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

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

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

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

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

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Journal of International Agricultural and Extension Education

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Welcome to the *Journal of International Agricultural and Extension Education (JIAEE)*. This issue increases our understanding of international agricultural and extension education topics from Australia to Ireland, and Cameroon to Bangladesh. What do you know about improving farmer knowledge and skills to better manage climate variability and climate change in Australia? Probably about as much as I did before reading the article by George et al. Less than one-third of the Australian farmers in this study considered themselves as competent in managing climate risk, but effective, flexible training and resources improved their competencies (p. 5). You will recognize the contributing authors from a previous publication in the *JIAEE*.

McNamara et al. provide thoughtful views on the incidence and impact of disabilities on Irish farms (p. 21). This topic should be investigated in many countries, as the results worldwide may give us better ideas about reducing farm-related injuries leading to physical disabilities. It would be interesting to learn about the differences between countries when compared by level of mechanization use in each country. Maybe the authors can initiate such a worldwide study.

David (p. 35) explored knowledge improvement and social benefits among farmer field school participants in Cameroon. A focus was placed on farmers who attended cocoa integrated crop and pest management schools. This article expands our recent published efforts on farmer field schools, a topic that has gained much attention and illustrates farmer empowerment through education and training.

Hoque and Usami (p. 51) described the effectiveness of Department of Agricultural Extension (DAE) training courses for block supervisors’ extension skills in Bangladesh. Although block supervisors perceived course design and delivery, and course evaluations as satisfactory, they were not as pleased with the quality of training materials, transportation arrangements, or refreshments. One lesson learned may be that regardless of location, training and development activities may be only as good as the materials and refreshments. Finally, McGowan, a graduate student, provided her views on study abroad experiences (p. 61). All *JIAEE* readers who are contemplating study abroad may find her suggestions useful before leaving country.

The 23rd Annual AIAEE Conference was a great success, with a plethora of research paper topics (p. 67), posters, and carousel roundtable presentations. If you missed the beauty that is northwest Montana, then you should not miss next year’s venue at E.A.R.T.H. University in Costa Rica. You must submit your research paper, poster, or workshop proposals earlier than usual because of the earlier (March, 2008) conference date (see our Web site [http://www.aiaeec.org/index.html](http://www.aiaeec.org/index.html), for additional conference details).

Thank you to all *JIAEE* contributors, reviewers, and board members for assisting in the production of this issue. Enjoy the summer issue and continue doing what you can to promote greater understanding of agricultural and extension education worldwide.

Sincerely,

Gary J. Wingenbach, Editor

*Journal of International Agricultural and Extension Education*
Improving Farmer Knowledge and Skills to Better Manage Climate Variability and Climate Change

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Abstract
Although it is expected that farmer education will improve climate risk management, there is only anecdotal evidence that this is true. We wanted to approach and test this in a more rigorous way.

A needs analysis showed that only 30% of farmers believe they are competent or very competent to manage climate risk and, as a consequence, they consider flexible education and training as one way to address this issue. In consultation with farmers, educational resources were developed to cover strategic thinking for managing risk, climate variability impacts, management options, planning and monitoring decisions. Training with this package was delivered to fifteen farmers and consultants over a week, with feedback recorded at the end of each session and post-training. Measurements were made of knowledge, attitude, skills and aspirations (KASA), and followed with assessment of end-result and practice-change.

After this training, farmers improved their competency, from 2.2 (before) to 3.9 (after) on a proficiency scale of one to five. From the feedback, a “problem-based” resource manual was refined to appeal to a broad range of agricultural enterprises such as livestock, horticulture and cropping, and across diverse climates. Farmers can best learn about improving management of climate risk through a variety of ways that include exercises, discussion, reflection and putting their ideas into practice. Actions resulting from the training included development and enactment of strategic plans.

Keywords: Applied Climate Education, Climate Variability, Climate Change, Sustainable Agriculture, Climate Risk

Acknowledgment: This research was partly funded by the Commonwealth of Australia, Department of Agriculture Fisheries and Forestry through the FarmBis program.
Introduction

The climate of Australia is one of the most variable in the world. A better understanding of this variability and of the application of seasonal climate forecasts is central to the profitability and competitiveness rural industries and for sustainable resource management (Munro & Lembtit, 1997). Recent developments in climate science help us with this understanding and in forecasting events such as El Niño and drought (Hammer, 2000). Traditional approaches by farmers when managing climatic risk include avoidance, minimisation and transfer (Hardaker, Huirne, & Anderson, 1997). Avoiding climate risk often took the form of off-farm investment; minimising climate risk was often presented through diversification of enterprises; and transfer of climate risk was often by insurance. The overlying threat of climate change implies that payoffs from managing climate variability, particularly with risk minimisation by diversification, may not necessarily be similar in the future, particularly if dry times are more frequent, longer and more severe. Thus the importance of climate change becomes even more critical if considered with declining terms-of-trade (Cai et al., 2003; Douglas, 1997).

Few studies examine the effectiveness of climate education targeting farmers in Australia (George, Clewett, Selvaraju, & Birch, 2006; Grimson, 1999). The evidence indicates that applied climate education should improve knowledge and skills, thus build capacity to contribute to a sustainable agriculture in a variable climate and where the climate change issue is increasing in importance (Cai et al., 2003; George, Birch, Buckley, Partridge, & Clewett, 2005; Nelson, Holzworth, Hammer, & Hayman, 2002).

Climate variability, manifested as in drought, adds to social and environmental stress (Judd, Cooper, Fraser, & Davis, 2006; Page & Fragar, 2002; Sartore, Hoolahan, Tonna, Kelly, & Stain, 2005); this means that climate education needs to be managed sensitively because a sudden change in social and economic position may leave individuals unable to cope. In many rural communities, there are only limited educational and employment opportunities, and such social pressures may lead to a sense of powerlessness and loss of hope. There may even be a reluctance to consider applied climate education as an option worth considering (Shrapnel & Davie, 2001). Thus applied climate educators must be mindful of emotional issues, try to complement other programs, and be seen as positive contributors when this work coincides with extreme drought as in much of eastern Australia during 2002 and mid-2006. Producer psyche presenting as bias and rules-of-thumb also need to be recognised in any education (Nicholls, 1999). The complexity of applied climate education requires expertise in climate science, agriculture and education, and the intricacy of the task should not be underestimated (Roberts & Dyer, 2004).

In general, farmers are concerned about the lack of accuracy of seasonal climate forecasts and their use (Buckley, 2002; George et al., 2007-a). This concern may become a justification for not undertaking education and training. The use and value of learning theory (Bransford, Brown, & Cocking, 1999) to enhance farmer management of climate risk may well overcome this obstacle. The issue has not been thoroughly investigated or documented in Australia (Burton, 1997; Howden et al., 2003; Smit, Burton, Klein, & Wandel, 2000).

This paper addresses several learning and educational issues that are confronted when developing a vocational education course to enhance management of climate risk. We firstly describe the methods used to develop a course concerning the development and application of relevant strategies for managing climate risk, and then describe content of the course and the resource materials, before evaluation from
pilot testing the course with a group of farmers and agricultural consultants. Issues concerning the development of educational resources and delivery of applied climate education are examined. Examples of risk management strategies relevant to Australian agriculture are given.

Methods

Course Requirements

A reference group of farmers, industry representatives, scientists and educators was established to guide development of a vocational education course for managing climate risk. This group identified the following broad parameters. The course content should be relevant at a managerial level to sectors of the community that are impacted by climate variability and climate change such as the farming sector (farmers, natural resource managers, agricultural consultants and agribusiness). Content should address the performance criteria of units in the Australian Qualifications Framework so that course participants may gain qualifications for their investment in education. The learning methods used should have a strong theoretical basis, be developed to achieve national standards in vocational education and be relevant to the needs of decision-makers. The learning objectives should seek to improve the knowledge and skills of decision-makers in relation to the:

- Capacity to compile and survey data concerning climatic and enterprise issues that are impacting on the performance of their enterprise;
- Analysis of climatic risks and opportunities (e.g., droughts and flood risks associated with climate variability and climate change), impending seasonal conditions (e.g., forecasts of El Niño or La Niña conditions) and managerial options; and,
- Development and application of strategies for more effective management of climatic risks so that the performance of the enterprise is improved.

Given these criteria, the course “ClimEd: Managing Climate Risk” was developed to achieve the elements and performance criteria specified by the vocational education unit “Develop Climate Risk Management Strategies” (DCRMS) which is a nationally accredited Unit of Competency at Level 5 in the Australian Qualifications Framework (George, Clewett, Birch, Wright, & Allen, 2007b). The learning objectives of the ClimEd course require a substantial investment in time and go far beyond a simple one-day skills development workshop. The nominal times for the unit are 40 hours theory and 40 hours practical.

The process used to identify and refine the content of the ClimEd course, and also the methods to most effectively deliver it included:

- An analysis of results from a survey of the farming sector that clearly showed the need for vocational education courses in the community concerning management of climate risk (George et al., 2007a, b);
- Development of printed reference materials;
- Feedback from participants attending a 5-day pilot course and completing (as a subsequent project), the analysis and development of climate risk management strategies for their own business; and
- Commentary and feedback from the “expert” reference group described above to ensure the course meets the needs of participants and is robust from both educational and scientific perspectives.

Educational Design and Delivery

The method chosen to deliver the ClimEd course was based on a combination of experiential learning (Kolb, 1984), participative action research (Zuber-Skerritt,
1993) and learning theory (Bransford et al., 1999). The delivery methods also recognised that farmers generally prefer training that is practical and helps to provide immediate solutions to problems in their business (Kilpatrick, 2000). The educational design incorporated a mix of experiences for activists, review time for analysts, drawing conclusions for theorists and planning the next steps for the pragmatists (Honey & Mumford, 1986). The course-work and project were designed to engage all these preferred learning styles.

A five-day pilot ClimEd course was held in May 2003 and attended by 15 participants who had responded to a national advertisement. The format of this course involved a series of presentations with evaluation sheets completed at the end of each session. The presentations were made by an experienced farmer, scientists with specialities in climatology and agriculture, agricultural extension specialists and the participants. Many of the workshop exercises involved use of the internet and computer software to assess climatic risks and the likely outcome of various management options. This software included the climate analysis and education package “Rainman StreamFlow” (Clewett et al., 2003), and the broadacre crop analysis software “Whopper Cropper” (Nelson et al., 2002). Internet sessions examined data on the weather, climate risks and pasture productivity from a range of web sites including the Bureau of Meteorology and others (see references). The projects started during the pilot workshop were completed by participants in the weeks following. Each participant selected a supporter during the workshop to act as a mentor and for peer review.

Registered training organisations were able to accredit participants who fulfilled the course competencies by including this unit within the scope of courses they offer.

**Evaluation**

Evaluation of the course was through qualitative and quantitative methods described by Bennett (1976) and Davis (2003). Feedback sheets were used at the end of each session for reflection and consideration as to how information could be applied to their situation. Evaluation immediately following the training covered questions concerning inputs, activities, reactions, and change in knowledge, attitude, skills and aspirations (Bennett, 1976). Post-workshop analyses of “end result” and “practice change” were undertaken by survey and semi-structured interviews at year 1 and 3 as part of the longitudinal study to triangulate results (Cohen & Manion, 1994).

**Results**

**Principles**

A key finding was that the course should highlight the need for a strategic approach in managing climate risk. The benefit from adopting a strategic planning approach is that management decisions are focused on ways to achieve goals and integrated with overall business operations. There is a need to go beyond one-off climatic decisions that are isolated from other risks and elements of the farm business (Malcolm, 1992). Isolated decisions (such as one-off responses to seasonal forecasts) do not encourage thinking and planning for an integrated approach to managing climate events such as a sequence of seasons with below-normal rainfall, or the interactions of climatic risk with other production and market risks (McKeon, Hall, Henry, Stone, & Watson, 2004) and climate change projections (George et al., 2005; Howden et al., 2003).

The order of the risk management approach we used covered strategic thinking, analysing climate and weather risks and impacts, assessing options, and developing and acting on plans. This conforms to generic approaches to managing risk such as the Australian Standard on risk
management as shown in Figure 1 (Climate change impacts, 2006). This process also favours learning for understanding and tailors the work to suit an individual’s circumstances.

The reality of the variable climate on their (farmer) enterprises and business become prominent, climate change projections that are expected to impact on their operations are addressed. The necessary solutions need to be weighed, acted out and assessed according to their viability and capacity to manage. It helped farmers to recognise the climate risks and apply them in their management situation. The logical consequences are then components of the knowledge and skills needed in the course delivery and are described below.

![Diagram](Figure 1. Steps in the risk management process (Source: Climate change impacts, 2006). Permission to use Figure 1 (recommended framework for risk management) is provided by the Australian and New Zealand Standard AS/NZS 4360 Risk Management, as published by the Australian Greenhouse Office (Climate change impacts, 2006).

**Course Delivery**

The second key finding was that the course should have a modular format that provides for a flexible mode of delivery and achieves the required learning outcomes by developing analytical and decision-making skills through the following six units and project:

- **Unit 1.** A strategic approach - investigating climate and weather and business. The objective of this introductory unit is to highlight the benefits of strategic thinking and planning, to clarify terms like “risk,” and to explore participant goals on which climate risk strategies could be targeted.
- **Unit 2.** Weather and climate - assessing weather processes and evaluating climate risk. The unit identifies and analyses risks relating to the enterprise,
explores mechanisms of meteorological processes causing climate variability and phenomenon such as the El Niño - Southern Oscillation (ENSO), Madden-Julian Oscillation and climate change, reviews the availability of relevant data (particularly historical weather data), and examines the basis, skill and interpretation of probability based forecasts.

- **Unit 3.** Impacts - analysing the influence of weather and climate on performance of land and water systems. This unit builds skills to assess the impacts of climate on the environment and agricultural systems. It uses tools to help determine impacts of climate on enterprises and business.

- **Unit 4.** Options - exploring alternative options for business and environmental management. This unit assesses the importance of climate variability on the business and clarifies options and actions to better manage risks and take advantage of opportunities.

- **Unit 5.** Plans - developing strategic plans for better management of climatic and weather risk. This unit integrates previous units and reviews climate and weather risks and opportunities, develops strategies and identifies appropriate actions to address climate risk.

- **Unit 6.** Decisions and actions - establishing methods to monitor and respond to climate and weather information in business. This unit establishes decisions and actions and methods to monitor and respond to climate and weather information.

- **Project.** A project is a requirement of the course. It enables participants to develop the skills needed to apply what has been learnt to their own situation. This project requires a comprehensive survey of climate and enterprise data, an analysis of climate risk and opportunities, and a document showing how climate risk management strategies were developed and applied in the business.

**Educational Resource Materials**

A resource book was developed with sections covering key concepts, introduction, and a body with relevance of the topic to industry (George, 2004). The course was developed in a module format to make it more attractive for participants to attend in one-day training rather than as a one-week block. The structure was problem-based and enabled course participants to think about their own risk management issues and work towards their own risk management plan by the end of the course, with applicability to any rural enterprise and climatic zone. Each section of the notes has exercises to support the text, and is used by participants to see how information may be applied. Gross margin budgets were used for financial impacts. A position statement covering personal, financial and an environmental situation analysis was outlined, along with steps for strategic planning. The course refers to examples of local conditions relevant to the participant.

**Achievement of Learning Outcomes**

Fifteen participants attended the ClimEd Pilot training in May 2003. The participants represented agricultural industries of grazing and wool-sheep, prime lambs, beef cattle, irrigation and dry-land crops and agribusiness from several states throughout Australia. There was a relatively even age spread amongst the group (from 20 to 65 years of age), which comprised thirteen males and two females. The participants had diverse educational backgrounds including those who finished primary school only and others with vocational, tertiary and post-graduate qualifications. Nearly half of the participants had over 21 years of experience in their industry.

Feedback from all the sessions are summarised and described in the following tables. Table 1 shows a pre-post achievement of learning outcomes. Table 2
shows ratings about session relevance and usefulness. Data was also collected on where forecasts and climate information could be used in key decisions (Box 1) and some strategies developed (Box 2).

Participants completed the one-week course and were then expected to undertake projects to apply principles learnt to their own situation. Twelve out of the fifteen developed written strategic plans to better manage the variable climate. Three of the twelve submitted their projects to receive accreditation with The University of Queensland.

Table 1

Achievement of Learning Outcomes by Comparing “Before” versus “After” Self Ratings of Workshop Participants (n = 15)

<table>
<thead>
<tr>
<th>Competency</th>
<th>Start of course</th>
<th>End of course</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (variance)</td>
<td>Mean (variance)</td>
<td></td>
</tr>
<tr>
<td>Survey climate and enterprise data</td>
<td>1.9 (± 0.1)</td>
<td>3.6 (± 0.5)</td>
<td>5.67**</td>
</tr>
<tr>
<td>Analyse climate risk and opportunities</td>
<td>2.1 (± 0.6)</td>
<td>4.0 (± 0.3)</td>
<td>7.25**</td>
</tr>
<tr>
<td>Develop climate risk management strategies</td>
<td>1.9 (± 0.6)</td>
<td>4.0 (± 0.3)</td>
<td>8.10**</td>
</tr>
<tr>
<td>Ability to develop a plan for the business</td>
<td>2.8 (± 0.8)</td>
<td>4.3 (± 0.2)</td>
<td>4.28**</td>
</tr>
</tbody>
</table>

Note. Self-assessed rating (1-5) before/after workshops: 1 = not very competent; 3 = competent; and 5 = very competent.

Results from Table 1 demonstrate that, by attending the course, participants were now better able to: survey climate and enterprise data; analyse climate risk and opportunities; develop climate risk management strategies; and, develop a strategic plan for their business.

Participants were very satisfied that the material was relevant and useful. All participants said they would recommend this course to a colleague (Table 2). The longitudinal study revealed 13 of the 15 participants had implemented new climate risk management strategies developed from the course.

Table 2

Summary of Session Feedback (n = 15)

<table>
<thead>
<tr>
<th>Items</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response to “…would you recommend this to a colleague.”</td>
<td>100</td>
</tr>
<tr>
<td>Participants implementing climate risk management strategies developed from the course.</td>
<td>86</td>
</tr>
<tr>
<td>Participants Ratings:</td>
<td></td>
</tr>
<tr>
<td>Course relevance&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.1</td>
</tr>
<tr>
<td>Sessions&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Analysis of climate impacts on cropping systems</td>
<td>8.3</td>
</tr>
<tr>
<td>Development of climate risk management strategies and plans</td>
<td>7.2</td>
</tr>
<tr>
<td>Introduction and strategic thinking / planning</td>
<td>7.3</td>
</tr>
<tr>
<td>Analysis of climate impacts on pastures and grazing systems</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Note. <sup>a</sup>Scale: 1 = not satisfied; 3 = satisfactory; and 5 = extremely satisfactory. <sup>b</sup>Scale: 1 = not so good…10 = excellent.
Box 1 presents information on where seasonal climate forecasts and climate information could be used in key decisions. The data supported previous research results to the effect that improving knowledge and skills in climate and agriculture can be used in enhancing decisions about cropping, grazing and natural resources (Hammer, 2000).

### Box 1. Some responses to “What do you think are the key decision points in the agricultural system where seasonal climate forecasts may be useful?”

- Using the Southern Oscillation Index in spring to forecast summer rainfall and thus determine best crop or livestock options
- Preparing “drought” policy - grazing and budgeting for our mixed livestock, cropping and irrigation operation
- Probability and reliability assessments for water trading and irrigation management

Examples of climate risk management strategies developed by participants, to achieve the goal of “developing improved drought-resilient farming systems” are shown in Box 2.

### Box 2. Examples of some climate risk management strategies developed by participants, to achieve the goal of “Develop improved drought resilient farming systems.”

- Adjust crop type and area based on current soil moisture and expected future climate conditions
- Develop objective livestock decisions in rangelands by matching stock numbers to expected feed supply
- Adjust irrigation regimes based on expected water supplies and irrigation demand
- Develop off-farm investments to generate cash-flow in years of expected lower production and prices

In response to what worked well in different sessions, it was clear that there was value in describing weather and climate systems, plus the latest climate change information. Climate prediction limitations and reliability information were also undisputed as important. Modelling tools for cropping and grazing were also considered valuable insofar as examining the impacts and options of weather and climate on enterprises and natural resources. Comparing different forecast systems and including forecast accuracy and climate change projections were some of the suggestions of what could be included in any applied climate education and are described in detail in a companion paper (George et al., 2007a). The discussion elaborates on analysis and implications of these results.

### Discussion

The most important finding from this work was confirmation that the educational content and process used with the pilot group led to improved knowledge and skills to better manage climate risk. Furthermore, the subsequent longitudinal study with this group showed that the improved knowledge and skills translated into more sustainable practices (George, Clewett, Wright, Birch, & Allen, 2006). The main reasons for this success are discussed below, together with several ways to improve the course. This discussion on applied climate education is based on learning theory (Bransford et al.,...
1999), experiential learning and action research and is framed on the following six areas.

**Cultural and Social Norms**

Conducting the pilot within the cultural and social norms of the participant group helped to achieve learning outcomes. This helped the educational process in several powerful ways as described by Bransford et al. (1999). Two examples of this concern “credibility” and “subject matter.” Firstly, the credibility of the learning was consistent with social norms because it was organised and delivered by respected organisations and individuals. Secondly, the subject matter with its focus on developing climate risk management strategies was highly relevant to the needs of participants. We recognised the current circumstances of the industry concerning compounded years of drier than normal times, and often associated low cash flow, low equity and high emotional stress. This meant the immediate problems for many were about the “...here and now...” that needed to be addressed before new learning could be considered.

Managing climate in Australia is a complex socio-economic and environmental problem that has no simple answer and there have been numerous inquiries to address climate variability and drought issues confronting agriculture. However, vocational education on risk management has a role to play and can improve knowledge in the farming sector to better manage climate variability and change. The depth and extent of the current drought (viz. mid-2006), in parallel with climate change, lead us to think the importance of social and cultural norms will be even more important in the future and necessary to consider for any successful applied climate education.

**Building on Pre-existing Knowledge**

The ClimEd course is targeted to people already managing farm and natural resources who want to enhance their climate risk management skills. Their previous experience provides the basis on which participants can survey climate and enterprise data, analyse climate risks and opportunities and develop better climate risk management strategies. Thus, pre-existing knowledge plus information from the course is used to progress from basic to more advanced concepts (George et al., 2005; George, Birch, Clewett, Wright, & Allen, 2005). There is also a need to pay attention and address any unhelpful or false concepts learners bring with them.

A challenge for educators with applied climate education is to determine the “acceptable level of improved knowledge and skills?” Incremental improvements in knowledge and skills that build on pre-existing knowledge are important, but the overall objective is to attain autonomous learning. This is a notion for lateral-thinking and problem-solving as advocated by de Bono (1967). It has advantages in utilising collective wisdom to resolve complex issues and leads to greater autonomy in thinking and problem-solving. We found this approach is achievable with producers who have backgrounds of either elementary or advanced education, who progressed along the didactic-autonomous learning spectrum (Knowles, 1975).

Feedback coming from the evaluation shows that participants believed they were better able to manage climate risk as a result of attendance at this training. We recognise that participants can sometime overvalue their abilities (Kruger & Dunning, 1999) and so longitudinal investigations were undertaken and will be reported in a future companion paper.

**Introduce Important Concepts for Advanced Reasoning**

The pilot training recognised six key concepts for applied climate education refined from work by Clarkson (2000) and Clewett (2003). These were:

1. Awareness and determination of the extent of climate variability. An up-to-
date climate record is valuable as a learning tool on which to build from recent experience. This includes interpreting weather systems and knowledge of how climate is modified by seasonality and other forces such as ENSO and greenhouse gases.

2. Description of climate systems and the causes of variability and using information from historical records for the particular location to describe local variability. The ENSO phenomenon explains a large part of the climate variability in Australia but users must know where and when ENSO may be useful as a climate predictor. An ability to understand specific terms like “mean,” “median” and “probabilities” to assess climate risk was also essential.

3. Adaptation and mitigation to climate change issues including changes that may have occurred in recent decades and those likely to occur in the next several decades in both the global and local contexts.

4. Capability to use analytical tools to describe the variability and assess climate risk. Information useful to management includes expected rainfall probabilities concerning the amount, timing and frequency of seasonal rainfall, incidence of frost and heatwaves and decadal shifts in climate. Characterising drought duration and frequency (and forecasting) is recognised as being the most important climate skill required by producers (George et al., 2007a). Inherent uncertainty is covered by probabilistic forecasts.

5. Evaluation of forecasts used in risk management strategies including short-term forecasts associated with daily conditions and decision making, seasonal forecasts associated with tactical or strategic responses, and long-term climate change forecasts that may be linked with structural changes to the resource base or business enterprise.

6. Application of climate and weather forecasts and risk information to key decisions. Forecasting climate variability provides producers with an edge in the goal of producing a right quality product at the lowest unit cost possible under a sustainable system.

These were manifested in the six units delivered to the group and described previously in the “course delivery” section of the results. That this was important and helped reasoning, can be speculated from the high rating of satisfaction from course participants and in the unanimous recommendation of the course to colleagues (Table 2). To help demonstrate important concepts, the educational materials and support of specific rainfall, streamflow, pasture growth and temperature data analysis tools help to empower participants, because these tools illuminate the importance of climate impacts, and the increasing relevance of this to their business.

**Structuring Learning Experiences**

Farmers are predominantly action-oriented (Kilpatrick, 2000; Shrapnel & Davie, 2001). They want to know about climate science and change projections and how this is likely to impact on their operations, the options available and the consequences of their choices. The benefit of the strategic planning project was the opportunity for participants to apply new information and concepts as outlined above, in new settings to their business, using the structured risk management approach in Figure 1. This is consistent with the action research cycle (Zuber-Skerritt, 1993) which is known to promote adoption of autonomous learning. Eighty percent of the fifteen participants completed their projects and hence developed climate risk management strategies for their business. The three who submitted their work for certification, did so to achieve business and personal goals. The remaining nine used their plans for on-farm and business uses.
that did not require the qualification. The formal qualification was appealing to a small but important percentage of participants and this is consistent with other research (Kilpatrick, 2000), but it was incidental to most participants who emphasised learning for specific solutions to problems. The extent of what was applied from the participants learning is detailed in a future companion paper.

In addition to the project, another factor of importance was our delivery being held over five consecutive days. This had advantages for the national workshop but participants were fatigued by the end of the week because of the unfamiliarity of sitting and doing desk-work for that period of time. A better approach for local workshops would be to collaborate with participants to schedule when and how often to meet to complete the desired tasks with smaller amounts of information being able to be considered and applied before re-meeting and discussing the next stages of work. It is important to offer the education and training as a set of modules that can be tailored to suit the needs of participants and trainers.

**Emerging Technologies**

Learning and the development of risk management concepts were enhanced through use of new technologies. In particular this included advances in agriculture and climate sciences coupled with advances in information technology to analyse climatic risks at locations relevant to the enterprises of workshop participants. Examples include: (1) use of the Southern Oscillation Index and the analytical capabilities of the Rainman Streamflow software (Clewett et al., 2003) to assess the skill of seasonal climate forecasts concerning probabilities of seasonal rainfall, on-set of the wet season, frequency of storm events, likelihood of frosts, and expected levels of runoff and streamflow, (2) analysis of various grain sorghum cropping options using the latest advances in knowledge contained within the Whopper Cropper crop modeling software (Nelson et al., 2002), and (3) analysis of real-time climate impacts on the condition and productivity of native pastures in the Australian rangelands using the on-line Aussie GRASS model (Carter et al., 2000). Recognition of changes in the skill of ENSO-based seasonal forecasts with time of year, lead-time and location are important in risk assessments (Clewett, 2003). These new technologies help to demonstrate agro-climate concepts in the training and were used to approach the problem of better managing climate variability with strategic planning. The technology helped to understand the elements of competency (Tables 1, 2), with actual applications (Box 1). These tools were then able to help answer, “What if…?” questions that arise from the exercises, discussion and reflection sessions.

The following kinds of questions can be addressed by the new technologies and assist discussion about climate variability and better decisions.

- Cropping - what are the chances of getting sufficient rainfall over the next cropping season?
- Livestock - when is the wet season likely to break and how much pasture will be produced over the growing season? What will be the optimal stocking rate?
- Irrigation - how many high flows could be expected in the local river this year? What are the chances of getting heatwave conditions during the crop’s flowering period?
- Resource management - have heavy rainfall events become more frequent in recent years? Is it getting hotter with climate change at this location?

Up-to-date and accurate climate change projections are needed to ensure the accuracy and necessary “cutting-edge” work is maintained and credible.

**Learning from “Wisdom of Practise”**

Our training used experienced climate scientists. We also used discussion sessions where participants shared their
experiences of managing the variable climate. The producer peer review process we put in place was good in theory. In practice though, this was difficult to achieve because unless cooperation occurs on a regular basis, it is difficult to obtain success. The pilot group came from distant locations so that synchronising times and availability to compare and discuss work was difficult (and also expensive if using long-distance phone calls when email was not the usual way of communication - which was the case for some). It is felt that if a local group was established, this problem may be more easily overcome.

In summary, this pilot group information has been helpful to derive the development, delivery, evaluation and subsequent direction of the applied climate education. The response from producers is that applied climate education has helped and will help to improve knowledge and skills, enhance agricultural and natural resource management decisions and reduce climate risk. This work supports the use of experiential learning, participative action research and learning theory.

**Conclusion**

Our study has provided evidence that appropriate and timely applied climate education that develops climate risk management strategies, is an important factor that can improve knowledge and skills to better manage climate variability and climate change. Emphasis on a flexible modular course that has a strategic approach to risk management is important. Key steps are: defining components of the strategic approach, analysing weather and climate data, assessing impacts, evaluating management options, developing plans and making decisions by applying these plans to the farming business. The response from participants was that this course provided new information and was an achievable challenge that was helpful to the way they strategically and tactically approached their management of the variable climate. An appropriate management level course on climate risk can be successfully delivered to a broad-based audience by combining the knowledge and skills of participants with sound facilitation processes, rigorous education resources and up-to-date technical knowledge. Learning needs to go beyond awareness of climate issues to skills development and application in decision-making.

These results are supported by a small but significant sample with intervention from experts that may or may not be available for all training. Significant results in this work can be attained if vision, personnel and resource issues are addressed and targeted to this end. It is unclear what can be attributed to climate education alone in the overall scheme of improved climate risk management demonstrated by the group members in addition to other factors such as increased availability and use of weather and climate tools on the internet, and increased awareness of climate change. Climate education is a positive factor that should not be ignored. Furthermore, if it is argued climate education helps to better manage climate variability, this will also then help to better manage and adapt to climate change. The impacts of climate change are becoming increasingly clear and rapidly evolving, and so adding to the resources and delivery of this work as new research results become available is critical.

**Acknowledgement**

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References


Preliminary Investigation of the Incidence and Impact of Disability on Irish Farms

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Abstract
Farming is identified as being a hazardous occupation, resulting in disability and numerous fatalities each year. While occupational health and safety issues among farm households have been studied recently in Ireland, there has been no research directed at identifying the incidence and impact of disability within farm households.

The aim of the research outlined in this paper was to identify the cause, extent, and nature of disability among farm household members. The impact of disability on the farm business was examined also. Questions relating to disability were attached to the Teagasc National Farm Survey, and circulated to a representative sample of 119.5k households in 2001. The results revealed that 19.5% of farm households reported one or more persons with disability, with the farm operator (39.5%) reporting the highest incidence among household members. Physical disabilities accounted for 80.1% of all reported disability, with its principle source being health-related. Disability in affected households had a “major” or “some” impact on the farm business in 22.4% and 52.9% of cases respectively. Family farm income was €24/ha less on farms where the farm operator reported disability compared to non-disability farms. When the farm operator reported disability, participation in off-farm employment was reduced for the farm operator and spouse when compared to non-disability farms. The results generated raise awareness of issues among farm households reporting disability. Further research should be directed toward agricultural disability to facilitate agricultural and extension educators in designing prevention programmes that minimise the occurrence and impact of disability among farm households.

Keywords: Disability, Impact, Farm Business, Farm Household

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Introduction

Internationally, farming has been identified as being a hazardous occupation, accounting for numerous accidents each year (McCurdy & Carroll, 2000; Karwat, 1998; Browning, Truszczynska, Reed, & McKnight, 1998). Outcomes from these accidents range from production delays, property damage and minor injury to more serious results such as disabling injuries or fatalities (Jovanović, Arandelović, & Jovanović, 2004).

Researchers, internationally, have approached the issue of farm and farmer safety from a variety of perspectives. Jovanović et al. (2004) reviewed various accident causation theories from the literature and identified the Domino Theory as the oldest of these theories. The Domino Theory postulates that “88% of all accidents were caused by unsafe acts of people, 10% by unsafe actions, and 2% by ‘acts of God’” (Jovanović et al., 2004, p. 329).

The Multiple Causation Theory (MCT), while building on the conceptual and theoretical dimensions introduced in the Domino Theory, attempt’s to provide greater understanding to the true causation of accidents from a different perspective. The MCT suggests that “the accident is the result of a complex and random interaction between the victim, the agent and the environment” (Taylor, Easter & Hegney, 2004, p. 12), and “rarely, if ever, is an accident the result of a single cause or act” (Jovanović et al., 2004, p. 329). In many respects the conceptual dimensions of the MCT mirror the Biopsychosocial Model of disability, as used by the International Classification of Functioning, Disability, and Health (WHO, 2002). This model encapsulates elements from the Medical and Social Models of disability and views disability as being an outcome of a complex interaction between personal factors, environmental factors and a health condition (WHO, 2002). Disability is an emerging issue, but as yet, receives relatively little attention in the agricultural education and extension literature.

The principal mechanisms of injury (machinery, livestock, trips and falls) are continually being reported as sources of farm accidents at an international level (McCurdy & Carroll, 2000; Browning et al., 1998; Suutarinen, 2004). These farm accidents, and their mechanisms, are also contributing sources of impairment, which may lead to disability. Other causations of disability include the farm-working environment (Harmon, Zhang, & Xin, 1994), sports injuries, motor vehicle accidents and health impairments (O’Shea, 1997).

Many farm related sources of disability, for example, farm accidents or health conditions related to the farm-working environment, are potentially avoidable. It is the remit of organisations in extension and education to raise awareness of the situation on the farm and to educate the farming population in ways to avoid causes of disability. “Education, as the carrier of science and technology, should play an important role in this transformation process” (Shen & Jones, 2005, p. 28). One such mechanism through which this may be achieved is by designing a multifaceted development programme. However, “as the extension process advocates, and in line with what has been suggested in international extension (World Bank, 1990; Zijp, 1991), the first step must be to understand what the situation is and have a clear understanding of the nature and scope of the problem” (Seepersad, 1994, p. 23).

Farming in Ireland remains an important indigenous industry, with population statistics showing that there were 270,000 persons employed in agriculture on 143,000 Irish farm holdings (CSO, 2001a). Occupational health and safety issues among farm households have been studied recently (McNamara & Reidy, 1997; Finnegan & Phelan, 2003), but there has been no corresponding research on the incidence and impact of farm household disability in Irish
agriculture. Disability may create a substantial negative impact upon an individual’s life, yet in the occupational area of agriculture and related fields, there has been relatively little research on farm-based disability. Accordingly, a preliminary collaborative study between Teagasc (Irish Agriculture and Food Development Authority) and University College Dublin, was conceived to obtain a metric of the extent of disability on Irish farms, determined by respondents’ self-reporting of disability in respect of themselves and members of the farm household.

**Purpose**

The research objectives of the study were: (1) to identify the cause, extent, and nature of disability among farm household members, and (2) to assess the impact of disability on the farm business. The definition of disability used in this research was derived from the Report of the Commission on the Status of People with Disabilities (1996, p. 11), and includes: “People with disabilities were to include children and adults who experience any restriction in their capacity to participate in economic, social or cultural life on account of physical, sensory, learning, mental health, or emotional impairment.”

**Methodology and Data Sources**

The research instrument was a survey carried out on the National Farm Survey (NFS) sample of farms, which is conducted annually by Teagasc (Irish Agriculture and Food Development Authority). The NFS sample is a random sample of farms selected statistically to represent the main farming systems and farm size groups nationally (Connolly, Finnerty, Kinsella, & Quinlan, 2001). The main objective of the NFS survey is to monitor trends in output, costs, incomes and socio-economic changes in Irish agriculture. In 2001 the relevant NFS population represented was 119,500 farms of at least 2 Economic Size Units–(ESU) (1 ESU = €1200 of Standard Gross Margin). NFS farms are categorised into the main farming systems on the basis of EU Farm Typology, which applies Standard Gross Margins to each farm enterprise.

Questions on disability were appended to the NFS survey in autumn 2001. Disability was classified using seven codes based upon an adaptation of ICIDH-2 (WHO, 1997). The codes were for type of disability and were identified to respondents. All the data on disability were collected on a voluntary basis by trained farm recorders. The survey data were analysed using SAS®.

**Results**

*Occurrence of Disability among Irish Farm Households*

Disability was reported for 19.5% of farm households nationally corresponding to an estimated 23,332 farms in 2001. The majority of farms reporting the incidence of disability had one case, while two or more persons with reported disability were found on 2.1% of all farms nationally. The highest reported incidence among farm households reporting disability was the farm operator (39.5%). Spouses with a disability represented 10.2% of farm household members while children, parents and other household members reporting disability were 20.8%, 23.1% and 6.4% respectively. Younger farm operators (i.e. under 45 years) reported lower disability levels than older farmers (over 65 years). A similar finding was also reported by Karwat (1998) and Woolf and Pfleger (2003).

**Main Causes of Disability**

Physical disabilities accounted for 80.1% of all reported disabilities while 19.9% were non-physical. Within the physical categories, the combined incidences of health-related and physical injury among farm operators and spouses were 75.3% and 74.7% respectively. These persons represent the usual income providers in farm households.
Where disability arose from injury, further analysis of the data showed that 70% of the incidence occurred from farm work, with the remaining 30% from non-farm causes (most notably vehicular and industrial accidents). The highest incidence in the non-physical categories was recorded in children with learning and intellectual disabilities (42.6%). Table 1 illustrates the distribution of reported categories of disability by type of farm household member.

Table 1

<table>
<thead>
<tr>
<th>Distribution of Categories of Disability by Type of Farm Household Member (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical:</strong></td>
</tr>
<tr>
<td>From Injury</td>
</tr>
<tr>
<td>From Birth</td>
</tr>
<tr>
<td>Health Related</td>
</tr>
<tr>
<td>Sensory Impairment</td>
</tr>
<tr>
<td>Other Physical</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
</tr>
<tr>
<td><strong>Non-Physical:</strong></td>
</tr>
<tr>
<td>Learning/Intellectual</td>
</tr>
<tr>
<td>Mental Health</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

The reported source of health-related disability identified from the farm operators household, attributed the sources of their disability to arthritis or cardiovascular problems in approximately equal proportions with a smaller number reporting cancer and diabetes.

Table 2

<table>
<thead>
<tr>
<th>Source of Reported Health-Related Disability of Farm Operators Only</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source of Disability</strong></td>
</tr>
<tr>
<td>Total health-related disabilities</td>
</tr>
<tr>
<td>Of which:</td>
</tr>
<tr>
<td>Arthritis</td>
</tr>
<tr>
<td>Cardiovascular</td>
</tr>
<tr>
<td>Cancer</td>
</tr>
<tr>
<td>Diabetes</td>
</tr>
<tr>
<td>Other health related disabilities</td>
</tr>
<tr>
<td>Total non-health related disabilities</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
Occurrence of Disability across Farming Systems and its Impact on the Farm Business

The NFS identifies six systems of farming: namely dairying, dairying & other, cattle rearing (mainly suckler cows, cow-calf systems), other cattle systems, mainly sheep and mainly tillage for categorization purposes. The system title refers to the dominant enterprise in each group. Disability was reported across all the main systems of farming as illustrated in Figure 1.

The presence of disability in the farm households by system of farming shows that a similar distribution pattern of farming systems was observed as for all farms nationally. This occurrence was not observed where focus was averted solely to the farm operator reporting a disability. The results showed 59.8% of farm operators with reported disability have cattle rearing/other cattle systems as their principal enterprise. This is higher than the equivalent proportion (52.1%) for all farms nationally. There are proportionately fewer specialist dairy (10.3%) and sheep (8.2%) farm operators with disability than for all farms nationally and proportionately more in tillage farming (10.4%).

Further study of the data showed that farm operators with disability worked predominantly on farms of 50 hectares or less (83.2%).

![Figure 1. Distribution of farms reporting disability, all farms nationally and farms with disability by system of farming (%).](image)

1Estimated number of Farm Operators with Disability = 10,400.
2Estimated number of Farms with a Disabled Person = 23,332.
3Estimated number of All Farms Nationally = 119,500.

Farm families are now becoming more dependent on external sources of income in order to maintain a viable income. Data from the CSO highlight that 48% and 44% of household income comes from off-farm work and farming respectively (CSO, 2001b). The impact of the presence of reported disability on off-farm employment by the farm operator and spouse was examined in this study. Table 3 describes the incidence of off-farm employment among farms where there is reported disability, and among farms where disability was not reported.
On farms reporting disability, the proportion of farm operators with disability and other disabled farm household members with an off-farm job was 13.7% and 28.9% respectively, while the corresponding proportion of farm operators on non-disability farms was 34.6%. The proportion of spouses with an off-job where the farm operator reports disability (23.5%) was lower than on non-disability farms (35.9%) while the corresponding proportion in respect of farms where a person other than the farm operator reports a disability was higher (48.9%). The low incidence of off-farm employment due to disability of the farm operator or spouse may give rise to a reduced household income compared to farms having another member of the household with disability. CSO (2002) data suggest that just 40% of people with a disability were employed in the Irish economy compared to 65% in the total population between 15 and 64 years of age.

Table 3

<table>
<thead>
<tr>
<th>Person with Off-farm job</th>
<th>Farms with a person reporting disability</th>
<th>Non-Disability Farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Operator</td>
<td>13.7</td>
<td>34.6</td>
</tr>
<tr>
<td>Spouse</td>
<td>23.5</td>
<td>35.9</td>
</tr>
</tbody>
</table>

Note. 1Based on a reduced sample of 980 farms weighted to represent 119,500 farms in NFS 2001. 2Estimated number of farms with reported disability - 23,332. 3Estimated number of farms with no reported disability – 96,213. 4Includes all household members other than the farm operator. 5Farms with a spouse in the household.

Reduced family farm income (FFI), in addition to the lower amounts of off-farm employment being obtained, can add additional pressure on the farm family. In 2001, FFI and FFI/ha were lower, by €2429 and €24.1 respectively, on farms where the farm operator reported a disability compared to farms where disability was not reported. Table 4 attributes these differences to various factors. Some of this difference in FFI may be attributable to differences in farm size. Direct payments (DP), which are income supports made to farmers from the European Union (EU) for participation in certain farming systems, were higher to farmers reporting a disability by €1050 compared to non-disability farmers. The DP’s expressed as a percentage of FFI were 19% higher on farms where the farm operator reported a disability. The data show that farm operators with a disability had therefore, a higher income dependency on DP’s. Table 4 illustrates that FFI and system gross margins were comparable across enterprises on farms where no disability was reported compared to farms with a household member with a disability other than the farm operator was reported. However, care must be taken in interpreting the NFS farm income data on an individual year basis as FFI outcomes from year-to-year may vary (NFS (1998-2001)).
Table 4

**Business Parameters on Farms Reporting Not Reporting Disability in 2001**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Farm operator with disability</th>
<th>Other member with disability</th>
<th>Farms where disability was not reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family farm income (FFI) (€)<strong>1</strong></td>
<td>13,733</td>
<td>16,571</td>
<td>16,162</td>
</tr>
<tr>
<td>Size of farm (ha)<strong>3</strong></td>
<td>31.7</td>
<td>33.6</td>
<td>35.3</td>
</tr>
<tr>
<td>FFI per ha (€)</td>
<td>433.7</td>
<td>493.9</td>
<td>457.8</td>
</tr>
<tr>
<td>Direct Payments (DP) (€)</td>
<td>10,978</td>
<td>9,492</td>
<td>9,928</td>
</tr>
<tr>
<td>DP as % of FFI</td>
<td>80</td>
<td>57</td>
<td>61</td>
</tr>
<tr>
<td>Total farm GM<strong>4</strong>(€)</td>
<td>26,148</td>
<td>31,499</td>
<td>31,383</td>
</tr>
<tr>
<td>GM from Dairying (€)</td>
<td>5,554</td>
<td>12,135</td>
<td>11,300</td>
</tr>
<tr>
<td>GM from “Cattle”<strong>5</strong>(€)</td>
<td>9,810</td>
<td>9,529</td>
<td>9,552</td>
</tr>
<tr>
<td>GM from “Sheep” (€)</td>
<td>2,735</td>
<td>2,458</td>
<td>2,700</td>
</tr>
<tr>
<td>GM from mainly tillage (€)</td>
<td>8,049</td>
<td>7,378</td>
<td>7,831</td>
</tr>
</tbody>
</table>

*Note.* **1** Based on a sample of 980 farms weighted to represent 119,500 farms in NFS 2001. **2**€1 = $1.11691 (2001 average) – (OANDA Corporation, 2006). **3**Area in hectares (ha) adjusted for land quality. **4**Farm gross margin is Gross output from all farming activities minus direct costs. **5**“Cattle” includes cattle from cattle rearing and other cattle systems (Figure 3).

When respondents were asked to estimate what the total impact of the household’s disability had on the farm business the results showed that farm household disability was described as having a “major” or “some” impact on the farm business in 22.4% and 52.9% of cases respectively with 24.7% reporting “little or no impact”. On farms where a farm operator reported a disability, the corresponding figures were 27.8%, 66.1% and 6.1% respectively for the three stated impacts. On the farms where the spouse reports a disability, the proportion of respondents who stated there was a major, some, or no impact on the farm business, the results showed the corresponding figures were 30.8%, 42.0% and 27.2 per cent respectively. The incidence of “major impact” on the farm business was 16.2% where the person reporting a disability was someone other than the farm operator or spouse.

The FFI was lower on farms where the impact was “major” by €5,098 compared to farms with no disability or €3,678 compared to farms where disability had “some impact” on the farm business (Table 5). These differences are due to a combination of variation in farm size, levels of activity as reflected by total farm gross margin, dairying, the other enterprise systems and the DP income levels. Total gross margin was lower on the farms where disability had “some” impact compared to farms reporting no disability. On farms where disability had “little or no” impact, the farms in this group were larger and more intensive compared to farms with no disability.
Table 5

**Business Parameters for Farms by Reported Impact of Household Disability and for Farms not Reporting Disability in 2001**

<table>
<thead>
<tr>
<th>Major</th>
<th>Some</th>
<th>Little or no</th>
<th>No Disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Farm Income (FFI) (€)</td>
<td>11,064</td>
<td>14,742</td>
<td>20,456</td>
</tr>
<tr>
<td>Ha Adjusted</td>
<td>29.2</td>
<td>31.6</td>
<td>38.6</td>
</tr>
<tr>
<td>FFI/ha</td>
<td>378.6</td>
<td>467</td>
<td>530</td>
</tr>
<tr>
<td>Direct Payments (DP) (€)</td>
<td>7,505</td>
<td>10,698</td>
<td>11,418</td>
</tr>
<tr>
<td>DP as % of FFI</td>
<td>68</td>
<td>73</td>
<td>56</td>
</tr>
<tr>
<td>Total farm Gross Margin (GM) (€)</td>
<td>20,284</td>
<td>28,532</td>
<td>38,652</td>
</tr>
<tr>
<td>GM Dairying (€)</td>
<td>5,404</td>
<td>8,602</td>
<td>14,019</td>
</tr>
<tr>
<td>GM Cattle (€)</td>
<td>7,331</td>
<td>10,444</td>
<td>10,206</td>
</tr>
<tr>
<td>GM Sheep (€)</td>
<td>1,929</td>
<td>2,217</td>
<td>4,026</td>
</tr>
<tr>
<td>GM mainly Tillage</td>
<td>5,621</td>
<td>7,270</td>
<td>10,401</td>
</tr>
</tbody>
</table>

On 40.9% of farms with reported disability, a household member working on the farm attended to the needs of a farm household member with a disability. Table 6 shows respondents' estimates of the amount of farm-working time, expressed as a percentage of estimated total farm-working time, spent by a household member attending to the needs of a person with a disability in the household. As these were verbal estimates provided by respondents, and not the result of a referral to farm records, these estimates must be treated cautiously. Best estimates provided on this basis by respondents were that 29.3% of farm household members spend a maximum of 25% of their working time attending to the person with a disability, and a further 11.6% spent 25 to 50% of their working time (Table 6).

Table 6

**Estimated Proportion of On-Farm Working Time for People in Farm Households Attending to Disabled Members of the Farm Household, %**

<table>
<thead>
<tr>
<th>Attending to Person with disability</th>
<th>Household member with a disability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Farm operator</td>
</tr>
<tr>
<td>No information provided</td>
<td>4.8</td>
</tr>
<tr>
<td>Zero</td>
<td>78.2</td>
</tr>
<tr>
<td>1% &lt; 25%</td>
<td>12.7</td>
</tr>
<tr>
<td>25%&lt;50%</td>
<td>4.3</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

It is evident that if a considerable amount of farm working time is spent by a household member who is also attending to the significant needs of a household member with a disability, then an impact on the farm business is likely. Spending substantial amounts of time caring for a family member was also reported by Karwat (1998) in Poland.

**Discussion and Conclusions**

A discussion of the incidence of disability in agriculture or indeed in any other occupational group centres on the
definition used to describe disability. In a preliminary study, such as this, using a self-reporting mechanism, the broad definition of disability used was the most appropriate for the sector as represented by a NFS sample. This study provides agricultural education and extension professionals with new knowledge on occupational disability among the farming community. This research area previously has not received adequate attention.

The study findings indicated that self-reported disability was recorded in 19.5% of farm households. Within the farm household, physical health related (43.9%) followed by injury (14.3%) and intellectual disability (12.9%) were the highest incidence levels found. The farm operator was the most frequently affected, with physical health related disability, arthritis and cardiovascular conditions being their most frequent causes identified. This finding mirrors somewhat those found in a major Polish study, where the most frequent reasons for disability found among disabled rural inhabitants were cardiovascular diseases, diseases of the musculo-skeletal system and connective tissue (Karwat, 1998).

Farming is often considered a “healthy occupation” in the public domain, yet this perception is questionable. Recent research has found that farmers have a particularly negative health profile in the Irish Republic (Hope, Kelleher, Holmes, & Hennessy, 1999). Also over 3000 accidents take place on Irish farms annually and these predominantly occur to the farm operator. This group (i.e. farm operators) has been found to have low levels of training in occupational health and safety in Ireland (Finnegan & Phelan, 2003). Farm operators also had the highest level of accident-related disability in this study of disability while spouses and children had the highest proportion of health and learning/intellectual disability-related conditions respectively. Clearly attending to matters of health and safety, together with disability are important issues to address for farm operators, farm households, extension faculty and other professionals.

On farms where the farm operator reported a disability, farm income measures showed that incomes were reduced. This was attributable to respondents reporting a disability being less involved in dairying and more involved in the cattle rearing enterprises (Figure 1). It may be that a larger proportion of farm operators with significant impairment arising from the preponderance of cardiovascular and arthritic conditions may have been involved in the less labour-demanding enterprises of cattle systems compared to dairying. Respondents indicated that disability in the household impacted to some extent upon the farm business in 75% of cases. The data in Table 5 shows that financial performance of farms where the respondents indicated a major impact was below that of the other groups. A measure of the full extent of the impact on the farm business requires further study.

Where significant time was required to attend to needs of a person with a disability in the farm household, maintaining a high labour input into an intensive enterprise such as dairying would be difficult in practice. The results in Table 6 tend to support this assertion but again further research is required to examine this issue more fully. Households reporting disability had less participation in off-farm employment than households not reporting disability. There was no indication sought as to the kind of off-farm work in which the farm operator or the spouse was engaged, and consequently it was not possible to assess this impact on farm household income. However, if the work sought by these respondents reporting disabilities was physical in nature, the preponderance of health-related conditions and injuries among these respondents may make off-farm employment more difficult to secure in certain cases.

This study indicates that disability is a major issue among farm households.
When disability occurs it can adversely affect the farm business. Going forward, the labour resource available to farming is projected to decline further (Agri Food 2010 Report, 2000).

Generally, farms will have to increase in scale and efficiency or farm family members will have to find off-farm employment to maintain household viability. This research shows that farm households with disabilities may already be suffering disadvantage in the farm business and in off-farm employment. Against this background the occurrence of disability has the potential to have an increasingly detrimental impact on the viability of affected households. Agricultural Educators in Colleges, Extension and Universities need to become proactive in learning about the issues affecting people with disabilities. Prevention programmes that reduce the incidence of disability, farm accidents, and ill health are critical matters requiring attention.

Extension officers traditionally, have been seen as service providers (Kroma, 2003), providing solutions to problems encountered by farmers. This “top-down” approach has now been viewed as an inappropriate means for human resource development (Tucker, 2000), and prevents the adoption of innovation provided by extension workers. Perry and Bloom (1998, as cited in Seiz & Downey, 2001) suggest that, “prevention programmes, to be effective, must be responsive to the concerns and values expressed by the population to whom they are directed”. Indeed Extension Workers may be viewed “as a catalyst and facilitator of learning processes” (Kroma, 2003, p. 43), especially when the potential user (i.e., farmer) is involved in the programme from the onset (Sadighi & Mohammadzadeh, 2002; Bogue & Phelan, 2004; Kroma 2003; Rogers, 1995).

Involving the target audience from the beginning empowers them to “act on the concerns that they jointly define” (Morton, 2001, as cited in Morton, 2002). This is particularly relevant to the issue of disability, which may affect any member of the farming community.

Brashear, Hollis, & Wheeler (2000), in their study highlighted a range of channels, namely “popular publications, corporate representatives, Extension newsletters, current users of innovation” through which research findings may be transferred to both Extension and public knowledge. Extension educators should target these channels so that the probability of adoption of the desired message is increased.

One successful accident prevention programme, which incorporated the components outlined above, was the West Jutland study (Denmark) initiated in 1992 (Rasmussen, Carstensen, Lauritsen, Glasscock, Hansen, & Jensen, 2003). The benefits experienced from a well-constructed prevention programme will surpass participation in the programme, as the farm incorporates the home in addition to the place of employment. Children of farm families generally learn from actions of other family members. These actions “influence how they approach their work and their safety on the farm” (Seiz & Downey, 2001). If this fact can be harnessed, and the accident prevention messages adopted by participating adults, the programme will enjoy a synergistic effect as accident prevention messages are passed on to their offspring.

Health and Safety issues on farms have received increasing attention in recent years. However, insufficient attention has been paid to the consequential disability issues arising from ill health and farm accidents, in agricultural curricular and extension programmes. Extension educators need to design courses to address the issue of disability management and prevention. These courses must not solely be directed at farmers and their families. Health and Safety modules must also be highlighted in our agricultural educational system so that students become aware of the hazards associated with farming and appreciate the
potential impact of unsafe actions on the farm. The consequential impacts on individuals on the occurrence of disability, ill health, and farm accidents must be highlighted to the students. Education on farm safety management, the use of personal protective equipment and the maintaining of general farm health and safety will facilitate these farm hazards being eliminated. The process of commencing this development will be through research, knowledge development and through educating and training of agricultural and other professionals, together with the farming community.

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**References**


Learning to Think for Ourselves: Knowledge Improvement and Social Benefits among Farmer Field School Participants in Cameroon

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Abstract

A case study of farmers who attended cocoa integrated crop and pest management (ICPM) farmer field schools in Cameroon and non-participating farmers provides empirical results on areas where there are gaps and mixed results in the FFS literature. FFS provided farmers with new skills and knowledge on cocoa ICPM and FFS graduates demonstrated superior knowledge on cocoa ICPM generally compared to non-FFS farmers. However, the tendency of FFS participants to retain and diffuse new skills and practices more than concepts and principles suggests the need to review aspects of the training. Forty-nine FFS graduates spontaneously provided hands-on informal training to 193 other farmers on key ICPM practices, demonstrating the contribution of farmer-to-farmer diffusion to scaling up farmer training. The case study suggests that FFS can be a starting point for farmer empowerment, but points out that social and technical outcomes can only be sustained if the appropriate local and national level institutions, support systems and policies related to agricultural extension and research are developed. The paper also highlights methodological issues related to measuring the social impacts of FFS.

Keywords: Africa, Cameroon, Cocoa, Diffusion, Farmer Field Schools, Integrated Crop and Pest Management, Social Impact

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Introduction
The challenge facing agricultural extension in the 21st century is how to develop sustainable approaches that go beyond extending technical knowledge to producers, to playing a leading role in helping small-scale farmers organize themselves for production, marketing and advocacy in ways that promote farmer empowerment. The farmer field school (FFS) approach, which promotes group learning based on principles of adult education, is seen as one approach that can meet these goals. Developed in Asia in the 1980s and introduced to Africa in the mid 1990s, there are currently FFS programs in over 27 African countries, covering diverse topics such as integrated production and pest management (IPPM) of annual and perennial crops, soil management, livestock production and HIV/AIDS (Braun, Jiggins, Röling, van den Berg, & Snijders, 2006).

While recent studies show that FFS leads to reduced pesticide use, increased productivity and improved farmer knowledge (van den Berg, 2004), critics have pointed to two key challenges in promoting the approach: the high cost of FFS in terms of time, funds and human resources and the difficulty of scaling up FFS in a financially sustainable way (Feder, Murgai, & Quizon, 2003; Quizon, Feder & Murgai, 2001). Nearly all of the empirical evidence on FFS implementation challenges is taken from Asian countries with long-standing FFS programs, but there are important gaps in the literature and mixed results which do not allow for conclusions to be reached about the efficacy of the approach.

Purpose
As enthusiasm over FFS spreads in Africa and a growing number of donors and governments establish FFS programs, it is important to have more empirical evidence from Africa on the effectiveness of FFS and the strengths and weaknesses of the approach. In particular, more studies are needed on the effectiveness of the approach in imparting knowledge and empowering farmers, areas strongly influenced by the socio-cultural context. These discussions must go beyond mere description to provide analyses of factors contributing to farmer learning and diffusion behavior and to document the impact of FFS on farmer empowerment. This paper contributes to the literature on FFS impact by drawing on a case study of cocoa integrated crop and pest management (ICPM) FFS conducted by the Sustainable Tree Crops Program (STCP) in the central province of Cameroon. STCP, which operates in four other West African cocoa producing countries (Cote d’Ivoire, Ghana, Nigeria and Liberia), is hosted by the International Institute of Tropical Agriculture (IITA). The aim of the paper is to examine what knowledge and skills farmers acquire in FFS, what they transmit to non-participants and the social impacts of this training approach. The discussion is organized in five parts. Following a brief review of the literature on FFS learning effectiveness, farmer-to-farmer diffusion and social impact, section three describes the methodology used in the Cameroon study. Section four presents the empirical results, while the final section of the paper assesses the implications of the Cameroon findings for the debate on FFS efficacy.

Do farmers benefit from FFS?
Better internalization and retention of knowledge, attributed to the discovery learning process, coupled with social benefits of FFS training, are key justifications for the relatively high time, human and cost investments required to implement farmer field schools. A number of studies show the effectiveness of FFS as a training method by comparing knowledge test scores of FFS and non-FFS farmers (Mutandwa & Mpangwa, 2004; Godtland, Sadoulet, de Janvry, Murgai, & Ortiz, 2003; Rola, Jamias, & Quizon, 2002), but few empirical studies compare the technical knowledge of FFS graduates and farmers
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trained through conventional methods (Godtland et al., 2003). FFS seek to improve farmers’ problem solving abilities by sharpening their observational skills and decision-making ability rather than promoting “one fits all” recommendations, yet, most research on FFS focuses on adoption of practices and technologies and few studies assess the impact of FFS training on farmer experimentation, observational skills and problem solving abilities.

Proponents of the farmer field school approach propose that social benefits and related spin-offs mitigate the relatively high investment costs. Notably, the social benefits of FFS include better communication skills (e.g. confidence in public speaking, negotiation skills) and increased social capital as a means to collective action. The few empirical studies of social impacts of FFS show mixed results, with some studies, particularly in Africa, documenting greater group cohesion and leadership skills (Khisa & Heinemann, 2005; Mwagi, Onyango, Mureithi, & Mungai, 2003), while others studies found no evidence of increased social capital (Tripp, Wijeratne, & Piyadasa, 2005).

The FFS literature devotes much attention to the challenges of scaling up. The FAO team that developed the FFS approach recognized farmer led expansion and farmer-to-farmer diffusion as instrumental in the scaling up process and critical for making the approach more cost-effective and sustainable. Studies on FFS diffusion, however, show disappointing results in terms of the effectiveness of farmer-to-farmer diffusion and the type of knowledge FFS participants share. Research conducted in West Africa (Simpson & Owens, 2002), the Phillipines (Rola et al., 2002) and Sri Lanka (Tripp et al., 2005) suggests that FFS participants are more likely to share practices and skills and less likely to discuss abstract concepts and principles with other farmers. The effectiveness of farmer-to-farmer diffusion was called into question by a study which showed that the knowledge of secondary recipients on key technical topics was not significantly better than that of a control group of farmers (Rola et al., 2002). However, besides observations made in Ghana and Mali that some FFS farmers “established close, almost apprentice-ship type, relations with one or two other farmers” (Simpson & Owens, 2002, p. 32), the literatures provides little discussion of whether the way in which farmers share knowledge (e.g. verbally, through apprentice arrangements or by demonstration) affects knowledge retention and learning.

Methods

In 2004, STCP supported 15 cocoa ICPM FFS in the forest and savanna zones of the central province of Cameroon. The study was conducted between May and June 2005 using multiple methods to investigate farmers’ technical knowledge of cocoa management practices, their diffusion behavior and the social impact of FFS. First, non-structured interviews were conducted with selected FFS graduates to investigate knowledge diffusion patterns.

In June 2005, a formal survey of FFS and non-FFS participants was conducted around eight FFS in three divisions (Lekie, Mefou et Afamba, and Mbam), selected to represent forest and savanna agro-ecologies. Interviews were conducted with eight FFS graduates randomly selected from each school, resulting in a sample of 64 FFS farmers. For each of the eight FFS locations, a non-FFS village was selected based on the following criteria: same characteristics as the FFS village in terms of proximity to a road, agro-ecological conditions, ethnicity of the population, absence of an FFS, resident facilitator or participant.

Non-FFS villages were typically 5-25 km from FFS villages. In these villages, interviews were conducted with eight cocoa farmers, giving a sample of 64 non-FFS (NFFS) farmers. In most, but not all, cases, non-FFS farmers were randomly selected.
from a sampling frame of farmers with productive cocoa farms.

A third sample, consisting of 26 farmers who received knowledge from FFS participants through demonstration (referred to in this paper as knowledge recipients), was interviewed on uptake of ICPM practices and knowledge. This purposive sample was drawn from the list of knowledge recipients provided by 24 FFS participants interviewed in three villages. All knowledge recipients lived in the same village as FFS graduates. In all, 154 cocoa farmers from 16 villages were interviewed in the three categories (Table 1).

Most interviews were conducted in French, but where necessary, local languages were used. All respondents were male, reflecting the low number of women cocoa farm owners in Cameroon.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Lekie</th>
<th>Mefou et Afamba</th>
<th>Mbam</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFS graduates</td>
<td>16</td>
<td>16</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>Non-FFS farmers</td>
<td>16</td>
<td>16</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>Knowledge recipients</td>
<td>16</td>
<td>10</td>
<td>-</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>42</td>
<td>64</td>
<td>155</td>
</tr>
</tbody>
</table>

The survey instrument for FFS and NFFS farmers covered questions about uptake of practices/knowledge learned in FFS, diffusion of knowledge acquired from FFS to household and non-household members, method of diffusion, social impacts of FFS and a test to assess knowledge related to four broad areas covered in FFS: cocoa physiology, disease and pest management, rational pesticide use and post-harvest operations. Each question in the knowledge test was related to a basic idea, concept or principle conveyed during the FFS. The test was developed in conjunction with FFS facilitators to ensure its fairness. In scoring the test, a numerical score (1-2 points) was assigned to each correct answer and 0 to incorrect answers. A shorter questionnaire administered to knowledge recipients included the ICPM knowledge test but respondents were only asked questions from sections of the knowledge test that corresponded to the specific practice or message passed on by an FFS graduate.

Cocoa Production in Cameroon and the Need for a Discovery Learning Farmer Training Approach

Cocoa (Theobroma cacao) has been grown in Cameroon since the 1920s and today the country is the sixth largest producer in the world. The crop accounts for 6% of the country’s export revenue and provides over 50% of household income among small-scale growers (International Institute of Tropical Agriculture, 2003: 11). Farmers in the central province, where the study was conducted, grow cocoa on small farms as part of a mixed farming system incorporating food crops, perennials, and in some cases, horticultural crops for sale in urban markets. There were few socio-economic and demographic differences between FFS participants and non-participants (Table 2), which implies that the FFS participant selection process was relatively unbiased. Participants tended to have significantly smaller cocoa farms and households, fewer years of experience in growing cocoa and living in rural areas and less access to a means of transportation.
Table 2

**Characteristics of Farmers Surveyed**

<table>
<thead>
<tr>
<th></th>
<th>FFS graduates ($N = 64$)</th>
<th>Non-FFS farmers ($N = 64$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>41.8</td>
<td>50.0</td>
</tr>
<tr>
<td><strong>Years lived in village</strong></td>
<td>29.2</td>
<td>37.2**</td>
</tr>
<tr>
<td><strong>Household size</strong></td>
<td>7.0</td>
<td>7.7*</td>
</tr>
<tr>
<td><strong>Years of formal education</strong></td>
<td>9.0</td>
<td>7.3</td>
</tr>
<tr>
<td><strong>Years of experience growing cocoa</strong></td>
<td>12.8</td>
<td>22.9**</td>
</tr>
<tr>
<td><strong>Cocoa farm size (ha)</strong></td>
<td>3.2</td>
<td>4.6*</td>
</tr>
<tr>
<td><strong>Have an off-farm income sources (%)</strong></td>
<td>45</td>
<td>31</td>
</tr>
<tr>
<td><strong>Belongs to a farmer group (%)</strong></td>
<td>100</td>
<td>91</td>
</tr>
<tr>
<td><strong>Type of transport owned (%):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>83</td>
<td>70</td>
</tr>
<tr>
<td>Bicycle, motorbike, car</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>Eton ethnicity (%)</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td><strong>Had previous training on cocoa (%)</strong></td>
<td>44</td>
<td>41</td>
</tr>
</tbody>
</table>

* $p < 0.05$.

** $p < 0.01$.

The average yield of cocoa in Cameroon is low at 354 kg per hectare due to the age of the trees (up to half of all trees are above 30 years old), poor farm management and two major biotic constraints: black pod disease caused by *Pytophthora megakarya* and mirids, an insect pest that feeds on young shoots and pods. From the mid 1970s to the mid 1990s, when active cocoa extension was phased out due to declining state and donor support, SODECAO, the government agency responsible for cocoa improvement, trained farmers on farm management practices mainly through demonstrations. It also subsidized the cost of pesticides used to control black pod disease and mirids.

Cocoa extension activities focused on blanket technical messages without much emphasis on understanding interactions within the cocoa agro-ecology and factors contributing to diseases and pests. While demonstrations may be an effective method for teaching farmers skills and practices such as pruning cocoa trees, this approach is less appropriate for conveying knowledge about diseases and pests (e.g. how shade contributes to the spread of black pod disease). Similarly, teaching farmers to spray fungicide on a calendar basis and mass spraying campaigns undertaken by government agents (Sonwa, Coulibaly, Adesina, Weise, & Tchatat, 2004) does not encourage farmers to make observations on disease levels and to make their own decisions about when to spray. The result was, as one farmer put it succinctly “We never learned to think for ourselves.” To address these weaknesses in past extension approaches, STCP adopted farmer field schools as a method for training farmers on cocoa integrated crop and pest management.

The objectives of STCP supported cocoa ICPM FFS are to increase farmers’ yields and reduce pesticide use by encouraging good farm sanitation (pruning, shade management, weeding), rational pesticide use for black pod and mirid management and improve farmers’ knowledge of diseases and pests, crop physiology, and post-harvest operations. Schools of 20-30 participants meet fortnightly for an average of 16 four hour sessions over a period of 10 months (March to December) to carry out discovery learning exercises and field activities guided by a
trained facilitator. Farmers trained by the project, but with no previous FFS experience, facilitated the FFS, most having at least 11 years of formal education.

To encourage experimentation, observation and decision-making, the FFS farm (belonging to one of the participants) is divided into two adjacent plots: the ICPM plot, where new practices are implemented, and the farmer practice plot, where participants carry out their normal practices. Learning occurs through three types of activities. Discovery learning exercises allow farmers to develop an understanding of concepts and principles related to the topic as well as skills or practices, while field activities focus solely on teaching skills or practices. Through conducting agro-ecosystem analysis (AESA), FFS participants learn how to make close observations on farm conditions and to analyze the interactions between the cocoa trees and other biotic and abiotic factors coexisting in the field. The group learning process, and specifically group dynamic exercises, are designed to increase farmers’ communication skills, self-confidence and encourage team building.

**Findings**

*Farmer Learning and Application of ICPM Practices*

When asked what they learned in FFS, the majority of farmers mentioned practices related to black pod management, spraying and post-harvest operations (Table 3), the main ICPM messages conveyed through the training. A third of FFS alumni considered pruning cocoa trees as the most important topic learned in FFS. FFS graduates were less likely to mention learning about topics related to rational pesticide use (spraying based on observation, choosing the correct sprayer nozzle, correct use and maintenance of sprayers, protection during spraying and pesticide selectivity). With the exception of the concept of natural enemies and the impact of humidity on black pod disease, FFS graduates rarely mentioned agro-ecological concepts and principles covered in the discovery learning exercises, but focused more on management practices and techniques. Although 44% of graduates had received previous training related to cocoa, FFS provided new knowledge on a number of topics including shade management, black pod disease management, pesticide application and the concept of natural enemies (Table 3). The emphasis in discovery learning exercises on understanding concepts and principles related to the learning topic through observation and hands-on learning, is probably the main reason why farmers considered much of what they learned in FFS to be new.
Table 3

*Technical Topics Covered in FFS, as Recalled by Participants*

<table>
<thead>
<tr>
<th>Topics</th>
<th>% who mentioned the topic was covered in FFS</th>
<th>% who acquired new knowledge on the topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruning cocoa trees</td>
<td>95</td>
<td>44</td>
</tr>
<tr>
<td>Shade management</td>
<td>83</td>
<td>58</td>
</tr>
<tr>
<td>Phyto-sanitary harvesting</td>
<td>91</td>
<td>40</td>
</tr>
<tr>
<td>Managing black pod</td>
<td>58</td>
<td>54</td>
</tr>
<tr>
<td>Impact of humidity on black pod</td>
<td>41</td>
<td>73</td>
</tr>
<tr>
<td>Identifying natural enemies and pests</td>
<td>63</td>
<td>78</td>
</tr>
<tr>
<td>Quantity of pesticides to use and proper mixing of chemicals</td>
<td>64</td>
<td>63</td>
</tr>
<tr>
<td>Spraying method</td>
<td>72</td>
<td>63</td>
</tr>
<tr>
<td>Not spraying fungicide on a calendar basis</td>
<td>39</td>
<td>88</td>
</tr>
<tr>
<td>Protection while spraying</td>
<td>44</td>
<td>75</td>
</tr>
<tr>
<td>Harvesting method</td>
<td>63</td>
<td>50</td>
</tr>
<tr>
<td>Pod breaking method</td>
<td>70</td>
<td>49</td>
</tr>
<tr>
<td>Fermentation</td>
<td>80</td>
<td>41</td>
</tr>
<tr>
<td>Drying</td>
<td>67</td>
<td>33</td>
</tr>
</tbody>
</table>

Most FFS alumni applied ICPM practices on their farms in 2004, although the study did not verify these reports. Compared with non-FFS participants, they were significantly more likely to prune their cocoa trees, manage shade from other trees, carry out phyto-sanitary harvesting more frequently and spray fungicide correctly (Table 4). As the study was conducted in June, it did not investigate post-harvest practices. These findings suggest that key areas of knowledge identified by farmers as acquired from FFS resulted in changes in management practices. Partial budget analysis from a 2005 study of Cameroonian farmers who attended STCP supported cocoa FFS showed that ICPM practices lowered overall costs of production by 11%, implying that even if cocoa yields were unchanged, farmers would still be better off financially (Nyemeck & Gockowski, 2006).

Table 4

*Implementation of Key Cocoa ICPM Practices in 2004 (%)*

<table>
<thead>
<tr>
<th></th>
<th>FFS graduates ((N = 64))</th>
<th>Non-FFS farmers ((N = 64))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruned cocoa trees</td>
<td>98</td>
<td>57</td>
</tr>
<tr>
<td>Frequency of phyto-sanitary harvesting*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regularly</td>
<td>89</td>
<td>59</td>
</tr>
<tr>
<td>Not regularly</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Never</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>Managed shade of other trees*</td>
<td>86</td>
<td>70</td>
</tr>
<tr>
<td>Spray fungicide to moisten pods without run-off*</td>
<td>75</td>
<td>22</td>
</tr>
</tbody>
</table>

*\(p < \) 0.05 level based on t-test.*
Eighty-six percent of FFS alumni shared some aspect of what they learned with other farmers, either verbally or through demonstration. Informal training through demonstration focused on pruning cocoa trees, shade management, spraying technique, phyto-sanitary harvesting and fermentation method (Table 5). Notably, the 26 knowledge recipients interviewed mentioned receiving information from FFS participants on these same topics, corroborating reports by the latter (Table 6). FFS graduates shared knowledge with an average of 3.9 other farmers.

Table 5

<table>
<thead>
<tr>
<th>Knowledge/practice</th>
<th>% of FFS participants who trained others (n = 49)</th>
<th>No. of farmers informally trained by FFS participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruning cocoa trees</td>
<td>84</td>
<td>155</td>
</tr>
<tr>
<td>Shade management</td>
<td>43</td>
<td>76</td>
</tr>
<tr>
<td>Spraying technique</td>
<td>43</td>
<td>95</td>
</tr>
<tr>
<td>Phyto-sanitary harvesting</td>
<td>35</td>
<td>84</td>
</tr>
<tr>
<td>Fermentation method</td>
<td>22</td>
<td>33</td>
</tr>
<tr>
<td>Drying</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Quantity of pesticides to use and proper mixing of chemicals</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Grafting</td>
<td>14</td>
<td>40</td>
</tr>
<tr>
<td>Identification of insects</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Harvesting</td>
<td>10</td>
<td>27</td>
</tr>
</tbody>
</table>

Note. Percent may not equal 100 as most FFS participants shared knowledge on multiple topics.

Table 6

<table>
<thead>
<tr>
<th>Cocoa ICPM Knowledge and Practices Learned and Applied by Knowledge Recipients (N=26) (number of respondents)</th>
<th>Learned from FFS participants</th>
<th>Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruning cocoa</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>Shade management</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Phyto-sanitary harvesting</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Fermentation method</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Quantity of pesticides to use and proper mixing of chemicals</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Harvesting method</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Spraying method</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Not spraying fungicide on a calendar basis</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

Since knowledge retention and behavioral change is most likely to occur on the basis of what we see and do, the way information and knowledge was shared is important. While the majority of farmers (84%) verbally shared their field school experience with others, forty-nine FFS graduates (77 percent of those surveyed)
informally trained a total of 193 farmers through demonstration and verbal instruction on the beneficiary’s own farm (76%) (Table 5). A smaller number of FFS alumni provided informal training on their own farm (11%), while 10% assisted knowledge recipients to carry out ICPM practices on the whole farm. In one instance, three farmers requested an FFS graduate to enter into a sharecropping arrangement (locally known as bolengo) so that he could apply ICPM practices to their farms. Although the study did not compare learning and uptake of ICPM practices by the method of communication (i.e. verbal instruction alone versus hands-on training), the high uptake of ICPM practices by knowledge recipients (Table 6), in addition to evidence from the extension literature, suggests that interpersonal communications and hands-on training as a means of farmer-to-farmer diffusion has a stronger positive effect on learning and adoption rates (Bentley, Boa, Van Mele, Almanza, Vasquez & Eguino, 2003; Rogers, 1995). It is also significant that knowledge sharing was effective in sparking interest in FFS among knowledge recipients, as evident by the willingness of 19 of the 26 farmers to pay an average of CFA 14,700 (U.S. $28) to attend a field school.

FFS participants informally trained relatives (42%), friends/neighbors (30%) and fellow members of farmer groups (27%). Significantly, diffusion occurred predominantly on request (76%) from residents of the same village (84%), but in 16% of cases, knowledge sharing took place outside of the FFS participant’s village. Strong demand for knowledge sharing was prompted by visible results (e.g. more pods, less black pod disease) on the farms of FFS participants. Reasons given by the 14% of farmers who did not share knowledge in any manner were that all their friends were FFS participants and lack of interest on the part of other farmers. One farmer summed up the psycho-social aspect of diffusion by observing: “It is not easy to share knowledge. People thought that I was crazy when I started to prune. It will take time for information to be shared.”

As household labor is important in cocoa production in Cameroon, in weeding, carrying water for spraying, harvesting and post-harvest operations, intra-household knowledge diffusion has significant implications for FFS impact. Seventy three percent of FFS graduates shared some aspect of what they learned with a total of 121 household members, 64% of whom were females. FFS graduates shared knowledge with their wives (39%), children (33%), other relatives (25%) and non-related household members (3%). Those that did not pass on knowledge had no other household member involved in cocoa production activities. Participants shared over 17 knowledge points and practices with household members, the most common being phyto-sanitary harvesting (16%), spraying method (14%), pod breaking method (14%) and pruning cocoa trees (12%). Notably, FFS participants were more likely to provide other farmers with information on how to implement management practices rather than share knowledge about concepts and principles, and with the exception of pod breaking, these were the same practices shared with non-household members.

Farmer Knowledge of Cocoa ICPM

On average, FFS graduates had significantly higher test scores than non-FFS farmers in all subject areas (Table 7), an indication that field schools are providing technical knowledge and information that other farmers do not have access to. However, their test scores on tree physiology and rational pesticide use were below average. While, knowledge recipients had lower test scores compared with FFS participants in all subject areas, their scores were higher than those of non-FFS farmers in three of the four areas, significantly so for rational pesticide use and post-harvest practices (Table 7).
Table 7

**Knowledge Test Score (%) among FFS Participants, Non-participants, and Knowledge Recipients**

<table>
<thead>
<tr>
<th>Subject areas</th>
<th>FFS Graduates</th>
<th>Non-FFS Farmers</th>
<th>Knowledge Recipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree physiology</td>
<td>50&lt;sup&gt;a&lt;/sup&gt;</td>
<td>40</td>
<td>39 (n = 25)</td>
</tr>
<tr>
<td>Disease/pest management</td>
<td>59&lt;sup&gt;a&lt;/sup&gt;</td>
<td>36</td>
<td>42 (n = 13)</td>
</tr>
<tr>
<td>Rational pesticide use</td>
<td>52&lt;sup&gt;a&lt;/sup&gt;</td>
<td>41</td>
<td>50&lt;sup&gt;b&lt;/sup&gt; (n = 18)</td>
</tr>
<tr>
<td>Post-harvest</td>
<td>66&lt;sup&gt;a&lt;/sup&gt;</td>
<td>46</td>
<td>62&lt;sup&gt;b&lt;/sup&gt; (n = 16)</td>
</tr>
</tbody>
</table>

<sup>a</sup> <i>p < 0.00</i> level for differences between FFS graduates and non-FFS farmers, based on <i>t</i>-test.

<sup>b</sup> <i>p < 0.01</i> level of differences between non-FFS farmers and knowledge recipients, based on <i>t</i>-test.

Test scores trends between and among the three groups of farmers provide insights into the effectiveness of FFS and knowledge diffusion. While the highest score for all groups was on post-harvest operations, tree physiology (FFS graduates and knowledge recipients) and disease and pest management (non-FFS farmers) received the lowest scores. This suggests three things. First, Cameroonian cocoa farmers generally have relatively good knowledge of post-harvest operations from previous training, although FFS training significantly improved knowledge in this area. Secondly, topics where the test scores of knowledge recipients and non-FFS farmers were significantly different confirms the findings of other studies that informal knowledge transfer through verbal explanation and demonstration is less effective for abstract concepts related to tree physiology and diseases and pests and is better suited to message related practices and techniques (i.e. post-harvest operations and rational pesticide use). Finally, low test scores among FFS graduates suggest that FFS training in this program is weak in the areas of rational pesticide use and tree physiology.

What accounts for the relatively low test scores of FFS graduates on certain topics? Timing of the study may be one factor. The study was conducted at an early stage in the development of the FFS program (i.e. the second training cycle), at a time when the FFS curriculum was still undergoing changes, especially in the area of rational pesticide use and facilitator training on certain topics was still incomplete. However, evidence suggesting weaknesses in the FFS participants’ comprehension of ICPM concepts and principles is worrying in view of the emphasis in the FFS methodology on conceptual understanding. For example, both FFS graduates and non-participants shared certain misconceptions regarding tree physiology. Many farmers considered pruning as necessary to “rejuvenate” a cocoa tree but were unable to explain how this works (i.e., removal of unproductive branches allows for better energy use). Some, both FFS participants and non-participants, maintained the traditional belief that when a cocoa tree has excessive branches, the “sap” is not enough to nourish all the branches, thereby reducing production (cf. Bidzanga, 2005). A number of farmers in both groups misunderstood the relationship between light and mirid infestation (thinking that more light means less mirids, whereas the opposite is true) and were not aware of the effect of humidity on moss formation. Relatively few FFS participants understood the concept of pesticide specificity, and a quarter of those interviewed sprayed fungicide to the point of run-off (Table 4). Weaknesses in the comprehension of FFS participants raises general questions about the effectiveness of
FFS as implemented in this program in improving farmers’ understanding of abstract concepts and principles, and more specific questions about the quality of training in the Cameroon case.

Social Benefits of FFS

Measuring the social impacts of FFS poses major methodological challenges. Our evidence is drawn from a survey questionnaire which asked farmers to evaluate non-technical benefits and verify their responses by giving specific examples of changes in their behavior. Cameroonian FFS participants mentioned five areas where they experienced social benefits (Table 8).

Table 8

<table>
<thead>
<tr>
<th>Benefit/change</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to arrive at group consensus</td>
<td>63</td>
</tr>
<tr>
<td>Make observations before making farm management decisions</td>
<td>59</td>
</tr>
<tr>
<td>More confident public speaker</td>
<td>47</td>
</tr>
<tr>
<td>Better at working in a group</td>
<td>41</td>
</tr>
<tr>
<td>Experiment more with cocoa and other crops</td>
<td>31</td>
</tr>
</tbody>
</table>

While only a few farmers conducted “experiments” on cocoa (e.g. comparing planting methods, using a new type of fungicide), most experiments were done on other crops, an indication of how FFS improved farmers’ problem solving abilities. Some farmers tried pruning other tree crops such as bananas and oil palm, and one even attempted to graft orange trees. Other experiments include spraying pesticides on pepper, maize and tomato. Drawing on his new knowledge of natural enemies, one farmer successfully reduced caterpillar populations by introducing red ants into his tomato garden. A more detailed, qualitative study is needed to confirm farmers’ perception of increased experimentation and to ascertain whether FFS graduates experiment differently and more frequently than non-participants. The value of strengthening farmers’ abilities to solve problems and experiment more systematically can be best optimized by organizing selected FFS graduates into research groups linked formally or informally with national research institutes so that research results can be validated and disseminated more widely through FFS and other channels. Research efforts by FFS graduates and cocoa researchers in Ghana and Nigeria, with support from STCP, is one of the few examples from Africa of how FFS can provide a platform for technology development (I. Okuku, personal communication, October 5, 2005).

FFS alumni reported improved social skills such as punctuality, being able to speak more confidently in public, listen to others without interrupting and respecting the opinions of others. The case where a FFS graduate publicly challenged an extension agent on the safety and specificity
of a new brand of insecticide, provides anecdotal evidence of farmers’ increased self-confidence. As one farmer succinctly noted “Before the FFS I was timid; I could not address people in a group. Now I am confident. I can openly talk with anyone without being afraid.” The FFS experience made some farmers more enthusiastic about cocoa farming. Some said that before the training, they went to their cocoa farms to pass time, but now they looked forward to going to their farms to make observations and work. As one farmer confessed “Before the FFS, I used to neglect my work on the cocoa farm. Now I take it more seriously.”

The survey provided evidence of stronger social capital among FFS graduates, at least in the short term. Six months after the schools closed, 67% of FFS graduates surveyed continued to meet regularly with other participants without follow-up by an FFS facilitator. Post-FFS groups had an average of 6 members, but some groups had up to 21 members. Group formation was no doubt facilitated by pre-existing relationships: 89% knew one or more participants prior to the FFS as relatives (72%), friends (67%) or fellow group member (27%). Most groups worked on members’ farms on a rotational basis carrying out ICPM practices, an uncommon practice in some locations before the FFS. Notably, group support and validation appeared to be important to developing and maintaining the confidence for carrying out ICPM practices such as pruning cocoa trees and using pesticides rationally, as well as for supporting group action. As one farmer explained “The goal of the group is to encourage sharing of ideas after the FFS and to encourage each other to use good production methods.” Five participants belonged to groups that worked for pay on other farmers’ cocoa farms. The most common service provided by FFS participants that formed work groups was pruning cocoa trees. Three participants formed a local interest group (GIC), while one established a savings group (tontine) with other FFS graduates. As distances between villages where FFS participants live could hinder post-FFS group formation (28 of the 64 participants surveyed lived an average of 5 km from the FFS site), clustering FFS sites is recommended for promoting collective action, innovation and farmer-to-farmer diffusion (Witt, Waibel & Pemsl, n.d).

Conclusions, Implications and Recommendations

The present case study provides empirical evidence on three issues where there are gaps in the farmer field school literature: the effectiveness of FFS training, the potential contribution of farmer-to-farmer diffusion to the scaling up process and social impact. Cameroonian data shows positive results that confirm the effectiveness of facilitated discovery learning. FFS provided farmers with new skills and knowledge on cocoa ICPM, especially pruning of cocoa trees, shade management, phyto-sanitary harvesting, spraying methods and fermentation. FFS graduates demonstrated superior knowledge on cocoa ICPM generally compared to non-FFS farmers and most applied skills and knowledge acquired from the training to their own farms. However, the study raises two cautionary points regarding farmer learning in FFS. The tendency of Cameroonian FFS participants to retain and diffuse new skills and practices more than concepts and principles raises the question whether elements of FFS related to ecological concepts (e.g. agro-ecosystem analysis) and discovery learning protocols that focus on principles need to be modified, deemphasized or dropped. Similar studies in STCP project areas in Ghana, Nigeria and Cote d’Ivoire will help to confirm whether weaknesses in farmer knowledge are specific to the Cameroonian case or reflect weaknesses in STCP training tools, facilitation or the FFS methodology more generally.
Secondly, while Cameroonian FFS graduates had higher test scores than non-participants, below average scores in the area of tree physiology and rational pesticide use suggest the need to assess the effectiveness of FFS training. FFS managers should regularly assess how trainers are trained on abstract conceptual topics but finding a method for assessing training quality is a bigger challenge. Because of the high cost of formal evaluation studies and the time lag in getting results from such studies, “quick and dirty” methods for monitoring training quality are needed, especially when large numbers of FFS are being implemented. Scores from the end of training “ballot box” test, an integral part of FFS, could be used more rigorously to evaluate farmer learning and provide quick feedback to program managers and facilitators on training effectiveness. Training FFS facilitators to conduct simple, periodic surveys of former participants for a season would also provide useful feedback data.

The Cameroonian case provides strong evidence of the important role farmers play in knowledge diffusion. STCP FFS staff in other West African countries also observed apprenticeship like arrangements between FFS graduates and other farmers. What accounts for this behavior and how can it be supported and encouraged? A number of contributing factors can be proposed including strong traditions of sharing and support found in many African cultures, the existence of multiple strata of social networks and groups into which FFS participants are linked and the confidence developed by FFS graduates through the experiential learning process. More cross-cultural sociological studies are needed on farmer-to-farmer diffusion processes of agricultural knowledge and practices to fully understand this phenomenon. Learning from spontaneous farmer-to-farmer diffusion and making it more systematic so as to maximize scaling up, can take many forms including requesting each FFS participant to identify and work with a number of “apprentices,” providing apprentices with technical support (extension materials and follow-up field visits by FFS facilitators), and encouraging learning through community dialogue initiated by FFS graduates. STCP is testing some of these approaches as part of efforts to scale up cocoa ICPM FFS.

The Cameroonian case suggests that FFS can be a starting point for social change by improving farmers’ ability to make observations, apply new knowledge to solving other problems, communicate better, have increased self-confidence and form groups to support cocoa production activities as well as other livelihood initiatives. But it would be unrealistic to expect these outcomes to be sustainable without developing the appropriate local and national level institutions, support systems and policies related to agricultural extension and research. A key challenge in Africa is linking FFS groups to rural development initiatives that promote farmer empowerment and developing and/or strengthening local institutions for sustaining the momentum created by FFS with the objective of creating an FFS-derived sustainable development movement, similar to the community IPM movement in parts of Asia.

Finally, the study raises up issues related to methodologies and approaches for assessing the impact of FFS. Formal surveys alone cannot provide the kind of in-depth analyses required to understand diffusion pathways, farmer experimentation and empowerment more broadly. Qualitative studies using diffusion and social network mapping, focus groups and participant observation, among other methods, are needed to complement formal surveys. More cross-cultural comparative studies would allow us to determine the importance of cultural factors in determining impact, particularly diffusion behavior. The timing of knowledge, diffusion and social impact studies is an important issue and should be
determined by the specific objectives of the study. Longitudinal studies would be useful for documenting long-term change in behavior and knowledge. These observations echo calls in the literature (van den Berg, 2004) for developing a conceptual framework for monitoring and evaluating FFS that considers the interests of both FFS program administrators and farmers and documents all dimension of FFS impacts.

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References


Effectiveness of Agricultural Extension Training Courses for Block Supervisors at the Department of Agricultural Extension (DAE) in Bangladesh

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Abstract
The study attempted to determine the effectiveness of DAE training courses conducted for improving block supervisors’ agricultural extension skills. Data for this study were collected from 102 block supervisors using designed standard questionnaire. The result revealed that block supervisors perceived the evaluation of courses and attainment of course objectives as satisfactory level. The similar result was obtained in regard to course design and delivery, which indicated that trainers could effectively provide agricultural extension training to the block supervisors. The block supervisors, however, expressed poor perceptions towards the quality of training materials, transportation arrangement and refreshments. It is therefore, recommended that providing sufficient training materials, enough transportation facilities and refreshments should be a gradual process for improving the quality of agricultural extension training in Bangladesh.

Keywords: Block Supervisors, Perceptions, Effectiveness, Agricultural Extension Training, Extension Personnel, Department of Agricultural Extension.
**Introduction**

The Department of Agricultural Extension (DAE) is the largest extension organization in Bangladesh. The mission of the DAE is to “provide efficient and effective need-based extension services to all categories of farmers, to enable them to optimize their use of resources, in order to promote sustainable agricultural and socio-economic development” (DAE, 1999, p. 1). To achieve this goal the DAE employs about 25,000 people, of whom 11,382 are block supervisors (BSs) (Kashem, 2001).

According to DAE guidelines (2003), each block supervisor has to provide agricultural extension services to around 1,200 farm households. Training wing of the DAE is responsible to provide training for block supervisors to ensure high quality agricultural extension services. To achieve this objective, block supervisors’ trainings at the DAE were started at an initial stage of its establishment.

“Training is considered as a basic feature of the agricultural extension approaches that can help block supervisors in building their confidence to solve farmers’ problems and to provide information needed” (DAE, 1999, p. A-17). The major objective of the general DAE training for block supervisors is to increase their job performance through improved knowledge, skills, and changed attitude.

Block supervisors’ training is ongoing with regular monthly training while additional block supervisors’ training is provided periodically as part of specific development assistance projects. This periodic training is usually prescribed by the specific project and may involve external trainers and venues. Upazila (sub-district) Agricultural Officers (UAO) with the Assistance of Additional Agricultural Officers (AAO), Agricultural Extension Officers (AEO), Assistant Agricultural Extension Officers (AAEO) and Junior Agricultural Extension Officers (JAEO) usually design, manage, and deliver the regular monthly training for block supervisors. The UAO serves as principal trainers. Moreover, district specialists and District Training Officers (DTO) may also participate in the training to ensure the training quality. However, extension training specialists at the DAE headquarters usually design, manage, and deliver additional block supervisors’ training. Benor and Baxter (1984) identified, “UAOs, AAOs, and AEOs are equivalent to Agricultural Extension Officers (AEO) and Subject Matter Specialist (SMS) in traditional T&V system” (as cited in Reynar & Bruening, 1996, p. 54).

According to Charles (1990), the main objective for investing resources in training is to eliminate performance deficiencies (as cited in Ajayi, 2001, p. 41). To achieve this objective, the training organization must be concerned about the effectiveness of the training program (Ajayi, 2001; Davies, 1973). The theoretical framework for this study was based on Davies conceptual model for training effectiveness (Ajayi, 2001; Davies, 1973; Maybey, 1989). According to the Davies’ model, the effectiveness of agricultural extension training exclusively depends on the successful attainment of course objectives, successful evaluation of the courses, quality of course design and delivery, and improved motivation of trainees (Ajayi).

Effectiveness may be defined as the way of performing the right things (Ward & Dettoni, 1974, as cited in Ajayi, p. 41). However, opinions have differed about the effectiveness of agricultural extension training courses. The DAE has invested huge resources in agricultural extension training to develop block supervisors’ agricultural extension skills so that they can motivate and help farmers to adopt new crop varieties and improved farming practices leading to more agricultural production and income. But, this huge investment could not ensure need-based agricultural extension services to farmers (DAE, 1999).
Regarding training, Halim (1991) indicated that extension training is a common constraint for developing block supervisors’ skills in Bangladesh. Similarly, Reynar and Bruening (1996) found that the lack of training institutions and infrequent periodic training for block supervisors are the main agricultural extension issues in Bangladesh. Karim and Mahboob (1991) reported that neither the simple number of in-service training in the total service period nor the simple duration of in-service training in the total service period could improve the job performance of the Agricultural Extension Officers in Bangladesh. Thus, to address training problems, it is necessary to increase agricultural extension training in Bangladesh. But, the DAE does not have resources to provide training to meet all training needs for block supervisors and conduct training within their limited budget. On the other hand, block supervisors’ trainings are often not the most effective to increase their agricultural extension skills (DAE, 1999). So, it is important to make effective block supervisors’ running training.

The success or failure of a training program is measured through evaluation of the courses. Numerous studies have cited problems with agricultural extension training in Bangladesh. However, there are no published reports, specifically on the perceptions of block supervisors regarding the effectiveness of these training courses. Determining block supervisors’ perceptions regarding agricultural extension training courses would provide information in decision making for training designer as well as policy makers to develop strategy for improving the effectiveness of training courses. As Patton (1983) noted, “in many rigorously designed evaluations go unused because evaluators failed to find out what program staff and decision makers really needed and wanted to know” (p. 15) (as cited in Reynar & Bruening, 1996, p. 54).

According to Finkel (1997), the design of meeting environment has either positive or negative influence on the learning process (as cited in Ajayi, 2001, p. 42), and according to Wheatley (1993), mental comfort of the learners exclusively depends on the physical environment in the training venue (as cited in Ajayi, p. 42). Similarly, Davis and McCollon (1974) indicated, “the ability to change is directly proportional to the level of comfort adults feel” (as cited in Ajayi, p. 42). The study conducted by Ajayi indicated that training venue, meals, and local transportation for trainees played a vital role in the commitment of trainees to the learning process.

**Purpose and Objectives**

The major purpose of this paper was to determine the perceptions of block supervisors on courses conducted in agricultural extension training. The specific objectives of the paper were:
1. Examine the perceptions of block supervisors regarding the level of attainment of course objectives and the evaluation of agricultural extension training;
2. Examine the perceptions of block supervisors regarding the effectiveness of design and delivery of agricultural extension training courses;
3. Examine the perceptions of block supervisors regarding the adequacy of facilities at agricultural extension training courses.

**Methods**

A survey research design was used to obtain the perceptions of block supervisors regarding the effectiveness of agricultural extension training courses. The target population for this study consisted of all 236 block supervisors in Kishorganj district, Bangladesh. Upazila-based random sample of block supervisors (102) in 4 randomly selected upazilas (sub-district) was identified. The data were collected by using the designed standard questionnaire and resulted in a 100 percent response rate.
The questionnaire was designed to include five-point Likert scale (1 = poor, 2 = satisfactory, 3 = undecided, 4 = good and 5 = excellent). The questionnaire consisted of four sections. The first section represented the demographic information of the respondents, which included age, service tenure, educational level, individual contact, group contact, and mass contact. The second section consisted of the attainment of course objectives and evaluation of courses, which included the following variables: objective clarity, attainment of course objectives, relevance, and planning and management of courses. The third section represented the design and delivery of courses and included presentation of topics, integration of lectures and practical session such as demonstration, integration of lectures and practical session such as field visits, and quality of training materials. The forth section included the training facilities such as transportation arrangements, administrative arrangements, refreshments, and accommodations.

The questionnaire was pilot-tested with 16 block supervisors in the study area before the study. Cronbach’s Alpha reliability coefficient of .87 for the questionnaire was achieved. Data were collected from July to August 2004 by first author.

The survey employed face-to-face interviews with the respondents. The data were analyzed through the use of descriptive statistics, such as frequencies, percents, means and standard deviations.

**Findings**

As shown in Table 1, the average age of the respondents was 43.87 years. The majority of the respondents (52%) belonged to middle age category, and only 5% belonged to young age category. The respondents had on average 23 years of service tenure as block supervisor. The majority of the respondents (46%) had a Higher Secondary Certificate (HSC) degree while 38% had a Secondary School Certificate (SSC) degree with Agricultural Diploma as an associate degree. Only 16% of the respondents had a Bachelor of Science degree with Agricultural Diploma as an associate degree. Besides, the majority of the respondents (51%) maintained frequent individual contact with information sources. However, 41% and 46% of the respondents maintained rarely to frequently group contact, respectively. The largest respondents (64%) maintained moderate mass contact.
Table 1

Demographic Characteristics of Block Supervisors (N = 102)

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Categories</th>
<th>f</th>
<th>%</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Young (34 to 35)</td>
<td>5</td>
<td>5</td>
<td>43.87</td>
<td>5.26</td>
</tr>
<tr>
<td></td>
<td>Middle aged (36-45)</td>
<td>53</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Old (46 and above)</td>
<td>44</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service tenure (years)</td>
<td>Short (up to 10)</td>
<td>2</td>
<td>2</td>
<td>23.20</td>
<td>5.89</td>
</tr>
<tr>
<td></td>
<td>Medium (11-20)</td>
<td>39</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long (21 and above)</td>
<td>61</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education (years of schooling)</td>
<td>SSC with Agricultural Diploma</td>
<td>39</td>
<td>38</td>
<td>11.55</td>
<td>1.41</td>
</tr>
<tr>
<td></td>
<td>HSC with Agricultural Diploma</td>
<td>47</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BSc with Agricultural Diploma</td>
<td>16</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual contact (score)</td>
<td>Rarely (19-28)</td>
<td>33</td>
<td>32</td>
<td>31.51</td>
<td>4.23</td>
</tr>
<tr>
<td></td>
<td>Moderate (30-31)</td>
<td>17</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequent (32-39)</td>
<td>52</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group contact (score)</td>
<td>Rarely (6-25)</td>
<td>42</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate (26-27)</td>
<td>13</td>
<td>13</td>
<td>27.25</td>
<td>5.78</td>
</tr>
<tr>
<td></td>
<td>Frequent (28-40)</td>
<td>47</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass contact (score)</td>
<td>Rarely (6-10)</td>
<td>14</td>
<td>14</td>
<td>12.26</td>
<td>1.81</td>
</tr>
<tr>
<td></td>
<td>Moderate (11-13)</td>
<td>65</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequent (13-15)</td>
<td>23</td>
<td>22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Block Supervisors’ Perceptions Regarding the Evaluation of Courses and Attainment of Course Objectives

The data in Table 2 shows that the mean ratings of the four variables ranged from 2.25 to 2.63, indicate block supervisors’ satisfactory perceptions regarding the evaluation of courses and attainment of course objectives of agricultural extension training. Three of the variables, attainment of course objectives (M = 2.49, SD = 0.92), relevance (M = 2.63, SD = 1.03), and planning and management of courses (M = 2.40, SD = 0.96) did not provide much difference in their means. However, one of the variable, objective clarity provided lower mean (M = 2.25, SD = 0.78) than the other three variables.

Table 2

Means and Standard Deviations of Block Supervisors’ Perceptions Regarding the Evaluation of Courses and Attainment of Course Objectives (N = 102)

<table>
<thead>
<tr>
<th>Items</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective clarity</td>
<td>2.25</td>
<td>0.78</td>
</tr>
<tr>
<td>Attainment of course objectives</td>
<td>2.49</td>
<td>0.92</td>
</tr>
<tr>
<td>Relevance</td>
<td>2.63</td>
<td>1.03</td>
</tr>
<tr>
<td>Planning and management of course</td>
<td>2.40</td>
<td>0.96</td>
</tr>
<tr>
<td>Grand Mean</td>
<td>2.44</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Note. Means were calculated on the basis of a five-point Likert scale: 1 = Poor, 2 = Satisfactory, 3 = Undecided, 4 = Good, 5 = Excellent.
Block Supervisors’ Perceptions of Course Design and Delivery

As indicated in Table 3, big differences were found among block supervisors in their perceptions regarding course design and delivery. The mean ratings of the four variables ranged from 1.98 to 2.69, indicate block supervisors’ poor to satisfactory perceptions regarding the effectiveness of course design and delivery. This indicates that DAE personnel are perhaps less effective in training course design and delivery. Supporting this view, Karim and Mahboob (1991) also indicated that job performance of AEO was a major concern in Bangladesh.

In regard to the quality of training materials, the respondents provided lower mean ($M = 1.98$, $SD = 1$) than the other three variables, presentation of topics ($M = 2.65$, $SD = 1.09$), integration of lectures and practical session such as demonstration ($M = 2.69$, $SD = 1.24$), and integration of lectures and practical session such as field visits ($M = 2.25$, $SD = 1.03$). This might be due to lack of knowledge in selecting appropriate training materials by DAE personnel serving as resource persons in providing training to block supervisors.

Table 3

Means and Standard Deviations of Block Supervisors’ Perceptions of Course Design and Delivery ($N = 102$)

<table>
<thead>
<tr>
<th>Items</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation of topics</td>
<td>2.65</td>
<td>1.09</td>
</tr>
<tr>
<td>Integration of lectures and practical session, such as demonstrations</td>
<td>2.69</td>
<td>1.24</td>
</tr>
<tr>
<td>Integration of lectures and practical session, such as field visits</td>
<td>2.25</td>
<td>1.03</td>
</tr>
<tr>
<td>Quality of training materials</td>
<td>1.98</td>
<td>1.00</td>
</tr>
<tr>
<td>Grand Mean</td>
<td>2.39</td>
<td>1.09</td>
</tr>
</tbody>
</table>

Note. Means were calculated on the basis of a five-point Likert scale: 1 = Poor, 2 = Satisfactory, 3 = Undecided, 4 = Good, 5 = Excellent.

Block Supervisors’ Perceptions of Course Venue Facilities

As reported in Table 4, the mean ratings of the four variables ranged from 1.93 to 2.25, indicate block supervisors’ poor to satisfactory perceptions regarding the facilities of course venue. In regard to the transportation arrangements ($M = 1.93$, $SD = 0.88$) for participation in training program and refreshments ($M = 1.94$, $SD = 0.91$) at training place, block supervisors expressed their poor perceptions toward transportation and refreshments facilities. This might be due to lack of budgets for training venue facilities and proper planning by course designer.
Table 4

Means and Standard Deviations of Block Supervisors’ Perceptions of Course Venue Facilities (N = 102)

<table>
<thead>
<tr>
<th>Items</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation arrangement</td>
<td>1.93</td>
<td>0.88</td>
</tr>
<tr>
<td>Administrative arrangement</td>
<td>2.14</td>
<td>0.77</td>
</tr>
<tr>
<td>Refreshments</td>
<td>1.94</td>
<td>0.91</td>
</tr>
<tr>
<td>Accommodation</td>
<td>2.25</td>
<td>1.07</td>
</tr>
<tr>
<td>Grand Mean</td>
<td>2.07</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Note. Means were calculated on the basis of a five-point Likert scale: 1 = Poor, 2 = Satisfactory, 3 = Undecided, 4 = Good, 5 = Excellent.

Conclusions, Recommendations, and Implications

Overall, block supervisors in the Department of Agricultural Extension (DAE), Bangladesh demonstrated satisfactory perceptions regarding the effectiveness of agricultural extension training courses. The study showed that the respondents expressed poor perceptions regarding quality of training materials (\(M = 1.98, SD = 1\)), transportation arrangement (\(M = 1.93, SD = 0.88\)), and refreshments at training venue (\(M = 1.94, SD = 0.91\)). Based on the findings of this study, the following recommendations are offered.

1. It needs to review the existing policy for transportation arrangement and refreshments for block supervisors. These venue facilities play a vital role in the commitment of block supervisors to the learning process. Thus, the DAE should make a policy on providing better transportation facilities and refreshments to block supervisors. In addition, the DAE should ensure that the other facilities, such as accommodations and administrative arrangement for agricultural extension training courses must be adequate enough to foster learning.

2. It needs to improve the quality of training materials by allocating more budgets that would have a significant impact on increasing the effectiveness of training courses.

The findings of this study indicate that the poor perception level of block supervisors towards the agricultural extension training courses is the major obstacle for developing their skills to provide need-based extension services. Thus, it can be concluded that the results from this study could have implications in developing the block supervisors’ in-service training program in Bangladesh. Besides, the findings may also be used as a basis and guide for providing effective pre-service training for newly recruited block supervisors. In addition, this study may provide training program planners in other developing nations with valuable information in order to make more effective training program for the agricultural extension personnel.

As the present study was aimed to determine block supervisors’ perceptions on the effectiveness of agricultural extension training courses, further study is needed to assess the impact of these training courses on improvement in block supervisors’ capacity to provide need-based agricultural extension services to farmers. This is because performance of trainees may not be improved in-spite of having their enhanced knowledge and skills acquired during training. (Jaiswal, 1992, as cited in Ajayi, pp. 46).
References


Benefits and Preparation for an International Study Abroad Experience: A Student’s Perspective

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Abstract
In a world that continues to move rapidly toward globalization, it is important for students to expand their global awareness and gain international experience. Study abroad programs offer students an excellent way to develop themselves both personally and professionally. Entering a foreign country and/or university setting can be an overwhelming life and cultural transition, and it is important to remember that despite all that is learned while abroad, problems will arise. With proper preparation and a clear understanding of what might happen during an international learning experience, possible complications during the transition process can be alleviated so that students gain the most from their study abroad experience.

Keywords: Study Abroad, Travel, Students
Introduction

Internationalization of curriculum and globalizing U. S. Colleges of Agriculture in order to prepare students to work in an increasingly interdependent world are reoccurring themes as one delves into educational resources and involves oneself in the educational sector.

Brooks, Frick, and Bruening (2006) found “study abroad programs were widely recognized by survey respondents as the most valuable internationalization technique…” (p. 100). Although other, more cost-effective means of participating in an international experience, such as using multimedia to create a virtual international experience have been suggested (Boyd, Felton & Dooley, 2004), Tritz (1997) explained “such exchange programs [study abroad programs] and others have helped numerous students gain an international perspective that could not have been taught in the classroom” (p. 49). Boyd et al. (2004) added “…simulations cannot be compared to study abroad courses…” (p. 67).

However, without proper preparation and knowledge of what to expect when entering another country, one will not reap the full benefits from such a program. The outcomes of an educational experience in an international setting are highly dependent upon the extent to which the participant in the experience has been prepared for it (Tritz, 1997).

Why Study Abroad?

For most people in the world, direct experience with other countries and cultures is infrequent or nonexistent (Ludwig, 1994). Study abroad programs provide an opportunity for students to gain international experience, to learn about other people and embrace their culture, to explore the world, broaden their horizons, and to escape the perception that “their” country is the center of the universe. Such programs open students’ minds to people with different ideas and values (Zhai & Scheer, 2002), spark interest in international issues and change students’ global perspectives. Zhai and Scheer found that students who had studied abroad, “saw how much the United States influences other countries” and, “gained appreciation, respect, and understanding of their host country and culture” (p. 26). In the same study, international educational experiences were shown to facilitate personal growth and boost self-confidence. Regarding self-efficacy,

78% of the students believed that their study abroad experience was a great confidence builder for them. The confidence came from being able to survive in such different countries, the coping and travel skills they gained, and the ability to share their experience and knowledge with others. (p. 25)

International educational experiences provide the opportunity for professional growth as well. By entering a career with a global perspective and knowledge of how people from other cultures work, students have an advantage over their counterparts who have not experienced life abroad. “Today one in six U. S. jobs is directly tied to international trade” (Bruening & Shao, 2005, p. 48), and “multinational companies seek employees with cross-cultural and language skills” (Acker & Scanes, 1998, p. 60). Bickson (as cited in Wingenbach et al., 2003) stated that corporate administrators noted almost all future jobs will either require or benefit from global awareness and understanding.

Preparation

Despite all that is learned while abroad, problems do arise. Therefore, it is crucial to have a clear understanding of what might happen during an international learning experience (Tritz & Martin, 1997). Intelligent preparation is essential in making your international experience successful and satisfying (Carey, 2002).
University Requirements

It is imperative that students plan ahead if they intend to study abroad. A good place to begin is at the university study abroad office where a study abroad advisor will be able to explain the application process and specify deadlines. Generally, paperwork is due at the beginning of the semester prior to when the student plans on leaving the country. Your study abroad office may also be able to offer you contact information of students who have already experienced the program you are considering.

Keep in mind that most programs require proof of international insurance before departure. If your existing insurance does not cover Emergency Medical Evacuation and Repatriation of Remains, you should investigate and purchase additional insurance. A listing of international insurance providers is available online (http://www.insuranceabroad.com/).

Government Requirements

When traveling abroad, students must carry some form of identity such as a passport or birth certificate. Passport applications can be found at your local district clerk’s office or the U. S. Department of State Web site (http://travel.state.gov). Allow six to eight months before departure for your application to be processed (L. Tauferner, personal communication, February 23, 2007).

According to the U. S. Department of State (http://travel.state.gov, 2007), as of January 23, 2007, citizens from the United States, Canada, Mexico, and Bermuda must present a passport to re-enter the U. S. by air from any part of the Western Hemisphere.

Entry and exit requirements for visas will vary by country and can be researched at the U. S. Department of State’s Web site. Allow a minimum of two to three months for processing of your visa and consult the consular office nearest you for application forms (L. Tauferner, personal communication, February 23, 2007). A complete and official listing of the foreign consular offices in the U. S. can be found on the U. S. Department of State’s Web site (http://www.state.gov/s/cpr/rls/fco/fallwinter2/).

Financial Preparation

Costs associated with traveling and studying abroad were one of the primary concerns expressed by students considering participation in a study abroad program (Wingenbach, Chmielewski, Smith, Piña & Hamilton, 2006). Cost however, should not be a determinant. With minimal effort and proper planning, students will find many financial aid opportunities exist to alleviate the financial burden of studying in another country. In addition to study abroad offices, students should seek out scholarships from their academic department, agricultural organizations, and hometown businesses and clubs.

Medical Requirements

Medical requirements and recommendations differ by country. If you are unsure about a country’s requirements, check the Center for Disease Control and Prevention Web site (http://www.cdc.gov/travel/vaccinat.htm) which provides a list of recommended and required vaccinations and preventative medicines.

Culture Shock

Culture shock is the anxiety one feels when traveling to a completely new environment. It usually sets in after the first few weeks of being in a country and has been shown to be a central barrier to participation in global opportunities (Wingenbach et al., 2006). It is important for students to remember that there will be a time when they feel frustrated, mad, or sad during their study abroad experience; this is a normal process in cross-cultural adjustment.
Many travelers have a tendency to “over pack” for their first study abroad experience. The following list of items should not be overlooked when preparing for international travel.

• Extra change of clothes packed in carry-on luggage (lost luggage happens);
• Gifts for host family and friends (homemade crafts that are special to your state or country);
• Home photos (people are curious about your way of life);
• Laptop (school work, photos, etc.);
• First-aid kit (small travel kits available at most outdoor shops);
• Three copies of visa, passport, international insurance and vaccination record (carry one with you, pack one in your luggage, and leave one at home with trustworthy source);
• Two copies of emergency contact information sheet (take one with you and leave one at home);
• Travelers checks, credit card, ATM card (I found using ATMs to be the easiest for cash, but this varies by country. Also, remember most credit card companies charge an extra percentage of the total purchase price for purchases made in foreign countries.);
• Journal (You will be glad you maintained a written account of your experiences. Even if you are not accustomed to keeping a journal, I recommend you do so during your time abroad.); and
• Extra credit card for emergencies.

Recommendations
Regardless of how well one has prepared for their study abroad experience, mistakes can happen. It is better to learn from others’ mistakes, than to make them yourself. Following are some personal lessons learned from my study abroad experiences (Mexico).

1. Study a foreign language for at least two years before going abroad. Although most programs require only two semesters of foreign language training, I suggest studying the language for at least two years. Learning a foreign language is harder for some than others. Be it hard or easy, it is important to keep in mind that once you enter a country, you will be immersed in a completely new lifestyle without the comforts of home. Language and communication related problems are seen as one of the most difficult challenges for international students (Zhai, 2004), and having a strong grasp of the language will alleviate many communication difficulties, making the transition into a new culture much easier. It is amazing how hard the simplest task can be when you cannot understand what you are being told nor say what you would like to say.

2. Remember: it is not weird, it is different. For most people, their first response when they see, taste, or experience something different is to think that because it is not what they expected, it is weird. The truth is that it is only different. An international experience is a beneficial, worthwhile endeavor, and an open mind and positive attitude are two of the most important criteria for making the most of it (Tritz & Martin, 1997). Take advantage of your time in another country; learn as much as you can about a new culture, experience it, try new foods, travel, and keep an open mind.

3. Do not lose sight of your goals. Learning a foreign language can be very difficult. No matter how frustrated you get, do not give up. Keep in mind, however, there will be days when you do not want to hear or speak another word of the foreign language. This is normal. Spend a few hours each day speaking your
native language or take the whole day off. Listen to your favorite music; watch a movie in your native language; do something with those from your home country. Do not feel like you are wasting your time abroad by taking a break, but also never lose sight of the reason you chose to study abroad. Give yourself some time to relax and then continue learning.

4. Be careful what you eat and drink. When you first arrive, you may want to try every new food you see. Be careful! Gradually introduce new foods into your diet. Wash fruits and vegetables well and try to stay away from those you cannot peel or boil. Stay away from street food and if you are not sure the water is safe to drink, use only bottled water.

5. Spend time with host country students. Rather than spending all your time with students from your own country, make friends with host country students and spend quality time with them. Doing so will greatly improve your language skills and build lifelong friendships.

6. If possible, study abroad for a full year. By the end of the first semester, you most likely will have adjusted to a new culture, gained confidence in your communication skills, and established relationships with host country students and families. You will find yourself communicating more easily, find that you are able to absorb more information, and that you have more overall confidence as you continue with a second semester.

Summary

As America becomes more globalized, it is important for tomorrow’s leaders to have in-depth global knowledge and first-hand international experience; a study abroad program is an excellent way to achieve these qualities. International experiences foster cultural awareness, change perceptions, and garner a more worldly perspective (Tritz & Martin, 1997). They provide an opportunity for personal growth, offer students a chance to greatly improve their foreign language skills, and give them an added advantage over their fellow counterparts in the professional world.

Entering a foreign country and/or university can be an overwhelming life and cultural transition. Preparation aids students with cross-cultural adjustments and makes experiencing another culture more enjoyable resulting in a more rewarding study abroad program.

References


Editor’s Note: The following abstracts, listed by primary author’s last name, were derived from professional papers presented at the 23rd Annual AIAEE Conference. Complete papers are available online at http://www.aiaee.org/2007/index.html

Gender and Trends in Production Constraints among the Bambara People of Mali
Mercy Akeredolu, University of Mali
Chinagorom O. Asinobi, Imo State University
Ibiyemi Ilesanmi, Imo State University

The majority of the small scale farmers in the two ethnic Bambara villages of Mali involved in this study were women and they all faced particular farming constraints different from their male counterparts. The major constraints as rated by the women farmers are:

- Socio-cultural restrictions that make women almost invisible
- Rural-urban migration of youths and male household leaders
- Non-viability of village associations and professional groups due to their low level of formal education, numeracy and management skills.
- Heavier work load as compared to that of men farmers.
- Lack of improved inputs.
- Limited access to formal credit due to their poor literacy and group organisation.
- The poor demand for the products of their activities such as shea butter, vegetable production, and seasonal variations in supply and demand.
- Lack of production and marketing information.
- Lack of appropriate and affordable technology especially to save labour, energy, as well as to transform and store perishable produce, such as vegetables.
- Monotony of work and poor diversification
- Improved agricultural production activities not precisely directed at them.

Leadership Styles of International Agricultural Extension Agencies
Shannon Arnold, Courtney Meyers, and Nick Place, University of Florida

The purpose of this exploratory research was to discover the dominant styles of leadership international extension agencies use in the development and implementation of effective rural community development programs. Informal semi-structured group interviews were conducted with key leaders and representatives from various international agricultural extension agencies. The focus of the interviews was to determine how leadership is employed in international rural development programs and how it affects program development and implementation. Interview data, observations, and field notes were content analyzed based on raw data and personal interpretation. Results answered the following research questions: 1.) How does leadership affect international agricultural extension and rural community development? 2.) What leadership characteristics or skills are important for extension personnel when working in international rural development programs? 3.) What is the role of community leadership in developing sustainable rural extension programs? Themes regarding agencies’ approaches to leadership when working with rural community programs were created and a leadership profile was then developed to
describe the styles practiced by agency leaders in their approaches to international extension programming. The two dominant styles of leadership revealed were transformational and servant leadership. According to participants, rural populations and community structures ultimately define how extension must deliver its services. These particular leadership styles have proved successful in developing and implementing sustainable extension programs. Therefore, international extension agencies must continue to seek additional knowledge and training in areas of leadership to serve rural communities effectively in the future.

Reducing Conflict and Increasing Productivity within International Extension and Agricultural Teams Using Kirton’s Adaption-Innovation (KAI) Theory
Cheri Winton Brodeur, University of Florida

Advances in communication technology and other types of technology are leading to both an unprecedented increase in the size of organizations and in many cases to globalization of organizations. This phenomenon has led to issues related to complexity. One of the primary concerns related to complex organizations is linked to the failure of organizations because of ineffective problem solving. Failure frequently occurs when problem solvers are unable to see all the ramifications their solutions are likely to incur. For this reason knowledge teams are quickly replacing the traditional single leader or management team for problem solving purposes. Lewin (1943) warned that teams would become essential to problem solving and this time has arrived. It is teams who must provide the holistic range of knowledge and diversity necessary to effectively problem solve within a complex organization. A team’s ability to effectively problem solve is critical to organization survival. Unfortunately teams fail as often as they succeed often because of dissension. Millions of dollars have been spent in training to improve team cohesion without sustainable improvements in many cases. This paper looks at the need for changing theory which provides a better explanation as to how and why complex organizations are failing and why the need for cohesive teamwork. Covered is the cognitive (thinking) style theory that appears to be critical in improving teamwork success thus leading to more effective problem solving. Kirton’s Adaption-Innovation Theory, one of the bestthought out cognitive style theories, is explored.

Using a Market Segmentation Approach to Better Target Extension Programs – Aligning Learner Needs with Learning Programs
Margaret Brown and Denise Bewsell
AgResearch Ltd, New Zealand

Feed planning – assessing current pasture feed quantity and quality, predicting future pasture growth rates, and assessing the costs of feed production – had been identified as an area in which New Zealand sheep and beef farmers could improve practice. The industry body was keen to develop an extension program whereby sheep and beef farmers could update their knowledge in this area. To develop a program, a comprehensive understanding of learner needs and readiness for the learning was required. Market segmentation was used to inform the design of the program by gathering information about farmers’ current experience of feed planning and the type of learning experience that most appealed to them. A survey of sheep and beef farmers was used to identify three segments. Segment 1 (49% of respondents), were informal feed planners. Respondents in this segment gave no indication that they had any particular issues that might require them to feed plan more formally. Segment 2 (29% of respondents), were also informal feed planners; however these respondents indicated there were a range of reasons for this. Segment 3 (22% of respondents), had formal feed plans and were consistently more likely to monitor and measure pasture growth. Key challenges were identified for an industry driven
extension program. We conclude that using market segmentation as a tool to assist in the
development of a learning program firmly centered on the needs of the learner helped us to better
balance individual requirements with industry demand in the planning of an agricultural learning
program.

Extension, Technology, and Client Constraints in Hybrid Rice Technology as Perceived by
Farmers and Extension Agents in the Philippines
Dario A. Cidro, Philippine Rice Research Institute
Rama B. Radhakrishna, Penn State University

Rice is the main staple food for 75% of the population in the Philippines. The Hybrid Rice
Program was initiated in 1998 to improve rice production. Over the years, the Philippines has
made tremendous growth in rice production and productivity through its Hybrid Rice Program
(HRP). The promotion of hybrid rice is a challenging and time consuming task. Besides
increasing population and other production factors, the hybrid rice technology is characterized by
problems and constraints. This study examined constraints)—extension, technology, and client--
in the promotion of hybrid rice technology as perceived by extension agents and farmers in the
Isabela province. A random sample of 257 farmers and 132 extension agents responded to a
three- section survey instrument. Data was collected by personal interview method. The major
technology constraints were: cost of pesticide, cost of labor, pests and disease problems, cost of
fertilizer, and availability of educational materials. The extension constraints perceived by both
groups were: lack of transportation, inadequate number of extension workers to carry out hybrid
rice promotion work, and availability of teaching aids to teach farmers. Availability of credit for
rice production and cost of inputs were identified as client constraints. Overall, when all the 45
constraints were examined, significant differences were found between extension agents and
farmers for 25 constraints. Interestingly, extension agents perceived these 25 constraints
significantly higher than farmers.

Adequacy of Entrepreneurial Training Provided to Students by the College of Agriculture
at the University of Swaziland
Barnabas M. Dlamini and Marietta P. Dlamini, University of Swaziland
Fikile Mdluli, Ministry of Education, Swaziland

A descriptive relational study was designed to describe the level of adequacy of the
entrepreneurial knowledge and skills taught to students by the College of Agriculture at the
University of Swaziland, and to identify the characteristics that explain and predict students’
perceptions toward entrepreneurship. Results revealed adequate provision of entrepreneurial
training by the College of Agriculture. Results also revealed negligible to substantial association
between students’ perceptions toward entrepreneurship and selected characteristics, as well as
among student characteristics. The characteristics found to explain and predict variance in the
dependent variable, students’ perceptions toward entrepreneurship, were attitudes, running a
business currently, and number of employment sites. Conclusion was that the College of
Agriculture at the University of Swaziland should continue making adequate curriculum
provisions in terms of content and number of courses offered. Implications of the findings
therefore, are that, graduates should be aware of the business environment conditions that are
being made supportive of, or challenging entrepreneurship, and they should be ready for the
social obligations that are associated with operating a business.
Educational Reforms and Career Choice in Agriculture: Implications for Workforce Development in Ghana
Proper Kwesi Doamekpor, Connie D. Baggett, and Ahmed K. Banya, Penn State
William Amexo, The West African Examinations Council, Accra, Ghana

Educational reforms in Ghana were part of the Economic Recovery Program undertaken to restore the country’s old system of education and raise the hopes of the Ghanaian citizenry after a long economic decline. Among the reasons for the reforms were to improve teaching and learning efficiency and effectiveness by increasing school hours and the quality of teachers, including the phasing out untrained teachers, and to make education more relevant by increasing the attention paid to problem solving, environmental concerns, prevocational training, manual dexterity, and general skills training. This paper explores some achievements made with regards to senior secondary school education enrollments in agricultural science. A review of some problems that were encountered prior to the nationwide implementation of the reforms is discussed. This study employs a mixed methods design. Primary and secondary data were used to analyze trends in the enrollment of final year candidates in agricultural science for the period (1999 – 2006). The findings of the trend analysis of final year agricultural science school candidates for the senior secondary school certificate examinations (SSSCE) are reported. These preliminary results were complemented with qualitative data from key informants in the education sector as a follow-up. Results indicate low enrollment of students in forestry and fisheries. Currently, only one secondary school offers fisheries and two secondary schools offer forestry in Ghana. It is speculated that there are no job prospects for students enrolled in these subjects. Further inquiries to ascertain the lack of interest in these subjects are underway.

Rebuild a New Agricultural Education System: Based on the Actuality and Issues of the Agricultural Education in Contemporary China
Penghui Dou, Northwest A&F University, Yangling, Shaanxi Province, China
Roger Tormoehlen, Purdue University

As China’s economy and society evolves through science innovations and educational reform, China’s government is developing and implementing new strategies to build an innovation-oriented country. Since 1985, human resource development and education have been emphasized as the essential factors for building an innovation-oriented country. With an understanding of the need for a strong basic educational system, tremendous change has occurred in rural education, vocational & technical education and high agricultural education. However, challenges still exist within the contemporary agricultural education system. This paper focuses on six issues with the current agricultural education system. Utilizing investigative methodologies this paper presents an analysis of the current educational situation in China and proposes a new agricultural education system.

Social Attitudes of Native American and Non-Native American Water Right Owners in the Walker River Basin of Western Nevada
Staci Emm, Don Breazeale, and Marilyn Smith
University of Nevada Cooperative Extension

Policy makers and individual water right owners need to understand the differences and similarities involving lifestyles, customs, and cultures within given communities affected by water use. The demand for water is constantly increasing and conflict arises based upon who should have the right of use. Research suggests that water policy is not only science based, but is
significantly impacted by social-economics. The Walker River in Nevada faces the same situation as other rivers in the American west with the Walker River Indian Reservation at the terminus of the system, which ends in one of the nation’s desert terminal lakes. This study sought to provide insight and direction to those individuals, government entities and agencies currently dealing with the basin’s water needs and to help them as they struggle for consensus on this difficult issue. This study identified similarities and differences between Native American and Non-Native American populations despite years of conflict. While there are still several issues where clear differences were reported, there were also several areas where agreement was reported. The challenge for policy makers is to take the information and see if possible solutions can be reached.

Assessing the Impact of Farmer Field School Participation on IPM Adoption in Uganda
J. Mark Erbaugh and Joseph Donnermeyer
The Ohio State University
Magdalene Amujal, Makerere University

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 apt to adopt components 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.

Shaping a Keystone Undergraduate Course in International Agriculture
Arlen Etling, James Partridge, Rachel Hustedt, and Charlene Kastanek
University of Nebraska-Lincoln

This case study describes the development of a “keystone” course in international agriculture for undergraduates. Specific objectives are to describe: 1) the course background and the process used to redesign it; 2) curricular revisions made; 3) evaluations, and 4) recommendations to others who teach or develop similar courses. Program planning and curriculum development approaches were used to redesign an existing course. The content was updated and diverse “graded activities” were organized. Innovative graded activities included problem solving reports on international issues, a country briefing portfolio, a debate on controversial issues by students representing different countries’ points of view, a class text built during the course by students for use ten years into the future, and a take-home essay on “my world view” in place of a final exam. Evaluations over a four year period indicate that curriculum revisions improved the course. An experimental instrument to document changes in students’ attitudes was developed and used. Recommendations were made for planning, updating and managing such a course.
Social Capital and Ability to Change among Indian Farmers
N. R. Gangadharappa, Bangalore, Karnataka, India
David G. Acker, Iowa State University
P. G. Chengappa, S. Ganesamoorthi, Sunil Kumar, and M. V. Sajeev, UAS, Bangalore, India
Difei Shen, Iowa State University

Vulnerable individuals and communities often tend to be impoverished. Social capital building approaches are increasingly used in poverty alleviation programs. A social capital orientation in rural development can help transform people into active citizens by adopting a bottom-up approach, influencing the ability of individuals and groups to cooperate in taking advantage of emerging opportunities. This study was undertaken to analyze the existing social capital status in two villages of Bangalore rural district of Karnataka state, India, as a prerequisite for developing extension strategies that promote sustainable rural livelihoods. An ex-post-facto cause to effect design was used. A Participatory Rural Appraisal ascertained that the level of poverty and vulnerability were significant in both villages. Most of the 120 farmers surveyed belonged to the medium investment category and a vast majority (78.3%) had medium social capital status. Six variables—level of education, area under agriculture, annual investment in agriculture, long-term investment in agriculture, cosmopolitaness, and mass media usage—had a positive and significant relationship, whereas three variables—area under agriculture, long-term investment in agriculture, and cosmopolitaness—collectively explained 37.2% of the variation in social capital between the groups. Stepwise regression analysis yielded four models explaining only 32.1% of the variation in social capital. The results suggest a need for further research to identify other variables that help to explain social capital status. However, understanding some of the dynamics in social capital formation can help rural development leaders working in these villages to design better extension interventions.

Organizational and Leadership Development: A Case Study of Three Coffee Cooperatives in Rwanda
Samuel Goff, James R. Lindner, and Kim E. Dooley, Texas A&M University

Rwanda’s growth has been hindered by insufficient investments in agricultural enterprises and education. In 2001, USAID funded the Partnership for Enhancing Agriculture in Rwanda through Linkages (PEARL). The project centered its efforts on strengthening the coffee sector and improving the human resources of producer cooperatives. PEARL assisted Rwandan coffee producers to form cooperatives focused on production for the specialty coffee market. This study was conducted to assess the perceptions of three coffee cooperatives’ board of directors, management, and membership regarding their cooperative’s organizational and leadership development. Research objectives include perceptions on decision-making processes, conflict resolution, job descriptions, the training of members for leadership positions, strategic planning, and the imminent development of a national federation of coffee cooperatives. The research instruments included a quantitative, close-ended category-scale questionnaire and a qualitative, open-ended interview using standardized questions. A case study data analysis methodology was used to combine the responses to the quantitative and qualitative methods. A sample of 65 participants was chosen for the study. The vast majority (>75%) of the respondents believed that decision-making is equitable. Likewise, (>85%) of the participants perceived that the board of directors and management know how to help members resolve conflicts. Moreover, it is widely believed (>87%) that conflict resolution should be handled by the overall leadership rather than at the sector level. The employees of Cooperative 1 lack job descriptions. All of the cooperatives
would greatly benefit from a program for developing new leaders, strategic planning, and increased communication on the emerging national coffee federation.

Benefits and Barriers: Faculty International Professional Development
Emily Hand, Kristina G. Ricketts, and Thomas H. Bruening, The Pennsylvania State University

The salience of international experiences within today’s education is obvious and apparent. International experiences can help prepare students to live and work in an increasingly global society (NASULGC, 2004). It has been found that faculty members who themselves participate in international exchanges are much more likely to incorporate similar experiences into their curriculum. The focus of this study was to examine faculty development as a result of participation in the National Security Education Program (NSEP) in Russia and/or Ukraine. The objectives of the study were twofold: 1) to explain the faculty professional growth that occurred during or as a direct result of participation in the program, and 2) to identify the barriers that prevent or hinder faculty participation in this and similar programs. In-depth interviews with former NSEP participants confirmed researcher hypotheses. Professional growth of participating faculty included improved teaching techniques, increased integration of international examples, and a heightened global perspective. Faculty-perceived student benefits included a more diverse viewpoint on world events, improved interpersonal interactions, and increased post-graduation employability. Barriers focused around cost or resources required and time commitment. In conclusion, international faculty experiences have enormous potential for both faculty development, and the development of students with whom they interact.

Going Global: Developing Research Partnerships between Texas A&M University and the Universidad Autónoma de Nuevo León
Amy Harder, Gary Wingenbach, and Manda Rosser, Texas A&M University

Developing international partnerships is increasingly important for university researchers in the 21st century. A qualitative study was conducted to explore the factors affecting faculty and student involvement in a collaborative project between Texas A&M University, U.S.A. and the Universidad Autónoma de Nuevo León, Mexico. Factors were found to cluster under the major themes of (a) research and programmatic opportunities, (b) communication, (c) international experience, and (d) student opportunities. Communication can be a significant barrier to participation in international collaborations, but faculty and students should be encouraged to pursue such experiences due to their many benefits.

Challenges of Communicating Indigenous Knowledge within Guarani-Kaiowa and Terena Communities: A Brazilian Case Study
Wilmara Correa Harder and Thomas H. Bruening
The Pennsylvania State University

The Mato Grosso do Sul State in Brazil is home to 48 Indian reservations. An estimated population of 35,000 indigenous people from 11 ethnic groups lived in these areas. The purpose of this study was to determine the challenges of communicating local agricultural knowledge between generations within two indigenous communities in Dourados, MS, Brazil. The objectives were to 1) identify communication processes that older populations use in passing agricultural knowledge to younger generations and 2) identify strategies that could help sustain agricultural knowledge within Caiowa and Terena Communities. Twelve respondents were selected using the snow-ball approach. Although respondents in both of the Guarani-Kaiowa and
Terena communities value the importance of transferring agricultural knowledge from one generation to another, there is no systematic communication channel in place that could reinforce this indigenous knowledge transfer. Formal education in the village tends to focus on Portuguese language skills and mathematics and there is little emphasis on indigenous agricultural practices. In addition, older generation adults suggest that it is becoming more difficult to transfer agricultural knowledge to younger generations. There is a need to conserve indigenous knowledge but also to educate Guarani-Kaiowas and Terena Indians on new agricultural techniques thus the quality of life can be improved.

Integrating Cultural Patterns in International Extension Efforts
Marta M. Hartmann, University of Florida

This paper advances a strategy to enable Extension systems to effectively address changes in the cultural profile of its current and/or potential Extension audiences. The components of the proposed strategy are pertinent to Extension efforts in both, the rapidly increasing multicultural U.S. society and in an international context. First, Extension needs to acknowledge, adapt to, and integrate the culture-specific demographic characteristics of their clientele. These characteristics which include age, race, ethnic background, gender, religion, and family structure, among others, need to be considered from a cultural or ethnic group-specific perspective. Another component of the proposed strategy is that Extension must acknowledge, adapt to, and integrate the culture-specific patterns that constitute the personal and social realities of target audiences. This strategy considers a more anthropological evaluation of the audience including its cultural identity, time orientation, perceptions of self and community, communication patterns, learning styles, thinking patterns, cosmology, and problem-solving approaches for example. Finally, for Extension systems to be effective in the new millennium, they should determine and consider the target audience’s degree of acculturation and assimilation in the mainstream society. Considerations in the acculturation assessment include the information on the length of time the target audience has resided in the host country; how often and with whom does the target clientele socialize outside the community; and what percentages of the target population are traditional, marginal, bicultural, and fully acculturated and assimilated into the mainstream culture. It is recommended that this Extension strategy be carefully considered by Extension leaders domestically and internationally.

Leadership, Entrepreneurship, and Vision: The Case of the Women’s Association of Farmers in Stragari, Central Serbia
Alexandria I. Huerta, Mark A. Balschweid, and Roger Tormoehlen, Purdue University

The purpose of this qualitative study was to examine the community leadership role taken by the Women’s Association of Stragari, Central Serbia, and its subsequent impact on the economic development of the region. Due in part to its turbulent past, the population of Serbia, most especially its rural population, had to forge a new path in the country’s post-conflict transition economy. Unemployment is a major problem in Serbia, but it has had an even greater impact on women. The Association was created out of a need to address the challenges faced by the community of Stragari. Data were collected during a focus group meeting with members of the Association involved in the agricultural production, marketing, and sales of its organic products. The Women’s Association of Stragari has helped to revitalize a dying rural community. Membership in the Association increases yearly, with both men and women joining the Association with the aim to improve their livelihoods and have gainful employment. What started out as a small local venture has gained national and international recognition.
Significance of Attitude as a Determinant of Agricultural Extension Agents’ Motivation for Delivering Conservation Tillage Programs: Directions for Planning In-service Training

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Julia W. Gaskin and R. Dewey Lee
University of Georgia
D. Wayne Reeves, USDA ARS
Gary Hawkins, University of Georgia

Conservation tillage systems are promoted in many parts of the world to help achieve environmental sustainability in agriculture. In-service training programs are used to educate extension agents as means to diffuse conservation tillage practices. However, changing extension agents’ attitudes is a commonly overlooked factor in planning in-service training programs. Exploring the significance of attitude in conservation tillage systems in-service training is the focus of this study. The target population for this study included all agricultural and natural resource (ANR) extension agents in Georgia. This study received 62.3% response rate. Findings indicate that the agricultural extension agents have favorable attitudes towards conservation tillage systems and have fairly high level of motivation in delivering conservation tillage extension programs. Their level of motivation varies with levels of education and extension experience. Partial correlation analysis confirmed that there was a positive significant correlation between extension agents’ knowledge and their motivation to present conservation tillage programs. However, there was an even stronger positive correlation between extension agents’ attitudes and their motivation to present conservation tillage systems programs. This finding indicates that changing attitude is as important as changing knowledge for motivating extension agents to deliver conservation tillage systems training programs. Therefore, it is important to focus on attitude as an important training factor in planning in-service training programs.

Perceived Needs and Barriers of Rwandan Rural Women to Participate in Agricultural Extension Services

Olive M. Kemirembe, Penn State
Frank Brewer and Dave Krueger
Michigan State University

The purpose of this study was to determine perceived needs and barriers of Rwandan rural women to participate in Extension services in Gikongoro province, Rwanda. Data were collected from a sample of 120 rural women farmers using face-to-face interviews. Results of this study indicated that rural women’s immediate needs were farm inputs and farm tools and the long-term needs were agricultural loans, income generating activities and extension trainings. The strongest barriers of rural women to participate in extension services were low education level, time constraints, lack of information, transportation, and little land. Results from this study suggest several recommendations for enhancing extension programs for rural women in Rwanda. First, the Ministry of Agriculture must develop policies that provide rural women with access to agricultural inputs and tools, loans, information, free education and transportation. Second, creating associations’ for women to more easily reach extension agents. Third, increase resources and in-service trainings to extension agents so that they can effectively reach women farmers.
Community-Based Ecotourism Design Studio in the Yucatan Peninsula–Enhancing Study Abroad through the Inclusion of a Service-Learning Component
Charles Klein, ASLA, David Lawver, and Chad Davis, Texas Tech University

The benefits of study abroad programs in higher education are well documented. Lewis and Niesenbaum (2005) concluded that by incorporating a Service-Learning component, a short-term study abroad program can be greatly enhanced. The purpose of the paper is to document the preliminary results from an on-going research study to determine the benefits of incorporating a Service-Learning component into a study abroad program. A qualitative, rather than quantitative approach was used in the evaluation process. The research involves a course in community-based ecotourism for landscape architecture students from Texas Tech University. It includes three weeks of travel to historic, cultural and environmental venues and a Service-Learning design studio project for rural Mayan villages. Students keep journals as part of the Service-Learning reflection activities that are later analyzed utilizing the qualitative techniques described by Boyd, Dooley and Felton (2006) to determine patterns or themes of students’ interest or concern. The writing was further analyzed within The Taxonomy of the Affective Domain (Krathwohl, 1964) to document the level at which the students were reflecting on their experience. The results indicate an increased level of affective learning among a majority of the students. Incorporating Service-Learning activities into a study abroad program provides an exciting opportunity for students to go beyond the traditional international educational experience. It enhances learning by providing an opportunity to interact and participate, rather than simply observe. Therefore, many students who are unable to participate in a long-term program can receive similar benefits from a short-term setting.

Culture and Leadership in a Cross-Cultural Environment: A Case Study
John Klem, Minneapolis, Minnesota

There is a growing awareness of the role that culture plays in the success or failure of international projects. However, an awareness of the importance of culture does not necessarily provide one with the tools needed to work effectively in cross-cultural situations. This paper looks at the role of cultural values in the experiences of a group of US Peace Corps volunteers working in the Farmers’ Training Centers of Lesotho. The Ministry of Agriculture operates these Centers as a training resource for providing extension services to rural farmers in this mountainous nation. However, after changes in the national economy and political systems, these Centers suffered years of administrative neglect. These seven volunteers were assigned as Management Advisors to four FTCs as part of a national effort to reinvigorate these Centers. This group of Advisors was responsible to work with local staff to improve the management, facilities and model farm at these Centers. The author summarizes Frons Trompenaars and Charles Hampden-Turner’s model of seven cultural value continua developed for corporate managers in cross-cultural situations. Using this model as a lens, the author selected three of the continua and explores how differences in values led to predictable areas of conflict that limited the efficacy of the Advisors in engaging their counterparts or improving management practices. Based on this discussion, the author provides some recommendations for being more successful in navigating differences in cultural values.
Re-purposing the Livelihoods of Afghani Farmers: An Examination of Licit Alternatives to Producing Opium Poppy  
Timothy K. Kock and M. Craig Edwards  
Oklahoma State University

As Afghanistan changes and its society and government moves forward, its agricultural sector must remain economically viable to support that progress. Afghani farmers are facing many issues, including challenges that were intensified during the Taliban regime. Poverty has become all too familiar to rural Afghans forcing many to look at alternatives for income generation. In the northern region of Afghanistan, infrastructure is non-existent; roads, electricity, and clean water are often very limited, thus forcing farmers to consider other crops that need little or none of these resources. Although it is against Islamic law, the growing of opium poppy flourishes in this environment and generates incomes well beyond those of licit crops. This paper describes a program designed to help farmers produce licit crops as an alternative to opium poppy production. The Agricultural Marketing and Production Support (AMPS) program described was a vegetable production and support program designed to respond to a market-driven economy. The vegetables grown had high market value, either fresh sales or processed, and transport availability. As a result of participating in the program, it was hoped that farmers’ incomes would increase, therefore, making them less likely to produce illicit crops such as opium poppy. This paper outlines factors addressed by the AMPS program and results derived from its implementation in northern Afghanistan during 2006. Findings from this study may have implications for similar programs in other developing countries, especially in nations that also may be struggling to reduce the production of illicit crops by their farmers.

Attitudes and Perceptions of Students Participating in a Study Abroad Field Trip as Related to Human Dimensions in International Agricultural Development  
David E. Lawver, Texas Tech University  
Ricardo Abel Soto-Cruz  
Universidad Autónoma de Chihuahua  
Charles Klein and Chad Davis  
Texas Tech University

The benefits of study abroad programs in higher education are well documented. The purpose of the paper is to document and report experiences and gains in global awareness of graduate students in a College of Agriculture who participate in a graduate course focusing on human dimension in international agricultural development. A qualitative approach was used in the evaluation process. The research involves a course in call Human Dimension in International Agricultural Development for graduate students at Texas Tech University. It includes a week long field trip to historic, cultural and environmental venues in the state of Chihuahua, Mexico. Students keep journals before, during, and immediately following the field trip. Entries prior to the field trip dealt with prereflective issues, entries during the field trip were of daily observations, and entries following the field trip were to illustrate the most poignant impressions as a result of this international experience. The researchers identified five pervasive themes within the prefection portion of the student journals. These themes were termed; 1) anticipation, 2) cultural observations, 3) agricultural practices, 4) language barrier, and 5) safety. The pervasive themes identified in the daily journal portions were; 1) travel log, 2) curriculum-based issues, 3) language issues, and 4) cultural observations. In the reflection portion of the student journals, students wrote primarily about; 1) cultural observations, 2) appreciation of their home, and 3) the privileges associated with living in the U.S.
Land redistribution is one of the three pillars of the land reform program of South Africa. The program transferred agricultural land privately owned by commercial farmers to subsistence farmers operating communal land. Entrant farmers became co-owners of farm property. Group interviews were conducted in 13 farms in Capricorn district and unstructured participant observations complemented structured data collection methods. The study sought to investigate the extent to which beneficiaries of the farms have over time moved to adopt institutional arrangements that were introduced during land settlement. The study revealed that the pro-innovation bias in the diffusion of the program resulted in consequences that were neither anticipated nor intended. Discrepancies between the ideals of land redistribution and experiences on the farms include high turnover rates among beneficiaries, whereas the adoption of institutional arrangements has been limited. Different patterns of participation in group activities, membership to the groups as well as land use rights have evolved over time.

**Strengthening the Links between Programs of Technology Transfer and Indigenous Knowledge Systems**

Maria Navarro, The University of Georgia

Many programs of technology development and technology transfer have failed – and continue to fail – because change agents do not fully understand and embrace the fundamental role that Indigenous Knowledge Systems play in the lives of people and their environment. Some of the most critical factors affecting this process are: 1) change agents’ (creative) struggle to successfully link Indigenous Knowledge Systems with science, technology, economic, communication, organizational, political, and infrastructure considerations, 2) the complexity and dynamic nature of Indigenous Knowledge and the lack of systematic records, and 3) ethical concerns and intellectual property rights issues. The paper presents examples and discusses several strategies to help change agents better analyze the realities and dynamics of the change process, and better achieve complementarity, synergy, interdependence, interaction, and collaboration among various stakeholders in the development process. Some of the key strategies include: Moving from a transfer of knowledge framework to a co-creation of knowledge framework; facilitating social and experiential learning; building interdisciplinary teams that include social scientists; giving farmers a central role in agricultural innovation processes; enhancing trust relationships; using participatory methods; recognizing appropriate criteria to judge the truth value, applicability, consistency, and neutrality of both naturalistic and quantitative processes (Lincoln and Guba, 1985); and engaging in sound program development (including analysis of situation, priority setting, design and implementation, and evaluation).

**Toward a More Student-Centered Education: Analyzing the Value of Participatory Development Methods in College Teaching**

Maria Navarro, The University of Georgia

Many college educators are shifting from teacher-centered to student-centered instruction. Some strategies used are inquiry-based activities, case studies, discussions, project evaluations, and peer learning. Participatory development methods, tools, and techniques are increasingly used in
international development work to assure local and grass-roots initiation, design, implementation, evaluation, and ownership of development programs. A tacit assumption is that a participatory process is more likely to yield a successful and sustainable program, for it starts with the people’s needs, mobilizes local resources, and strengthens local capacity. Thus, participatory processes have been designed to bring out the best of each individual, facilitate exchange of ideas and collaboration, and result in a much better product than any one team member could have produced alone. The purpose of this paper is to discuss the potential of participatory development methods in supporting the shift from a teacher-centered to a student-centered learning environment in higher education. In particular, three participatory methods are analyzed in-depth: Mind maps, problem tree diagrams (causes, effects, and solutions), and pocket charts (score matrix). In most occasions, the three methods can be used as excellent tools to 1) enhance group processes and cooperative learning, 2) promote active learning, 3) nurture multidisciplinary analysis, 4) improve student motivation, initiative, and individual work prior to class meetings, 5) promote student development of higher order thinking skills, and 6) address the needs of particular students who would typically not participate in traditionally-designed group exercises. An application example is given at the end of the paper.

New Knowledge of Facilities and Practises on Irish Dairy Farms – Fundamental Requirements for Effective Extension
Bernadette O’Brien and David Gleeson
Teagasc, Ireland
Dermot J. Ruane and Jim Kinsella
University College Dublin, Ireland
Kevin O’Donovan, Teagasc, Ireland

Investment in labour is a significant limiting factor to expansion so it is crucial to research technical issues that would reduce labour/cost requirements. The purpose of this study was to establish the profile of dairy farms of various sizes with regard to facilities and practises and to identify labour saving techniques. Data on farm facilities and practices were recorded though a series of one-off questionnaire surveys. These surveys investigated facilities and practices associated with the milking process, grassland management, farm fragmentation and calf care. Data analysis was carried out using chi-square analysis. Herd-size group had a significant effect on the number of cows per milking unit with the number of cows milked per unit being higher on large compared to both medium and small farms (P<0.05). Herd-size group had a significant effect on fragmentation (P<0.05) with the grazing area in one block on 73% of small farms compared to 37% of large farms. Herd-size group had a significant effect on the methods used to transfer milk to young calves (P<0.05) and the type of milk consumed by older calves (P<0.05). Twenty-seven percent of large farms pumped milk to the calf house compared to 3% of small farms. Superior facilities and practices found on large farms illustrated a greater ability on these farms to invest capital. However, fragmentation of dairy farms represents a serious impediment to expansion, given the inaccessibility of the milking parlour in many cases and/or the labour associated with transfer of cows for milking.
Perceptions and Assessments of Georgian Agricultural Education Teachers Who Participated in a Professional Development Seminar in 2006

Brian Parr, The University of Georgia
M. Craig Edwards, Oklahoma State University
Dennis W. Duncan, The University of Georgia

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

A Farm Safety Model for Irish Farms

James Phelan, Dermot J. Ruane, and Anne Finnegan, University College Dublin

While farming in Ireland accounts for 6% of the workforce, statistics illustrate that farming accounts for on average one third of workplace fatalities in Ireland. In total, 179 people have lost their lives on Irish farms over the last ten years. For every fatal accident that occurs on farms, many more non-fatal accidents occur resulting in injuries of varying severity. The statistics portray an image of a sector, which has a significant health and safety problem. It is also a sector in the Irish economy in which very little research in health and safety has been undertaken. Several models of health and safety on farms have been put forward over the years from a range of disciplines, while each model has elements that apply to farm safety in Ireland, none are complete. The aim of this paper is to develop and present an Irish Farm Safety Model, particularly oriented towards farm safety at farm level in Ireland. The research establishes that there is a dynamic relationship between people, the environment and technology in farming which is fundamental to health and safety on the farm. It also concludes that stress and the broader environment are influencing factors. The Irish Farm Safety Model (IFSM) provides an understanding of the factors which impact on farm safety through farmer, farm environment and farm technology interactions. It therefore suggests that a trichotomous rather than a dichotomous model is best in explaining farm safety in the Irish situation.
Tehran Citizens' Satisfaction of Services Offered by Fruit and Vegetable Markets
Affiliated to the City's Municipality
Gholamreza Pezeshki Raad
Tarbiat Modares University, Tehran, Iran
Naser Zamani, University of Tehran
Rama B Radhakrishna, Penn State

A good understanding of who extension audiences are and what their needs, behaviors and their level of satisfaction of extension programs are critical to any extension programs’ success. This study focused on Tehran citizens’ satisfaction of services offered by fruit and vegetable markets affiliated to Tehran’s city municipality. Five different aspects of customer satisfaction—market situation, produce quality, produce prices, behavior and treatment by sellers, and quality of services—were examined. Study population included all municipality fruit and vegetable markets’ customers (N=360000), of them 1450 persons were chosen using systematic sampling procedures. Data was gathered via the use of a three-part questionnaire. Thirty-seven statements/questions were developed to measure the level of customer satisfaction. Customers reported highest level of satisfaction for the statements, “having price labels on crops” and “giving receipt,” and lowest level of satisfaction for the statements: “sorting quality” and “selling crops based on customer’s demands.” Significant, negative relationships were found between citizens’ age, school years, and their total satisfaction. Significant, positive relationship was found between respondents’ “frequency of buying weekly” and their total satisfaction. Findings of this study have implications for developing extension programs in the area of post harvest technology and other activities to relative to customer satisfaction.

Labour-use Efficiency Studies on Suckler Beef Farms—Some Continuing Specialist Roles for Extension
Dermot J. Ruane, University College Dublin
Richard Fallon, Teagasc, Ireland
Hazel Leahy, University College Dublin
Edward O’Riordan, Teagasc, Ireland

There has been an outflow of farm family labour into off-farm employment giving rise to labour shortages on Irish suckler beef farms. Over a 12 month period, data were collected from 115 predominantly spring-calving suckler beef (cow-calf) farms, average herd size 54 cows (range 21-195 cows). Seven principle tasks were identified. Task duration, length of working day and other discretionary time-uses were recorded. Tasks classified as Animal Husbandry and Feeding were the most labour demanding activities within the suckler enterprise. Farms had other enterprises that were labour-demanding at critical periods to the suckling enterprise. Seven principle task categories were identified. Task duration, length of working day and other discretionary time-uses were recorded. The results showed that the net average labour input was 9.9 hours per farm per day (h/f/d) (s.d. 3.41) with a labour peak and base labour input of 11.5 h/f/d (s.d. 4.30) and 8.3 (s.d. 3.56) h/f/d in March and December respectively. The net time spent working with the suckler herd was highest and lowest in July and January respectively. Farm buildings and facilities required modernisation. Farm fragmentation and herd management strategies were important factors impacting on labour input into the suckling enterprise. Large variation in net labour input in the suckler beef enterprise suggests farmers may be best assisted through individual case studies. Educators need to be fully aware of the labour demand placed upon farmers when strategies...
Strengthening Sustainable Agriculture Practices on American Indian Lands in the Western United States
Loretta Singletary and Staci Emm
University of Nevada Cooperative Extension

This paper presents the preliminary results of the analyses of primary data collected between 2005 and 2006, from American Indian producers, tribal leaders and agriculture professionals working on reservations in Nevada, Washington, Oregon and Idaho. The purpose of collecting and analyzing these data is to provide insight into perceptual differences regarding quality of life issues on American Indian reservations in the western United States. Perceptions of quality of life issues are compared between American Indians who live on reservations and agriculture professionals who work with American Indian producers and tribal officials on reservations. The short-term goal is to identify perceptual differences that may impede the efficacy of agriculture professionals to work with American Indian producers. The middle-term goal is the utilize the results of this applied research to develop a Western Region Sustainable Agriculture Research and Education (SARE) training program that targets the educational needs of agriculture professionals who work on reservations with the long-term goal to strengthen sustainable agriculture practices on reservation lands.

Transforming Higher Agricultural Education in Egypt: Strategy, Approach and Results
Burton E. Swanson, University of Illinois
R. Kirby Barrick, University of Florida
Mohamed M. Samy, University of Illinois

Faculties of Agriculture in many developing countries face serious challenges in keeping their academic programs up-to-date and linked to the human resource needs of the agricultural sector. In many cases, faculty members have limited opportunities to conduct research, and linkages with the private sector may be weak, so academic programs are not effective in preparing students for technical and managerial jobs within agribusiness firms. This paper describes a strategy being implemented in collaboration with five universities in Upper Egypt to transform their academic programs and to bring specific institutional changes that would strengthen linkage between these universities and private sector firms and commercial farms. The project began with a skill-gap analysis to identify the specific needs of private sector employers and weaknesses in current academic programs. Based on this analysis, the first step was to introduce active teaching-learning methods to faculty members to enhance the development of higher level cognitive skills needed by private sector employers, including critical thinking, problem-solving and decision-making skills. Through specific course and faculty development activities, it was possible to update the content of “core” courses being taken by all agriculture students. Next, based on a strategic planning exercise carried out by academic and private sector leaders, universities organized external advisory committees and internship programs, as well as career resource and extension-outreach centers. Two independent reviews verified that these activities had successfully transformed these academic programs and that most faculty members had updated their courses and were now using active teaching-learning methods.
Introducing Active Teaching-Learning Methods and Materials into Egyptian Agricultural Technical Secondary Schools
Burton E. Swanson, University of Illinois
Jamie Cano, The Ohio State University
Mohamed M. Samy, University of Illinois
James W. Hynes, Sam Houston State University
Benjamin Swan, University of Idaho

This paper summarizes activities undertaken by teacher-educators from several U.S. Land Grant Universities to introduce active teaching-learning methods and materials into 25 agricultural technical (secondary) schools (ATSs) in Upper Egypt. The goal of the project was to transform the cognitive and psychomotor skills being taught in these schools from knowledge recall and comprehension to higher-level cognitive skills, including problem-solving, critical thinking and decision-making, as well as practical skill training. Each of the seven steps taken to implement this pilot project are summarized and discussed. This project is educationally significant because vocational agriculture education programs have been neglected in most developing countries; also, most international donor agencies allocate the majority of their educational resources to strengthening basic education. As a result, this effort to pilot-test and validate how vocational agricultural education programs in these ATSs can be strengthened has considerable educational significance, not only in outlining a methodology for strengthening the remaining 105 ATSs in Egypt, but also in outlining a strategy and approach that could be used to strengthen vocational agricultural education programs in other developing countries.

Internationalizing Extension with Stakeholder Training Meetings Use of a Distance Diagnostic Information System and Interactive Video
Pete Vergot III, and Tim Momol
University of Florida IFAS Extension

The International Plant Diagnostic Network (IPDN) was developed to assist in food safety and the protection of crops for citizens of the United States of America and international host countries. IPDN used the model of a system of diagnosing plant problems and information sharing. This model was developed among the Land Grant Universities in the United States as part of the “Homeland Security” response to develop strategies to crop biosecurity for the producers of the U.S. Early activities of the IPDN plan included a stakeholder meeting and training session of increasing communications and plant pathogen diagnostic tools in Western Africa. To train the stakeholders on communications and digital diagnostics a hands-on four day training was offered in collaboration with the International Institute of Tropical Agriculture (IITA) located in Benin, of Western Africa. The agenda included seminars, discussion, workshops for practicing new techniques and laboratory training on scientific techniques for 47 participants from 32 NGOs, Research and Extension departments located in 13 countries of Benin, Burkina, Faso, Cameroon, Cote D’Ivoire, Ghana, Guinea, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. During the stakeholder meeting, participants gained knowledge and skills of using a Distance Diagnostic Information System (DDIS) and the use of web-based interactive video to communicate across countries. This paper will focus on the Distance Diagnostic Information System (DDIS) and the use of web-based interactive video to increase communications for the West African Plant Diagnostic Network (WAPDN), across Western Africa and Land Grant Universities in the United States.
**Farmers’ Perceptions and Adoption of a ‘Push-Pull’ Technology for Control of Cereal Stemborers and Striga Weed in Western Kenya**

J. W. Wanyama, Kenya Agricultural Research Institute, Kitale, Kenya  
J. A. Pickett, Rothamsted Research, UK

Stemborers and striga weed are major constraints to production of cereals in sub-Saharan Africa. In mitigation of yield losses caused, farmers apply various strategies and methods, but efficient control remains largely elusive. ICIPE and partners have developed a novel integrated management system called ‘push-pull’ technology (PPT). The technology involves intercropping maize with a forage legume, silverleaf desmodium and planting Napier grass around the intercrop as a trap crop. The desmodium produces volatile chemicals, which repel the stemborer moths from the maize (push) while those released by Napier grass pull or attract the moths (pull). This ensures most of the stemborers land on the Napier grass leaving the target crop protected. Additionally, chemicals produced from desmodium roots suppress and eliminate Striga. We evaluated farmers’ perceptions of PPT attributes and whether this had any influence on its adoption in 15 districts in Kenya. We interviewed a random sample of 843 farmers with 438 having adopted and 405 not yet adopted but attending field days demonstrating results of PPT. The farmers’ perceptions nuanced that both pests were serious constraints to their cereal production efforts and that PPT controls them leading to an increase in grain yields and that this significantly influenced technology adoption. These findings suggest that PPT could be a practically desirable option for livelihood diversification by smallholder farmers who largely depend on land as their main resource base. Effective dissemination pathways that provide farmers with appropriate information for evaluating potential benefits and tradeoffs of such management-intensive technologies are therefore required.

**Establishing Community-Based Producer Working Groups in Ukraine: a Process Review**

Grant Wood, University of Saskatchewan  
Sergei Grygoryev, Tavria State Agrotechnical Academy  
Berny Wiens, Canada-Ukraine Agrarian Development Inc.

Two foundational pillars of Canadian civil society are the act of giving voice to the people, and for governments to be responsive to the voice of the people. This project saw the formation of two community-based producer groups with a mandate of informing the Tavria State Agrotechnical Academy (TSAA) of the agricultural production needs of household producers, small-plot producers and small private farmers. Even though this audience is a major producer of food in the oblast few resources or support services have been targeted to them. It is the desire of the TSAA to become more responsive to the needs of this target audience. This project will also see the enhanced ability of the TSAA to develop and effectively deliver extension programs to meet the needs of this target audience. An effective community-university partnership will ultimately see an improvement in both quality and quantity of agricultural production, with an associated elevation in the economic livelihood of household producers, small private farmers and their communities. The goal of this paper is to share experiences of the authors in this project.
Association for International Agricultural and Extension Education
23rd Annual Conference
Polson, Montana
May 20-24, 2007

Outstanding Professional Paper Presentations

First Place Outstanding Paper Presentation

Using a Market Segmentation Approach to Better Target Extension Programs – Aligning Learner Needs with Learning Programs
*Margaret Brown and Denise Bewsell*
*AgResearch Ltd, New Zealand*

Second Place Outstanding Paper Presentation

Introducing Active Teaching-Learning Methods and Materials into Egyptian Agricultural Technical Secondary Schools
*Burton E. Swanson, University of Illinois at Urbana-Champaign*
*Jamie Cano, The Ohio State University*
*Mohamed M. Samy, University of Illinois at Urbana-Champaign*
*James W. Hynes, Sam Houston State University*
*Benjamin Swan, University of Idaho*

Third Place Outstanding Paper Presentation

Culture and Leadership in a Cross-Cultural Environment: A Case Study
*John Klem*
*Minneapolis, Minnesota*

Outstanding Graduate Student Paper Presentation

Organizational and Leadership Development: A Case Study of Three Coffee Cooperatives in Rwanda
*Samuel Goff, James R. Lindner, and Kim E. Dooley*
*Texas A&M University*
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First Place Outstanding Poster Presentation

Helping Students Analyze Complex and Global Issues
Maria Navarro
The University of Georgia

Second Place Outstanding Poster Presentation

Use of iPod Technologies in International Development – Current Uses, Challenges, & Opportunities
Theresa Pesl Murphrey, Kim E. Dooley, James R. Lindner, Tim Murphy, and Glen Shinn
Texas A&M University

Third Place Outstanding Poster Presentation

Enhancing Faculty and Graduate Student Competencies for International Research and Teaching: A Case Study of Universidad Autónoma de Nuevo León, and Texas A&M University, a Mexico and United States Collaborative
James R. Lindner, Amy Harder, Gary Wingenbach, and Jeanie Long
Texas A&M University

Outstanding Graduate Student Poster Presentation

Internationalization of the Curriculum through Faculty Professional Development
Emily Hand, Kristina G. Ricketts, and Thomas H. Bruening
The Pennsylvania State University
Outstanding Carousel Roundtable Presentations

First Place Outstanding Carousel Roundtable Presentation

Innovative Approaches to Internationalizing U.S. Extension Programs
Michael McGirr, USDA, Cooperative State Research, Education and Extension Service
Michelle Owens, Michigan State University

Second Place Outstanding Carousel Roundtable Presentation

Teaching Agriculture in a Hunger Issues Course….Or was it Teaching Hunger Issues in an Agriculture Course?
Maria Navarro, The University of Georgia

Third Place Outstanding Carousel Roundtable Presentation (tie)

An Instrument to Gauge World-Mindedness of College Students
Arlen Etling and Rachel Hustedt, University of Nebraska-Lincoln
AIAEE Award Winners for 2007

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E-mail: x1jones@iastate.edu

Outstanding Achievement Award

Dr. Rama B. Radhakrishna
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Department of Agricultural and Extension Education
323 Ag Admin Building
University Park, PA 16802
E-mail: brr100@psu.edu

Outstanding Early Achievement Award

Ms. Kelli Selby
Learning Development Specialist
Johnsonville Sausage
P.O. Box 906
Sheboygan Falls, WI 53085
E-mail: kselby@johnsonville.com
The Editor requested *JIAEE* Board Members to review and nominate articles published in Volume 13 (2006) for the fifth annual *Article of the Year Award*. The nomination period occurred in April 2007. Criteria for article selection and nomination were the article’s capacity for “enhancing the *research* and *knowledge base* of agricultural and extension education worldwide…”

Dr. James Lindner, Associate Editor, conducted a survey of all *JIAEE* Board and AIAEE leadership members, asking them to review and rank the overall excellence of each article. Following are the results of this evaluation to promote the scholarship of enhancing the *research* and *knowledge base* of agricultural and extension education worldwide.

Congratulations to all the authors on their scholarly achievements. Please take a moment to send your congratulations to these authors for their achievements and for helping all AIAEE members achieve prominence in the research publication process.

**Outstanding Journal Article of the Year for 2006**


**Runner-Up Journal Articles of the Year for 2006**


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General Requirements

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

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