners

Early Achievement:	Robert Strong
Outstanding Achievement:	Mercy Akeredolu
Outstanding Leadership:	James Lindner
Outstanding Service:	Kristin Davis

Fellow:
Mercy Akeredolu
Marta Hartmann
Koralalage Jayaratne
James Lindner
Theresa Murphrey

Sr. Fellow:
Gary Briers
David Lawver
Bill Rivera
Brenda Seevers
Pete Vergot

JIAEE Article of the Year 2012

Coffee as a Livelihood Support for Small Farmers: A Case Study of Hamsapur Village in Nepal
Kana Aoki & Murari Suved

Manuscript Submission Guidelines

The *JIAEE* is the official refereed journal of the Association for International Agricultural and Extension Education (AIAEE).

General Requirements

Microsoft Word files only may be submitted. All manuscripts must indicate the type of article—Feature; Commentary; Tools of the Profession and Book Review—on the title page of the manuscript. **All manuscripts must be submitted online** at http://jiaee.ft.expressacademic.org. Manuscripts cannot be published or be under consideration for publication in another journal. The *Journal of International Agricultural and Extension Education* (*JIAEE*) follows the standards set forth in the *Publication Manual of the American Psychology Association* (6th ed.). Online manuscript submission guidelines are posted at http://www.aiaee.org/guidelines.html. **Authors must follow these formatting requirements** prior to submitting manuscripts to the *JIAEE*.

Feature Articles

A **title page** with manuscript title, authors' names, institutions, complete addresses, telephone and fax numbers, and e-mail addresses is required. The manuscript must include an **Abstract** (a succinct idea of the article's content) not exceeding 250 words, followed by 5-7 **Keywords** (selected from a list of topics available on the submission log on page), **Introduction**, **Theoretical/Conceptual/Operational Framework**, **Purpose and Objectives**, **Methods**, **Findings/Results**, **Conclusion**, **Recommendations/Implications**, and **References**, or similar appropriate headings. There is no fee charged for submitting a feature article. Feature Articles cannot be longer than **20 double-spaced** (12 point font) pages (not including the title page) with **one-inch margins** on all sides.

Commentary Articles

Commentary Article manuscripts are submitted online. A **title page** with manuscript title, authors' names, institutions, complete addresses, telephone and fax numbers, and e-mail addresses is required. The article must include an **Abstract** not exceeding 250 words. Please include 5-7 **Keywords** (selected from a list of topics available on the submission log on page) to describe your manuscript. Commentary Articles should be no longer than **eight double-spaced** (12 point font) pages (not including the title page) with **one-inch margins** on all sides.

Tools of the Profession and Book Review Articles

Tools of the Profession Article manuscripts are submitted online. A **title page** with manuscript title, authors' names, institutions, complete addresses, telephone and fax numbers, and e-mail addresses is required. Please include **Keywords** (about seven) to describe the manuscript. Tools of the Profession Articles should be no longer than **four double-spaced** (12 point font) pages (not including the title page) with **one-inch margins** on all sides. If you wish to submit a book review, policies and guidelines are available online http://www.aiaee.org/files/BookRevGuide.pdf.

Page Fees

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

Call of Managing Editor-Elect
Journal of International Agricultural Extension Education

AIAEE's Board of Directors is accepting nominations (including self-nominations) for the position of **Managing Editor-Elect** *Journal of International Agricultural and Extension Education*. Nominations should include a letter of interest by the nominee and the nominee's curriculum vitae. The Managing Editor-Elect will be expected to move into the roles of Executive Editor and Past Editor. The individuals must have published in *JIAEE* in the last 5 years. Preference is given to those having served on the Editorial Board.

Term as Managing Editor: January 1, 2014-December 31, 2015 – (Volume 21 & 22)
Managing Editor: Manages the submission and review process using the Academic Express online system; delegates *Tools of Trade* and *Book Reviews* to Associate Editors.

Term as Executive Editor: January 1, 2014-December 31, 2015 – Amy Harder (Volume 21 & 22)
Executive Editor: Set the overall standards the *Journal* and is responsible for editing each issue, printing each issue, and distributing each issue. Handles all post acceptance issues including page fees, manuscript publication agreements, and library subscriptions.

Term as Past Editor: January 1, 2014-December 31, 2015 – Brenda Seevers (Volume 21 & 22)
Past Editor: Assist with process and product transition. Advise on Associate Editors and Editorial Board Membership.

Please submit electronic nomination materials **by September 1, 2013** (either in pdf or MS Word) to:

Dr. T. Grady Roberts
President-elect AIAEE
groberts@ufl.edu
University of Floriday

Dr. Theresa Murphrey
President AIAEE
t-murphrey@tamu.edu
Texas A&M University

Book Reviewers Needed

Our European counterpart, JAEE (Journal of Agricultural Education & Extension) is in need of individuals to write a review on selected books related to various aspects of agriculture and extension work. Guidelines for writing a book review for JAEE are included below. If you are interested in this opportunity, a list of available books follows. This is an excellent opportunity to review new materials available and to assist our colleagues.

Guidelines for book reviewers of "The Journal of Agricultural Education and Extension" (JAEE)

Thank you for your interest in reviewing books for the *JAEE.* The Journal of Agricultural Education and Extension (JAEE) encourages scholars in various fields related to agricultural extension and education to contribute to the book review section of the journal.

Generally speaking, a book review can be developed in two different ways:

- The reviewer has already read a recent book in one of the fields which are relevant for the journal and is willing to write a review of it. The reviewer can express interest in writing the review to the Book Review Editor(s). The reviewer will be asked by the Editor(s) to provide a description of his/her background and also bibliographic information of the book (name of author/authors or editor, year of publication, title, place of publication, name of publisher, number of pages, ISBN and price). The Book Review Editor(s) will inform the reviewer about the appropriateness of the book proposed for review.

- A list of books received from publishers is printed in each issue of the JAEE. An interested reviewer can contact the Book Review Editor(s) and propose to prepare a book review about a certain book. The selected book should be within the field of expertise of the reviewer. After agreement with the Book Review Editor(s), the book is sent to the reviewer and becomes the property of the reviewer.

If, because of unforeseen circumstances and after assuming the task to write the review, the reviewer is unable to deliver the review within the agreed time frame he/she is expected to return the book to the book review editor six weeks before the deadline of submission to make it possible to find another reviewer for the book.

How to write a book review?

- The manuscript should be submitted as a Microsoft Word document not exceeding 2000 (approximately about four to five typewritten A4 pages) words. It is recommended to use Times New Roman 12 point font and double-spacing.
- The heading for the review should be formatted as follows: 1. Author/s, Editor/s; 2. year of publication (as stated in the book); 3. Title; 4. City of publication; 5. Publisher; 6. number of pages (last printed number page); 7. ISBN; 8. hard-cover and soft-cover price.
- At the end of your review, please include your complete contact information: Your first and last name; current position and affiliation, email address, postal address, and fax and phone numbers.
- All references should be made in-text; please do not use footnotes or endnotes. These references should take the following form: (Smith, 1999). If it is necessary to cite a particular page number, the reference should be in the following form: (Smith, 1999, p. 27). The list of full references should appear in alphabetical order at the end of the review.
- The language of the reviewed book and also the review itself must be English (UK).
- Language should be simple and comprehensive
- Avoid quoting long passages directly; paraphrase where possible. Always give the page number of the quote in parentheses.

- Present an integrated overview of the various chapters of the book (not presenting each chapter separately) that shows how they demonstrate the main message of the book; this may involve focusing on certain areas more than others.
- Compare the characteristics of the book with other books and academic publications in the field.
- Remain objective; highlighting both strengths and weaknesses. Use relevant examples as evidence.
- Study other reviews in the JAEE to find good examples of how to handle detail, depth, evaluations and format (these can be obtained from the Book Review Editor on request).

Issues to be addressed in a book review for JAEE

- The purpose for writing the book.
- The main ideas and messages and how effectively these are communicated.
- The extent to which the author(s) has achieved their main writing objective.
- The intended audience for the book; who would find it useful and why.
- The background of the author (his/her other books, publications, experiences and so on).
- Suitability of the book to be considered as a textbook; at what level (introductory, undergraduate, or graduate) and for what subject area?
- Readability and accuracy of the book.
- The soundness of methods and information sources used.
- A comparison with other scholarly works on the subject;
- Constructive comments about the strengths and weaknesses of the book.
- The extent to which the book has added value for agricultural education and extension, as well as learning and communication for innovation and change.
- General conclusions and recommendations about the usefulness and effectiveness of the book for the readers.

Procedure of book review submission

To summarise, a book review submission to JAEE consists of the following stages:

1. Preliminary agreement between book reviewer and the Book Review Editor(s) is made about the type of book to be selected for review.
2. The book reviewer starts writing the review following the given guidelines of the JAEE and sends it to the Book Review Editor(s) within an agreed time frame.
3. Reviews will be checked by the Book Review Editor in consultation with the Editor. No change in the substance of the text will be made without consulting the reviewer. The Editor of the *JAEE* is the final authority in matters of content and decides whether the contribution will be published. The Book Review Editor may ask the reviewer to make revisions in the manuscript where necessary and send it back to the Editor before an agreed deadline.
4. The Book Review Editor, will inform the reviewer about the acceptance or rejection of the book review and estimated issue of the JAEE in which the book review will appear. Due to the production schedule of the JAEE, the review may not appear earlier than between 6-9 months after acceptance.

We would be pleased to receive recommendations regarding books you find worthwhile for a possible JAEE review. In addition, if you have not reviewed books for the JAEE before and would like to review, please let the Book Review Editor(s) know. The Journal additionally offers some incentives for book reviewers such as three months free online access to the journal and book vouchers. Publishers are kindly encouraged to send their books for review to the Book Review Editor at the following address:

Prof. Dr. Volker Hoffmann
Department of Agric. Communication and Extension
Universität Hohenheim (430)
70593 Stuttgart
Germany

For more information, please contact the Assistant Book Review Editor **Worku T. Birru** (worku.birru@wur.nl) or the Book Review Editor **Prof. Dr. Volker Hoffmann** (vohoff@uni-hohenheim.de).

Books Received

The Book Review Editor has review copies of the following books. Potential reviewers should contact Volker Hoffmann to obtain a review copy (vohoff@unihohenheim.de or worku.birru@wur.nl). Publishers and authors are welcome to send their books for review. When you find a ULR, it indicates where to find advertising text about the book. **Books not previously listed are in bold-faced type.**

Akouègnon, Guy-Erick (2010): Targeting Herbaceous Legumes: Experiences with Intensification Domains and Local Knowledge Systems in West Africa. Margraf Publishers, Weikersheim, paperback, 207 pp., €25.60.

Bauer, Vinzenz (2008): Farmers and their Financial Institutions. Comparisons of Case Studies from the US and Germany. Margraf Publishers, Weikersheim, paperback, 104 pp., €25.60.

Basu, Priya (2006) Improving Access to Finance for India's Rural Poor. The World Bank, Washington DC, paperback, 119 pp., $25.

Brubaker, Elizabeth (2007) Greener Pastures: Decentralization the Regulation of Agricultural Pollution. University of Toronto Press, Toronto, hardcover, 153 pp., $45.

Bulte, Erwin & Ruben, Ruerd (Eds) (2007): Development Economics between Markets and Institutions: Incentives for Growth, Food Security and Sustainable Use of the Environment. Mansholt Publication Series Vol. 4. Wageningen Academic Publishers, Wageningen, paperback, 447 pp., $76.00.

Christaensen, Luc & Demery, Lionel (2007) Down the Earth. Agriculture and Poverty Reduction in Africa. The World Bank, Washington DC, paperback, 105 pp., $15, http://siteresources.worldbank.org/INTPOVERTY/Resources/335642-1130251872237/DownToEarth_final.pdf

Ferrari, Aurora (2008) Increasing Access to Rural Finance in Bangladesh: The Forgotten 'Missing Middle'. The World Bank, Washington DC, paperback, 137 pp., $20.

Gottwald, F.-T., Keino, S. & Fayeye, T.R. (2007) Fostering Subsistence Agriculture, Food Supplies and Health in Sub-Saharan Africa. Peter Lang, Frankfurt am Main, paperback, 199 pp., £28.80.

Halle, Ekane Ignatius (2005) The Rationality of African Cultural Dynamism. A Case Study in Bakossiland, South-West Province of Cameroon. Margraf Publishers, Weikersheim, paperback, 258 pp., €25.60.

Haussner, Bianca (2013): Pig management Practices as assessed by Smallholders in the Uplands of Northern Vietnam. Margraf Publishers, Weikersheim, paperback, 139 pp., €25.60.

Kennedy, Ivan E., Solomon, Keith R., Gee, Shirley J., Crossan, Angus N., Wang, Shuo & Sanchez-Bayo, Francisco (Eds) (2007) Rational Environmental Management of Agrochemicals: Risk Assessment, Monitoring, and Remedial Action. Oxford University Press, Washington DC, hardback, 415 pp., $160.00.

Kriesemer, S. & Grötz, P.A. (2008) Fish for All? Small-scale Pond-aquaculture in Africa with Special Reference to Malawi. Margraf Publishers, Weikersheim, paperback, 158 pp., €25.60.

Limnirankul, Budsara (2007) Collective Action and Technology Development. Upscaling of Innovation in Rice Farming Communities in Northern Thailand. Wageningen University, Wageningen, paperback, 243 pp. On request against payment of postage, as long as copies are available from Conny Almekinders, conny.almekinders@wur.nl, http://library.wur.nl/wda/dissertations/dis4198.pdf

McMahon, Josef A. (2007) EU Agricultural Law. Oxford University Press, New York, cloth, 412 pp., $230.00.

Minh, Thai Thi (2010) Agricultural Innovation Systems in Vietnam's Northern Region. Six Decades Shift from a Supply-driven to a Diversification-oriented Approach. Reihe Kommunikation und Beratung 95, Margraf Publishers, Weikersheim, paperback, 271 pp., €25,60.

Ravallion, Martin & Van DeWalle, Dominique (2008) Land in Transition: Reform and Poverty in Rural Vietnam. TheWorld Bank,Washington DC, paperback, 203 pp., $30.

Schad, Iven (2012): "We Vietnamese do new things differently". Facing uncertainty in agricultural innovation. Reihe Kommunikation und Beratung 104, Margraf Publishers, Weikersheim, paperback, 125 pp., €25.60.

Seppänen, Laura, 2011: Learning Challenges and Tools in Organic Vegetable farming. An Activity Theoretical Study of Practices in Farming and Inspection. Verlag Dr. Müller, Saarbrücken, paperpack, 229 pp. 70,23 €, Download at http://ethesis.helsinki.fi/julkaisut/maa/sbiol/vk/seppanen/

Taylor, Iain E.P. (Ed.) (2007) Genetically Engineered Crops: Interim Policies, Uncertain Legislation. Haworth Food & Agricultural Products Press, New York, paperback, 425 pp., $29.95.

Tiwari, Narayani (2007) Women's Agency in Relation to Population and Environment in Rural Nepal. Wageningen University, Wageningen, paperback, 214 pp., http://library.wur.nl/wda/dissertations/dis4256.pdf