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From the Executive Editor

Reflection on Change

Think about all the idiomatic expressions dealing with change. When we want to have people do things in a new way we might say “out with the old, in with the new.” Whenever we want new viewpoints on an issue we may want to “see things from a different angle.” If we want to start over we express “go back to square one.” We can exclaim that “change is good” or that we’ve had a “change of heart.”

In AIAEE, we want to “stay on the cutting edge” and be “agents of change.” According to Everett Rogers (2003), “a change agent is an individual who influences clients’ innovation-decisions in a direction deemed desirable” (p. 27). Last year at our annual conference we deemed a desirable direction for JIAEE to be more economical in our publishing and distribution. As a result, we are now exclusively using an electronic publishing system on our webpage domain: http://www.aiaee.org. The current volume is password protected; however, current members and library subscribers are able to view current issues with a registered email address and login. All of our past issues are freely available to the public.

The time has come. This is the last “print on demand” version of the journal for hard copy distribution. You may notice that this issue has a new “look and feel” that will make it easier to read and print via the webpage. Subscriptions run from January 1 – December 31 with renewals easily processed online at http://www.aiaee.org/subscribe.html.

We are also updating our submission guidelines and updating our citation index to the American Psychological Association’s (APA) 6th edition beginning with Volume 18. You may have noticed that we started using Digital Object Identifiers (DOI) with Volume 17 and plan to continue that nomenclature on all past issues. The current volume has the DOI numbers registered with CrossRef (an electronic database system). I hope you like the changes.

At times we may feel that technology is outpacing our ability to manage it. However, it was Machiavelli (1494) who stated, “[t]he times are more powerful than our brains.” We have always been an organization that is inclusive and innovative, and we will continue to carefully consider the best practices in our discipline, and for distributing new knowledge to our readers.

Sincerely,

Dr. Kim E. Dooley, Executive Editor

Journal of International Agricultural and Extension Education
Assessing the Impact of Farmer Field School Participation on IPM Adoption in Uganda

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Abstract
The Integrated Pest Management Collaborative Research Support Program (IPM CRSP) has been implementing IPM farmer field schools (FFS) with small scale farmers in Eastern Uganda since 2001. This study assesses the impact of cowpea-specific IPM FFS on IPM knowledge and the theoretical link between increased knowledge on the adoption of IPM strategies. The assessment was conducted to evaluate the impact of IPM FFS on adoption of IPM strategies. Comparison groups consisting of FFS participants and non participants were used to evaluate the impact of FFS on IPM knowledge and cowpea specific IPM strategies. A summated ratings scale consisting of five attributes was used to measure farmers’ knowledge of IPM and another summated scale consisting of five IPM strategies for cowpea was used to measure adoption. The results indicate that participation in FFS leads to more knowledge of IPM and knowledge of IPM is the most important variable in explaining adoption of IPM strategies. These results provide a confirmation of the adoption decision making process and a validation of FFS as an effective mechanism for increasing both knowledge of IPM and the adoption of cowpea specific IPM strategies. Farmers were more likely to adopt component strategies rather than the entire IPM package. The diffusion of IPM knowledge and strategies to farmers who did not participate in the FFS appears to have been limited.

Key words: technology transfer, farmer field schools (FFS), integrated pest management (IPM), adoption, Uganda

Acknowledgement
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Introduction

Throughout sub-Saharan Africa there is a growing consensus that inadequate systems and methods of technology transfer have limited rapid and broad-based dissemination and adoption of many improved agricultural technologies including integrated pest management (IPM) strategies (Rajotte, Norton, Luther, Barrera, & Heong, 2005; Gutierrez, 2003; Maredia & Minde, 2002; Morse & Buhler, 1997). This has led to a search for and experimentation with alternative methods of technology design and dissemination. In the 1980s, participatory agricultural research (PAR) emerged as an attempt to enhance technology suitability and transfer by engaging farmers in the research process.

IPM farmer field schools (FFS) emerged out of participatory farmer training activities in Southeast Asia in the late 80s as an approach to reach larger numbers of farmers with essential IPM principles and scientifically derived knowledge and practices (Simpson & Owens, 2002; Feder, Murgai, & Quizon, 2003). The perceived success of IPM FFS, particularly in Indonesia, in training large numbers of farmers and reducing the use of synthetic pesticides, led to the adaptation and application of this approach to other topics and to other areas of the world (Quizon, Feder, & Murgai, 2001; Tripp, Wijeratne, & Piyadasa, 2005).

From 1995-2000, the Integrated Pest Management Collaborative Research Support Program (IPM CRSP) used a PAR approach at on-farm research sites in eastern Uganda to promote IPM and develop IPM strategies for small scale farmers growing cowpea, groundnuts, and sorghum. An evaluation of this project conducted in 2000 concluded that although participating farmers demonstrated a greater knowledge of IPM than non-participants, the number of project beneficiaries was relatively small and IPM knowledge diffusion was limited (Erbaugh, Donnermeyer & Kibwika, 2001). In an attempt to scale-up and reach more farmers, the IPM CRSP combined with the Rockefeller Forum supported Makerere University Grain Legume Project (MUGLP) in 2001, to implement modified farmer field schools with groups of farmers in eastern Uganda.

The primary objective of the FFS was growing a “healthy crop” and the experiential learning approach, a cornerstone of FFS, was adhered to in covering additional topics including pest and disease identification, agro-ecological interactions, and implementing participatory field trials. An additional objective of the IPM CRSP FFS was to communicate and demonstrate cowpea specific IPM strategies that had been developed during the previous six years of participatory agricultural research. Although some argue that the main objective of FFS should be to convey some combination of farmer empowerment, improved farmer decision making and critical thinking skills, others maintain that measuring these outcomes is often difficult and ignores the essential rationale of agricultural development activities to improve small farmer livelihoods through the dissemination of improved farming practices (Bunyatta, Mureithi, Onyango, & Ngesa, 2006; Tripp et al., 2005).

To accomplish these objectives the field school syllabus was modified to focus on the demonstration and dissemination of crop specific IPM strategies. The expected outcomes were to be increased knowledge of IPM, adoption of crop specific IPM strategies, and the diffusion of knowledge and practices via farmer-to-farmer communication. Groups of 20-25 farmers were asked to attend one session every two weeks over the length of an entire growing season or 16 weeks. Each FFS was facilitated by an extension worker who had attended a training-of-trainers workshop (Amujal, 2004).

This study assessed the impact of FFS on IPM knowledge and the theoretical link between increased knowledge on the adoption of IPM strategies. Previous research in the diffusion of agricultural innovations asserts that awareness and knowledge of a new technology is a necessary first step in the adoption, decision-making process (Rogers, 1995). Although a range
of IPM FFS assessments have now been conducted there is little agreement as to the framework for these evaluations (van den Berg, 2004; Simpson and Owens, 2002; Quizon et al., 2001). This assessment was conducted to evaluate, modify, and improve the effectiveness of IPM FFS programs in Uganda by the IPM CRSP.

**Purpose and Objectives**

The main purpose of this study was to assess the impacts of FFS on the adoption of cowpea-specific IPM strategies by farmers in eastern Uganda. The theoretical relationship between enhanced IPM knowledge and adoption is also examined. Traditionally, IPM program effectiveness has been evaluated by assessing the adoption of new technologies and monitoring reductions in pesticide use (Zalom, 1993; Tripp et al., 2005). Participatory approaches and FFS have placed more emphasis on increasing knowledge and awareness of key concepts and creating better farm managers through the development of critical thinking skills. This evaluation is an attempt to provide a framework for merging these two approaches by assessing both increases and adoption of IPM strategies. The specific objectives are to: (a) compare FFS participants and non-participants on knowledge of IPM; and, (b) compare FFS participants and non-participants on the adoption of IPM strategies for cowpea.

**Methodology**

**Evaluation Approach**

The assessment of FFS participation on the adoption of IPM strategies corresponds to the model suggested by Bennett and Rockwell in Targeting Outcomes of Programs (TOP) (1995). Their model involves seven stages to guide both program development and program performance assessment. These stages are arranged in ascending order with each stage serving as a step towards achieving higher order program impacts. This particular assessment focused on stages five (knowledge, attitudes, skills and aspirations) and six (adoption of practices), with the assumption that changes in stage five, as a result of participation in FFS (stages two through four), will lead to changes in stage six. Increased awareness and knowledge are generally considered prerequisites to the adoption of new practices and technologies, including IPM (Rogers, 1995). Since farmer adoption of IPM strategies was an important project goal and FFS objective, this study assesses the effectiveness of FFS in achieving this goal.

**Population and Sample**

A multi-staged sampling procedure was used to select farmer field school participants and non participants from Kumi and Pallisa districts in eastern Uganda. These two neighboring districts were purposively selected because they are two of the most important cowpea growing districts in Uganda; and share similar agro-ecologies, an ox-plough based farming system and ethnic composition. FFS participants were selected from lists of farmers who had participated in one of six FFS, 3 per district, during the previous year. A systematic random sample of 15 farmers was selected from each FFS list, totaling 45 per district and 90 FFS participants in all.

**Control Group**

One of the basic principles of impact evaluation design is selection of a control group (Bamberger, Rugh, Church, & Fort, 2004). Non participants were selected to serve as a control group and were defined as those who had not participated in any field school activities. There was no assumption that non participants had not received any information about IPM or cowpea IPM strategies. To the contrary, sampling of non participants was purposively conducted in three parishes bordering each FFS to look for any spill-over effects from the field schools. In
each of these parishes lists of farmers were obtained from Local Council officials, and five names per parish were randomly selected. The process resulted in the selection of 90 farmers who had not participated in FFS. The final sample consisted of 90 FFS participants and 90 non-participants for a total sample size of 180.

Data Collection and Instrumentation

A draft questionnaire was assembled from previous instruments used to examine socio-economic background characteristics, pest management practices, knowledge of IPM attributes, and FFS assessments. Added to the instrument were specific questions designed to measure adoption of four cowpea specific IPM strategies. The questionnaire was vetted in an intensive two-day session with enumerators. The goals of the training were to have field enumerators contribute to instrument design; insure their understanding of the instrument; and identify sampling frames. Revisions to the instrument included the deletion of several items to reduce the length of the questionnaire. Six extension workers (four female and two male) who had earlier participated in a pre and post test assessment of FFS (Amujal, 2004) were used as enumerators for this study because they were familiar with study objectives and had been previously screened for familiarity with the local language (Iteso), and knowledge of survey methodology and the local farming system. A one-day training workshop for enumerators was held to review the final questionnaire. A pre-test of the instrument was conducted by teams of enumerators with five farmers. All questionnaires were completed through personal interviews conducted by one of the six interviewers. Each enumerator completed 30 questionnaires with either FFS participants or non participants.

Group Comparability

To assess the impacts of FFS on knowledge of IPM and the adoption of IPM strategies, the degree of comparability between FFS participants and non participants was assessed. This was deemed necessary to check for sample selection bias. Using a T-test of mean differences, the two groups are compared on the basis of socioeconomic criteria including sex, age, years of education, household size, farm size, acres in crops and cowpea, and total family income.

IPM Knowledge

Knowledge of an innovation is usually preceded by awareness of a need, and it is need-awareness that precipitates active knowledge seeking behavior in order to address the need. Since IPM is a multi-dimensional concept (Dent, 1995), a summated ratings scale consisting of four attributes, with a score range of 0-11, was devised to measure farmers’ knowledge of IPM. Each of these knowledge attributes were considered fundamental to a strong working knowledge of IPM and have been validated in previous IPM studies in Uganda (Erbaugh, et al., 2001; Morse & Buhler, 1997). The coefficient of reliability for the knowledge of IPM scale was .84, indicating an acceptable level of reliability (Nunnally, 1978, p. 245). The first item requested interviewers to evaluate farmers’ ability to define these dimensions or attributes of IPM on 0-2 scale, where 0 indicated an inability to define IPM; 1, indicated a partial definition of IPM; and, 2, indicated a more complete definition. Partial and more complete definitions were scored if farmers mentioned one or more of the attributes of IPM including, reducing use of pesticides or using them selectively, using alternative practices besides pesticides to control pests, or protecting beneficial organisms. The second item asked farmers if they were aware of any harmful effects from using pesticides, and was coded 0 if they were unaware; and 1-3 if they were aware of one or more of the potential harmful impacts from using pesticides. A third item asked farmers if they could name any beneficial insects, with a no response coded 0, and naming beneficial insects coded 1-3. The fourth item asked farmers if they knew other practices to
control pests and diseases besides using pesticides, with a no (0) response indicating that they were not aware of other means to control pests besides using pesticides and the mentioning of alternative control methods coded 1-3. Alternative control methods mentioned included crop rotation, fallowing, increasing plant populations, roguing diseased plants, hand-removal of pest species, using homemade concoctions, use of locally available bio-rational products, and use of resistant or tolerant varieties.

Factors Associated with Adoption of IPM

The traditional diffusion model has long been employed in the U.S. and sub-Saharan Africa to explain the adoption of farm technologies (Rogers, 1995). However, factors associated with the adoption of IPM practices in developing countries are not well documented. The basic premise of the diffusion model is that adoption behavior is influenced by personal background characteristics, or human capital, such as experience or its surrogate age, and level of education that, in turn, facilitate understanding, access, and exposure to information associated with a particular technology (Pfeffer, 1992; Padel, 2001). Participation in FFS is a direct measure of farmers’ access to information. Age and years of education were continuous variables. Education was measured by the number of years of formal education completed. Gender also has been suggested as an important background characteristic that affects access to information and influences adoption (Blumberg, 1992). Sex was a dummy variable with women coded 0, and men coded 1. Others have argued that adoption is better explained by the differential possession of economic assets such as capital and land (Hooks et al., 1983). Total family income was measured as the approximate mean annual farm and off farm incomes separately in Uganda shillings (UGS). Cowpea acreage is the amount of land in cowpea production and was used instead of total farm size because it more accurately reflected each household’s resource capacity for putting land into production and the priority of cowpea in the farming system. Adoption of new technologies has long been linked with need (Rogers, 1995), and thus it was assumed that those with greater cowpea acreage would have more need and be more willing to adopt improved cowpea growing methods such as IPM. Distance (kilometers) to sources of inputs such as pesticides can also affect their use. In this case, distance is used as a proxy for capturing the substitutability between IPM strategies and synthetic pesticides. Finally, Lucas and Freedman (1983) note that IPM, in most cases, substitutes knowledge for capital, implying that knowledge of a complex technology such as IPM is critical to adoption.

Adoption of Cowpea Specific IPM Strategies

Through the PAR activities of the IPM CRSP, five IPM strategies were developed for managing the most important pests and diseases of cowpea in eastern Uganda. The first strategy was early planting and was defined by farmers as occurring 7-10 days following the onset of rains. Early planting is important to avoid the build-up of destructive pest populations. The second strategy was correct plant spacing and density. Besides facilitating improved crop management, proper plant density controls the humidity levels between plants which can reduce plant diseases and certain insect pests (Adipala, Obuo, & Osiru, 1997). The recommended plant spacing was 60 cm X 20 cm, which converted to 15-21 plants per square meter. Plant density was measured in each farmer’s field by placing a 1m X 1m quadrant in the center of the field and then counting the number of plants. This strategy was recommended to increase plant population and to counter the farmers’ traditional practice of broadcast seeding. The third strategy was growing an improved cowpea variety, MU.93, that displayed both insect and disease tolerance and was high yielding.

The fourth strategy was to use synthetic pesticides three times during the crop cycle at budding, flowering, and podding. An earlier baseline study found that farmers in eastern Uganda
sprayed their cowpea as much as ten times per season (Erbaugh, Kyamanywa, Epieru, & Mwanje, 1999). The fifth strategy advised farmers to scout their fields on a regular basis for destructive pests and diseases and to spray only when pests were observed in the field as opposed to the traditional farmer practice of spraying regularly following plant emergence.

All five IPM strategies (see Table 1) were coded 0, if farmers had not adopted; coded 1, if they had adopted the specific strategy and combined into two summated adoption scales. Adoption scale “A” used all five IPM strategies, had a score range of 0-5, and a coefficient of reliability of 0.64. Scale reliability was lowered by including the three-spray strategy. However, it was decided to retain this strategy in scale “A” because it had been field-tested and recommended. Adoption scale “B” combined four strategies by dropping the three-pesticide-spray strategy. It had a score range of 0-4, and a coefficient of reliability of 0.66.

Table 1

<table>
<thead>
<tr>
<th>IPM Strategies</th>
<th>Range</th>
<th>Early Planting</th>
<th>Plant Spacing</th>
<th>Improved Variety</th>
<th>Field Scouting</th>
<th>Pesticide Sprays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Planting</td>
<td>0-1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Plant Spacing</td>
<td>0-1</td>
<td>.300**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Improved Variety</td>
<td>0-1</td>
<td>.266**</td>
<td>.628**</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Field Scouting</td>
<td>0-1</td>
<td>.101</td>
<td>.370**</td>
<td>.297**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pesticide Sprays</td>
<td>0-1</td>
<td>.169</td>
<td>.212**</td>
<td>.141</td>
<td>.112</td>
<td>-</td>
</tr>
<tr>
<td>Scale Total</td>
<td>0-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.86</td>
<td>.24</td>
<td>.27</td>
<td>.22</td>
<td>.59</td>
<td>.53</td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>1.45</td>
<td>.43</td>
<td>.44</td>
<td>.41</td>
<td>.49</td>
<td>.50</td>
</tr>
</tbody>
</table>

** Correlation significant at .01 level; * Correlation significant at .05 level

Data Analysis

A t-test of mean differences was used to assess the impact of FFS on awareness/knowledge of IPM. A summated ratings scale consisting of five attributes of IPM knowledge was used as the dependent variable. To examine the effects of IPM knowledge on adoption of IPM strategies, a Poisson Event Count Model was estimated.

IPM systems (packages) generally consist of several interdependent strategies such as cultural controls, pest monitoring, host plant resistance and biological control agents. Each of these strategies could be adopted individually or in farmer-selected combinations based on their specific means and needs (Bentley and Andrews, 1996). In these cases, the decision to adopt is not binary – 0 for non-adoption and 1 for adoption – but is more likely to lie along a discrete continuum. In the current study the dependent variable takes on values ranging from 0 where no single strategy is adopted, to a value of 5 where all strategies of the IPM system are adopted.

The nature of the dependent variable is an important factor in determining the choice of estimation model, especially in cases where the dependent variable is both non-normal and discrete. A number of studies have ignored the discrete and non-normal nature of IPM adoption variable and considered the dependent variable as continuous and estimated adoption models using Ordinary Least Squares (OLS). Others have assumed that the dependent variable either takes on a value of zero where the farmer adopts none of the strategies, or a value greater than zero where the farmer adopts at least one of the strategies and estimated the model using either the Binomial Probit or Logit models. Selection of these estimation models introduces a number
of statistical or estimation errors. For instance, the use of Ordinary Least Squares (OLS) performs best only where the dependent variable is continuous and normally distributed, which is not the case in the present study. Moreover, the Binomial Probit or Logit models could be considered, however, the dependent variable (number of IPM strategies adopted) is not truly binomial as required for estimation of these models.

Event Count Duration Regression Models (ECDR) have been recommended for analyzing adoption of agricultural technological systems (packages) such as IPM strategies (Ramirez and Shultz, 2000). For this study a Poisson Event Count Regression Model was estimated using maximum likelihood approach in which the dependent variable is defined as the total number of possible IPM strategies that could be adopted by farmers. The advantage of this model is that it is able to address the non-normal distribution and the discrete nature of the dependent variable. Independent variables include farmer knowledge of IPM, distance to source of inputs, cowpea acreage, and socioeconomic factors including sex, age and average annual household income.

**Findings**

*Group Comparability*

Comparisons of FFS participants and non-participants on key socio-economic variables (see Table 2) indicate significant mean differences between the groups on sex, age, and years of education. Participants were more likely to be female, younger and have completed fewer years of formal education. For the sample population, men averaged 3 more years of education than women. There were no significant mean differences between the two groups on household size, farm size, crop and cowpea acreage, and total family income. The average total income for the sample population in US dollars was $390. Although participants had slightly larger total incomes, the average difference between the two groups was $33.

**Table 2**

*Means, Standard Deviations and Significance Levels of Socio-economic Characteristics for Farmer Field School (FFS) Participants and Non-Participants in Eastern Uganda*

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>FFS Participants N=90</th>
<th>FFS non-Participants N=90</th>
<th>df</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>.52 (.50)</td>
<td>.71 (.45)</td>
<td>178</td>
<td>2.64**</td>
</tr>
<tr>
<td>Age</td>
<td>36.02 (10.52)</td>
<td>39.02 (10.20)</td>
<td>178</td>
<td>1.94 *</td>
</tr>
<tr>
<td>Years of Education</td>
<td>5.03 (3.36)</td>
<td>6.87 (3.62)</td>
<td>178</td>
<td>3.52 **</td>
</tr>
<tr>
<td>Household size</td>
<td>9.08 (11.51)</td>
<td>8.25 (4.79)</td>
<td>178</td>
<td>-.631</td>
</tr>
<tr>
<td>Farm Size</td>
<td>5.67 (3.29)</td>
<td>5.66 (3.08)</td>
<td>178</td>
<td>-.035</td>
</tr>
<tr>
<td>Acres in Crops</td>
<td>3.96 (2.42)</td>
<td>3.99 (2.07)</td>
<td>178</td>
<td>.107</td>
</tr>
<tr>
<td>Acres in Cowpea</td>
<td>.86 (.69)</td>
<td>.80 (.61)</td>
<td>178</td>
<td>-.683</td>
</tr>
<tr>
<td>1Total Income (Farm &amp; off-farm)</td>
<td>6.03 (5.64)</td>
<td>5.64 (2.29)</td>
<td>160</td>
<td>-.932</td>
</tr>
</tbody>
</table>

Values in parentheses are standard deviations; 1Equal Variance not assumed; * t-test significant at p < .05; ** t-test significant at p<.01
Knowledge of IPM

A T-test of mean differences between FFS participants and non participants was used to assess the impact of FFS participation on a summated ratings scale of IPM knowledge (Table 3). For each IPM knowledge attribute and for the total IPM knowledge scale, a statistically significant difference was found between the two groups. For all items in the scale, mean scores were higher among farmers who had participated in FFS indicating that FFS were effective in improving knowledge of IPM.

Table 3
Means, Standard Deviations and Significance Levels for Items Comprising IPM Knowledge Scale by Farmer Field School (FFS) Participants and non-Participants in Eastern Uganda

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Range</th>
<th>FFS Participants N=90</th>
<th>FFS non-Participants N=90</th>
<th>df</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define IPM</td>
<td>0-2</td>
<td>1.62 (.57)</td>
<td>.19 (.42)</td>
<td>163</td>
<td>-19.13**</td>
</tr>
<tr>
<td>ID Beneficial Insects</td>
<td>0-3</td>
<td>1.90 (.97)</td>
<td>.45 (.80)</td>
<td>172</td>
<td>-10.83 **</td>
</tr>
<tr>
<td>Negative Effects of Pesticides</td>
<td>0-3</td>
<td>1.77 (.09)</td>
<td>1.19 (.96)</td>
<td>178</td>
<td>-4.09 **</td>
</tr>
<tr>
<td>Aware of alternative pest mgt. practices</td>
<td>0-3</td>
<td>2.07 (.94)</td>
<td>1.03 (1.18)</td>
<td>170</td>
<td>-6.46**</td>
</tr>
<tr>
<td>IPM Knowledge Scale</td>
<td>0-11</td>
<td>7.35 (2.63)</td>
<td>2.85 (2.61)</td>
<td>178</td>
<td>-11.47**</td>
</tr>
</tbody>
</table>

Scale Adjusted Cronbach’s Alpha = .84; Values in parentheses () are standard deviations; ¹Equal Variances not assumed; * t-test significant at p < .05; ** t-test significant at p<.01

Adoption of Cowpea IPM Strategies

Zero-order correlations among all variables in the model along with means and standard deviations are presented in Table 4. Considering that FFS participants were more likely to be female, younger, and have fewer years of education, all relationships between independent variables and dependent variables are in the expected direction except for total income. The correlation for total income suggests that those with higher total incomes were less likely to adopt IPM strategies. Adoption of IPM strategies was most highly correlated with IPM knowledge, followed by years of education, acres in cowpea, and total income. All other correlations were not significant at the P ≤ .05 level.

The adoption of specific IPM strategies by FFS participants and non participants is shown in Table 5. Although there are significant mean differences between the two groups on the adoption of all IPM strategies, only FFS participants adopted the strategies of plant spacing and using the improved variety. FFS participants were also more likely to be doing field scouting. Although participants were more likely than non participants to have adopted the 3-spray and early planting strategies, almost as many non-participants had adopted the three-spray strategy and very few of either group adopted early planting.
Table 4
Zero-order Correlations between Adoption of IPM Scales and Independent Variables

<table>
<thead>
<tr>
<th>N = 180</th>
<th>Adoption IPM</th>
<th>Sex</th>
<th>Age</th>
<th>Educ. Level</th>
<th>Total Income</th>
<th>IPM Know.</th>
<th>Cowpea acres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>-.055</td>
<td>-.099</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.057</td>
<td>-.043</td>
<td>.015</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>-.171*</td>
<td>-.236**</td>
<td>.406**</td>
<td>-.066</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Income</td>
<td>-.115</td>
<td>-.156*</td>
<td>.057</td>
<td>-.105</td>
<td>.178**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>IPM Knowledge</td>
<td>.557**</td>
<td>.553**</td>
<td>.029</td>
<td>-.114</td>
<td>.082</td>
<td>.150*</td>
<td>-</td>
</tr>
<tr>
<td>Cowpea acres</td>
<td>.218**</td>
<td>.198**</td>
<td>.118</td>
<td>.009</td>
<td>.089</td>
<td>.274**</td>
<td>.176**</td>
</tr>
<tr>
<td>Mean</td>
<td>1.85</td>
<td>1.32</td>
<td>.62</td>
<td>37.5</td>
<td>5.95</td>
<td>5.84</td>
<td>5.11</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>1.44</td>
<td>1.25</td>
<td>.49</td>
<td>10.4</td>
<td>3.60</td>
<td>2.80</td>
<td>3.45</td>
</tr>
</tbody>
</table>

** Correlation significant at .01 level; * Correlation significant at .05 level;
A - Includes 5 IPM strategies: planting date, spacing, field scouting, improved variety, and pesticide application timing.
B - Includes 4 IPM strategies described in “A” but excludes pesticide application timing.

Table 5
Means, Standard Deviations and Significance Levels for cowpea IPM Strategies comprising the Adoption Scales by Farmer Field School (FFS) Participants and non-Participants in Eastern Uganda

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Range</th>
<th>FFS Participants N=90</th>
<th>FFS non-Participants N=90</th>
<th>df</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Early Planting</td>
<td>0-1</td>
<td>.31 (.46)</td>
<td>.18 (.38)</td>
<td>178</td>
<td>-2.09**</td>
</tr>
<tr>
<td>1Plant Spacing</td>
<td>0-1</td>
<td>.53 (.50)</td>
<td>.00 (.00)</td>
<td>178</td>
<td>-10.08**</td>
</tr>
<tr>
<td>1Improved Variety</td>
<td>0-1</td>
<td>.43 (.09)</td>
<td>.00 (.00)</td>
<td>178</td>
<td>-8.25**</td>
</tr>
<tr>
<td>1Field Scouting</td>
<td>0-1</td>
<td>.82 (.38)</td>
<td>.36 (.48)</td>
<td>178</td>
<td>-6.98**</td>
</tr>
<tr>
<td>3-Pesticide Sprays</td>
<td>0-1</td>
<td>.61 (.49)</td>
<td>.45 (.50)</td>
<td>178</td>
<td>-11.47**</td>
</tr>
<tr>
<td>1Adoption Scale – A</td>
<td>0-5</td>
<td>2.71 (1.41)</td>
<td>1.00 (.86)</td>
<td>178</td>
<td>-9.83**</td>
</tr>
<tr>
<td>1Adoption Scale - B</td>
<td>0-4</td>
<td>2.10 (1.23)</td>
<td>.54 (.64)</td>
<td>178</td>
<td>-10.66**</td>
</tr>
</tbody>
</table>

Values in parentheses ( ) are standard deviations; 1Equal Variances not assumed;
* t-test significant at p <. 05; ** t-test significant at  p<.01

Poisson regression results for both adoption scales are presented in Table 6. These results indicate that the independent variables included in the model explain a significant proportion of variance for both IPM adoption scales, accounting for nearly 30% in the five strategy scale (scale A), and 34% in the four strategy scale (scale B). Strategy scale B performs better that scale A, presenting larger and more significant coefficients. Farmer’s level of IPM knowledge has the largest effect on adoption of IPM strategies for both scales. Possession of IPM knowledge significantly increases (P<0.01) the probability of adopting an IPM strategy by about 23 percentage points for scale A and 31 percentage points for scale B. Cowpea acreage, farmer’s level of education, total family income and distance to sources of inputs are also found to significantly affect the adoption of IPM strategies. An increase in cowpea acreage by one acre increases the possibility of adopting an additional IPM strategy by 20 percent for scale A and 30 percent for scale B. This indicates that farmers who rank cowpea high in importance are more
likely to adopt IPM strategies. The study also finds that farmers who live farther away from input (synthetic fertilizers and pesticides) sources are more likely to adopt IPM strategies. This finding suggests that farmers with less access to inputs are more likely to substitute such inputs with IPM strategies. For each additional kilometer a farmer lives from the input source, the likelihood of adopting an additional IPM strategy increases by 2 percent. Results for education and gender conflict with the expected positive effect. This is most likely attributable to the composition of the FFS sample being mostly women and with lower education level compared to the non-FFS participants. The notion that poorer farmers are less likely to adopt technologies is not supported by this study. This finding is similar to that found by Octavio and Shultz (2000). Income level exhibits a negative effect on adoption of IPM strategies. For an additional Uganda Shilling that a farmer earns per annum, the possibility of adopting an IPM technology is reduced by about 9 percentage points. Age and sex of the farmer do not significantly affect adoption of IPM strategies.

Table 6
Poisson Model Estimation of the Factors that Influence the Adoption of IPM Strategies (N=180)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter</th>
<th>S.E.</th>
<th>Parameter</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPM knowledge</td>
<td>0.232**</td>
<td>0.019</td>
<td>0.305**</td>
<td>0.034</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.189</td>
<td>0.109</td>
<td>-0.272</td>
<td>0.156</td>
</tr>
<tr>
<td>Education</td>
<td>-0.091**</td>
<td>0.016</td>
<td>-0.123**</td>
<td>0.023</td>
</tr>
<tr>
<td>No of cowpeas acres</td>
<td>0.212*</td>
<td>0.062</td>
<td>0.339**</td>
<td>0.087</td>
</tr>
<tr>
<td>Total Family income</td>
<td>-0.115**</td>
<td>0.023</td>
<td>-0.174**</td>
<td>0.032</td>
</tr>
<tr>
<td>Age</td>
<td>-0.006</td>
<td>0.005</td>
<td>-0.012</td>
<td>0.007</td>
</tr>
<tr>
<td>Distance to source of</td>
<td>0.027**</td>
<td>0.008</td>
<td>0.035**</td>
<td>0.010</td>
</tr>
<tr>
<td>inputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.146</td>
<td>0.321</td>
<td>-0.068</td>
<td>0.537</td>
</tr>
<tr>
<td>Pseudo R-square</td>
<td>0.295</td>
<td>0.34</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure in parentheses are robust standard errors; Level of significance: ** 1% , * 5%

Conclusions

IPM Farmer Field Schools (FFS) have been deployed around the world since their success in Southeast Asia. However, assessments are needed to evaluate, modify and improve their effectiveness. This assessment indicates that FFS are effective in increasing IPM knowledge, and IPM knowledge is the most important variable in explaining the adoption of IPM strategies. These findings provide a confirmation of the adoption decision making process and also a validation of FFS as an effective mechanism for increasing both knowledge of IPM and the adoption of cowpea specific IPM strategies.

Adoption of cowpea IPM strategies is largely explained by participation in FFS. That farmers with less education were more likely to adopt IPM strategies is related to FFS participants having less education. This would also explain the negative but non-significant findings for sex and age. Both women and younger farmers were more likely to have been FFS participants. Farmers with more total income are less likely to have adopted IPM strategies. This may be related to their having other on or off-farm income generating priorities other than cowpea that reduces their interest, time, and willingness to take on additional risks associated with adoption of new practices. However, farmers with more cowpea acreage are more likely to adopt IPM strategies. These farmers’ view cowpea as a priority crop and are thus more interested in adopting improved methods for growing their cowpea.
Independent variables were slightly more successful in explaining the adoption of IPM strategies in scale B than in scale A. In scale B the IPM strategy of 3 pesticide sprays was dropped because it was not highly correlated with the other strategies. In part, this can be explained by the fact that about twenty percent of the FFS participants and non-participants sprayed less than three times because they did not have access to funds necessary to purchase the pesticides or to pay someone else to spray their fields. It appears that the 3-spray strategy represents a slightly different phenomenon than the other IPM strategies in that it requires capital to adopt the strategy. It also indicates that communicating the IPM message of reduced pesticide usage has not been totally accepted by farmers; they still like to use pesticides whenever they can afford them.

The adoption pattern of other IPM strategies indicates other revealing features. Field scouting was widely adopted by FFS participants and some non participants and is an activity many farmers take for granted. Early planting was the least adopted strategy by FFS participants. Adopting this practice is constrained by a lack of available labor and mechanization (animal traction) for land cultivation and planting at the onset of rains, and is a traditional labor bottleneck confronting many small scale farmers in eastern Uganda. Since early planting is a beneficial practice for most crops, the decision as to which crop to plant first is a matter of farmer experience. The adoption of plant spacing and the improved cowpea variety are clearly associated with participation in FFS. The communication of these two strategies to farmers may have been facilitated because these two strategies are divisible and compatible with the existing farming system.

This situation serves as a reminder to policy-makers and practitioners responsible for the design of technology transfer of agricultural innovations that they should not think of adoption in “all or nothing” terms. Farming in any given environment represents a set of specific and inter-related tasks, creating a complexity that cannot be fully anticipated during the development of planned programs for the dissemination of new agricultural innovations. New strategies, like IPM, may be introduced as a total package, but are actually comprised of various components, each entailing a specific set of decisions and actions. Factors like climate, agro-ecology, labor availability, and market access, among others, cause farmers to adjust their strategies as they go about their farm-level decision-making. Hence, what growers learn at a FFS or some other educational setting may not be completely adopted. This is not, however, an indication that the transfer strategy failed. To the contrary, re-invention, that is, the process by which an innovation as a bundle of specific practices is adapted to local conditions and circumstances, is critical to its utilization (Rogers, 1995). A package that allows farmers to partially adopt various components is better because it more accurately reflects the actual context of farm-level decision making.

Another implication of this study for extension programs in all countries is that the strategy of sustained (repeated and over time) field-based extension education is important. Behavioral change, or in this case the adoption of a complex agricultural technology such as IPM, cannot be expected without a sustained educational effort to raise awareness, technological understanding and competence, and lower perceptions of risk (Rogers, 1995). The extension agent who can take a message to the field and provide follow-up visits is more likely to be successful. One-off messages or extension contacts with farmers are not likely to yield adoption results. Repeated contacts by extension agents over a period of time, as suggested in the FFS approach, are more likely to yield desired results.

The diffusion of IPM knowledge and strategies to farmers who did not participate in the FFS appears to be limited. This may be attributed to the relatively short time (seven months) between the end of the FFS and when the assessment took place. Perhaps those who attended the farmer field schools have talked to those who did not about the advantages of using various IPM strategies, and adoption will follow as soon as the next growing season begins. However, it is
also possible that non-participants may not follow the lead of participants. Ecological strategies
like IPM may need to be used on a sustained basis, that is, for more than one growing season,
before benefits emerge. For non-adopters, especially those who did not participate in the field
farmer schools, recognizing the benefits of an IPM approach, particularly if those benefits only
emerge over time, may impede rapid adoption. This argues for a longer time horizon to be built
into the design of impact assessments particularly those that are assessing impacts of informal
communication among farmers.

Finally, it appears that the FFS have been able to reach greater numbers of farmers
(scaling-out) in a shorter period of time than the PAR approach. FFS activities reached 150
farmers in one year and PAR activities worked with approximately 60 farmers over the course of
six years. This is to be expected, considering that the two programs had different goals and
levels of programmatic intensity. The goal of PAR activities was to develop and test alternative
IPM strategies with a hoped for diffusion of knowledge and practices. The PAR phase of the
project used teams of scientists and graduate students to work with farmers over the course of
several seasons to develop IPM strategies. As noted in an earlier evaluation, very little farmer-to-
farmer diffusion occurred. The main goal of the FFS was to increase farmer knowledge of IPM
and to promote adoption and diffusion of IPM strategies developed by PAR activities. The
program engaged farmers on a bi-weekly basis to discuss, demonstrate, and test IPM strategies.
As was the case for PAR activities, it appears that very little diffusion occurred beyond the FFS
groups. This perhaps indicates that farmer-to-farmer diffusion of information is difficult to
measure and attribute; requires more time; or, in the case of complex technologies such as IPM
is not likely to broadly occur unless the results of technological adoption are dramatic and
clearly visible. In the case of this study, the programmatic advantages of FFS in terms of
scaling out and adoption appear to be clear, however, the financial sustainability of FFS is
unclear and will await future evaluations.

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Attitudes of Advisory and Extension Agents Towards People with Mental Health Problems

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Abstract

In Queensland Australia extended drought has had negative impact on the mental health of farmers who are often geographically isolated. Advisory and Extension Agents are often their main contacts. At the behest of extension agencies a two-day mental health first aid training was provided to 32 AEA to improve their attitudes towards people with mentally health problems. Immediately prior to the course and six months after training information about attitudes towards people with mental health problems were collected from the AEA using the data collection instrument. The findings indicated that the training had significantly improved the attitudes of AEAs towards people with mental health problems and their ability to help them. Females and older AEAs with less work experience demonstrated more positive attitudes towards people with mental health problems after the training than males, and younger AEAs.

Keywords: mental health, training, farmers, advisory agent, attitudes

Acknowledgement

This study was funded by a Foster's Community Grant.
Introduction

Australian Health and Welfare statistics demonstrate that the health of rural communities in general is lower than that of urban communities (Australian Institute of Health and Welfare, 1998). In particular cancer, heart disease, stress and suicide rates are higher (Brumby, Martin, & Willder, 2005). The vulnerability of farmers to stress has been documented (Sanne, Mykletun, Dahl, Moen, & Tell, 2003) and authors of a recent review of literature concluded that the farming environment has a unique set of characteristics that are potentially hazardous to mental health (Fraser et al., 2005). Contributory factors to the stress upon farmers include production demands, financial uncertainty, weather patterns, long work hours, inter generational relationships and an ageing population (Centre for Rural and Mental Health, 2005). These issues accelerate depression and stress that affect mental health and may end in suicide (Booth, Briscoe, & Powell, 2000).

Previous research into mental health issues in rural Australian communities has shown that there is a general lack of understanding regarding mental health issues and reduced accessibility to mental health services in rural areas (Turpin, Bartlett, Kavanagh, & Gallois, 2007). Community surveys of mental health literacy have found that many members of the public lack knowledge about mental illness: they do not correctly recognise specific illness, have simplistic beliefs about causes, and frequently hold stigmatizing attitudes (Angermeyer, Breier, Dietrich, Kenzine, & Matschinger, 2005; Croghan et al., 2003; A. F. Jorm, Angermeyer, & Katschnig, 2000; Lauber, Nordt, Falcato, & Rössler, 2003; Magliano, Fiorillo, De Rosa, Malangone, & Maj, 2004; Martínez-González & Trujillo-Mendoza, 2005; A. F. Jorm, Kitchener, Kanowski, & Kelly, 2007; and Priest, Vize, Roberts, Roberts, & Tylee, 1996). AEA do not routinely receive training in this area and this lack of knowledge and the stigma associated with mental illness contribute to the lack of appropriate support that may be offered (Wolff, Pathare, Craig, & Leff, 1996). There is a gap between required and existing knowledge, skills, attitudes and aptitude required to support people to efficiently and effectively solve their mental health problems.

Attitudes may be defined as the beliefs, feelings and action tendencies of individuals or group of individuals toward objects, ideas and people (Hutt & Vaize, 1966) and attitude is always related to the liking or disliking of an attitude object and this in turn is always a result of what is known about that object (Rameela, 2004). Poor knowledge about mental illness and negative attitudes toward people with mental illness are widespread in the general public (Caldwell & Jorm, 2000; Gureje, Lasebikan, Ephraim-Oluwanuga, Olley, & Kola, 2005; Link, Phelan, Bresnahan, Stueve, & Pescosolido, 1999). While educational interventions can reduce stigma (Pinfield et al., 2003), stigmatizing opinions are not closely related to knowledge (Crisp, Gelder, Rix, Meltzer, & Rowlands, 2000). Although their “mental health literacy”—defined as the knowledge and beliefs about mental disorders (A. F. Jorm, 2000) - is not questioned, negative stereotypes and stigmatizing attitudes of mental health professionals toward people with mental illness are questionable (Turpin et al., 2007).

Some attitudes are formed based on the direct experience with the attitude object, while other attitudes may be acquired less directly. Experience may be direct personal experience or socially mediated experience, such as any verbal instruction about the object. Experience can be gained through family interactions, social environment, education and contact (Rameela, 2004). Age and sex also influence the attitudes of individuals. Melissa et al. (2006) found in their study that participants aged 27 to 40 years reported that they would accept people with mental health problems in their workplace. Males were less willing to accept services from these patients because they could not trust them.

In rural areas and particularly in the remote regions of Australia, Agricultural Extension Agents are often the first access points for those rural residents with mental health issues (Turpin et al., 2007). In that position is it recognised that AEA could contribute to well being by
providing support, yet they are limited by their qualifications, skills and role in what support they might offer (Turpin et al., 2007). Being at the forefront of contact with farming communities, AEA could benefit from the knowledge of how to assist people in the community. Therefore, there is a need to initiate effective measures to address mental health issues and support of this vulnerable group. One initiative is the delivery of need-based mental health training directed at the AEA, who are involved in working with rural farming communities.

By training them on mental health issues and individual resilience, it is anticipated that they would have increased positive attitudes and support farmers who are experiencing difficult times. The better knowledge of mental health would enhance the willingness of the AEAs to closely interact with their mentally ill clients (Nordt, Rössle, & Lauber, 2006).

A mental health first aid (MHFA) training programme was therefore organised which aimed to improve the mental health learning and attitudes towards people with mental health problems of AEA. The Advisory and Extension Agents in this study included Extension Officers, Landcare Officers, Financial Counsellors, Agribusiness Officers, Catchment Management Officers, Customer Service Officers, Facilitators, and Farm Inspection Officers all employed in rural areas of Queensland.

Purpose and Objectives
The main purpose of the study reported herein was to determine the attitudes of the Advisory and Extension Agents (AEAs) pertaining to their help and work with people with mental health problems in the rural areas. The specific objectives were:

1. to determine the attitudes of AEAs pertaining to work with the people with mental health problems in the rural areas;
2. to ascertain their ability to contact with and help people with mental health problems; and
3. to determine whether there are any significant differences in attitudes of the AEAs based on their age, sex, work experience and experience in mental health problems.

Methodology
Participants
Thirty two Advisory and Extension Agents (AEAs) from five organizations participated in the mental health training course. They were recruited from both government and non-government organizations working in Queensland, Australia; the Department of Primary Industries & Fisheries (DPI&F), the Department of Natural Resources & Water (DNRW), the Queensland Murray Darling Committee (QMD), AgForce and the Condamine Alliance (CA). Prior meetings with each organization had revealed interest in the program and the organizations solicited self nomination from within their staff. Once identified, the participants were divided into two groups balancing across the groups as much as possible for employer, sex and age. The initial intention was to do this randomly, however owing to ongoing job commitments some participants self selected into a group. The final distribution was 17 AEAs attended the training in September 2007 and 15 in March 2008.

Training
The mental health training program involved 12 hours of training over two consecutive days (Kitchener & Jorm, 2002). The course gave an overview of the major mental health problems in Australia, introduced the five steps of MHFA (i.e., assess risk of suicide or harm, listen non-judgementally, give reassurance and information, encourage to seek professional help, and encourage self-help strategies) and then applied these steps to problems of depression, anxiety disorders, psychosis and substance use disorders. Participants learned the symptoms of
these disorders, possible risk factors, and where and how to get evidence-based effective help. The course also covered how to help a person in the following mental health crisis situations: a person who is suicidal; a person having a panic attack; a person who has experienced a traumatic event; a person who is acutely psychotic and perceived to be threatening; and a person who has taken an overdose of drugs. Further details of the course can be found at the Mental Health First Aid website (www.mhfa.com.au). The same accredited instructors taught all the courses in both groups.

Data Collection

Testing of attitudes of the AEAs attending training on mental health issues of their rural clients (farmers) were based on MHFA course material developed by Kitchener and Jorm (2002). The survey instrument tests personal attitudes towards mental illness and the perceived attitudes of others towards mental illness. Cronbach's Alpha procedure was used to obtain reliability estimates of the attitudinal items in the instrument. The reliability coefficient was .84. Borg (1981) indicated that attitude scales with a reliability coefficient of .79 are considered to be median range, whereas those with coefficients above .79 are considered to have high reliability. Thus according to Borg the reliability of this instrument was very high and acceptable.

The item discrimination index analysis was also calculated by correlating item scores with total scale scores; this procedure was done by using SPSS Statistics 17.0. Ary, Jacobs, and Razarieh (1985) indicated that “each item should correlate at least .25 with the total score. Items that have a very low or negative correlation with the total score should be eliminated because they are not measuring the same things in the total scale and hence are not contributing to the measurement of attitudes” (p. 197). All the 19 items had fulfilled these criteria and were included in the instrument.

Pre training data were collected from all 32 participants immediately prior to their training course either in September 2007 or March 2008 using the data collection instrument. Six month follow up data were collected from the participants in March 2008 and September 2008 using mailed questionnaires. Two follow up mails were sent to increase the response rate of the participants and 27 completed questionnaires were returned and used for analysis.

Data Analysis

Data were analyzed using the SPSS statistics 17.0 program. Descriptive statistics such as frequency distribution, means and standard deviations were analyzed. Chi-square and independent sample t-test were used to determine significant differences between AEAs with regard to their pre and six month of training on their stigmatized attitudes towards people with mental health problems based on age, sex, work experience and experience with a mental health problem. A .05 level of probability was used as a basis for ascertaining the significant differences in responses of the participants.

One of the limitations of this study is the relatively small sample of Advisory and Extension Agents. Another possible limitation is that although the study was conducted with employees of the largest organizations employing AEAs in Queensland they are not necessarily representative either of small organizations or those throughout Australia. Ethical clearance for the study was received from the University of Southern Queensland’s Human Research Ethics Committee.
Results

Personal Profiles of Participants

The highest proportions of participants were female. The age of participants ranged from 21 to 60 years; the average being 38 (SD =13.14) years. The majority of participants (56%) had 5 or fewer years of work experiences. Nine of the participants indicated that they had experienced a mental health problem sometime in their life and 21 indicated that at least one of their family members had experienced a mental health problem.

Table 1
Personal Profile of the Participants

<table>
<thead>
<tr>
<th>Demographic Profile</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>13</td>
<td>41</td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>59</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>below 25</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>25-34</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>35-44</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>45 and above</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100</td>
</tr>
<tr>
<td>Years of working as an AEA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤5 yrs</td>
<td>18</td>
<td>56</td>
</tr>
<tr>
<td>&gt;5 yrs</td>
<td>14</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100</td>
</tr>
<tr>
<td>Ever experienced a mental health problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>28</td>
</tr>
<tr>
<td>No</td>
<td>23</td>
<td>72</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100</td>
</tr>
<tr>
<td>Someone in your family ever experienced a mental health problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21</td>
<td>66</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100</td>
</tr>
</tbody>
</table>

Attitudes of AEAs toward People with Mental Health Problems

The data collection instrument contained 19 statements pertaining to attitudes of the participants: nine statements were related to personal attitudes of the participants and the other ten statements were perceived attitudes. The mean ratings were calculated on a five-point Likert scale: 1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree and 5=strongly disagree.

Pre and Six Month of Training

Data in Table 2 indicated that the mean ratings of the participants in all the personal attitudinal statements at pre training ranged from 3.09 to 3.48, indicating their neutral level of attitudes towards people with mental health problems, whereas at six months of their training the mean ratings ranged from 4.11 to 4.81, indicating disagree to strongly disagree in the statements. That is at six months of their training the participants indicated positive attitudes toward people
with mental health problems. T-test results showed significant differences in mean ratings between pre and six month of training of AEAs for 8 of the 10 statements.

### Table 2

**Personal Attitudes of Respondents based on MHFA Training**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Training</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>Sig of t</th>
</tr>
</thead>
<tbody>
<tr>
<td>People with a mental health problem could snap out if it if they wanted</td>
<td>pre training</td>
<td>3.26</td>
<td>1.09</td>
<td>-4.65</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>4.37</td>
<td>.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A mental health problem is a sign of personal weakness.</td>
<td>pre training</td>
<td>3.48</td>
<td>1.12</td>
<td>-4.47</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>4.56</td>
<td>.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental health problem is not a real medical illness</td>
<td>pre training</td>
<td>3.48</td>
<td>1.09</td>
<td>-4.57</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>4.56</td>
<td>.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People with a mental health problem are dangerous.</td>
<td>pre training</td>
<td>3.32</td>
<td>1.04</td>
<td>-5.15</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>4.52</td>
<td>.64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is best to avoid people with a mental health problem so that you don't develop this problem.</td>
<td>pre training</td>
<td>3.87</td>
<td>.99</td>
<td>-4.63</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>4.81</td>
<td>.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People with a mental health problem are unpredictable</td>
<td>pre training</td>
<td>2.87</td>
<td>.80</td>
<td>-1.84</td>
<td>.07</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>4.93</td>
<td>.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I had a mental health problem I would not tell anyone.</td>
<td>pre training</td>
<td>3.39</td>
<td>.98</td>
<td>-2.91</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>4.11</td>
<td>.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would not employ someone if I knew they had a mental health problem.</td>
<td>pre training</td>
<td>3.06</td>
<td>.72</td>
<td>-3.01</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>3.23</td>
<td>1.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would not vote for a politician if I knew they had suffered a mental health problem</td>
<td>pre training</td>
<td>3.81</td>
<td>1.14</td>
<td>-1.86</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>3.70</td>
<td>.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall personal attitudes</td>
<td>pre training</td>
<td>3.32</td>
<td>.68</td>
<td>-5.09</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>4.37</td>
<td>.87</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Responses to perceived attitudes are presented in Table 3. The mean ratings of the participants in all the perceived attitudinal statements at pre and six months of training ranged from 2.51 to 3.23, indicating their neutral level of stigmatised attitudes towards people with mental health problems. T-test results indicated no significant differences in perceived attitudes between the pre and six month of training, for any of the items or overall.

Work experience also exhibited significant influence on overall personal attitudes ($t=-2.38$, $\alpha=.02$). That is those with more work experience had rated higher means indicating that they had more positive attitudes pertaining these statements than those who had less work experience. No significant differences were found in perceived attitude except in the case of *Most people believe that it is best to avoid people with a mental problem so that you don't develop this problem* ($t=-2.05$, $\alpha=.04$): the >5 years of work experience group rated higher mean ($\bar{x}=3.67$, SD=.58) in this statement than those of $\leq 5$ years of work experience ($\bar{x}=3.09$, SD=.66).

At six months of training, no significant differences were found in both personal and in perceived attitudes, except *Most people believe that it is best to avoid people with a mental...*
problem so that you don't develop this problem \((t=2.34, \alpha=.02)\): the \(\leq5\) years of work experience group had higher mean \((\bar{x} = 4.94, SD = .24)\) ratings than those with \(>5\) years of work experience \((\bar{x} = 4.60, SD = .60)\).

**Attitudes Based on Experience in Mental Health Problem**

Significant differences were found in four personal attitudinal statements, based on participant experience of mental health problem: *People with a mental problem could snap out if it if they wanted* \((t=-2.46, =.02)\); *it is best to avoid people with a mental problem so that they don't develop this problem* \((t=-2.37, =.02)\); *if I had a mental problem I would not tell anyone* \((t=-2.16, =.03)\); and *I would not vote for a politician if I knew they had suffered a mental problem* \((t=-2.01, = .05)\). This area also exhibited significant influence on the overall personal attitude of the participants \((t=-2.57, \alpha=.01)\) at pre training. No differences were found in perceived attitudes except of *Most people believe that people with a mental problem are dangerous* \((t=-2.11, \alpha=.04)\): those who had no experience of a mental health problem had rated significantly higher mean \((\bar{x} = 3.25, SD = .79)\) participants who had experience \((\bar{x} = 2.37, SD = .53)\).

Significant differences were found in two statements relative to personal attitudes: *People with a mental problem are dangerous* \((t=-2.21, \alpha=.03)\) and *I would not employ someone if I knew they had a mental problem* \((t=-2.66, \alpha=.01)\) after six months of training. The participants with experience of mental health problems differed significantly from those with none in overall personal attitudes \((t=-2.07, \alpha=.05)\). No significant differences were found between the groups in their perceived attitudes, except *If they had a mental problem most people would not tell anyone* \((t=3.02, \alpha=.01)\).

**Contact with People with Mental Health Problems**

Before the training the participants were asked to indicate whether they had contact with someone with mental health problems in the last six months. After the training the highest proportion of respondents (40%) indicated that they had a contact with someone with mental health problems \((\chi^2=6.209, df 2, \alpha=.04)\) (Table 4).

Further the participants were asked both in pre and after six months of their training whether they were able to help the people with mental health problems with whom they had had contact. After the training the highest proportion of respondents (38%) indicated that they were able to extend their help (Table 5). However, this proportion of increment was insignificant \((\chi^2=.424, df =1, \alpha=.51)\).

The participants who reported that they were able to help had offered varieties of help such as referral advice to go to General Practitioner (GP) in pre training, however, after the training they indicated that they had listened and talked to the person very carefully and advised different referral pathways to the clients.
Table 3
Perceived Attitudes of Respondents based on MHFA Training

<table>
<thead>
<tr>
<th>Statement</th>
<th>Training</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>Sig of t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most other people believe that people with a mental problem could snap</td>
<td>pre training</td>
<td>2.77</td>
<td>.84</td>
<td>.32</td>
<td>.75</td>
</tr>
<tr>
<td>out if it if they wanted.</td>
<td>six month</td>
<td>2.70</td>
<td>.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most people believe that a mental problem is a sign of personal weakness.</td>
<td>pre training</td>
<td>2.84</td>
<td>1.00</td>
<td>.25</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>2.78</td>
<td>.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most people believe that mental problem is not a real medical illness.</td>
<td>pre training</td>
<td>2.81</td>
<td>.79</td>
<td>.29</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>2.74</td>
<td>.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most people believe that people with a mental problem are dangerous.</td>
<td>pre training</td>
<td>3.10</td>
<td>.79</td>
<td>1.68</td>
<td>.09</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>2.74</td>
<td>.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most people believe that it is best to avoid people with a mental problem</td>
<td>pre training</td>
<td>3.13</td>
<td>.80</td>
<td>.72</td>
<td>.47</td>
</tr>
<tr>
<td>so that you don't develop this problem</td>
<td>six month</td>
<td>2.96</td>
<td>.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most people believe that people with a mental problem are unpredictable.</td>
<td>pre training</td>
<td>2.81</td>
<td>.79</td>
<td>.99</td>
<td>.32</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>2.59</td>
<td>.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If they had a mental problem most people would not tell anyone</td>
<td>pre training</td>
<td>2.74</td>
<td>.68</td>
<td>1.04</td>
<td>.29</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>2.52</td>
<td>.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most people would not employ someone if they knew they had a mental</td>
<td>pre training</td>
<td>2.58</td>
<td>.72</td>
<td>.45</td>
<td>.65</td>
</tr>
<tr>
<td>problem</td>
<td>six month</td>
<td>2.51</td>
<td>.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most people would not vote for a politician they knew had suffered a</td>
<td>pre training</td>
<td>2.94</td>
<td>.81</td>
<td>1.28</td>
<td>.20</td>
</tr>
<tr>
<td>mental problem.</td>
<td>six month</td>
<td>2.63</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would not vote for a politician if I knew they had suffered a mental</td>
<td>pre training</td>
<td>3.23</td>
<td>.92</td>
<td>1.08</td>
<td>.28</td>
</tr>
<tr>
<td>problem</td>
<td>six month</td>
<td>2.96</td>
<td>.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall perceived attitudes</td>
<td>pre training</td>
<td>2.89</td>
<td>.46</td>
<td>1.36</td>
<td>.17</td>
</tr>
<tr>
<td></td>
<td>six month</td>
<td>2.70</td>
<td>.60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 4
**Distributions of Participants based on Their Contact with Farmers by Training**

<table>
<thead>
<tr>
<th>Contact with Farmers</th>
<th>Pre Training (Percent)</th>
<th>Six Month (Percent)</th>
<th>$\chi^2$</th>
<th>Sig $\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the last six month have you had contact with farmer with mental health problem</td>
<td>Yes: 27, No: 1, Don't know: 9</td>
<td>Yes: 40, No: 14, Don't know: 9</td>
<td>6.209</td>
<td>.04</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 5
**Distribution of Participants based on Their Ability to Help People with Mental Health Problems by Training**

<table>
<thead>
<tr>
<th>Able to Help</th>
<th>Pre Training (Percent)</th>
<th>Six Month (Percent)</th>
<th>$\chi^2$</th>
<th>Sig $\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to do anything specific to help the people with mental health problems</td>
<td>Yes: 24, No: 24</td>
<td>Yes: 38, No: 14</td>
<td>.424</td>
<td>.51</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>52</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Discussion

The recipients of the Mental Health First Aid training programme clearly demonstrated an improvement in their attitudes to people with mental health problems from the first to the second period of assessment.

Recognition of mental illness also changed. After the training, the highest proportion of respondents indicated that they had a contact with someone with mental health problems and were able to extend their help. They reported that they had listened and talked to the person very carefully and advised different referral pathways to the clients. Whilst it is probable that the AEAs were exposed to people with similar health issues prior to the training they were unable to recognise the same.

Based on sex, no significant differences were found in most personal attitudes at six months follow up of training. The only statement for which there was a difference was *If I had a mental problem I would not tell anyone* for which female participants were more likely than their male counterparts to disagree to the statement. There is some evidence to suggest that women endorse less negative attitudes (Leong & Zachar, 1999) and behave more favourably toward the mentally ill than do men (Farina, 1981). Crisp (2001) also stated that females are more open than males.

That there were no significant differences in responses based on age was somewhat surprising. We had hypothesised that the older age AEAs would have wider experience about the various social issues and that might have had an influence on their attitudes. However, these findings are incongruent with Crisp, (2001); Hossain, Moore, and Elliot (1995); and Brockington, Hall, Levings, and Murphy (1993). Crisp (2001) found that younger people have a
positive attitude toward the people with mental health problem and Brockington et al. (1993) found in their study in England that that is was older people who were relatively intolerant and maintain negative attitudes. Likewise Hossain et al. (1995) found that younger participants expressed more favourable attitudes than did the older one.

At pre training assessment more positive attitudes were found in four of the items among those with longer work experience than those with less experience. However, six months after training, a significant difference was found only in two of the items showing that those with less experience had come closer to the attitudes of those with experience. It may be hypothesised that was due to the training, perhaps complemented by post training experience working with farmers.

Significant differences were found in the overall personal attitudes of the participants in both pre and post six months of training based on their experience with mental health problems. While all participants had a positive attitude towards those with mental health problems, those who had more experience with mental health problems were even more positive. This could be explained by the hypothesis that experience with people with mental health problems helped to dispel some of the negative myths, such as that people with mental health problems are dangerous.

**Educational Importance**

The study has enlightened the ability of the change agents (Advisory and Extension Agents) to provide effective assistances and services to their clients. The extension agents, who are a main line of contact of farmers, are able to recognize mental disorders of people and help them appropriately. After the training they are more willing to work with people who may otherwise not get support because of the stigma associated with their illness and know who to refer people to for help.

Research into mental health issues in rural Australian communities has shown that there is a lack of understanding regarding mental health issues, reduced accessibility to mental health services. This lack of knowledge and the stigma associated with mental illness contribute to the lack of appropriate support that may be offered to sufferers by Advisory and Extension Agents.

Advisory and Extension Agents, who have regular contact with farmers, are in a position to be the first to recognise a mental health concern and provide initial support, but they are limited by their qualifications, skills and role in what support they might offer. In order to do that, they need to understand the escalating factors of mental illness among the farming communities as well as the way of helping them. To increase the knowledge and skills of the Advisory Agents a Mental Health First Aid (MHFA) training program was organised and found that the training had improved the participants’ knowledge on various issues and ability to recognise various symptoms of mental disorders. This exposure helps them to change their attitudes and deal with mentally ill clientele more effectively. Eventually this training would alleviate the mental illness of the farming communities through building resilience, early intervention, community education, and support. Therefore, this type of mental health training should be encouraged both with agricultural extension agents and with other rural service providers – and in particular, private providers.

**Conclusions**

Following training the personal attitudes of AEAs toward people with mental health problems have been changed and they are more willing to work with their clients (farmers). In our social milieu there are strong, stigmatizing beliefs about the mentally ill. Following training, AEAs are better able to recognize mental disorders and more competent to provide help to
anyone with mental health problems. Their personal attitudes towards those suffering stigmatizing illness have been changed.

While more research is needed to clarify and extend these findings, this study provides strong evidence for the potential usefulness of incorporating mental health literacy into agricultural extension education and training programmes.

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Don’t Drink the Water: Recognizing the Fears Associated with International Extension Work

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Abstract

In order to serve all segments of the global population, it is increasingly important for Extension agents to work with diverse clientele. Participating in an international extension experience is an ideal way for an individual to develop a cultural identity by offering assistance beyond their borders. Many opportunities for international extension experiences exist, but most extension agents do not participate. In order to attract extension agents to international extension experiences, organizers need to recognize the fears associated with this type of travel and work to alleviate these concerns. The main purpose of this study was to identify the fear-related barriers keeping extension agents from participating in international extension experiences. A census survey of University of Florida extension agents measured fear-related barriers associated with international extension experiences. The study revealed significant relationships existed between selected locations and the level of fear-related barriers perceived. The less appealing locations substantially correlated to a higher level of fear-related barriers. To deal with these fear-related barriers, increased education surrounding the realities of these experiences is necessary. In addition, administrators must emphasize the importance of participating in international experiences through recognition tied directly to the efforts of those working internationally. Not only do fears need to be dispelled, but extension agents must see how international extension experiences enhance their role domestically to increase participation.

Keywords: Extension agents, barriers, fears, locations, professional development
Introduction

Global and cross-cultural competencies are becoming increasingly important as the global community becomes more diverse and integrated (Zhai & Scheer, 2002). Increased globalization has elevated the need for professionals with a global perspective. While researchers have documented the U.S. Cooperative Extension System’s support of international involvement, Extension continues to face problems in adapting to a global environment (Etling, Reaman, & Sawin, 1993; Place, Jacob, Andrews, & Crago, 2002). As leaders in bringing research-based education to the general population, extension agents must be educated to work with all segments of the population they serve (Ludwig & McGirr, 2003). That population is likely to include residents from multiple countries and ethnic backgrounds (Hoorman, 2002).

International experiences abroad offer an excellent way to develop an individual both personally and professionally (McGowan, 2007; Place, Vergot, Dragon, & Hightower, 2008). People are more likely to develop their own cultural, national, and global identities once they have had direct contact with foreign partners (Wingenbach, Chmielewski, Smith, Piña, & Hamilton, 2006). Behavioral changes brought about by first hand international experiences develop positive interactions and comfort when working with diverse clientele (Place et al., 2008). In addition, organizations become more inclusive through increased cultural professional development for individuals (Grogan & Eshelman, 1998).

There are many opportunities for interested extension agents to work internationally. In 2003, the Cooperative State Research, Education and Extension Service (CSREES) made international development a priority nationwide by launching an initiative directed at strengthening the international dimension of state extension services (United States Department of Agriculture, 2007). In 2007, the Association of Public and Land-Grant Universities (APLU, 2009) prioritized international work by creating the Africa-U.S. Higher Education initiative. This initiative increased the global affairs of U.S. higher education institutions as they relate to Africa. U.S. faculty, staff, and students willing to travel to Africa were essential in developing strong relationships with African institutions of higher education (APLU).

The APLU and CSREES have proved their commitment by placing an emphasis on the development of poverty stricken, unstable geographic areas including sub-Saharan Africa, South Asia, East Asia, North Africa, and the Middle East (APLU, 2009). Since the growing world food crisis is having a major impact on these low income countries, the need for agricultural and economic support continues to grow (APLU). While the demand for assistance from developed countries increases, less than 2% of the U.S. academic population has participated in an international experience (Zhai & Scheer, 2002). In fact, direct experience with other countries and cultures is extremely limited for most of the world (Ludwig, 1994). Extension agents must gain a global perspective to stay relevant in their growing global communities, national extension initiatives have been created to make opportunities for extension agents to work internationally, the need for U.S. agricultural education overseas is higher than ever, yet extension agent participation in international extension experiences is still minimal.

Theoretical Framework

The theoretical framework for the study was based on Ajzen’s (2002) theory of planned behavior. According to Ajzen, human behavior is guided by three beliefs: behavioral, normative, and control. Behavioral beliefs represent likely outcomes of the targeted behavior and the associated evaluations of these outcomes (Ajzen). An individual’s behavioral beliefs correspond to a favorable or unfavorable attitude toward the targeted behavior. Normative beliefs represent what the individual believes other important individuals or groups expect in regards to the targeted behavior. Normative beliefs are linked with how an individual develops their perception of the subjective norm of the targeted behavior (Ajzen). Control beliefs represent the potentially
aiding or impeding performance of the behavior along with the perceived power of those factors (Ajzen). Control beliefs will determine an individual’s perceived behavioral controls. A person’s behavior can be modified; increasing the chance the person will perform a desired action, through the manipulation of any or all of these components (Francis et al., 2004). This study focused exclusively on the identification of behavioral beliefs as they related to participation in an international extension experience. Behavioral beliefs have a direct influence on the probability of whether or not an individual will exhibit a certain behavior (Ajzen).

An extensive review of the literature found no published studies regarding location preferences for international extension experiences and only one for study abroad preferences. Evans, Finch, Toncar, and Reid (2008) identified Italy, England, France, China, Germany, Australia, Japan, and Ireland as the top locations for study tours. Three of these locations are English speaking countries and only China is labeled as a developing country.

Researchers also identified specific factors limiting international participation. Past research supports fear-related barriers, organizational work issues, and familial pressure as the three main factors affecting an individual’s decision to participate in an international experience (Etling, Reaman, & Sawi, 1993; Wingenbach et al., 2006; Zhai, 2004). This study focused exclusively on the factor identified as “fear-related barriers.” Fear-related barrier are recurrently identified as having a significant influence on an individual’s choice to participate in international travel and employment. These fear-related barriers are commonly found in the literature and come in the form of communication issues, fear of illness as it relates to cultural differences, and safety concerns.

A lack of ability to communicate can affect an individual’s desire to participate in an international experience (Andreasen, 2003; Hand, Ricketts, & Bruening, 2007; Irani, Place, & Friedel, 2006). Previous issues occurring between U.S. institutions and non-U.S. institutions were generally based on communication difficulties (Etling & McGirr, 2005; Harder, Wingenbach, & Rosser, 2007). Language barriers lead to stress, increased emphasis on cultural differences, and lack of social integration (Zhai, 2004).

A fear of disease and illness also affects an individual’s willingness to participate in an international experience. Diseases and illnesses identified are typically due to a change in atmosphere, food, and water (Tritz & Martin, 1997). Most underdeveloped countries have different forms of food storage and refrigeration than the U.S. Food incompatibility, leading to illness, has been identified as a major barrier in the literature (Wingenbach et al., 2006; Zhai, 2004).

Wingenbach et al. (2006) found their respondents were concerned about their safety in another country. Etling et al. (1993) identified war and a country’s perceived state of unrest as some of the most significant perceptual barriers influencing extension agents’ willingness to participate in programs overseas. The fear of being victimized in a country where lawlessness and corrupt government prospers is a major limiting factor (Wingenbach et al.; Zhai, 2004).

An examination of the literature has revealed the most desirable locations for travel abroad. In addition, a further look into the research has revealed the most common fear-related barriers preventing participation in an international experience. Through a review of the theory of planned behavior, it has been established that an understanding of behavioral beliefs must be reached in order to make research based recommendations on how to modify an individual’s attitude towards a specific behavior (Francis et al., 2004).

**Purpose and Objectives**

The findings presented in this article are part of a larger study undertaken to understand extension agents’ willingness to participate in an international extension experience. The section
of the study reported here focused on the relationships between fear-related barriers and location appeal. The research objectives were to:

1. Describe extension agents’ perceptions of selected locations as destinations for an international extension experience.
2. Describe extension agents’ perceptions of fear-related barriers to involvement in an international experience.
3. Describe the relationships between extension agents’ perceptions of selected locations and fear-related barriers.

Methods

The section of the study presented here was descriptive and correlational in nature. A census of the 272 extension agents employed by the University of Florida was conducted. The study was limited to the University of Florida because of the stressed importance of international extension work within the university system. The University of Florida has been engaged in global programs for over 70 years and strives to be a leading internationally engaged institution, recognized for its educational and technical expertise in global issues (University of Florida, 2008).

The target population’s access to the Internet enabled the use of an online survey instrument (Dillman, Smyth, & Christian, 2008). The survey instrument used for the study was originally developed by Rieger (n. d.) to measure college students’ willingness to participate in a study abroad experience. Permission was granted to modify Rieger’s instrument to fit the professional context of extension and adapted for use in an online format. The instrument was reviewed by an expert panel from the University of Florida for content and face validity.

Three sections of the survey instrument are germane to the findings in this article: location, fear-related barriers, and demographics. Participants were asked to rate the appeal of 13 locations using a four point scale (1 = Very Unappealing, 2 = Somewhat Unappealing, 3 = Somewhat Appealing, 4 = Very Appealing). Next, participants were asked to rate three barrier statements using a four point scale (1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Somewhat Agree, 4 = Strongly Agree). Barriers identified from the review of literature (Andreasen, 2003; Wingenbach et al., 2006; Etling et al., 1993) were used to form a construct termed “fear-related barriers.” Finally, participants were asked to identify their gender, race/ethnicity, age category, educational level, tenure of employment, agent level, and primary program area.

Participants were contacted via e-mail using Dillman et al.’s (2008) Tailored Design Method. Of the original 272 e-mail addresses, 267 addresses were valid. A final response rate of 71.54% (N = 191) was obtained. Four participants opted out. There were 11 responses removed due to missing or incomplete data. There were no significant differences between early and late respondents for the primary variables of interest; therefore the results of the study can be generalized to the target population (Lindner, Murphy, & Briers, 2001).

The general demographics collected in the survey are displayed in Table 1. Descriptive analysis of the demographic data showed that there were 102 female (57.95%, n = 102) and 74 male (42.05%, n = 74) respondents. The large majority (88.07%, n = 155) of respondents were Caucasian/White (Non-Hispanic) with African Americans representing 7.39% (n = 13). Hispanic, Asian, and Other categories were represented minimally. The majority of respondents were in the 46 or older age category (61.93%, n = 109) with 36-45 representing 18.18% (n = 32) of respondents, 26-35 representing 18.18% (n = 32), and 25 or younger as the smallest group with only 1.70% (n = 3) of respondents. The majority of respondents (69.89%, n = 123) had obtained a Master’s degree while 18.18% (n = 23) had a Bachelor’s degree.
Table 1
Demographics of Respondents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>102</td>
<td>57.95</td>
</tr>
<tr>
<td>Male</td>
<td>74</td>
<td>42.05</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>13</td>
<td>7.39</td>
</tr>
<tr>
<td>Asian</td>
<td>1</td>
<td>.57</td>
</tr>
<tr>
<td>Caucasian/White (Non-Hispanic)</td>
<td>155</td>
<td>88.07</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5</td>
<td>2.84</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>1.14</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 or younger</td>
<td>3</td>
<td>1.70</td>
</tr>
<tr>
<td>26-35</td>
<td>32</td>
<td>18.18</td>
</tr>
<tr>
<td>36-45</td>
<td>32</td>
<td>18.18</td>
</tr>
<tr>
<td>46 or older</td>
<td>109</td>
<td>61.93</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>32</td>
<td>18.18</td>
</tr>
<tr>
<td>Master’s Degree</td>
<td>123</td>
<td>69.89</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>17</td>
<td>9.66</td>
</tr>
<tr>
<td>Professional Degree (DVM or other)</td>
<td>1</td>
<td>.57</td>
</tr>
<tr>
<td>Tenure of Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-3 years</td>
<td>43</td>
<td>24.43</td>
</tr>
<tr>
<td>4-6 years</td>
<td>17</td>
<td>9.66</td>
</tr>
<tr>
<td>7-9 years</td>
<td>24</td>
<td>13.64</td>
</tr>
<tr>
<td>10-19 years</td>
<td>41</td>
<td>23.30</td>
</tr>
<tr>
<td>20+ years</td>
<td>49</td>
<td>27.84</td>
</tr>
<tr>
<td>Extension Agent Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EAI</td>
<td>45</td>
<td>25.57</td>
</tr>
<tr>
<td>EAIII</td>
<td>52</td>
<td>29.55</td>
</tr>
<tr>
<td>EAIIII</td>
<td>34</td>
<td>19.32</td>
</tr>
<tr>
<td>EAIIV</td>
<td>44</td>
<td>25.00</td>
</tr>
<tr>
<td>Program Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-H Youth Development</td>
<td>33</td>
<td>18.75</td>
</tr>
<tr>
<td>Agriculture</td>
<td>40</td>
<td>22.73</td>
</tr>
<tr>
<td>Community Development</td>
<td>4</td>
<td>2.27</td>
</tr>
<tr>
<td>Family and Consumer Sciences</td>
<td>42</td>
<td>23.86</td>
</tr>
<tr>
<td>Horticulture</td>
<td>40</td>
<td>22.73</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>6</td>
<td>3.41</td>
</tr>
<tr>
<td>Nutrition</td>
<td>5</td>
<td>2.84</td>
</tr>
<tr>
<td>Sea Grant</td>
<td>6</td>
<td>3.41</td>
</tr>
</tbody>
</table>
Tenure of employment with Cooperative Extension showed more variation than other categories. The largest response categories were 20+ years (27.84%, \(n = 49\)) and 0-3 years as a close second (24.43%, \(n = 43\)). Even with variation in tenure, extension agent level was evenly distributed across the respondents with 25.57% \((n = 45)\) classified as EAI, 29.55% \((n = 52)\) classified as EAII, 19.32% \((n = 34)\) classified as EAIII, and 25.00% \((n = 44)\) classified as EAIV. Program areas were represented with 23.86% \((n=42)\) of respondents focusing on Family and Consumer Sciences, 22.73% \((n = 40)\) Horticulture, 22.73% \((n = 40)\) Agriculture, and 18.75% \((n = 33)\) from 4-H Youth Development. The remaining 11.93% \((n = 21)\) represented Community Development, Natural Resources, Sea Grant, and Nutrition specializations. Descriptive statistics were calculated for the first two objectives. Responses were coded for computer analysis using SPSS. Relationships between perceptions of locations and fear-related barriers were described by calculating Pearson’s product-moment correlation coefficient using Davis’ (1971) convention. A level of significance of .05 was established a priori.

Results

Location Appeal

Respondents were asked to rank the appeal of locations for an international extension experience (see Table 2). On a four-point scale (1 = Very Unappealing, 4 = Very Appealing), respondents rated “Australia and/or New Zealand” \((M = 3.49, SD = 0.84)\), the “Caribbean” \((M = 3.30, SD = 0.93)\), “Western Europe” \((M = 3.17, SD = 0.96)\), “Eastern Europe” \((M = 3.08, SD = 0.98)\), and “South America” \((M = 3.07, SD = 0.91)\) as somewhat appealing. “Central America, Mexico” \((M = 2.93, SD = 0.95)\), the “South Pacific Islands, Micronesia” \((M = 2.83, SD = 1.02)\), “Any developed country” \((M = 2.79, SD = 0.97)\), “China, Southeast Asia, Japan” \((M = 2.77, SD = 1.04)\), “Any developing country” \((M = 2.56, SD = 1.07)\), “Africa” \((M = 2.47, SD = 1.07)\), and “India, Central Asia” \((M = 2.41, SD = 1.03)\) were rated as somewhat unappealing. The “Middle East” \((M = 1.85, SD = 1.01)\) was rated as very unappealing.

Table 2

Respondents’ Perceptions of Location by Individual Response Item

<table>
<thead>
<tr>
<th>Location Items</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia and/or New Zealand</td>
<td>164</td>
<td>3.49</td>
<td>0.84</td>
</tr>
<tr>
<td>Caribbean</td>
<td>165</td>
<td>3.30</td>
<td>0.93</td>
</tr>
<tr>
<td>Western Europe</td>
<td>162</td>
<td>3.17</td>
<td>0.96</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>160</td>
<td>3.08</td>
<td>0.98</td>
</tr>
<tr>
<td>South America</td>
<td>167</td>
<td>3.07</td>
<td>0.91</td>
</tr>
<tr>
<td>Central America, Mexico</td>
<td>164</td>
<td>2.93</td>
<td>0.95</td>
</tr>
<tr>
<td>South Pacific Islands, Micronesia</td>
<td>160</td>
<td>2.83</td>
<td>1.02</td>
</tr>
<tr>
<td>Any developed country</td>
<td>150</td>
<td>2.79</td>
<td>0.97</td>
</tr>
<tr>
<td>China, Southeast Asia, Japan</td>
<td>159</td>
<td>2.77</td>
<td>1.04</td>
</tr>
<tr>
<td>Any developing country</td>
<td>149</td>
<td>2.56</td>
<td>1.07</td>
</tr>
<tr>
<td>Africa</td>
<td>165</td>
<td>2.47</td>
<td>1.07</td>
</tr>
<tr>
<td>India, Central Asia</td>
<td>162</td>
<td>2.41</td>
<td>1.03</td>
</tr>
<tr>
<td>Middle East</td>
<td>162</td>
<td>1.85</td>
<td>1.01</td>
</tr>
</tbody>
</table>

*Note.* Scale: 1 = Very Unappealing, 2 = Somewhat Unappealing, 3 = Somewhat Appealing, 4 = Very Appealing.
Fear-Related Barriers

Table 3 displays respondents’ perceptions of fear-related barriers associated with participating in an international extension experience. Using a 4-point scale (1 = Strongly Disagree, 4 = Strongly Agree), respondents somewhat agreed that “Language barrier” \( (M = 2.66, SD = 0.87) \) was a barrier to participation in an international extension experience. They somewhat disagreed the “Potential for being a victim of crime, terrorism, or unjust government action” \( (M = 2.34, SD = 1.00) \) and the “Potential for contracting diseases in foreign countries” \( (M = 2.08, SD = 0.94) \) were barriers to participation in an international extension experience.

<table>
<thead>
<tr>
<th>Fear Items</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language barrier</td>
<td>176</td>
<td>2.66</td>
<td>0.87</td>
</tr>
<tr>
<td>Potential for being victim of crime, terrorism, or unjust government action</td>
<td>176</td>
<td>2.34</td>
<td>1.00</td>
</tr>
<tr>
<td>Potential for contracting diseases in foreign countries</td>
<td>176</td>
<td>2.08</td>
<td>0.94</td>
</tr>
</tbody>
</table>

Note. Scale: 1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Somewhat Agree, 4 = Strongly Agree.

Relationships between Perceptions of Location Appeal and Fear-Related Barriers

There were significant correlations between respondent’s perceptions of location appeal and their perceptions of fear-related barriers (see Table 4). “Africa” \( (r = -0.56, p = .00) \), and “India, Central Asia” \( (r = -0.55, p = .00) \) had significant, substantial negative correlations. “Any developing country” \( (r = -0.47, p = .00) \), “Central America, Mexico” \( (r = -0.46, p = .00) \), “South America” \( (r = -0.41, p = .00) \), “South Pacific Islands, Micronesia” \( (r = -0.37, p = .00) \), the “Caribbean” \( (r = -0.30, p = .00) \), and “China, Southeast Asia, Japan” \( (r = 0.30, p = .00) \) had significant, moderate negative correlations. The “Middle East” \( (r = -0.27, p = .00) \), and “Any developed country” \( (r = -0.22, p = .01) \) had significant, low negative correlations.

<table>
<thead>
<tr>
<th>Fear Items</th>
<th>r</th>
<th>p</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>-0.56</td>
<td>0.00**</td>
<td>Substantial</td>
</tr>
<tr>
<td>India, Central Asia</td>
<td>-0.55</td>
<td>0.00**</td>
<td>Substantial</td>
</tr>
<tr>
<td>Any developing country</td>
<td>-0.47</td>
<td>0.00**</td>
<td>Moderate</td>
</tr>
<tr>
<td>Central America, Mexico</td>
<td>-0.46</td>
<td>0.00**</td>
<td>Moderate</td>
</tr>
<tr>
<td>South America</td>
<td>-0.41</td>
<td>0.00**</td>
<td>Moderate</td>
</tr>
<tr>
<td>South Pacific Islands, Micronesia</td>
<td>-0.37</td>
<td>0.00**</td>
<td>Moderate</td>
</tr>
<tr>
<td>Caribbean</td>
<td>-0.30</td>
<td>0.00**</td>
<td>Moderate</td>
</tr>
<tr>
<td>China, Southeast Asia, Japan</td>
<td>-0.30</td>
<td>0.00**</td>
<td>Moderate</td>
</tr>
<tr>
<td>Middle East</td>
<td>-0.27</td>
<td>0.00**</td>
<td>Low</td>
</tr>
<tr>
<td>Any developed country</td>
<td>-0.22</td>
<td>0.01**</td>
<td>Low</td>
</tr>
<tr>
<td>Australia and/or New Zealand</td>
<td>-0.14</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>-0.13</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>Western Europe</td>
<td>0.04</td>
<td>.66</td>
<td></td>
</tr>
</tbody>
</table>

Note. Magnitude: .01 \( \geq r \geq .09 \) = Negligible, .10 \( \geq r \geq .29 \) = Low, .30 \( \geq r \geq .49 \) = Moderate, .50 \( \geq r \geq .69 \) = Substantial, \( r \geq .70 \) = Very Strong. **p < .01.
Conclusions

This statewide study sheds light on how extension agents perceive selected locations as destinations for an international extension experience and the fear-related barriers they associate with working internationally. Extension agents perceived selected locations differently, with highly developed countries as most appealing. In general, extension agents only perceived language as a potential barrier to their participation. However, when geographical comparisons were included, differences in the levels of fear-related barriers emerged. The study revealed a significant relationship exists between selected locations and the level of fear-related barriers perceived. The less appealing locations substantially correlated to a higher level of fear-related barriers affecting participation.

Implications

The key implication for international extension experience organizers working to increase extension agents’ participation in international extension experiences is to be aware of, and address, extension agents’ pre-existing fears related to select locations. This study shows behavioral beliefs have already been formed. Ajzen’s (2002) theory of planned behavior emphasizes that these beliefs will have a direct influence on the probability of whether or not an agent will choose to participate in an international extension experience. Unfortunately, the areas of unrest including Africa, India, Central Asia, Central America, and other developing countries are those most in need of foreign assistance and are the areas extension agents are least likely to go for an international extension experience. Agricultural independence is necessary for these nations to develop their own capacity to help their people. In order to get these countries the agricultural education they need from extension agents, their behavior beliefs will need to be modified.

According to the theory of planned behavior, a person’s behavioral beliefs can be modified directly or through the manipulation of the other two beliefs (Ajzen, 2002). In this case, these are normative and control beliefs. Normative beliefs must be modified by altering group ideals, creating a subjective norm emphasizing the importance of working internationally across the entire Extension system. Extension agents need to believe other important individuals expect their participation in order to feel pushed to contribute. Therefore, a system-wide emphasis on international engagement will assist in setting a precedent, encouraging agents to work internationally. To do this, those working in the targeted locations should strive to educate U.S. Extension system administrators on working globally, encouraging them to develop international work as a norm within their systems, enhancing the likelihood extension agents will engage in international work.

Control beliefs can also be modified by increasing the perceived power of the performed action. Extension agents need to believe participation in an international extension experience will enhance their role in some way. This enhancement should come in the form of a higher performance reviews, increased pay, or increasing additional opportunities as a direct result of their participation. Together the normative and control beliefs can be manipulated to hold more weight and power than the behavioral beliefs of extension agents, changing their decisions regarding participation in international extension experiences.

Recommendations

This study provides insight into the barriers keeping extension agents from participating in international extension experiences. Globalization is rapidly increasing and the need for employees with a worldwide view and international experience in more important than ever. Enhancing extension agents’ ability to work with all segments of the population will increase their effectiveness in establishing community wide relationships and serving to educate their entire residential audience (Ludwig & McGirr, 2003). Florida extension administrators and organizers of
international extension experiences need to address the behavioral, normative, and control beliefs of extension agents to attract more participation in international extension experiences.

To decrease fear levels and increase the appeal of traveling to the areas needing the most assistance, including Africa, India, Central Asia, Central America, and other developing countries, increasing education surrounding the realities of these experiences is necessary. Educational sessions for extension agents should be created which include guest speakers that have had international experience in the specific locations in need of assistance. These sessions need to include details surrounding the assistance extension agents will receive while engaged overseas. These informative sessions should include how the language barrier is dealt with, how safety is handled as it relates to crime, terrorism or unjust government action, and the realities surrounding contracting diseases or becoming ill while in the country. An emphasis on what is being done to ensure the health and safety of those travelling is imperative.

Florida extension administrators also need to emphasize the importance of extension agents’ participation in international experiences. International opportunities must be highlighted at state meetings, updates regarding the current work being done by extension agents overseas need to be sent out statewide on a regular basis, and opportunities must be created for those who choose to participate in international experiences to share what they have engaged in with other extension agents. In addition, participation in international experiences must result in increased opportunities.

Several ways to reward extension agents for participating include increased opportunities for promotion, a place to record their participation on performance reviews, higher performance reviews, and an increase in pay.

Although many barriers exist in engaging extension agents in international extension experiences, they can be overcome. In order to gain more insight into the issues surrounding the challenges of attracting extension agents to international experiences more research should be conducted. This study was specific to extension agents working for the University of Florida and cannot be generalized beyond this population. A study conducted to determine if extension agents working in similar extension systems in the U.S. or Extension personnel working outside of the U.S. hold the same behavioral beliefs will assist in a broader interpretation of the results.

In addition, a study evaluating the fear-related barriers by location, rather than in general, would be helpful since an examination of these barriers in general did not reveal any significant differences until correlated with location. Examining the types of international extension educational sessions being conducted, and how they are working, would give extension administrators an idea of what is already working and how to enhance these programs. In addition, research examining why certain extension agents have already chosen to participate in international extension experiences would assist in gaining an understanding of how these barriers have been overcome.

References


An Evaluation of Farmer Field School Induced Changes in Ghanaian Cocoa Production

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Abstract

A case study of Ghanaian cocoa farmer field schools was conducted to provide feedback on a regional effort to close the yield gap across the cocoa belt of West Africa. Production practices were significantly modified in the year following training with notable increases registered in both the number of producers planting hand pollinated hybrid cocoa seedlings and in the area planted to hybrids. The effectiveness of pesticide application on farms of trained participants was significantly higher following training. Nearly 30 percent of the trained farmers were women, who appeared to derive a lower benefit from training as compared to men, although the result was on the borderline of statistical significance. In sum, farmer field school training and subsequent changes in management practices are estimated to have resulted in a net production increase of 14% for the average farmer field school participant. To improve the impact for women more attention should be given to their specific needs. Expansion of the curriculum to cover nursery management and planting/replanting options should also be considered.

Keywords: Field schools, yield gaps, pesticide use efficiency, hybrid cocoa seedlings, structural change, discovery learning

Acknowledgements

The authors wish to thank the United States Agency for International Development and the World Cocoa Foundation for their financial support. We are also indebted to Sylvanus Agordorku and Mary Adu Kuti for their insights about the start-up phase of the pilot program and to all the cocoa producers of Atwima who gave of their time and hospitality.
Introduction
The gap between on-farm cocoa yields and research station yields in West Africa is excessive. Average yields across West Africa are under 500 kg per hectare while on-station trials typically reach between 2,000 kg and 3,000 kg per ha. With nearly all of the forest gone in West Africa, closing this yield gap will be fundamental to the future growth of the sector and the conservation of rapidly dwindling West African forest resources. In late 2002 a pilot extension program was initiated for cocoa farmers in Côte d'Ivoire, Ghana, Nigeria, and Cameroon drawing upon the successful experiences in Indonesia with the farmer field school extension method. This study reports on the preliminary impacts of farmer field school training on management practices, cocoa production and the frequency of child labor participation in hazardous tasks among households trained in 2003 in Ghana.

What is sometimes referred to as the “transfer of technology” (ToT) method, was used with great success in South and Southeast Asia for the dissemination of high yielding irrigated rice and wheat seed-fertilizer technologies in the 1970s and 1980s (Byerlee & Pingali, 1994). However the success of this approach in Africa has been limited (Hagmann, 1999). In fact the failure of extension approaches in Africa has resulted in budget cuts for both agricultural extension and research. Pretty (1995) believes that a top down linear approach to extension has led to rigid bureaucracies and prevented systematic learning. Mettrick (1993) points out that in industrial countries like Germany or the USA, the ToT approach was not usually part of the rural transformation process which was rooted in the emergence of rural populism and strong farm lobbies in the late 19th and early 20th centuries. Organizations such as the Grange Movement and the Farmers’ Alliance in the United States were able to control the direction of research and extension. In West Africa, the organization of farmers as a force able to articulate demands in the political arena is just starting to emerge. To address this socio-political and institutional void, academics mainly in Britian and Europe have called for a new paradigm of research and extension (Chambers, Pacey, & Thrupp, 1989, Chambers, 1993; Scoones & Thompson, 1994; Pretty, 1995; Bauer, 1996). The essence of the proposed paradigm was to put the farmer first and work to develop his or her knowledge in a participatory process with extension and research. Out of this new thinking emerged the farmer field school discovery learning approach which encourages field observation and experimentation, usually in support of integrated pest management (IPM) practices. The approach was originally developed for the integrated management of rice pests in Indonesia in 1989 but has since been broadened in its objectives. Most FFS today strive to empower farmers through the development of their technical, as well as social capabilities (van der Burg, 2004).

The International Institute of Tropical Agriculture (IITA) organized and conducted a FFS training and curriculum development workshop for master trainers from the four above mentioned countries in March 2003. At this workshop, in addition to the training of master trainers and the development of country action plans, the core elements of the farmer field school curriculum were developed. Researchers from the Cocoa Research Institute of Ghana (CRIG) and other national institutes provided the scientific backstopping underlying the curriculum. The curriculum targets the integrated management of the cocoa cropping system to ensure sustainable and socially responsible production through experiential learning. There is a strong focus on the control of black pod disease but attention is also given to the problem of capsids, post harvest techniques, and social issues such as the use of child labor.

The program was initiated with 30 schools and 30 facilitators in the Atwima district of Ashanti region in the first year. Following 3 1/2 weeks of training, community facilitators selected by farmers themselves, were ready to begin the farmer field school. Farmer training occurred on a biweekly basis with the total number of training sessions ranging from 11 to 15 per school. The
The average session would last four hours. Participants attended an average of 12 sessions from March through the end of the harvest in December. Each school consisted of the facilitator, who was paid a small stipend and its members. The optimal size of the field school is considered to be 25 participants, but because of excessive demand for cocoa extension, the 2003 average number of participants per school was 28. Working in groups, the initial step of each field session was to conduct an analysis of the cocoa agro-ecosystem where farmers would observe and discuss dynamics of the cocoa’s ecosystem and the crop development. Simple experimentation protocols such as the black pod disease zoo helped farmers improve their understanding of ecological functional relationships such as the impact of humidity on disease development. Over the course of the growing season, the new practices were applied by the trainees on 15 trees of the school farm and compared to 15 trees managed according to farmers’ standard practice. Each session, the ripe pods, diseased pods and rodent attacked pods were harvested and added to a running total from the previous session. At the end of the field school the differences in results from the improved and unimproved plots were analyzed qualitatively by the farmers.

One of the problems in developing a curriculum for adult education on Integrated Crop and Pest Management for any agricultural commodity is the location-specificity of agronomic and natural resource constraints. For instance, there is a much lower incidence of cocoa black pod in Ghana as compared to Cameroon and Nigeria. As such, the initial Ghanaian training of trainers included less blackpod training with a focus instead on other subjects deemed to be important for Ghanaian cocoa farmers. These extracurricular topics included soil fertility management, mistletoe (Loranthus spp.) management, cocoa tree thinning, and postharvest issues. The facilitators were exposed to these topics by CRIG researchers at the training of trainers.

The main focus of this study is the extent to which crop management practices, production, and pesticide use changed in 2004 among the cocoa farmers of Atwima District in Ashanti region following their participation in the 2003 FFS. The objective is to document changes in cocoa management practices and structural changes in the cocoa cropping system that have occurred as a result of farmer training using a field school approach. The intended purpose of the study is to contribute to the further refinement and adaptation of a farmer field school extension approach applied to the cocoa farming systems of West Africa.

**Methods**

**Survey Sample**

To achieve the study objectives, a survey was conducted in February 2005 with a randomly selected sample of 2003 FFS participants and a randomized control sample of nonparticipating cocoa farmers. A simple random sample was drawn from the 829 cocoa farmers enrolled in the 30 field schools of 2003. The sample size was $n = 225$ and the sampling proportion 27%. A second random sample of 165 farmers was drawn from the population of nonparticipating cocoa growers living in the same villages where the STCP farmer field school programs took place. The differences noted in management practices between the two groups are attributed to the new knowledge gained through the discovery learning exercises of the field school. We are aware of the potential bias due to farmer to farmer knowledge diffusion which would tend to underestimate the program’s effects on the individual farmer to the extent that the control group farmers benefitted from farmer to farmer diffusion process. However, we argue that the probability of this bias was slight due to the short interval between the introduction of FFS in 2003 and the observation of practices in 2004. Simpson and Owens (2002) and Federer, Murgai and Quizon (2004) also point out that the abstract knowledge underlying some of the technical changes associated with FFS often encounters difficulty in diffusion. On the positive side, selecting control farmers from the same village eliminates biases due to inestimable village effects such as microclimate, soil type, and pest and disease pressure (Deaton, 1997).
The sample cluster size per locality for non-participants was directly proportional to that of the participant cluster size:

\[ n_{i,\text{nonpart}} = \left( \frac{n_{i,\text{part}}}{225} \right) \times 165 \]

Where:
- \( n_{i,\text{nonpart}} \) = the clustered subsample of non participants from the locality of farmer field school \( i \), and,
- \( n_{i,\text{part}} \) = the subsample of participants from the locality of farmer field school \( i \).

The survey teams constructed lists of nonparticipating cocoa farmers for the given locality through interviews conducted with local buying depot agents, chiefs and village elders. As the interest was in cocoa producers with mature, producing cocoa farms, only farmers selling cocoa were included in the sampling frame. All 30 farmer field schools were represented in the random sample with the sampled number of participants per school ranging from five to 21. The field research was conducted in February 2005 and focused mainly on farmer practice during the 2004 growing season. Data collection was conducted through structured interviews with cocoa farmers using a questionnaire and the data were entered and analyzed using Excel and LIMDEP software packages.

**Variable Measures**

The analysis revolves around the statistical comparison of FFS participant and non-participant farmers in terms of their production practices and outcomes in an effort to discern the impact of field school training. The principal demographic variables compared include: \( EDUC_i \), defined as the number of years of schooling attained by the cocoa farmer; \( GENDER_i \), defined as the gender of the cocoa farmer equal to 1 if male, 0 if female; \( HH\_LABOR_i \), defined as the adult male labor equivalents per household \( i \), where children aged 9 to 17 years are equal to 0.6 adult male equivalents, men aged 18 to 54 years are equal to one adult male equivalent, women of the same age are equal to 0.9 adult male equivalents, and men and women over the age of 54 are equal to 0.7 adult male equivalents.

The principal crop management variables analyzed include: \( PROD04_i \), defined as the quantity of cocoa produced sold in the 2004/2005 cocoa season by household \( i \); \( PRUNE_i \), defined as the number of prunings conducted in the 2004 cocoa season by household \( i \); \( WEED_i \), defined as the number of weedings conducted by household \( i \); and \( SHCROP_i \), defined as equal to one if the cocoa farmer obtained the cocoa farm through a sharecropping arrangement, zero if not. The quality and quantity of the cocoa treestock was measured by the age-differentiated variables \( HYBRID_i \) and \( NHYBRID_i \). \( HYBRID_i \) is defined as the number of hectares planted to F1 hybrid cocoa obtained from the seed production unit of the Cocobod, the state marketing board. \( NHYBRID_i \) is the number of hectares planted to non-hybrid cocoa.

The levels of agronomic inputs are key determinants in determining output. The number of kilograms of fertilizer applied is measured by \( FERT_i \). The number of fungicide applications was measured by \( FS\_SPRAY_i \), and the number of insecticide applications by \( INS\_SPRAY_i \). We also examine the impact of the distribution of hybrid cocoa pods by the FFS program on new plantings of cocoa.

**Data Analysis**

Mean differences between groups were tested for significant differences using Chi-Square Tests and Student's t-tests under the assumptions of normality and homoskedastic variance. A comparison of means between the two groups is not sufficient for establishing the impact of the farmer field school if there are situational differences in farmer field school participants and the
control group. If, for instance FFS participants had more productive tree stocks because of a higher proportion of hybrid material, then their yields could be higher independent of any FFS training effect. To avoid these confounding effects, multivariate regression analyses of production were conducted for both participants and non-participants. These models are tested for structural differences with a Chow test for structural change in model parameter.

The regression models for both groups were specified as:

\[
PROD_{04i} = a_0 + b_1 EDUC_i + b_2 GENDER_i + b_3 HH_LABOR_i + b_4 PRUNE_i + b_5 WEED_i + b_6 WEED\_SQ_i + b_7 SHCROP_i + b_8 HYB\_4\_10_i + b_9 HYB\_11\_40_i + b_{10} N\_HYB\_11\_40_i + b_{11} G\_FSPRAY_i + b_{13} F\_FSPRAY_i + b_{14} G\_INSPRAY_i + b_{15} F\_INSPRAY_i + b_{16} FERT_i + \epsilon_i
\]

We hypothesize that the cognitive ability of the producer, proxied by the number of years of schooling \(EDUC_i\), will have a positive effect \((b_1>0)\) on the output of cocoa. Given women’s lack of access to extension and other services we expect that \(b_2>0\). The supply of household labor and the pruning of the cocoa farm are expected to both positively affect output, \((b_3>0, b_4>0)\). The impact of weeding on cocoa production is expected to be nonlinear, that is, initially increasing \((b_5>0)\) and then decreasing \((b_6<0)\). High-yielding cocoa farms with well-developed cocoa canopies require only a minimal weeding of the under story. Low yielding cocoa farms with poorly developed canopies often require multiple weedings. We expect that acquiring the cocoa farm through a sharecrop arrangement will have a negative impact on production \((b_7<0)\) as sharecroppers typically receive the lower yielding portion of the farm as payment for their labor in creating the cocoa farm. The per hectare yield of young F1 hybrid cocoa is expected to exceed that of non-hybrid cocoa of a similar age, \((b_8>b_{10}>0)\), based upon the findings of Edwin & Masters (2005). Similarly, the per hectare yield of mature F1 hybrid cocoa is expected to exceed that of non-hybrid cocoa of a similar age, \((b_9>b_{11}>0)\). An increase in the application frequency of insecticides and fungicides is expected to increase production. However, we hypothesize that the application by government spray gangs is less effective than when the individual farmer applies, therefore we expect \(b_{13}>b_{14}>0\) and \(b_{15}>b_{16}>0\). Finally we hypothesize a linear fertilizer positive response to the application of fertilizer, \(b_{17}>0\).

**Results**

**Demographic**

The participants in the FFS were slightly younger than those in the control group and had significantly more schooling (Table 1). Although the difference was not statistically significant the mean proportion of women cocoa farmers was 8 percent greater among the non-FFS group. About four out of five cocoa farmers interviewed were household heads, the remainder were spouses of the head of household. Over ninety-seven percent of the cocoa farmers indicated that their principal occupation was agriculture with the commercial production of cash crops cited most frequently as the principal type of agriculture. There was no difference in occupational status of the cocoa farmer between the groups.

The age distributions between the participant and non-participant household samples are statistically indistinguishable, although participant households were approximately 10% larger (0.6 more persons) in terms of the number of household members (Student’s t = 2.05, prob. = 0.04). Approximately one in four of the cocoa farmers interviewed had migrated to their current residence with no appreciable difference between FFS participants and non-participants. Among the enumerated migrants, approximately one-third originated from the Northern Region and approximately one-third were from either the Brong-Ahafo, upper East, or upper West regions. Six of the migrants interviewed came from Burkina Faso (4), Togo, and Benin.
Table 1
Demographic, Educational and Occupational Status of Sampled Cocoa Farmers by Participation in FFS training, Atwima District, Ashanti Region, 2005

<table>
<thead>
<tr>
<th></th>
<th>FFS</th>
<th>Non-FFS</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=225</td>
<td>N=165</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>45.7</td>
<td>48.3</td>
<td>0.06</td>
</tr>
<tr>
<td>No. of years of schooling</td>
<td>6.59</td>
<td>5.34</td>
<td>0.01</td>
</tr>
<tr>
<td>Women (%)</td>
<td>26%</td>
<td>34%</td>
<td>n.s.</td>
</tr>
<tr>
<td>Household status:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of household</td>
<td>82%</td>
<td>77%</td>
<td></td>
</tr>
<tr>
<td>Spouse</td>
<td>17%</td>
<td>22%</td>
<td>n.s.</td>
</tr>
<tr>
<td>Son/daughter</td>
<td>0%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Principal occupation:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal rearing</td>
<td>0.0%</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>Agriculture (cash crop)</td>
<td>98.6%</td>
<td>96.2%</td>
<td></td>
</tr>
<tr>
<td>Agriculture (food crop)</td>
<td>0.5%</td>
<td>0.8%</td>
<td>n.s.</td>
</tr>
<tr>
<td>Sharecropper</td>
<td>0.0%</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>Trading</td>
<td>0.5%</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>Civil servant</td>
<td>0.5%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Artisan</td>
<td>0.0%</td>
<td>0.8%</td>
<td></td>
</tr>
</tbody>
</table>

n.s. = not significant
Calculated probability of mean difference is based on an independent groups t test

Farm Management

No significant differences in the mode of land acquisition were noted between FFS and non-FFS farmers. However there was a clear difference between the migrant group and the native people of Atwima District. Over three-fourths of the migrant respondents (versus one in ten native residents) indicated that they had acquired their land rights through a “sharecropping” arrangement with the landowner (Table 2). This arrangement entails the transformation of either bush fallow or forest land into a cocoa farm. The most typical arrangement is that the landowner provides the land, and any purchased inputs needed, while the sharecropper provides the labor for clearing, planting, and general maintenance until the farm begins to produce cocoa. Once the cocoa farm is productive it is divided into shares between the landowner and the sharecropper. At this time, the share allocated to sharecropper is his/her remuneration for having developed the farm. In contrast, land acquisition by inheritance was cited by over three-fourths of the cocoa farmers with their ancestral origin in Atwima versus only 10% of the migrant group.

Table 2
Land Acquisition Methods for Cocoa Farm by Resident Status

<table>
<thead>
<tr>
<th>Land Acquisition Method</th>
<th>Migrant/Immigrant (N=97)</th>
<th>Autochthones (N=261)</th>
<th>All (N=358)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inherited</td>
<td>10%</td>
<td>76%</td>
<td>58%</td>
</tr>
<tr>
<td>&quot;Share Crop&quot;</td>
<td>78%</td>
<td>11%</td>
<td>30%</td>
</tr>
<tr>
<td>Gift from Chief</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Purchased</td>
<td>2%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Leasing</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Other Acquisition</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
There appeared to be little structural difference in the cocoa systems of the two groups. The only significant difference was in the area planted to hybrid cocoa with field school participants reporting approximately one-quarter of their farms planted to improved hybrid cocoa materials, which was significantly higher ($P < 0.05$) than that reported by the non-FFS farmers (Table 3). Relative to the age structure of cocoa farms elsewhere in West Africa, the cocoa farms of Atwima District are newly established with over half of the productive acreage less than 10 years old.

Table 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Non FFS N=135</th>
<th>FFS n=225</th>
<th>Prob (Student t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of farms</td>
<td>1.8</td>
<td>1.8</td>
<td>0.954</td>
</tr>
<tr>
<td>Immature 0-3 yr (ha)</td>
<td>0.5</td>
<td>0.6</td>
<td>0.519</td>
</tr>
<tr>
<td>Young 4-10 yr (ha)</td>
<td>1.7</td>
<td>1.9</td>
<td>0.662</td>
</tr>
<tr>
<td>Mature 11-25 yr (ha)</td>
<td>0.6</td>
<td>0.9</td>
<td>0.134</td>
</tr>
<tr>
<td>Older mature 26-40 yr (ha)</td>
<td>0.1</td>
<td>0.1</td>
<td>0.955</td>
</tr>
<tr>
<td>Old 41+ yr (ha)</td>
<td>0.4</td>
<td>0.1</td>
<td>0.097</td>
</tr>
<tr>
<td>All producing (ha)</td>
<td>2.9</td>
<td>3.0</td>
<td>0.771</td>
</tr>
<tr>
<td>All cocoa (ha)</td>
<td>3.5</td>
<td>3.6</td>
<td>0.818</td>
</tr>
<tr>
<td>Hybrid producing (ha)</td>
<td>0.4</td>
<td>0.7</td>
<td>0.013</td>
</tr>
<tr>
<td>Proportion hybrid</td>
<td>16%</td>
<td>26%</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Note. Calculated probability of mean difference is based on an independent groups t-test.

Overall insecticide applications by farmers were more frequent than fungicide applications and no statistical differences were noted in the frequency of application between the target and control groups. In 2002, government sponsored spray teams were sent out to treat farmers’ cocoa fields with both fungicides and insecticide free of charge with the exception of the cost of the fuel for the motorized sprayers. Because of the atomized nature of the cocoa industry in Ghana, some producers failed to benefit from the program. Among survey respondents, 64% and 20% had their farms treated with insecticide and fungicide respectively by the government program in 2004. Independent of the government program, 54% of the respondents applied insecticides and 18% applied fungicides on their own initiative. Of the 82% who did not apply fungicides, approximately half indicated that cocoa black pod disease was not a problem (Table 4). For insecticides, the most common reason for not spraying was a lack of financial means with a significantly larger response given by non-FFS farmers suggesting fewer financial resources. This was the second most common response for fungicides as well. The overall differences in reasons given were statistically significant only in the case of insecticides.
Table 4
*Reasons Given for Not Spraying Fungicides and Insecticides*

<table>
<thead>
<tr>
<th></th>
<th>Non FFS</th>
<th>FFS</th>
<th>All</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fungicides</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of financial means</td>
<td>33%</td>
<td>23%</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>Lack of availability</td>
<td>4%</td>
<td>3%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>High cost of fungicides</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Blackpod not a major problem on my farm</td>
<td>45%</td>
<td>49%</td>
<td>47%</td>
<td>0.382</td>
</tr>
<tr>
<td>Benefited from gov’t spraying program</td>
<td>7%</td>
<td>10%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>IPM practices of FFS were effective</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Does not have a sprayer for application</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Young farm not requiring treatment</td>
<td>11%</td>
<td>9%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td><strong>Insecticides</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of financial means</td>
<td>65%</td>
<td>41%</td>
<td>51%</td>
<td></td>
</tr>
<tr>
<td>Lack of availability</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>High cost of insecticides</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Capsids not a major problem on my farm</td>
<td>0%</td>
<td>13%</td>
<td>8%</td>
<td>0.000</td>
</tr>
<tr>
<td>Benefited from gov’t spraying program</td>
<td>10%</td>
<td>29%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>IPM practices of FFS were effective</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Does not have a sprayer for application</td>
<td>0%</td>
<td>4%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Young farm not requiring treatment</td>
<td>25%</td>
<td>9%</td>
<td>15%</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Calculated probability of mean difference is based on chi-square tests.

Pruning is practiced in Ghana, in order to: (a) remove the parasitic mistletoe plant which grows in the upper canopy of the cocoa tree, (b) improve airflow leading to lower disease pressure from black pod, (c) remove diseased or dead tree stock and (d) improve the plant architecture to facilitate crop management. Field school participants pruned their cocoa an average of three times annually, versus two times for the control group (Table 5). Both groups of farmers reported pruning essentially their entire farm.

Table 5
*Pruning Practices by Cocoa Farmers in Atwima, Ghana, 2005*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Non FFS</th>
<th>FFS</th>
<th>Prob  (Student's T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency and extent of pruning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of times pruned in 2004</td>
<td>1.9</td>
<td>2.8</td>
<td>0.000</td>
</tr>
<tr>
<td>Average proportion of farm pruned</td>
<td>87%</td>
<td>89%</td>
<td>0.412</td>
</tr>
</tbody>
</table>

*Note.* Calculated probability of mean difference is based on an independent groups t-test.

In the FFS, discovery learning protocols such as the disease zoo are intended to lead farmers to an understanding of the factors influencing the development of cocoa black pod disease. This includes the source of disease inoculums and their proper removal. The main source of disease is infected pods. As seen in Table 6, prior to the farmer field school training the most common practices were, either to remove the infected pod and throw it on the ground, or to do nothing at all. Following training the vast majority of farmers indicate that they now remove the infected pods from their cocoa farms after harvesting as compared to the control group for whom only a small minority were aware of recommended practices.
Table 6
*Actions Taken by Farmer when Blackpod Infections Noted on Cocoa Pods (by training status)*
*Atwima, Ghana, 2005*

<table>
<thead>
<tr>
<th>Action taken</th>
<th>Participants</th>
<th></th>
<th>Non-participants</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>37%</td>
<td>1%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Treat on tree with fungicide</td>
<td>3%</td>
<td>7%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Remove and throw on ground</td>
<td>55%</td>
<td>9%</td>
<td>&lt;0.001</td>
<td>44%</td>
</tr>
<tr>
<td>Remove and carry out of farm</td>
<td>4%</td>
<td>83%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Other actions</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

The two calculated probabilities are chi-tests of independence comparing 2004 post-training blackpod practices among FFS trained farmers with their 2003 pre training practice and a cross-sectional comparison of reported 2004 practices by training status.

As a service to the farmer field school groups, STCP acquired a limited number of improved hand pollinated F1 hybrid cocoa pods from the Cocoa Services Division of COCOBOD, which were then distributed to farmers. Normally farmers wishing to plant hybrid cocoa must travel to the nearest seed production facility of the CSD to acquire the cocoa pods, which for farmers facing poor transport infrastructure can easily take up the whole day. STCP was able to use the structure of its farmer field school groups to determine collective demand, and then facilitate the delivery of cocoa pods. By bringing the hybrid pods closer to the farmer a substantial increase was noted in the number of farmers planting F1 hybrid seedlings.

In 2004, 54% of FFS participants indicated acquiring F1 cocoa pods versus 16% of the control group farmers. Among the FFS participants receiving F1 cocoa pods, seven in 10 received them through the facilitation of the STCP program. In both 2003 and 2004 FFS farmers received significantly more F1 hybrid pods and transplanted significantly larger quantities of F1 hybrid seedlings as compared to the non-participant control group. The large difference between these two groups can be attributed to advocacy in the field schools for using the best possible planting materials and as well the facilitation provided by the program.

**OLS Production Regressions**

Table 7 provides the summary statistics for the variables of the regression model of production for the FFS and control groups. Looking at the structural variables such as farm size or the amount of household labor we find very few significant differences. This suggests that selection bias may be minimal in our particular case study. Regarding management variables such as weeding and pruning there was a higher frequency among FFS participants. The proportion of cocoa farmers indicating they had acquired their land via a sharecropping labor exchange was also greater among the FFS farmers.

To test for structural differences in cocoa production technologies across the two groups a Chow test (Greene 1993, p. 212) for overall parameter stability was conducted. The F statistic for testing the restriction that the coefficient vectors for the two groups are the same was $F_{[17,253]} = 2.04$. The tabled critical value is 1.62 for 5 percent significance, so we would reject the hypothesis that the coefficient vectors are the same for the two groups. Therefore, discussion of the results that follows focuses on the group regressions. All three regressions were beset with heteroskedasticity and a consistent procedure for estimating standard errors was implemented. The coefficient of determination was relatively low, which is not uncommon for cross-sectional studies (Table 8).
One of the striking differences between the two regressions is the effect of the education level of the cocoa farmer on production. For FFS graduates the number of years of education was significant and positively related to output. For the control group, years of education had no significant effect on output. One interpretation of this result is that formal education becomes important when combined with adult education programs such as the farmer field school. Another noteworthy result is the difference in the magnitudes of the coefficients on the tree stock variables. The coefficients for young and mature hybrid cocoa were larger for control farmers, whereas the coefficients for young and mature non-hybrid cocoa were larger for FFS farmers.

The coefficient on \textit{SHCROP}, the dummy variable indicating that the farm was acquired by an exchange of labor to create the farm for half of the farm developed was negative. This could reflect the fact that when the landowner divides the farm, there is a tendency to keep the better land and allocate the less productive share to the sharecropper (Kasanga & Kotey, 2000).

The pesticide spraying frequency variables also had differential effects. In the control group regression there were no positive significant effects. Indeed the estimated coefficient for government fungicide spraying was negative and significant. In contrast, three of the four pesticide variables had a positive and significant effect on production in the FFS regression. As the intensity of pesticide application was not found to differ across the two groups this finding suggests that pesticides applied on the farms of FFS participants had considerably greater effect than among the control group farmers.

Table 7
\textit{Descriptive Statistics for Regression Variables}

\begin{tabular}{lccccc}
\hline
\textbf{Variable} & \textit{Pooled} (n=283) & & \textit{FFS} (n=188) & & \textit{Control} (n=95) \\
 & \textit{Mean} & \textit{Std. Dev.} & \textit{Mean} & \textit{Std. Dev.} & \textit{Mean} & \textit{Std. Dev.} \\
\hline
PROD04 & 287 & 401 & 312 & 450 & 238 & 276 \\
EDUC & 6.20 & 4.36 & 6.53 & 4.20 & 5.55 & 4.59 \\
GENDER & 0.72 & 0.45 & 0.73 & 0.45 & 0.71 & 0.46 \\
HH\_LABOR & 2.61 & 1.10 & 2.62 & 1.09 & 2.59 & 1.12 \\
PRUNE & 2.42 & 1.21 & 2.58 & 1.09 & 2.09 & 1.35 \\
WEED & 2.71 & 0.71 & 2.81 & 0.68 & 2.50 & 0.71 \\
WEED\_SQ & 7.83 & 4.00 & 8.38 & 3.95 & 6.75 & 3.90 \\
SHCROP & 0.29 & 0.45 & 0.33 & 0.47 & 0.21 & 0.41 \\
HYB4\_10 & 0.40 & 0.92 & 0.48 & 1.01 & 0.23 & 0.70 \\
HYB11\_40 & 0.15 & 0.52 & 0.17 & 0.44 & 0.12 & 0.65 \\
NHYB4\_10 & 1.69 & 2.74 & 1.57 & 1.84 & 1.94 & 3.96 \\
NHYB11\_40 & 0.77 & 1.72 & 0.90 & 1.81 & 0.52 & 1.51 \\
G\_FSPRAY & 0.31 & 0.67 & 0.33 & 0.71 & 0.26 & 0.58 \\
F\_FSPRAY & 0.27 & 0.66 & 0.27 & 0.63 & 0.28 & 0.72 \\
G\_INSPRAY & 0.88 & 0.76 & 0.91 & 0.74 & 0.83 & 0.82 \\
F\_INSPRAY & 0.93 & 1.04 & 0.98 & 1.02 & 0.83 & 1.08 \\
FERT & 29.08 & 87.59 & 35.52 & 95.93 & 16.47 & 67.05 \\
\hline
\end{tabular}
Table 8
Cocoa Regression Model Results

<table>
<thead>
<tr>
<th></th>
<th>Pooled (n=283)</th>
<th>FFS (n=188)</th>
<th>Non FFS (n=95)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Robust Coeff.</td>
<td>Robust t-ratio</td>
<td>Coeff.</td>
</tr>
<tr>
<td>Intercept</td>
<td>-39.9</td>
<td>-0.25</td>
<td>-212.2</td>
</tr>
<tr>
<td>EDUC</td>
<td>7.84</td>
<td>1.87*</td>
<td>16.46</td>
</tr>
<tr>
<td>GENDER</td>
<td>60.2</td>
<td>1.99**</td>
<td>62.6</td>
</tr>
<tr>
<td>HH LABOR</td>
<td>7.97</td>
<td>0.47</td>
<td>19.11</td>
</tr>
<tr>
<td>PRUNE</td>
<td>20.5</td>
<td>0.85</td>
<td>11.7</td>
</tr>
<tr>
<td>WEED</td>
<td>-14.9</td>
<td>-0.12</td>
<td>3.03</td>
</tr>
<tr>
<td>WEED_SQ</td>
<td>-3.52</td>
<td>-0.18</td>
<td>-7.87</td>
</tr>
<tr>
<td>SHCROP</td>
<td>-99</td>
<td>-2.12**</td>
<td>-150</td>
</tr>
<tr>
<td>HYB4_10</td>
<td>46.7</td>
<td>1.62</td>
<td>37.5</td>
</tr>
<tr>
<td>HYB11_40</td>
<td>189</td>
<td>2.76***</td>
<td>96.2</td>
</tr>
<tr>
<td>NHYB4_10</td>
<td>20.0</td>
<td>1.56</td>
<td>62.0</td>
</tr>
<tr>
<td>NHYB11_40</td>
<td>56.0</td>
<td>2.12**</td>
<td>66.3</td>
</tr>
<tr>
<td>G_FSPRAY</td>
<td>-23.3</td>
<td>-0.80</td>
<td>-31.8</td>
</tr>
<tr>
<td>F_FSPRAY</td>
<td>77.1</td>
<td>1.72*</td>
<td>124.1</td>
</tr>
<tr>
<td>G_INSpray</td>
<td>109</td>
<td>3.53***</td>
<td>168</td>
</tr>
<tr>
<td>F_INSpray</td>
<td>41.6</td>
<td>1.87*</td>
<td>51.8</td>
</tr>
<tr>
<td>FERT</td>
<td>-0.423</td>
<td>-1.63</td>
<td>-0.595</td>
</tr>
<tr>
<td>Adj. R squared</td>
<td>0.270</td>
<td>0.296</td>
<td>0.478</td>
</tr>
<tr>
<td>Breusch - Pagan</td>
<td>440.9</td>
<td>252.6</td>
<td>35.4</td>
</tr>
</tbody>
</table>

Significance levels: * P<0.10, ** P<0.05, ***P<0.01

The coefficient of G_INSpray was considerably larger than the coefficient of F_INSpray. This suggests that farmers applying insecticides on their own were considerably less effective relative to the government spray gangs. This could be due to the wider collective nature of the government spray program where all farms in a given locality sprayed within a few days in an effort to prevent the capsids from just flying to the adjacent non-treated cocoa. Alternatively, it may reflect spraying at inappropriate times by the farmer.

To estimate the net impact of farmer field school training under the assumption that the differences between the control and FFS group regression coefficients are attributable to training, we calculated the estimated production for the representative FFS producer using the control group regression model. Doing so results in an estimated output of 278 kilograms of cocoa, which is 38 kg less than the actual output achieved with the FFS model. On this basis, it would appear that the farmer field school resulted in a net production increase of 14% for the 2003 Ghana participants relative to predicted control group results.
Discussion

One of the striking demographic findings was the high proportion of women involved in cocoa farming in this sample, accounting for one-fourth and one-third of cocoa producers interviewed in the FFS and control group sub-samples, respectively. The coefficient on the gender variable for the FFS group regression, although not robustly significant suggests that men benefitted more from FFS training. As the roles, responsibilities, and household decision making autonomy of women in rural Ghanaian society differs considerably from men, these differences need to be considered when designing technology dissemination approaches.

The most important agricultural factors of production in rural West Africa are land and labor. FFS households had a significantly larger share of hybrid cocoa land. Edwin & Masters (2005) in a study from the same area found an increase of approximately 250 kg per hectare on lands planted to hybrid cocoa relative to “traditional” varieties under average farmer management. The program was successful in developing a brokerage service for facilitating producer access to hybrid cocoa pods. Facilitating access to hybrid cocoa pods in combination with a training emphasis on nursery management and replanting are logical next steps for the further development of the Ghanaian FFS program.

Farmers in FFS are exposed to new methods of discovery including observation and simple experimentation. These methods are used to develop their understanding of cause and effect concerning agronomic problems and to illustrate the importance of field management practices such as pruning, shade management, and proper phytosanitary control. Significant changes in farmer management for all of these practices were noted. David (2007) in an evaluation of farmer knowledge among Cameroonian cocoa FFS participants and a control group found that knowledge of these practices was significantly enhanced by farmer training. However, one management issue currently neglected by the FFS curriculum in Ghana is the issue of rational pesticide use by individual farmers. The program had supposed that there was no need to emphasize rational pesticide use since there was a government program which intended to spray farmers cocoa farms. However, the study revealed that less than two-thirds of all producers participated in the government spraying program and independent of the government program a majority of farmers applied additional pesticides funded out of household savings. In the regression analysis it was noted that the marginal impact of an independent spraying of insecticide was considerably lower than a government spraying. This rather surprising result suggests that producers were less efficient than government spray gangs. One area of farmer practice, that requires attention may be the timing of insecticide application for the control of capsids. One third of FFS farmers were spraying during the major fruit setting period which might affect successful pollination by midges. More consideration should be given in the FFS curriculum to dealing with rational pesticide use.

The objective of the disease zoo protocol is to lead farmers to discover the relationships between disease, humidity and black pod disease development. This understanding is then reinforced by learning protocols on phytosanitary harvesting and shade management. In the former, farmers discover the importance of proper removal of sporulating cocoa pods. Whereas prior to FFS training the majority of farmers left sporulating pods either on the tree or on the ground within the cocoa farm; following training the majority indicated that they removed these sources of disease from the farm. The protocol on shade management leads the farmer to recognize situations where excessive shade may be contributing to the development of black pod disease and where too little shade may be contributing to capsid infestation.

The regression models revealed significant structural differences in productive response of FFS trained farmers and control farmers. One striking difference was the production response to pesticide application, with the FFS participants eight times more effective than the control group. In sum, FFS training is estimated to have resulted in a net increase in production of 14% among the 2003 participants. To achieve this increase, producers mainly increased their own labor input and
indicated hiring more casual laborers. While the survey was unable to accurately determine the actual change in labor inputs, the additional labor costs required to achieve this increase (whether from the family or hired) are a real cost to the producer that should be netted out of the 14% increase in estimated gross revenues.

It is interesting to compare our survey results for 2003 participants with the yield results from the ICPM and farmer practice plots in the Ghana farmer field schools. As of September 2005, the yield on the ICPM plots was estimated to be 41% greater than the farmer practice plots, but required more than a doubling of the labor input. It is unlikely that most farmers would be willing or able to double their labor inputs in order to achieve such a result. Farmers are more likely to selectively apply the set of new practices and knowledge acquired. The corollary is that the productivity gained is likely to be less than that achieved in the field school itself. This explains in part the relatively low production increase seen among 2003 participants. The other explanation lies in the glitches associated with the start-up of the program in 2003 and in some cases a lack of curriculum validation. As the program has matured, these matters have been rectified.

**Recommendations**

From several different perspectives it is clear that the FFS training received by participants has had measurable impacts on their productive capacity. In support of the significant accomplishments already achieved, several recommendations can be made to potentially improve the performance and impact of FFS training. First of all, there is a need to refine the curriculum to address the specific needs of women producing cocoa. A needs assessment is recommended as a first step in adapting the curriculum or training approach. Secondly, given that the majority of producers were applying insecticides to control capsids, independent of the government spraying program but with lower use efficiency vis-à-vis the government program, training on the safe and rational use of pesticides requires more emphasis. Finally, the facilitation provided by the program in the distribution of improved cocoa planting material substantially increased the area planted to hybrids among participant farmers. This brokerage service is commendable and should be augmented with an additional training on nursery techniques and planting/replanting options.
References


From A Deficit-based to an Appreciative Inquiry Approach in Extension Programs:
Constructing a Case for a Positive Shift in the Current Extension Intervention Paradigm

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Abstract
This paper presents a philosophical argument for the institutionalization of appreciative approaches in extension programs. Such institutionalization would influence the negative discourse often directed toward the extension discipline. An Appreciative Inquiry approach offers an alternative, constructionist method to guide extension practitioners to envision a robust, positive future. Specific references are made to the perceptions of South Africans toward extension to anchor the pessimistic view. Public extension has been overly criticized in the agricultural development discipline for being irrelevant, nonfocused, and least beneficial to clients. Many blamed actors in extension for being complacent and incompetent. Yet, others perceived the challenging demands on extension as opportune for innovative reforms in strategy and approach. The paper argues that top-down approaches used in extension locate immense responsibility on practitioners to resolve development problems, thus limiting its chances for success. The resultant failure in approaches used is publicly perceived as failure of Extension. Three possible factors drive the pessimistic view. First, institutions of Extension tend to be narrowly perceived as useful to rural farm households. They overlook the heterogeneous character of communities, and their diverse survival strategies. Second, Extension approaches locate agenda-setting powers in the hands of the intervener, not the client. Last, extension interventions tend to be problem focused, often advancing problem modes of thinking. A shift in paradigm toward appreciative modes of probing, planning, and intervention for sustainable development is called for. This paper concludes with a pro-appreciative inquiry rationale for consideration by extension practitioners as they heed the call for Extension renewal.

Keywords: extension renewal, extension approaches, appreciative inquiry, new paradigm
Introduction

Public extension has been overly criticized by policy-makers in the agricultural development discipline. The criticism has prevailed despite international and national efforts directed toward extension renewal. Extension practitioners, as visible faces in the disciplines, carried the brunt of the criticism and came to represent the negative face of public extension. What is the root cause of the extension critique and what informs the contrasting perspectives on its role?

Rivera (1990) predicted what he called, ‘a turning point’ for extension worldwide. In his view, the onset of the decade heralded, “…the end of the beginning because the great majority of public extension systems in developing countries …have now arrived at a stage of consolidation or dissolution” (p. 4). Twenty years later, the discourse on the future role of extension continues with some seeing great value in extension reforms and consolidation, whilst others register concerns of failures in extension (FAO, 1999, 2000, 2001, 2005; FAO/World Bank, 2000; Swanson, 2008).

Such diverse perspectives, which suggest either a total collapse or resurgence of extension, gained prominence following the sector rationalization and critique directed at the World Bank-funded Training and Visit (T&V) extension approach (Benor & Harrison, 1977). Although others portrayed T&V as the best model for effective extension management in Africa, some acknowledged its failure at implementation in rural Kenya (Anderson et al., 2006). The failure of T&V destroyed the fragile image of public extension (World Bank, 1990; Rivera, 2008; Anderson et al., 2006). Since then public extension has, in some parts of the world, assumed the unflattering identity of a development discipline that is irrelevant, nonfocused, and least beneficial to clients (Leonard according to Rivera, 1990). And, pessimistic perceptions of extension have become a norm, rather than a novelty in development and academic discourse.

It is for this reason that practitioners in extension must begin to ask of themselves these hard questions. Is it conceivable that the consistent critique directed toward extension has turned into a ‘self-fulfilled prophecy’ among extension practitioners? Has the Extension discipline succumbed to the perpetual criticism, internalized the critique, and inadvertently lost confidence in and of itself? If so, can the same practitioners take it upon themselves to reverse the process and, thereby rebuild public confidence in the discipline?

Some might argue against the logic of internalization, given the dedication and commitment of most extension practitioners. Be that as it may, proponents of the latter view might consider apportioning blame for the pessimistic view to the methodologies and the approaches used in extension as failing the discipline. That being the case, is it possible that the intervention approaches currently used in extension programs locate much responsibility on extension to resolve development problems, hence the ongoing critique about extensions’ failures? The correctness of the rationale to these questions is of no major relevance. Of importance is the acknowledgement by practitioners and their superiors of the urgent need for a positive rethink of extension toward the long-term survival of the profession.

Using the example of South Africa, the following section presents parallels between the dynamic socio-political contexts of the country and perceptions of negativism in Extension. In addition, evidence of the prevalence of public extension negativism in some parts of that country is presented. An overview and discussion of the relevance of Appreciative Inquiry (AI) in the transformational agenda for Extension follows. The next section presents a critique on the use of rigid top-down approaches in Extension, and the problem of confinement of public Extension to the rural farming communities. The paper concludes with a philosophical argument articulating the impact of the criticism on the discipline and its practitioners, and presents a rationale for constructive positive change.
Contributing Factors and Evidence of Negativism in the South African Public Extension

This paper argues that the perception of negativism around public extension services is rooted, in part, to the socio-political and historical contexts of emerging democratic governments. The case of South Africa represents a good example of such. In that country, the contributions of extension to the broader national ideals of poverty alleviation, employment, political stability and food security are perceived as insignificant. South Africa gained independence in 1994, from apartheid rule. Under apartheid rule, all settlement patterns of the South African population, as well as their access to services was organised along racial lines. For instance, the country had 87 percent of her land designated as white settlements, with the remaining 13 percent assigned for settlement by the majority black population (Department of Agriculture, 1998). The legislated settlements for black people were designated as “homelands, or independent states,” whilst those for whites were known as “white areas” (Kock, 1996). The long-term outcome of these skewed hegemonic polices was the perpetual association of inferiority and below par performance that carried the “homeland” identity.

Included in this quagmire were institutions of higher learning, agricultural training institutions, economic development programs, and support services that mirrored these white supremacy social patterns. It is therefore, not surprising that 16 years into democratic rule, government-led public extension services still carries the former homelands’ burden of the inferiority identity.

Although shaped by this unique socio-political context, the dominant perception of public extension in South Africa follows global trends. Public confidence is weak around government-paid practitioners. And, studies have shown that in some parts of the country, a phenomenon known as ‘support-the-visible’ farmer prevails, where extension practitioners tend to service farmers along the road sides, the service centres, and those that are independently progressive (Ngomane & Mollel, 2000). As a result, few resource-poor farmers have direct access to public extension. Those who do have access, complain that extension practitioners experience difficulties responding to specific technical questions, and often provide inaccurate information (Machethe & Mollel, 2000).

According to Kock (2006), the racial-based training programs for extension practitioners in South Africa have greatly compromised the profession. In a nutshell, graduates from the homelands received low quality training, and served only subsistence smallholder farmers. Competent University graduates supported the commercial farmers. The combination of these factors, namely, segregation policies and curriculum content weaknesses has contributed somewhat to the negative perception of public extension in South Africa. It is these factors that helped intensify the criticism against extension in the country, which permeated even the government policy-making process.

Government perceived the estimated annual budget allocation of USD $50 million for public extension as a drain to the public coffers (Department of Agriculture, 1998). The situation prevailed despite reports that the majority of extension practitioners were highly demoralized, and in need of retraining opportunities (Machete & Mollel, 2000).

The long-term impact associated with the prolonged criticism of public Extension, particularly on its practitioners, remains unknown. Suffice to say that there is an urgent need to rethink the Extension service’s intervention strategies and approaches, its role in development systems and partnerships, and its engagement patterns with beneficiaries. Extension service as a public good, may not afford a prolonged negative public image. For this reason, the paper introduces in the next section an approach worth consideration for possible extension renewal – the Appreciative Inquiry (AI) approach.
An Overview and Relevance of Appreciative Inquiry Approaches to the Change Discourse

Appreciative Inquiry was developed by David Cooperrider and Suresh Srivastva at Case Western Reserve University in Cleveland in the 1980s (Cooperrider & Srivasva, 1987; Ashford & Patkar, 2001; Judy & Hammond, 2006), as an innovative “strategy for positive change that identifies the best of ‘what is’ to pursue dreams and possibilities of ‘what could be’” (Ashford & Patkar, 2001, p. 4). The approach entails a wholly inclusive search for the collective strengths, drive, and the individual insight to pursue inspired, positive change. Central to the approach is a constructionist ethos that all individuals, organizations and communities carry within them the seed and desire for positive change. Evidence of this philosophical orientation is seen in its application. The Appreciative Inquiry approach help shift focus from the difficulties and the problems experienced by individuals, organisations and rural communities toward exploring opportunities and finding solutions. The aforementioned researchers reckon that though commonly applied in the corporate world, AI “has remained largely unknown to those working outside the corporate sector” (p. iv). The former had “widely praised AI for its effectiveness in helping corporations become more competitive by aligning their structures and activities with employee and client values” (p. iv).

Recent evidence show increasing interest and diversity in the application of AI for positive interventions in the development sector. For instance, development practitioners used AI to establish sustainable projects for rural communities in India (Asford & Patkar, 2001). Others used AI to find pragmatic solutions to climate disruptions, biodiversity loss, and poverty (Myer & Kent, 2008), while some found the approach useful in resolving institutional transformation conflicts in the area of education (Pinto & Curran, 1998), promoting sustainable development of the desert communities in the Sahara (Elliot, 1999), and so forth. Irrespective of the context, an appreciative inquiry is commonly facilitated through four basic stages as follows.

(a) Discovering periods of excellence and achievement

Through interviews and story-telling, participants remember significant past achievements and periods of excellence. When was their organization or community functioning at its best? What happened to make those periods of excellence possible? By telling stories, people identify and analyze the unique factors—such as leadership, relationships, technologies, core processes, structures, values, learning processes, external relations, or planning methods—that contributed to peak experiences. (United Nations Development Programme, 2005, p. 11)

“Personal story questions would include examples such as ‘Tell a story about a time when you felt you overcame a significant challenge to achieve something remarkable. How did you feel?’ or ‘Tell a story about a time when you really felt the support and encouragement of other group members?’” (p. 12).

(b) Dreaming and envisioning an ideal organization or community

In this step, people “…challenge themselves to imagine a future in which their group functions at its absolute peak…” (Ashford & Patkar, 2001, p. 4). They derive strength from past achievements to envisage a desired future with tangible, achievable goals.

This aspect of appreciative inquiry is different from other vision-creating or planning methodologies because the images of the community's future that emerge are grounded in history and as such represent compelling possibilities. In this sense appreciative inquiry is both practical, in that it is based on the ‘positive present,’ and generative, in that it seeks to expand the potential of the organization or community. (United Nations Development Programme, 2005, p. 11)
Through an envisioning exercise in India Ashford and Patkar (2001), recorded powerful statements made by communities on the path of their “awakening” such as “This community will plant 1,000 trees over the next two years to ensure the forest’s survival for future generations” (p. 20).

(c) **Designing new structures and processes**

In the design stage people form specific action plans to better harness their strengths toward achieving their desired future.

This stage is intended to be provocative—to develop, through consensus, concrete short- and long-term goals that will achieve the dream. Provocative propositions usually take the form of statements such as ‘This community will do whatever is necessary to build a school and have a full primary cycle within the next year’ or ‘This village will protect what remains of the local forest and will plant one thousand trees over the next two seasons to ensure the forest’s survival for future generations. Provocative propositions should stretch an organization or community, but they should also be achievable because they are based on past periods of excellence. (United Nations Development Programme, 2005, p. 12)

With much improved understanding and appreciation of their collective strengths, core values, and a common vision regarding their anticipated future, the people are then ready for the final stage, Delivery (Ashford & Patkar, 2001).

(d) **Delivering the vision**

In this stage, people act on their provocative propositions, establishing roles and responsibilities, developing strategies, forging institutional linkages and mobilizing resources to achieve their dream. New project plans will be developed and initiated, new relationships will be established and the group will proceed with vision and a renewed sense of purpose. As a result of the appreciative process, people will have a better understanding of the relevance of new initiatives to the long-term vision of the organization or community. (United Nations Development Programme, 2005, p. 12)

The AI approach has been successfully used in both public and private settings where people were alienated, demoralized and demotivated, and proved to be a robust process for promoting positive change. According to Asford and Patkar (2001), its success has been confirmed with individuals, families, small and large groups. Although not a panacea for change, the use of appreciative inquiry can enable various actors in extension to create space for beneficiaries to build the foundation for change by beginning to address their own problems. The kind of negativism directed at public extension practitioners as discussed earlier requires some form of deliberate, positive action for redress. There has to be a targeted, purposeful change in the strategies and approaches used in Extension to address the alienation of practitioners from the discourse of success in the agricultural development discipline. Hence, the consistent argument for actors in the discipline to consider the use of Appreciative Inquiry, as an alternative approach for Extension program interventions.

The timing for such a step is ideal as evidenced by the increasing interest from international and national bodies in the great potential of innovative extension approaches for sustainable development. In embracing that growing interest, Extension may not fall back on the popular approaches responsible for its perceived “loss of face”. Other factors notwithstanding, it is largely the failures associated with the top-down approaches advanced in Extension, which served as a magnet for prolonged criticism and mis-perception of the discipline as non-caring and incompetent. Linkage of the extension critique to the popular approaches used in extension, as well as its predominant confinement to subsistence agricultural development, is established next.
The Parallel between Top-down Approaches in Extension and Public Perceptions of Negativism

Public extension has been criticized for its costly top-down approaches, such as the T&V. Although some successes of a modified T&V were registered elsewhere in Africa, some analysts believed that the approach failed. Training and Visit was found to be overly rigid in its principles of exclusivity to extension functions and inflexible in its adherence to time-bound programs, frequency of contact time, and excessive budget demands (Amezah & Hesse, 2004; Leonard according to Rivera, 1990). Despite the widespread weaknesses of the approach, its proponents progressed on the seemingly misguided notion that qualified extension practitioners exist as passive conduits of research outputs and new technologies to the extension clients. Thus framed, the role of public extension practitioners was erroneously interpreted as that of a “postal service” good enough to pass on research information from subject matter specialists to farmers, and vice-versa without much interpretation. Even within the seemingly more integrated Farming Systems Research and Extension (FSR/E) approach (Swanson, 2008, p.17), questions related to the role of extension remained unanswered. Such as, should extension provide information for all within the FSR/E or should its focus be on extending technological information related to the agricultural aspects of the system?

A related disconcerting trend was that of a public extension service confined to the transfer of technologies in support of mostly rural smallholder farmers for subsistence purposes at the exclusion of rendering support for commercial farmer development. Moreover, the excessive focus of extension efforts on transferring technologies has overtime overlooked the human aspects and the social capital inherent in individuals, families and communities for societal advancement. Helping the individual, the group and the community identify and release their potential should be the central focus for Extension, and remains one of the strong points in appreciative inquiry. By exploring acts of excellence and achievement from the actors in development, the intervener creates awareness of the potential within the individual and/or group to do more.

The Problem of Confinement of Public Extension to Rural Farming Communities

According to the Food and Agricultural Organization (FAO) (2001) past development experiences and practice have confined the role of public extension generally within the agricultural development goals, with little emphasis placed on other areas of social development such as health and education. In both conceptualization and practice, at least in the African context, the institutions of Extension tend to be narrowly perceived as useful to rural-based agrarian households. In so going, Extension overlook the heterogeneous nature of developing communities and their diverse sustainable livelihood strategies. In public and private sector partnerships contexts, public extension is often portrayed as a conduit for transferring public good technologies for smallholder farmer development, whilst the transfer of proprietary technologies remain the role of the private sector.

Such limiting conceptualization and practice have prevailed despite growing evidence that farming households were heterogeneous in nature and often employed diverse livelihood strategies for their economic survival. Furthermore, the self-limiting framing of public Extension served as the basis for the advancement of top-down interventionist approaches, such as the T&V and ToT. Thus framed, proponents of public extension for rural small farm households overlooked the growing reality that: (a) rural household family structures are undergoing rapid transformation as the economically active family members migrate to the urban centres in search of employment and better incomes (FAO, 2000); (b) the demand for urban agriculture and food security are increasing as urban populations grow (ibid); (c) rural farming communities engage in multiple livelihood activities outside the farming activity as survival strategies against natural disasters. Diverse livelihood strategies include handicrafts, temporary employment, microenterprises, and home-based teaching, which often require extension interventions; (d) the decision-making powers are shifting consistent
with the shift in family headship. As economically active men move to the cities, more women assume the traditional male role as defunct head of the household for decision-making. As a result, extension messages designed for male-headed households might be interpreted differently by the defunct female headed households (ibid); (e) consultative leadership and governance is increasingly practiced in fledgling democracies in the developing world, and “…most communities in most parts of the world…have already seen a better future for themselves or their children. For good or ill, the revolution of rising expectations has already engulfed them” (Elliot, 1999, p. 282). As a result, in the agricultural development sector and related disciplines, the role of civil society and group decision making bodies such as producer associations is growing, calling for participatory transformational approaches in public Extension.

Grappling with these shifting trends, others have argued that extension as a function undergoing major transition, may now serve different purposes, such as “dissemination and collection of health information” (Rivera, 2008, p. 20), natural resource management, education, attitude change, human resource development, and related social services (Marsh & Pannel, 1998; Swanson, 2008). Consequently, the term agricultural extension, which formerly referred to agrarian public sector extension, is being re-conceptualized to include all extension-type services provided by public, private and civil society organizations (Rivera, 2008, p. 20). In practice, the re-conceptualization of extension is occurring at the opportune moment, and provides a basis for extension to broaden its scope in program design, envisioning, and implementation to include diverse client needs and aspirations. The next section seeks to establish a rationale for the complex phenomenon of association of public extension with the failure-syndrome.

**Making Meaning of the Criticisms: Failure Mirrored through Extension Practitioners**

The general misinterpretation and limiting perception of the role of public extension that was directly linked to the highly publicized T&V approach within the sector (Ngomane, Thomson & Radhakrishna, 2002), created fertile ground for framing “the beginning of the end” predictions for Extension. When T&V failed, public extension portrayed the face of that failure. Extension practitioners, as the visible public face of the T&V approach logically mirrored that failure. Thus, despite the involvement of other role players in the implementation of the approach, such as subject matter specialists and funding agencies, extension service became the most visible “object” for criticism and was characterized as a discipline on the verge of extinction. In the case of South Africa the “extension-going-extinct” discourse was advocated in the late 1990s at the highest level of government leadership. The negative discourse gave rise to hasty compliance-driven restructuring programs aimed at mainstreaming Extension with disciplines, such as agricultural economics, resource conservation, and so on.

The long-term impact of these compliance-driven restructuring efforts only began to unravel a decade later as poor clarity regarding the direction for extension. It continues to negatively influence the curriculum design strategies, delivery mechanism, and field implementation approaches.

In addition, by design and application Extension interventions are problem focused, often advancing problem modes of thinking at client level. Known successes of Extension in countries like Asia where the annual rate of return on extension investment were estimated at 79 percent (Alston et al., 1999) have thus far been unable to shake off the negative perception surrounding extension. In most agricultural development forums, a discussion on Extension is often negative, peppered with adjectives of failure. To date, the psychosocial and performance impact of these extended criticisms on Extension, and developing country extension practitioners in particular, is yet to be determined. A shift in paradigm – a new direction – toward advancing appreciative modes of thinking for sustainable development through public extension is crucial to save Extension from itself.
The Silver Lining: Opportunities for Public Extension Renewal

In contrast to the dissolution discourse mentioned above, others are responding differently to the perceived lack of success of public extension, seeing it as an opportune era for re-organizing public extension. The Food and Agricultural Organization (FAO) led an intensive global program of work aimed at reviewing good agricultural extension and advisory services practices and proposed options for institutional reform. More market driven approaches, extension innovation systems, participatory rural appraisal approaches in their diversity are now adopted and practices in many countries (Swanson, 2008). There is a growing understanding within the sector of the broader role of extension in improving rural livelihoods and development of social capital for economic growth. Public extension focus is no longer interpreted as limited to improving household food security for the marginalized rural poor, but more on increasing incomes through high value commodity exports and rural employment (Swanson, 2006a; Swanson, 2008).

Although technology transfer remains an important function for improved yields there is sufficient sector consensus that this activity will become increasingly privatized as technologies become progressively more proprietary and as farmers become more commercialized (Swanson, 2006a). Likewise, the shrinking natural resource base due to the growing global population, climate change and economic growth serves as a catalyst for countries to urgently expand public extension systems and to allocate more resources and effort toward educating users on best “natural resource management” (ibid, p. xii) practices.

The role of extension in social capital development is progressively gaining clarity as more governments embrace the democratic rule of law (ibid). In most countries, public extension practitioners were barred from organizing farmers, women and youth groups for fear of the risk of militancy from these groups against the ruling government.

Following the lead of the Food and Agricultural Organization on the crucial role of extension in this regard, it should be noted that organizing rural youth groups was reported as an effective, long term strategy for building social capital for societal development. The public extension system in the United States thrives on this principle of massive organization of their youth groups through the 4-H and related youth organizations.

The adoption and use of participatory approaches in developing countries, especially within the Southern Africa Development Community (SADC) is beginning to encourage group social mobilization. However, there are limitations on participatory interventions in their current application, including Participatory Rural Appraisal (PRA), which entail the ease with which they locate agenda-setting-powers on the hands of the intervener, thereby compromising individual and community ownership of the process. In PRA interventions, the extension practitioner often becomes the custodian of the solution, thereby compromising the realization of social capital inherent within the community, and/or the household.

Another extension function that requires increasing attention has to do with the development of human capital, which includes increasing the technical and management skills of all types of households. Furthermore, development planners now place emphasis on differentiation amongst different types of farm households at micro and macro levels. These new emphasis on household differentiation brings to focus the differences among men, women, rural and urban youth, married and unmarried, educated and uneducated with respect to their skills base, the strength of their voice in development discourse, and decision making. Each category of people requires specific interventions that are unique to their group aspirations and capabilities. And when it comes to professional relevance to guide community members realize their human and social capital; extension is the frontrunner at the interface of public, private and civil society mobilization for positive societal transformation.

This paper argues that for public extension system to transform its image, to be more effective in improving rural livelihoods and better valued by the clientele, it should transform its focus,
structure and approach starting with a redefined role for its practitioners. In addition, the extension practitioners should develop intrinsic pride and self-worth as they contribute toward the new constructionist direction for the discipline. With participatory people-focused approaches gaining legitimacy in the extension transformational agenda for sustainable rural livelihoods development, there exist a stronger need to harness and intensify such positive energy for change at intervention envisioning, action planning, and implementation levels. Envisioning and action planning are some of the core principles advocated in appreciative inquiries. In other contexts, such as in education and health, the Appreciative Inquiry philosophy was found to be one possible method capable of guiding extension practitioners envision a vital future through the challenging change landscape by identifying the “best of what is” and building on their individual, group, organizational and system strengths to explore the possibilities of “what could be.”

**Constructing a Case for the Use of Appreciative Inquiry in Extension**

Extending knowledge effectively and efficiently from reputable knowledge sources to the end-users is a primary function for extension across disciplines. In a nutshell, success of the knowledge extended process relies largely on the receptivity of the end-users to change (new knowledge), the purposefulness and value of the product (intervention), and the technical confidence level of the change agent (extension practitioner), in disseminating, and interpreting the information.

Of late, the use of participatory rural approaches in extension, such as PRA, has gained popularity in sub-Saharan Africa, and other parts of the developing world. Participatory approaches are applied to help identify local problems, resource constraints, and unmet core needs for extension programs. Although the application of these approaches has gained popularity in some development aspects; they are not without limitations.

Lessons from the Canadian based International Institute for Sustainable Development (IISD) and the India-based non-government organization, MYRADA revealed the following weaknesses relative to the application of participatory approaches;

> While these approaches encourage participation, emphasize the importance of local knowledge and address real problems … such approaches often failed to sustain community participation. MYRADA concluded that deficit-based approaches left people with the impression that their community was full of problems and needs, most of which require the help of the outsiders to overcome. The focus on needs entrenched a sense of dependence that reduced people’s motivation to initiate their own development activities. (Ashford & Patkar, 2001, p. 5)

Problematic experiences similar to the one described above necessitates the need for a paradigm shift from, or at least some adaptation, of deficit-based approaches in extension program development towards those that capitalize on local strengths, local achievements, and adequately engage the end-users in the pursuit of their aspirations. This paper contends that the extension discipline is not immune from deficit-based tendencies. Supporting this view is Peutz and Kroths’ (2009), observation that “as a profession”, extension was “good at looking at problems and trying to improve” (p. 2). By applying appreciative strategies, extension practitioners could bring about purposeful and sustainable transformation, not only amongst them, but could enhance the human and social capital of the end-users for better livelihoods.

**Conclusion**

Public sector extension is highly essential for transformational interventions in both rural and urban communities. It is a funnel through which indigenous and scientific knowledge can be distilled for ease of appreciation by all end-users. It is an ideal professional presence for energizing diverse communities in their struggle against poverty and food insecurity. The discipline of extension remain
one of the few disciplines in social sciences designed to help release human and social capital potential amongst its actors. It has become “…a ‘frontrunner’ in government efforts at public sector reform” (Rivera, 2008 citing Rivera, 1999), especially in the developing countries of sub-Saharan Africa (p.20).

This paper presented a critical opposing view to the historic association of extension with the discourse of failure. There is a need to review the framing of Extension as “knowledge extended,” or “knowledge applied,” and “knowledge transferred,” in these changing times, as the common interpretation of such phrases limit the role of extension practitioners to that of extending research knowledge without much distillation. Recent work done by FAO and the World Bank (2000) regarding the strategic vision and guiding principles for agricultural knowledge systems suggest that much adaptation occurs in the research and extension knowledge system, with immense contribution from extension practitioners. Evidence of the shifting trends and new thrust for extension is growing, with numerous agencies calling for institutional reviews of extension functions, curriculum content, delivery approaches, and more focus on organizational mobilization of its clients in the market environment.

Putting effort toward a positivist shift in the direction of extension is especially important in that, the needs, demands, and aspirations of the actors in the system are shifting; getting more diverse, more complex, and integrated within the broader society and the economy (Ngomane, 2004). Extension dare not be complacent and linear in its approach. The same author argues that by assuming a linear, homogeneous approach to extension programming, the system downplays the porous boundaries, which define the myriad socio-cultural, economic, and political factors shaping our new society. Actors in Extension should strive to re-define their roles as educators, as facilitators, and as builders of community coalitions using as a reference point proven successes of traditional knowledge, local institutional resources, kinship tiers, and political will (Ngomane, 2004). The era for wallowing in professional deficit- mode has gone past, giving way to much needed space for nurturing the individual and communal strengths inherent in all Extension actors.

The use of new envisioning, action planning and implementation approaches for technology development and adoption, not only incorporates the collective knowledge of key role players, it increases the likelihood that research results shall be applied by giving the community space to realize its own collective strength (ibid). Appreciative Inquiry provides a framework for the realization of such strengths toward the development of sustainable livelihoods. As others have learned, “…by using questions to discover the strengths and successes that exist in every individual and community, a sense of hope is generated through which people begin to anticipate a better future” (Ashford & Patkar, 2001, p. 4).

This paper end by re-iterating the urgent need for Extension to re-invent itself to be more relevant to the contemporary demands of the 21st century, and to counter the negativism associated with the discipline. The paper argued that the traditional approaches currently used in Extension have, so far not enabled its actors to advance the renewal agenda. That adopting the use of an Appreciative Inquiry approach shall enable all actors in Extension to gain a better understanding of their dynamic and multiple environments for better program development. The actors shall be energized to take on more challenges in a positive mindset. There is no better time than the present for public Extension to consider a positive shift in the current intervention paradigm from a deficit-based to an appreciative inquiry approach.
References


