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

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

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

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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. Feature articles go through the Journal's blind review process utilizing peer reviewers to evaluate content and readability. Reviewers are usually selected from the membership of the AIAEE. In the blind review process all reference to author(s) is removed before the manuscript is sent to reviewers.

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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 Journal. Commentary articles are reviewed by two members of the editorial board for appropriateness and relevance to the Journal, and for readability.

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From the Editor

The saying goes, “time flies when you’re having fun.” This is the final issue for which I will serve as Editor. The past three years has been an interesting, educational and rewarding experience. It has been a pleasure to be able to serve the leadership and membership of the Association for International Agricultural and Extension Education by serving as Editor of the Journal of International Agricultural and Extension Education.

The Journal has become a vital tool in disseminating scholarly research, commentary and informational tools for the international agricultural and extension education field. The Journal could not operate without the dedication of many people, including the Editorial Board, AIAEE Leadership Team, manuscript reviewers and most importantly the agricultural and extension education professionals from around the world who have shared their scholarly pursuits with the Journal.

I would like to take this opportunity to thank some of the individuals who have supported me as Editor for 1999-2001. Dr. Lou Riesenberg, Ms. Victoria Seever and the rest of the faculty and staff in the Department of Agricultural and Extension Education at the University of Idaho were most supportive of my accepting this assignment. Dr. Mac McCaslin and Dr. Don Thomas in the Department of Human and Community Resource Development at The Ohio State University were very helpful in my transitioning of the Journal to Ohio State. I’d also like to thank, Ms. Tracie McDannald, OSU graduate assistant, for her work on organizing the Journal review process. My appreciation also goes to Dr. Jack Elliot and Dr. Satish Verma for their support. It has been a pleasure to follow in their distinguished footsteps.

The Journal of International Agricultural and Extension Education is in excellent financial and organizational shape as the 4th editor takes the reins. Manuscript submissions have increased dramatically over the last six months of 2001. Efforts are underway to streamline the blind-review process by putting the entire review process on-line. This will allow international members of AIAEE to play a more active role in the review process by serving as reviewers. Associate Editors for Spanish and French translations of paper abstracts is another area the Editor and Editorial Board will undertake in the future.

As AIAEE prepares for conferences in South Africa, North Carolina, and Ireland, the Journal stands ready to serve the organization and its members with the latest research, commentary and tools for improving the scholarly activity of AIAEE members. However, in order to keep the Journal the cutting-edge publication that it is, AIAEE members must be willing to serve as Editorial Board members, reviewers for manuscripts, and authors for feature, commentary and tools for the profession articles. The Editor cannot do it alone. The success of the Journal is a combined effort of many people within AIAEE.

I am confident that AIAEE, the Journal of International Agricultural and Extension Education, and the new Editor, Dr. Gary Wingenbach of Texas A&M University (see page 83 for contact information) will continue to grow and prosper long into the future. Thank you for the opportunity to serve AIAEE as Editor of the Journal of International Agricultural and Extension Education. It has been an honor to serve as Editor.

Sincerely,

James J. Connors, Editor
Journal of International Agricultural and Extension Education

Partnership Experiences by the University of Swaziland: Implications for Globalization Efforts

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Abstract

The partnership experiences by the University of Swaziland with other institutions and/or agencies at the international, regional and national levels during the past twenty years have provided some very useful lessons and guidelines to the university to face the challenges in this new millennium. Public and private sectors and civic society are crucial to the university not only to attain its mission to develop common visions, goals and objectives, shared responsibility and accountability but more important, to sustain its dynamism to improve the quality of academic excellence and professional development. The findings of this study recognize the need to establish linkages between the university and relevant institutions at various levels to pursue its globalization efforts to gain recognition and credibility. The implications of these partnerships ensure the sustained ability of development of the university's human resources, physical facilities and an environment that is conducive for the continued improvements of the quality of teaching/training and research agenda.

Introduction

The study examines more than two decades of partnership experiences of the University of Swaziland (UNISWA). The main reason to analyze the partnership experiences was to ensure that training of graduates was diversified and made more relevant to the needs of the wider society, public and private sectors and civil society. It was also to ensure that there was the development of common visions, goals and objectives, shared responsibility and accountability. The experiences studied included internship programs, partnerships between developed and developing countries, professional development of staff and students, student scholarships, infrastructure development, improvement of teaching facilities, research activities, and management. The study argues that partnerships are the key elements for the success of the university in its globalization efforts to gain recognition and establish reputation and credibility in the region as well as internationally.

Objectives of the Study

The objectives of this study are:

1. Describe the partnerships undertaken by the University of Swaziland in the last two decades and draw lessons from the experiences to improve the quality of training and professional development in the university; and
2. Discuss the implications of the various partnership activities to promote the university's globalization efforts to gain better recognition and establish its reputation as a credible institution in the region as well as internationally.

Methods and Data Sources

Data and information for this study were obtained from records and reports of the University of Swaziland partnership files, project reports, and survey reports on internship programs. These data and information utilized content analysis procedures and inductive categorization of issues. This type of analysis was used to facilitate interpretation, derive trends, formulate guidelines and draw implications of these partnerships.

Findings on Partnerships/Links and Their Achievements

The partnerships undertaken by the University of Swaziland included universities from the developed nations, funding agencies, the private sectors, foreign missions, the Swaziland government and non-governmental organizations. The partnerships addressed the provision of infrastructure and services such as vocational and practical training (including field attachment or internship programs), award of fellowships and grants, supply of equipment and physical facilities, research activities and

management improvement. The exchange of staff and students, library holdings, research collaborations, etc. was also part of the partnership activities.

Partnership at the International Level

Table 1 indicates the institutions that had linked programs with UNISWA and donors that supported the links. As can be observed, partners were from Canada, the USA and European countries. Links were mostly College (Faculty)-based and few University-wide partnerships.

Table 1

University of Swaziland (UNISWA) Links with International (Overseas) Institutions

No	Name of Link	Faculties/Units	Date Started	Date Completed	Donor
1.	UNISWA-Brandon	Education (In service)	1978	1997	CIDA
2.	UNISWA-Ohio/Penn	Agriculture	Feb. 1989	On-Going	USAID
3.	UNISWA-CalPoly	Commerce	Jan. 1992	1996	USAID
4.	UNISWA-VUA TRADIS SMART SUFA	NUFFIC Projects UNISWA-Wide Education (Science) Agriculture	1992	1999 1999 1998 1997	NUFFIC/ Dutch Govt.
5.	UNISWA-Hull	Social Science	1994	On-going	BC/ODA
6.	UNISWA/Birmingham	Humanities (ACS)	1993	1999	BC/ODA
7.	UNISWA-York	Education (Science)	Jan. 1988	1996	BC/ODA
8.	UNISWA-Sheffield	Library	Aug. 1992	1994	BC
9.	UNISWA-VVOB	UNISWA-Wide	Feb. 1983	1998	Belgian Govt.
10.	UNISWA-Brandon	Education (In-service)	Dec. 1987	1997	CIDA
11.	UNISWA-DTH	Science	Mar. 1992	1995	EU
12.	UNISWA-Bangor	Agriculture	Jul. 1993	On-going	BC/ODA

Abbreviations Used in Table 1:

CIDA = Canadian International Development Agency; USAID = United States Agency for International Development; NUFFIC = Netherlands University Funds for International Cooperation; BC = British Council; ODA = Overseas Development Agency; EU = European Union; VUA = Vrije Universiteit Amsterdam; VVOB = Flemish Organization for Education Abroad; DTH = Dutch Technical Cooperation.

The UNISWA-Brandon link was to assist UNISWA to become a self-sufficient, viable institution and to build its human resources through institution building. Through this link arrangement, nineteen masters and six doctoral scholars have been trained by 1997 (Halamandaris, 1997), a French Department established and the UNISWA Library was the recipient of 218 boxes of books and instructional materials. In addition, six Brandon University

academics visited UNISWA and seven UNISWA short-term visitors to Canada included the Dean of Humanities, the Vice Chancellor and short term training for the Physical Planning Department. The link also assisted in localizing the posts of UNISWA Bursar and Physical Planner. The partnership was considered successful by the linking universities and the Canadian International Development Agency (CIDA). It has contributed a great deal towards

UNISWA's research activities and materials on 'Human Resource Development', and at the same time created an international awareness and involvement of Brandon University in global issues. Research capacity and output at UNISWA have increased significantly in recent years. Staff received more grants; the number of journal articles increased by 40%; seminars, workshops and conference attendees increased by 25%.

The Ohio State University (OSU) and the UNISWA link helped to improve outreach programs which are of value to students, employers and the institution training prospective employees (Miller & Dlamini, 1998). Academic staffs were able to produce high quality lesson plans and notes for their students as well as practical manuals for their laboratory classes. This link facilitated profound personal and professional relationships that continue through frequent communication and that have evolved into other creative and productive relationships. Ohio State University academic staff members, for an example, have served as external examiners. Academics at OSU are sharing joint publications and exchange information in various ways. One of the indirect outcomes of this link program was the initiation of a 6-week 'Study Abroad Program' for OSU students who come to UNISWA to enroll for summer courses, seminars and field trips that introduced OSU students to issues of development and the culture in Southern Africa. The Faculty of Agriculture coordinates this program which started in June 1998 with seven graduate and two undergraduate students enrolled. The second program was also successfully implemented in June-July 1999 with two graduates and five undergraduate students while the third program was conducted during summer of 2001 with an enrollment of seventeen (17) graduate and undergraduate students. The program helps students to become aware of the unique challenges facing Southern Africa, through direct exposure to African development issues.

The UNISWA-Calpoly link (1992) assisted UNISWA in training four staff members to the MS degree level, conducting short-term courses (in country), engaging in curriculum improvement (including outreach programs), focusing on collaborative research and

development, and commodity acquisition (mainly computers).

The UNISWA-VUA (Vrije Universiteit Amsterdam) link (1992) included the Science and Mathematics Advice and Regional Training (SMART) which followed the Science Teaching Improvement Project (STIP), and the In-school Science and Mathematics Teaching Improvement Project (IMSTIP). The projects aimed at responding to the shortage of science teaching equipment and support materials remoteness of teachers from services and professional advice and stimulation and inexperience in planning and conducting practical-oriented courses and pupil-centered lessons. This link was considered successful as the program continues to run effectively even though the link arrangement came to an end in the late 1990s.

The Training and Development of Information Systems (TRADIS) project was an inter-university cooperation project executed between the UNISWA and the VUA designed to improve the management information system at UNISWA. TRADIS as a computer-related project was preceded by the MICRO project, which ran from 1988-1992. TRADIS was comprised of two components. One component was executed by the Faculty of Commerce (FoC) of UNISWA and aimed to build up training capacity in the field of Information Technology (IT) and Management Information Systems (MIS) in the Faculty. The other component was executed by UNISWA's Information Systems Development Unit (ISDU), and aimed to reinforce this unit as well as assist UNISWA in expanding its technical infrastructure. The link projects assisted UNISWA in establishing a student information system, training more than 25 UNISWA staff members in computerization, establishment of the Information Communication Technology (ICT) Center with the responsibility of teaching computer foundation course to all first year students. The ICT Center also maintains the e-mail and internet programs, run short courses, trouble shooting in the university, soft and hard ware management and management of information systems for the administration.

Under the Faculty of Commerce component of the UNISWA-TRADIS project link, two

Information Systems courses (IS-I and IS-II) were developed, tested and offered during each academic year covered by the project. A small reference library has also been built up under the project. Two counterpart staff who obtained their MBA degree in Information Systems during the project period assisted a Dutch long-term expert seconded to UNISWA and a computer technician was trained. To provide the necessary teaching infrastructure, two computer labs were equipped and linked to a teaching network. These activities directly linked to IT teaching, a number of workshops and seminars were conducted, links with the private sector were further developed and research into the required IT skills by Swazi organizations carried out.

Under the ISDU component a number of automated modules and systems were developed and/or implemented. These included Student Finances Module, Time Tabling Module, Student Results Module, and UNISWA Personnel Information System. The ISDU programmer obtained his B.Sc. (Hon.) in software engineering; ISDU staff attended a number of computer courses in the region; VUA technical staffs were seconded to ISDU for a number of different periods during the project; and the computer networks in the Administration and Library were extended.

During the project period, parallel to TRADIS activities, UNISWA installed a fiber optics backbone at the Kwaluseni campus, which is linked to the Internet. UNISWA's activities through the MICRO project, TRADIS project, and other inter-university links, and through its own independent IT initiatives over the past nine years have resulted in an institution where IT is an every-day tool of the administration, and where IT has also found its way in teaching and research. The challenges for the future will be to consolidate the achievements in the administrative area, to include the Luyengo and Mbabane campuses into the University network, and to further expand the use of IT in teaching and research in a coordinated effort.

The SMART Project has resulted in a well-established and balanced program of in-service activities for Swazi science and mathematics teachers. The activities are at the senior secondary level and they include a network of 32 Regional Mentor Teachers, a fully established Mathematics and Science In-service Unit, basic provisions with regard to school laboratory equipment, demonstration apparatus in Swaziland high schools and the establishment of a Science Education Center at UNISWA. These helped to standardize the minimum requirements for teaching mathematics and science at the high school level, provide a resource for the teachers as well as the focal point for UNISWA's contact with Swazi high schools in these subject areas. In addition, three Swazi national staff through this link has obtained their MS degrees.

Programs that were designed to improve the scholarship of staff members were the UNISWA-Hull link and the UNISWA-York link. The UNISWA-Hull link focused on writing a book on social transformation on Swaziland, while the UNISWA-York link engaged staff members on research and producing more than five journal articles. The British Council funded both links.

UNISWA also engaged in links for professional development in the form of short courses with overseas universities. These included the UNISWA-Brandon (In-Service Education); the UNISWA-VUA and the UNISWA-Bangor links were designed to achieve this objective. In addition, the UNISWA-Bangor and UNISWA-Birmingham links were also helpful in training three staff members up to the Ph.D. level. The SUFA (Strengthening of the University of Swaziland Faculty of Agriculture) project provided teaching materials and curricula improvement in addition to short courses for both technical and academic staff.

However, the UNISWA-Sheffield link did not go a long way beyond few visits to establish the link and the UNISWA-DTH link did not take off due to poor planning by both parties and the universities. The donor, the European Union (EU) funded a few activities but the universities involved did not agree on how to proceed with the link arrangements.

The UNISWA-VVOB link provided the university with professional staff personnel in two areas: to initiate the field attachment (internship) program at the Faculty of Agriculture, and strengthening of the French Department. These personnel provided three such personnel under this link as well as some equipment to facilitate the implementation of activities.

Partnership at the Regional Level

Partnership at the regional level focused mainly on long term and short-term training. The Southern Africa Center for Cooperation in Agricultural Research and Training (SACCAR) conducted research and training on behalf of the Southern Africa Development Community (SADC). Short term training were conducted to develop and enhance training capacity. Recognizing the importance of information, a regional information network coordinated by SACCAR was established to ensure sustained sharing of information by agricultural institutions in the region.

Research was also coordinated by SACCAR to ensure that the major staple crops were well researched and improvements for food security advanced. Partnerships with the private sector at a regional level were initiated by SACCAR (Mrema and Woodend, 1995) through a workshop held in Harare, Zimbabwe in 1994. This was attended by Deans of Faculties of Agriculture, Forestry and Veterinary Medicine of universities in the SADC countries and representatives of the private sector specializing in agribusiness and commercial agriculture. The principal objective of this workshop was to deliberate on and recommend ways and means through which the Faculties can offer education training and other services, which are more responsive to the needs of the private sector in the SADC countries. The Faculty of Agriculture, UNISWA, undertook to review the curricula (Dlamini, 1995) in response to the needs of the private sector in Swaziland.

Post-graduate studies including the master degree programs in various areas of specialization on a regional basis were developed in Zambia (agronomy), Malawi (animal production and health), Zimbabwe (agricultural economics) and Tanzania (water

management) as a consequence of the regional partnership through SACCAR and SADC. Swaziland is earmarked for a regional masters degree program in agricultural education and extension.

A long standing cooperation of the Universities of Botswana, Lesotho and Swaziland still exists focusing mainly on training, sporting activities by students, meetings of Vice Chancellors and officers in senior management and professional meetings by academic staff directed toward joint research projects and improvements of teaching and learning.

Partnership at the National Level

The partnership at national level included infrastructure development by the Swaziland Government and the business community. For example, the establishment of the Faculty of Commerce and buildings for the Faculties of Agriculture and Science were undertaken with such partnership. The foreign/diplomatic missions in the country including the Japanese Government, UNESCO, EU and UNDP, etc. have donated equipment and other teaching resources to the university. National organization and companies like the Tibiyo Takangwane, Royal Swazi Sugar Corporation, etc. have also made financial contributions towards the university's development.

Apart from the financial and materials support, numerous private sector companies also assisted the university on an annual basis to provide opportunities for work experiences in relation to field attachment or internship programs for students training, especially in the field of agriculture, home economics and commerce. An estimated 80 to 90 companies dealing with various enterprises and trade related to these fields is involved on a yearly basis. About 200 students take part in field attachments each year and those very companies often employ those who have graduated.

UNISWA'S partnerships and links with national level private sector institutions and companies have resulted in enriching the field attachment or internship program for students in agriculture, home economics and commerce. The major institutions and agencies (about 90) within the country have provided the opportunities for over

200 students annually to gain work experiences relevant to their areas of interest and specialization and sensitize them to the career options available in the private sector.

The achievements of partnerships at the University of Swaziland improved: (a) the capacity building through long and short term training programs; (b) teaching and learning facilities; and (c) research activities. These included an active advisory board that helped the Dean and Department Heads in the Faculty of Commerce to be more creative and open to opportunities. Also, mobilization of resources for special programs (such as the more than US\$2.5 million building for the Faculty of Commerce); and improved field attachment or internship programs by the Faculties of Agriculture and Commerce which are important and valuable to the students, potential employers and the university. Through these partnership programs and activities research outputs have increased significantly, and staff exchange in various areas is more visible than ever before. The university have received better equipment for teaching and research purposes; staffs and students have received fellowships and grants; and linkages and net-working have been established between the university and the firms/agencies to benefit both the prospective employers and students

Conclusions and Implications

Partnerships with regional organizations and overseas universities assisted the University of Swaziland to support global efforts, such as inter-university student and faculty mobility, curriculum sharing and cross fertilization of thought that has improved with the scale of interactions offered by such partnerships. The curricula in the Faculties of Agriculture and Commerce benefited from the American and European experiences, thus giving a global flavor. The continued improvements on the quality of professional training and development and the pursuit of academic excellence at the University of Swaziland is anchored on its ability to sustain partnerships with external institutions and agencies for mutual benefits. The outputs and achievements of these partnerships in the various areas of academic, professional and technical development expertise are therefore inevitable for the

university to accomplish a higher level of performance excellence and standardization of training in the educational process. It is only through effective partnerships that the pursuit of the university's globalization efforts will be able to achieve its goal.

The implications of the various partnership activities are to promote the university's globalization efforts and to gain better recognition, and establish its reputation as a credible institution in the region as well as internationally. These implications include (but not limited) to the need to continually improve and sustain the quality of teaching/training and research among academic, professional and technical staff. Further, development of program/curriculum must be based on demand-driven needs and reflect national priorities. Also, keeping abreast with the latest available technological innovations, physical facilities and resources; and capitalize on the improved opportunities and options available for employment and career advancement of graduates in national, regional and multi-national agencies.

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The Role of the Commercial Sector in Agricultural Extension in Jordan

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Abstract

The study aimed at examining the role of the private firms in extension in Jordan, and the association between their characteristics and the methods of extension they use. Two thirds of firms were either partnerships or corporations, and half of them were organized in a professional association. Their technical staff is many times the staff of the public extension system. Low percentage of firms arranged for formal in-service training for their technical staffs. Firms mostly use multi-media and promotional approaches in extension methods. Many firms have experimental sites or links with local or international firms. Extension partnership is imperative between the public and private sectors to develop differentiated programs for serving its diversity of farmer's needs. Merging firms into corporations and strengthening their professional association would enable firms to upgrade their services, experimental work, and in-service training. The quality of traded inputs has to be monitored to ensure fair dealing in business.

Introduction

Agricultural extension is an important instrument for stimulating agricultural development. The limited potential for promoting agricultural production in Jordan through horizontal expansion of cultivable land, is basically due to the limited water resources (Salameh, 1996). This calls for adopting a strategy for agricultural development based on the use of improved technologies. Significant increase in agricultural production may be achieved through raising water efficiency and land productivity by way of research and effective public and private extension. Several public and non-public organizations in Jordan are involved in agricultural extension, but coordination of their activities is largely accidental. Sources of public extension within the Ministry of Agriculture (MOA) in Jordan include (a) the Department of Extension, which is a typical general system of extension. It has a relatively limited number of field and subject matter specialists staff. Based on the 1997 Agricultural Census (Department of Statistics [DOS], 1999), the ratio of extension agent to farmer is 1: 920; (b) the National Research Center which undertakes limited technology transfer activities; and (c) the production-oriented projects, which provide technical information, financial aid, and subsidized inputs to target groups in the context of the agricultural development approach. Other public extension services are provided through: (a) the

Agricultural Credit Corporation which follows the system of controlled credit and provides technical guidance to the borrowers; (b) the farmers' organizations such as cooperatives and unions, which provide very limited services in size and scope; (c) the non-governmental organizations which provide limited technical and financial support to certain groups, especially to women farmers; and (d) the private for profit sector which includes the commercial agricultural companies, and private consultants. Extension services offered by the private companies, though sales-oriented and spatially limited to areas with commercial farming, are better in quality and more effective (Rimawi & Arabiyat, 1998).

The major dilemma for many governments is who should take the lead in the extension system? the public sector, the private for profit sector, the private non-profit sector or some combination of the three. Public funding is essential when dealing with the extension needs of small, subsistence and women farmers (Deininger, 1996). It is also essential in matters related to the public interest, and for activities where larger benefits are captured to society (Bloom, 1993). However, public extension has been criticized for its cost, financing and effectiveness (Rivera, 1992). State extension in Jordan was criticized for its insufficient impact, low coverage, inadequate access to knowledge sources and lack of relevant technology for farmers' needs to be extended (Sbeih, 1993).

State extension in Jordan suffers from shortage of funding, transportation, and need-oriented in-service training program, and from poor overall programming and monitoring of extension activities (Ministry of Agriculture [MOA], 1997a; Rimawi & Arabiyat, 1998). As a result, extension systems have had to make changes and to formulate plans for the necessary transition to achieve the desired change. Varied strategies were adopted towards privatization since the 1980s. These strategies include commercialization of the state extension such as in New Zealand, cost recovery such as in Mexico and England, gradual privatization such as in the Netherlands and Australia, chambers of agriculture and private companies in France and in many countries (Rivera & Cary, 1997).

When the good or service is primarily of private value, private markets can best provide it. The private firms would be an important source of information for market-oriented farmers in the irrigated areas (Bloome, 1993) as is the case in Jordan (MOA, 1997a). Commercially-oriented farmers are increasingly well educated, trained and rival state extension agents in their technical background and they prefer to go directly to the main source of information available, that is agribusiness representatives (Buttel, 1991). This applies to Jordan where some farmers rival, not only the state field extension, but also they outreach the agents of the leading input suppliers, and their limits are expanded to reputable sources outside the country. This emphasizes the private benefits of extension activities to business-oriented farmers.

Private firms, however, are motivated by profits, and thus they are more oriented towards high value crops, and relatively larger farms to reduce the number of transactions and costs (U.S. Agency for International Development, 1985). Rivera (1993) indicated that the bias of the privatized extension system is toward larger and wealthier farm enterprises. Rimawi, Eter, Freij, Ali, and Shaqwara (2000) arrived to the same conclusion in the case of Jordan. Under-served target groups by the private extension in Jordan include the small farmers, especially in the dry farming areas, the traditional sheep and goat herders, women farmers and environment friendly farming activities (MOA, 1997a). Animal herders accounted for 20% of holders, and women represented less than 3% of holders

(DOS, 1999). The Agricultural Policy in Jordan stated that the government would provide extension services to certain agricultural areas, and for target groups who are not adequately served by the private sector (MOA, 1997b). Thus, the private firms' role in extension has limits. They can be a supplement, but not a substitute to public extension for certain groups of farmers and areas and under certain conditions. Extension needs to develop differentiated programs for serving its diversity of farmer's clientele's needs and differentials in access to information (Buttel, 1991). An important role for the public extension would be to provide the appropriate regulatory framework to ensure fair competition and maintain quality standards (Deininger, 1996).

Insufficient impact, and low coverage of the state extension in Jordan, have made it imperative to search for alternative approaches to improve extension delivery, and to cooperate with the multiplicity of institutions offering extension services in joint efforts to achieve their common goals (MOA, 1997b). Following restructuring of the economy, and liberalizing the market and membership in the World Trade Organization in 1999, the government has become keen to revitalize the public system and to make it more cost-effective and to promote the private sector. The National Strategy for Agricultural Extension stated that the government would gradually withdrew from providing extension services to target groups that are provided adequately by the private sector (MOA, 1997a). The Jordanian agribusiness input market has shown healthy signs of development during the last two decades. Many new firms have entered the market and made a positive contribution in agricultural development, which indicates that there is a demand for their services. The public and private extension interactions are of interest, and this research is an attempt to assess the role of the private firms in agricultural extension, which was not a subject of analytical research in Jordan in the past.

Objectives

The main objectives of this research are the following:

1. To explore the characteristics of the commercial firms, and their capacity to undertake extension and research activities, and to investigate the association of these characteristics and type of business and membership in the Agricultural Materials Merchant Association [AMMA].
2. To examine the commercial firms methods of agricultural extension.

Methodology

The analysis is based on primary data through interviews with authorized persons from a sample of private firms involved in input supplies and extension activities. Data collectors were assigned by the Department of Extension in the Ministry of Agriculture [MOA]. The questionnaire was structured largely in a closed-ended form and pretested in different areas. Pre-testing was essential to help in sorting and modifying the questions, in pre-coding the responses, and to ensure that data collectors have correct and common understanding of the questions to be asked. A sampling frame of about 300 firms was provided by the AMMA. One hundred firms were selected, but 96 questionnaires were eventually used, either because some firms closed down, or because the authorities declined from cooperation. Thus, firms in the sample constitute about one third of the population of commercial organizations dealing with input supplies. Parametric tests, namely t-test and one-way analysis of variance (ANOVA), and nonparametric tests, namely χ^2 test of independence, Mann Whitney (M-W) and Kruskal Wallis (K-W) tests were used to analyze the data. Firms' representatives were asked to rank the extension methods used by their firms, and each response was graded on the basis of 5 points for the most used method, and one point for the least used method. To test internal consistency of the measure, the test of inter-item consistency reliability was used. The Cronbach's alpha was used and found to be 0.77. This coefficient is acceptable, considering that reliabilities of less than 0.60 would be considered poor (Sekaran, 1984, p. 227).

Results and Discussion

Objective 1

Legal Status, Location and Membership in a Professional Association

For a business to grow and prosper, the prospects for the sole proprietorship are quite limited. Two thirds of the firms in the sample were found to be either of the partnership type (44%) or corporation type of business (22%). This is a positive sign, which indicates that more resources are directed to the input supply system and the firms are business oriented. More than two thirds of firms are located in Amman the capital or its suburban areas. These are ideal locations for servicing the main agricultural areas, as most of the agricultural areas are located in a radius of 30-70 kilometers from Amman. However, 28% were found to have two branches or more in the main agricultural areas. Road and transportation networks are adequate and provide easy access to Amman from practically all parts of the country. Therefore, commuting to secure inputs does not seem to be a particularly difficult exercise to the business oriented farmers.

The Agricultural Materials Merchant Association [AMMA] was established in 1982, as a professional association for private dealers of agricultural inputs, with optional membership. Forty six percent of the study population was found to be members in the association. The main objectives of the association are to protect the interest of its members, and to promote professionalism in the business of input supplies. Part of its activities is organizing exhibitions, seminars and workshops, preparing leaflets and other printed materials. Also, it cooperates in training graduates of the faculties of agriculture. The association is represented in important technical committees responsible for registering inputs. Using t-test, mean number of branches was significantly higher for firms, which are members in the association ($p < 0.01$). Similarly, using one-way ANOVA, mean number of branches appears to be higher for corporations as compared with partnerships, but the differences were not statistically significant ($p > 0.10$).

Technical Staff

The input supply firms covered in the sample represented about one third of all firms. Firms in the sample employ 340 extension agents and subject matter specialists, who were largely agronomists, against a total of 111 agents in the public extension of the MOA in 1997 (Rimawi, 1997). This indicates that the number of technical staff in the private sector is very much greater than the staff in the public extension. Rimawi et al. (2000) reported that the number of private extension agents was 650 agents. Only 3% of the technical staff of the firms were females. Low immobility of females make it unlikely for them to be employed in essentially a field type of work which requires intensive interaction with traditional males who are less receptive to advice from women. The number of technicians per firm is small. About half of firms employ three extension agents or more. The mean number is 3.66 agents and the confidence interval for the mean is 2.89 – 4.43 agents at $p \# 0.05$. This is an indication of the low resources of the private firms as individuals, especially for research activities. This makes coordination of extension activities with public extension more difficult. Using t-test, mean number of technicians was significantly higher for members in AMMA ($p \# 0.05$). Similarly, using ANOVA, mean number of technicians was significantly higher for corporations as compared with partnerships and proprietorship ($p \# 0.01$).

Information System of the Private Firms

Ban and Hawkins (1988) reported that most farmers in the industrialized countries regard direct experience as the best, and often the only way to learn, despite their many opportunities to learn about new agricultural development. The direct practical experience by the technical staff, that is learning by doing, was found to be an important source of information for 59% of firms. This indicates an inward looking by many private firms towards staff development through professional training to strengthen technical and communication competencies of their agents. The regulation which requires that some inputs have to be tested or analyzed locally before they are allowed to be marketed (MOA, 1996), has encouraged larger firms to experiment with new

varieties of seeds, fertilizers and pesticides to promote their sales. Thirty five percent of private firms were found to have experimental sites in open fields or green houses. Nine percent of firms were found to undertake trials on farmers' fields. Forty three percent of firms have links with progressive Jordanian firms, and a similar percentage of firms (41%) have established linkages or joint ventures with international firms who may provide funds to help implement trials and demonstrations on farmer's fields. Members in AMMA were more likely to have experimental sites ($p \# 0.001$). Similarly, corporations and partnerships were also more likely to have experimental site ($p \# 0.10$). Members of AMMA, corporations and partnerships were more likely to have links with international firms ($P \# 0.05$). In contrast, individual firms were found to be more dependent on the field experience of the technical staff ($p \# 0.10$). Four percent of the technicians in the firms were found with MA or PhD holders against 47% of the technical staff of the National Research Center in 1996 (MOA, 1996). Thus, the private research activities are helpful, but certainly they are not adequate substitute for the well-established public research, as it had been admitted by a manager of a leading private firm.

Seventeen percent of firms organize formal in-service training for extension agents. This was explained by the limited opportunities for local training and costly overseas training. As Table 1 shows, type of business and undertaking in-service training were found to be associated ($p \# 0.01$). Corporations were more likely to undertake in-service training for their technical staff. Similarly, membership in AMMA and undertaking in-service training appeared to be associated, but the association was found to be statistically insignificant.

Table 1

Cross-tabulation of type of business by in-service training

Type of Business	Undertake In-Service Training (%)		Total
	Yes	No	
Proprietorship	2 (6.2)	30 (93.8)	32 (100.0)
Partnership	5 (12.5)	35 (87.5)	40 (100.0)
Corporations	8 (40.0)	12 (60.0)	20 (100.0)

* χ^2 level of significance 0.004.

Objective 2Extension Methods

Dexter (1985) pointed out to three patterns of contact to extension work depending on who took the initiative, the extension agent or the farmer. These patterns are (a) consultancy approach in which the initiative lies on the farmers, (b) promotional approach in which the initiative lies on the extension agency, and (c) participative approach where the initiative is shared between farmers and the extension agency. These approaches are not mutually exclusive and can be used in a complementary way. As Table 2 shows, private firms are largely involved in the consultancy and promotional approaches. Based on mean ranks of the extension methods, most used methods were the office visits, farm visits, exhibitions, advertisements and field days with mean ranks

ranging from 1.48 to 4.45 points. The private firms were found to be more active in the consultative approach, as 92% of dealers have indicated that they use office visits by farmers to extend technical information. Firms were also active in the promotional approach, as 70% of dealers have indicated that they use farm visits to promote their products.

The private firms were found to be active in disseminating information about new innovations through exhibitions (53%), advertisement in newspapers and professional magazines (39%), and field days (34%). Firms were also found to be active in assisting farmers to evaluate technology through regular farm visits (70%), in organizing demonstrations and seminars, and in involving progressive farmers in experimental and testing work. Traded inputs are largely seeds, fertilizers and pesticides, but very few were trading in IPM materials.

Table 2

Distribution of private firms by the extension methods

Extension Method	Frequency		Mean Rank *of Extension Method	Confidence Interval 5% Significance Level	No. Of Cases
	No.	%			
Office visit	88	91.7	4.45	4.20 – 4.69	96
Farm visit	67	69.8	3.25	2.95 – 3.55	96
Exhibitions	51	53.1	1.82	1.58 – 2.06	96
Advertisement	36	38.7	1.67	1.48 – 1.92	93
Field days	33	34.3	1.48	1.28 – 1.68	96
Demonstrations	19	19.8	1.33	1.17 – 1.50	96
Seminars	16	17.0	1.05	0.98 – 1.12	94
Model farms	10	10.6	1.04	0.98 – 1.07	94

* Ranking: 1 = "least used"; 5 = "most used"

Private firms use a wide range of methods and mostly simultaneously in promoting their sales. They have more flexible management, direct and continuous interaction with farmers. Most firms provide transportation facilities to their agents (76%), thus allowing them to follow up their clients without the restriction of the public working time for the state agents. Direct contacts with farmers enable firms to respond to the changing needs of farmers through regular visits to farms. Private firms are generally better funded on per-farmer basis in transferring new technologies, and they help to diffuse new technologies and to establish improved practices in the localities.

Table 3 presents the relationships between extension methods, type of business and membership in AMMA. Using K-W test, mean

rank for farm visits for corporations was significantly lower than proprietorship at low level ($p \neq 0.06$), but it was significantly higher for group extension methods such as exhibitions. Mean ranks for corporations were also significantly higher for seminars, model farms, exhibitions, and advertisement ($p \neq 0.10$). The χ^2 test of independence produced similar results, which support the findings that corporations are more likely to be active in-group extension. Using M-W test, mean rank for members in AMMA was significantly higher for farm visits, but not for exhibitions as it is shown in Table 3 shows. Mean rank for members was significantly higher for other methods ($p \neq 0.03$). The χ^2 test of independence support these results, which suggest that members of AMMA are more active in extension, and more likely to use varied extension methods.

Table 3

The relationship between extension methods and type of business and membership in AMMA

Type of Business/ Membership in AMMA	Extension Method	
	Farm Visits	Exhibitions
Kruskal –Wallis test: Mean rank by type of business		
Proprietorship	47.2	39.8
Partnership	51.1	47.7
Corporations	36.2	54.9
P # value	0.06	0.06
Mann-Whitney test: Mean rank by membership in AMMA		
Members	56.0	52.3
Not –members	42.2	45.3
P # value	0.01	n.s

Conclusions

The private firms are market-oriented as the majority was found to be either of the partnership or corporation type of business, and half of them were organized in a professional association. Firms are active in the promotional and consultative approaches to promote their products, and they use a wide range of individual and group extension methods. They are more oriented towards high value crops and relatively larger farms to reduce their cost and increase sales. They give little attention to low inputs, environment friendly technologies. Firms have more flexible management and

transportation facilities, which allow their agents to follow up their clients and to respond to the changing needs of farmers. Many firms have experimental sites or links with local or international firms. The private firms are generally better funded on per-farmer basis in transferring new technologies. They help to diffuse new technologies and to establish improved practices in the localities, either directly or through trickling down of the improved practices by way of interpersonal contacts. Thus, the private sector can play an important role in agricultural extension, which is crucial to agricultural and economic development through looking for a profitable

way in doing their businesses.

Members in the professional association, and firms of the corporate type of business are more business oriented and they have higher mean number of branches and technicians. They are more likely to undertake in-service training for their agents, to have experimental sites, and to have links with local or international firms. Members in the association were active in varied extension methods, and firms of the corporation type were more likely to use group extension methods.

Although the number of the technical staff in the private sector is many times more than the staff of the public extension, the number of agents per firm is small, and the percentage of graduate technicians is quite low. The majority of firms depend on direct practical experience of their agents as a source of information, and less than one fifth of firms organize formal in-service training. These findings indicate a limited capacity for research activities, and inward looking by many private firms towards staff development through professional training to strengthen extension agents' technical and communication competencies. Thus, the private research activities are helpful, but certainly they are not adequate substitutes for the well-established public research, and partnership is imperative.

Recommendations

Low coverage of public extension services and mutual interest in promoting the purchasing power in the rural areas call for partnership with the private sector. Agro-input supply firms can profitably collaborate in the provision of extension services, improve coverage, test appropriate technologies with farmers, and develop their products to match their supplies with real demand for inputs.

Public extension is still critical to serve the small, full time, less commercialized farmers, and women farmers, and to promote environment friendly activities. The private firms can not be perfect substitutes to the public extension.

A policy should be adopted to encourage private firms to be members in professional

associations or to be merged into corporations or both to enable them to upgrade their extension services, and to undertake experimental work and staff training.

Measures have to be adopted to ensure the effectiveness of the private extension such as qualifications, and experience. The qualities of inputs and the information they disseminate have to be monitored to ensure fair dealing in business. and low negative impact on the environment.

Studies are needed to provide more information on the private firms such as their attitudes towards environment friendly technologies, and the farmers image or attitudes toward the private firms.

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Evaluation of Extension Agents' Job Characteristics: A Case Study of Enugu State Agricultural Development Project, Nigeria

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Abstract

The paper evaluated job characteristics of Extension Agents (EAs) of Enugu State Agricultural Development Project (ADP). Data for the study were collected from 60 EAs, using a structured questionnaire schedule. Data were analyzed through the use of frequency distribution, percentages and mean scores. The findings indicated that a greater proportion (58.3%) of the EAs were relatively young. About 68% of them were males and almost all (63.3%) of them were married. Not less than 67% of them attained B.Sc and /or M.Sc. certificates. Those that were on secondment (sent from the ministry of Agriculture to work with ADP for a period of time) from the Ministry of Agriculture accounted for only 18.3%. About 88% of the EAs had more than 6 years working experience. Their role within the organization was fairly clear ($\bar{x} = 4.1$) to them, while majority of them perceived many of their professional routine duties as being fairly important ($\bar{x} = 3.9$). Their working-time was spent on both agricultural and non-agricultural development activities. Much more time was spent on crop production. Majority of them perceived many of the 12 months in the year as being busy. The implications of the findings for necessary administrative actions by the agency (Enugu State ADP) were drawn.

Introduction

Agricultural extension aims at providing farmers with necessary education, skills and technical information to enable them to make effective farm management decisions to enhance their daily practices. An effective extension service is therefore an essential factor for the accelerated development of agriculture in developing economies (Oyebanji, 1994). In 1974, the Federal Government of Nigeria in conjunction with the World Bank and then, the Northern Government established enclave (pilot) Agricultural Development Projects at Funtua and Gusua (Mabawonku, 1986).

The increase in agricultural production achieved through the enclave Agricultural Development Projects (ADPs) encouraged the Nigerian Government to establish ADPs on a nation-wide basis in all the states with the focus on small-scale farmers. The ADPs thus became the extension arms of the State Ministries of Agriculture. The Training and Visit (T and V) extension methodology was adopted. The T & V system is a management procedure involving regular intensive training for village extension workers followed by a scheduled of visits to farmers (Benor, 1979). Gradually, Unified Extension Approach which aims at

professionalizing extension duties to a level of helping farmers in raising production and increase income was introduced; thereby, each extension agent was expected to deal with the transfer of technology on all the agricultural sub-sectors (Unamma, 1989). Therefore, the central and most important feature of ADPs is reliance on the Extension Agents (EAs) as a vehicle for achieving its objectives (Fatunbi, 1994).

Having realized the importance of the EAS, efforts were made to recruit male and female extension agents. Besides, professional personnel were sent from the State Ministry of Agriculture to occupy some key positions within the ADPs. Efforts were also made at equipping the EAs technically through the Forth-Nightly Training (FNT) programme for the purpose of bringing about desirable changes in their technological competencies. The FNT programme is a process for bringing about desirable changes in the EAs' behavior (knowledge, skill, attitude and aspiration), which help to solve farm/home problems and improve their job characteristics. It (FNT programme) enables the extension agents to constantly receive training on various fields of agriculture forthrightly.

The term “Job Characteristics” contains two different components, namely, “Job” and “Characteristics”. The term “Job” refers to the “Piece of work either to be done and/or completed, while the term “Characteristics” refers to “forming part of”. When these two components are brought together, they could generate different meanings to different people in different disciplines. Within the context of this study, the term “Job Characteristics” refers to the intrinsic traits which the EAs should possess on the job. The possession of such intrinsic traits will improve their performance on the job. The expected intrinsic traits of the EAs within and ADP as an organization include: (1) adequate role clarity; (2) favorable perception of professional routine duties; (3) favorable perception of monthly work-load and (4) effective time budgeting.

Role clarity relates to clarity about the EAs’ activities, clarity about their supervisors’ expectations and clarity about the method of their evaluation etc. Perception is the process that goes on continuously as we see, hear, taste, touch and smell the world around us. Perception of professional routine duties refers to the understanding of job description. All extension agents should have an understanding of their job description. Perception of work-load has two aspects: (1) it relates to the way in which an EA perceives the various components of his/her job such as its structure, relative importance of its contents, tasks, etc. and (2) it relates to his/her idea about how much work-load is involved in the performance of the tasks assigned to him/her. Effective time budgeting by an EA is a function of his/her degree of role clarity, perception of professional routine duties and work-load (Patel, 1983).

The pertinent questions that are to be answered at this juncture include: (1) to what extent are the EAs’ role clear to them? (2) How do the EAs perceive their professional routine duties? (3) How do they perceive their monthly work-load? and (4) what proportion of their working hours do they apportion to each of the agricultural and non-agricultural activities, which they are engaged in? In order to provide answers to these questions, the study was designed to assess the job characteristics of Extension Agents of the Enugu State ADP. The Enugu State ADP was one of the Multi-State-wide ADPs that came into

existence in August, 1985. Specifically, the study was designed to:

1. Describe the socio-demographic characteristics of the extension agents;
2. Determine the role-clarity level of the EAs;
3. Determine the extent to which the EAs perceived their professional routine duties;
4. Determine the monthly perceived work-load of the EAs and
5. Determine the EAs’ proportion of working hours apportioned to each of their agricultural activities.

Evaluation of the job characteristics of EAs of a given agricultural agency is a good administrative decision and an action aimed at establishing qualitative and stable extension system. The understanding of the EAs’ job characteristics will go a long way in bringing about meaningful and timely information about the needed adjustment in the objectives, policies and implementation strategies of such an extension agency (Patel, 1983). The growing interest in job characteristics evaluation has been positively remarked and it has resulted largely and significantly in improving project planning, implementation and management performance of ADPs in the developing countries (Maddock, 1986).

Methodology

The Enugu State ADP was made up of three Agricultural Zones (AZs); namely, Enugu, Awgu and Nsukka zones. According to the Enugu State ADP Memorandum (1998), there were 70 EAs: 22 in the Enugu zone, 22 in the Awgu zone, and the remaining 26 belonged to Nsukka zone.

From each of the three zones, 20 EAs were selected, using a simple random sampling technique. In all, a total of 60 EAs were involved in the study.

A structured questionnaire was developed and used in the collection of the data. The questionnaire contained five different sections

based on the objectives of the study.

The role clarity of the EAs was measured by asking them to indicate the degree to which they were clear about a set of five role clarity items on a six-point Likert scale. The six points on the scale were weighted in order of degree of clarity: not very clear =1; not clear =2; clear =3; fairly clear =4; very clear =5 and most clear = 6. The clarity mean score was calculated for each of the five role clarity items by dividing the total role clarity score by the number of respondents. Their role clarity level was calculated by dividing the total role clarity mean score by the number of role clarity items.

The level of perception of professional routine duties by the EAs was measured by asking them to indicate their perceived importance of their professional routine duties on a five-point Likert scale. The five points on the scale were weighted in order of the degree of their importance: not very important = 1; important = 2; fairly important = 3; very important = 4 and most important = 5. The mean score for each of the professional routine duties was calculated by dividing the total score by the number of the respondents. The level of perception of the importance of their professional routine duties was computed by dividing the total professional routine duties mean score by the number of professional routine duties items.

Data for the monthly perceived work-load by the EAs were collected by asking them to indicate the extent to which they perceived their monthly work-load on a five-point Likert scale. The five points on the scale were graded as follows: not very busy = 1; not busy = 2; busy = 3; fairly busy = 4 and very busy = 5. The mean perceived work-load for each of the 12 months was calculated by dividing the total perceived work-load score by the number of respondents. The actual level of their perception of the monthly work-load was computed by dividing the total perceived work-load mean score by number of the months.

Data on the time spent on the various agricultural and non-agricultural activities were generated by asking the EAs to indicate the percentage (0%, 10%, 25%, 50%, 75% and 100%) of their time spent on each of the identified activities.

Basic statistical tools such as mean scores frequency and distribution percentages were used in the analysis of the data.

Results and Discussion

Socio-demographic Characteristics of the EAs

Entries in Table 1 show that majority (58.3%) of the EAs were between 30 –39 years of age. Those that fell within the age range of 20 –29 years accounted for 15.0%. The remaining five percent were above 50 years. The implication of these findings is that a greater proportion of the EAs were relatively young and hence, they would be expected to be very active and productive unlike the older ones.

Table 1 further reveals that majority (63.3%) of the EAs were married, while the remaining 36.7% were single. According to Ozor (1996), marital status is one of the most important factors conditioning the level of the EAs' job performance. Once an individual gets married, there is the tendency for such a person to be affected by family problems which may have trickle-down effects on his/her job-performance. The table also shows that 68.3% of the EAs were males, while 31.7% were females.

It is also evident from Table 1 that 15.0% of the EAs had West African School Certificates, while 18.3% had Ordinary National Diploma Certificates. About 57% had B.Sc./B. Agric. Certificates, while those who had M.Sc. Certificates accounted for 10.0%. Since a greater proportion (about 67%) of the EAs acquired B.Sc. and/or M.Sc. qualifications, the standard of professional input on the job would be expected to be high. The few EAs with low level of education should be encouraged to undergo in-service training for proficiency on the job.

Table 1

Percentage Distribution of EAs on the basis of their Socio-demographic Characteristics (n = 60)

Socio-Demographic Characteristic	%
Age (Years)	
20-29	15.0
30-39	58.3
40-49	21.7
Above 50	5.0
Marital Status	
Married	63.3
Single	36.7
Sex	
Male	68.3
Female	31.7
Educational Qualification	
WASC	15.0
OND	18.3
B.Sc./B. Agric	56.7
M.Sc.	10.0
Working Experience (Years)	
3-5	11.7
Above 6	88.3
Mode of Employment	
Direct	81.7
Secondment	18.3

Majority (81.7%) of the EAs were employed directly by the agency, while 18.3% were sent from the State Ministry of Agriculture. To maintain a high standard of performance right from the beginning of the agency, some professional personnel were sent from the State Ministry of Agriculture to occupy certain important key positions. A greater proportion (88.3%) of the EAs had above six years working experience, while the remaining 11.7% had 3 – 5 years working experience. A long working experience aids to increase proficiency on the job (Igben, 1988). A long working experience also gives room for acquisition of knowledge and skills which are crucial to effective job-performance.

Role Clarity Level of the EAs

Data in Table 2 show that the job activities of the EAs were very clear (= 5.0) to them, while the supervisor's expectations (= 4.1), evaluation methods (= 4.1) and decision-making process within the organization (= 4.1) were fairly clear to them.

The role conflict resolution (= 3.4) was just clear to them. The EAs' role clarity level was computed to be 4.1; implying that on the whole, their role within the organization was fairly clear to them.

Table 2

EAs' Role Clarity Mean () Scores

Roles Clarity Area	Mean Score()
Clarity about job activities	5.0
Clarity about the supervisor's expectations	4.1
Clarity about evaluation methods	4.1
Clarity about decision-making process	4.1
Clarity about role conflict resolution	3.4
Total Mean Score () =	20.7
Role Clarity Level (20.7/5) =	4.1

EAs' Level of Perception of their Profession Routine Duties

According to Table 3, attendance at Block Meeting (= 4.2), drawing up a work plan for the week (= 4.1), working out a fixed visit schedule to farming groups (= 4.1), listing the names of contact farmers (= 4.0) and delineating of circle into eight sub-circles (= 4.0) were perceived to be very important. On the other hand, conversant with the geographical limit of one's circle (= 3.9), attendance at two forth-nightly training meetings per month (= 3.9), living within the geographical area of the cell (= 3.9), recording of all scheduled activities in the work-book (= 3.8), keeping of clear, accurate and up-to-date records of extension activities (= 3.8) and making one special visit that is necessary (= 3.3) were perceived to be fairly important. The EAs' level of perception of their professional routine duties was computed to be 3.9; indicating that on the whole, the EAs perceived their professional routine duties to be fairly important to them.

Percentage Work-time Spent on Agricultural Activities by the EAs

Data in Table 4 reveal that the EAs spent their time on both agricultural and non-agricultural activities. Majority (42) of the EAs spent 70-100% of their working-time on crop production activities, while the remaining 18 EAs spent not less than 50% of their working time on crop production programmes. A total of 38 EAs did not spend any of their working-time on irrigation activities, while a total of 20 EAs spent 10-25% of their working-time on irrigation. Only two of them spent 50-70% of their working-time on

irrigation projects. A greater number (56) spent 0-50% of their working-time on irrigation projects. A greater number (56) spent 0-50% of their working-time on animal production activities, while those who spent up to 70% of their working-time on animal production were just four in number.

Table 4 also shows that a large number (37) of the EAs spent 0 – 10% of their working-time on fisheries activities, while 21 of them spent 25-50% of their working-time on fisheries projects. Only two of them spent up to 70% of their working time on fisheries activities.

It is also evident from Table 4 that 51 EAs spent 0-25% of their working-time on the formation and working with co-operative societies, while nine of them spent 50 – 70% of their working-time on co-operative societies. In the same vein, 36 of EAs spent 25 – 70% of their working-time on rural community development activities.

The implications of these findings are that, the EAs spent their working-time on both agricultural and non-agricultural activities. With respect to agricultural development activities, much more time was given to crop production by the EAs. On the other hand, less working-time was spent on animal and fisheries production. One of the major problems militating against effective livestock extension system in Nigeria is the poor recognition accorded it by the agricultural agencies and their agents (Williams and Williams, 1991; Akeeb, 1997). In case of the non-agricultural development activities, more working-time was spent on rural community development activities than those of the co-operative societies.

Table 3

EAs' Professional Routine Duties Perception Mean () Scores

Professional Routine Duty	Score()
Being conversant with geographical limit of one's circle	3.9
Delineating the circle into eight sub-circles	4.0
Listing the names of contact farmers	4.0
Specifying a precise and regular meeting point with contact farmers	3.9
Working out a fixed visit schedule to farming groups	4.1
Drawing up a work plan for the week	4.1
Recording all scheduled activities in a work-book	3.8
Attending two forth-nightly meetings per month	3.9
Making one special visit that is necessary	3.3
Living within geographical area of the cell	3.9
Keeping clear, accurate and up-to-date monthly records of extension activities	3.8
Submitting monthly summary report to Block Extension Supervisors	3.9
Attendance at block meetings	4.2
Total Mean () Score	50.8
Perception Level (50.8/13)	3.9

Table 4

Frequency Distribution of EAs on the Basis of Their Working-time Spent on Agricultural and non-Agricultural Activities (n =60)

Activity	0%	10%	25%	50%	70%	100%
Agricultural Development						
Crop Production	0	0	0	18	20	22
Irrigation	38	12	8	1	1	0
Animal Production	1	7	21	27	4	0
Fisheries Production	19	18	13	8	2	0
Non-Agricultural Development						
Establishment of cooperative societies	23	17	11	3	6	0
Community Development	6	18	12	14	10	0

Monthly Work-Load Perception by the EAs

Figure 1 shows that the EAs perceived the month of July to be a very busy month (= 5.0) of the year. This is because the month forms the peak of farming activities in many areas of Enugu State (e.g. Nsukka zone). April (= 4.4), May (= 4.8), June(= 4.8), August (=4.7) and September (= 4.1) were perceived by the EAs as fairly busy months. May and June could be seen as fairly busy months because at times, they serve as the beginning of rainy season in many parts of the state. For instance, in 1998, rain did not start in Nsukka until around May/June. The

rainy season always marks the beginning of extension activities. The months of August and September are the months when cropping activities in terms of crop production maintenance and demonstrations are going on in the farmer's farms; hence, the EAs from the study area are expected to be fairly busy.

The month of March (=3.5), October (=.5) and December (=3.4) were perceived by the EAs to be busy, probably because these are the fairly dry periods when campaigns for storage and dry season vegetable production are being executed. January (= 2.0); February (= 2.4)

and November (= 2.9) were perceived as not busy months. This is most likely due to the dry nature of the period. During this period, many of the farmers are always off-season and hence, less extension activities are normally carried out by the EAs. Their monthly work-load

perception level was computed to be 3.9; indicating that the majority of them perceived many of the 12 months in the year as busy probably due to their involvement in the fortnightly training programme and the weekly routine activities.

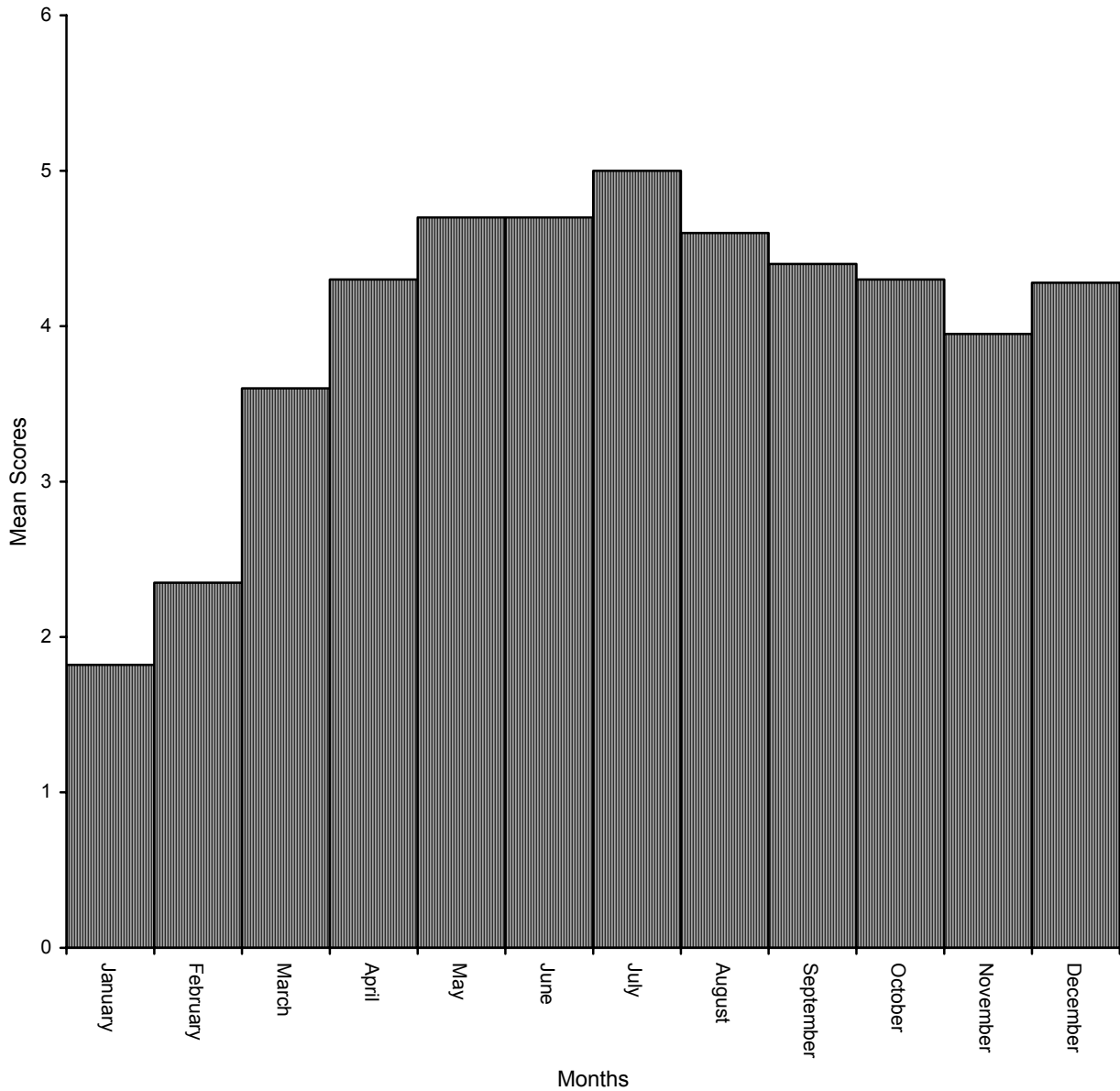


Fig. 1: Monthly Work-load Perception Mean Scores by EAs

Conclusion

A greater proportion (58.3%) of the EAs were relatively young. About 68% of them were males and almost all (63.3%) of them were married. Not less than 67% of them attained high levels of education. Those that were on secondment from the Ministry of Agriculture accounted for only 18.3%. About 88% of the EAs had above 6 years working experience.

The EAs' role within the organization was fairly clear to them, while the majority of them perceived many of their professional routine duties as being fairly important. Their working-time was spent on both agricultural and non-agricultural development activities. In the area of agricultural development activities, much more working-time was spent on crop production. A majority of the EAs perceived each of the 12 months in the year as being busy.

In conclusion the relatively young age of the EAs should serve as an added advantage to the agency. The agency should motivate the young EAs so that they will be willing to stay on the job and develop the necessary experience and expertise required by a functional organization. The EAs with low level of education should be encouraged to undergo in-service training in order to improve their proficiency on the job. For their role and professional routine duties within the organization to be very clear and at the same time, be of very importance to them, they should be given orientation in the area of philosophy, objectives, principles and organizational structure of the agency. Agricultural development agencies and their agents should accord both crop and animal production equal recognition and time frame since majority of the rural farmers are engaged in both crop and animal production.

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Journal of International Agricultural and Extension Education: From Early Beginnings to Sound Sustained Future

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Abstract

The *Journal of International Agricultural and Extension Education* (JIAEE) has been one of the primary outlets for publishing and disseminating research and development activities in international agricultural and extension education. Almost seven years have passed since the publication of the first issue of the journal. During this time, a total of 160 articles have been published. A review of these articles was undertaken to determine scope, focus, program areas, and subject matter topics of articles published in JIAEE. Findings include: 1) authors from a variety of public and private organizations representing all geographical regions of the world published articles in JIAEE, 2) articles published in JIAEE tend to be more research-oriented, and 3) subject matter topics such as extension education, agricultural education, sustainability, curriculum, and global issues, which have implications for both the U.S. and the developing world, were the topics frequently published in JIAEE.

Introduction

A group of 32 agricultural education faculty who were keenly interested in international development, came together in 1984 in Kansas City, Missouri to organize the Association for International Agricultural Education (AIAEE). The motto for this new organization was, "A professional association committed to strengthening agricultural and extension education programs and institutions in developing countries" (Thuemmel, 1985). The organization, 17 years later, now named the Association for International Agricultural and Extension Education (AIAEE), has attracted membership from the agricultural and extension education professions and related disciplines from nearly 50 different countries. AIAEE has sought to attract a broad range of membership including students, secondary teachers, county agents, researchers, college and university faculty, administrators, consultants, staff of donor agencies, and staff of non-government and private volunteer organizations (McBreen, 1989).

One of the purposes of AIAEE is to inform its members and others about new knowledge and information in international agricultural and extension education. To do this, AIAEE publishes refereed research papers at its annual conference in the form of proceedings. So far 17 volumes of the proceedings have been

published. The association also brings out a newsletter, "*The Informer*," to keep its membership informed of current events in the organization. In spring 1994, AIAEE published the first issue of its refereed journal, *The Journal of International Agricultural and Extension Education* (JIAEE).

The *Journal of International Agricultural and Extension Education* (JIAEE) has been one of the primary outlets for publishing and disseminating research and developmental activities in international agricultural and extension education. The purpose of the JIAEE is to enhance the research and knowledge base of agricultural and extension education from an international perspective. The articles appearing in the JIAEE reflect current international research activities of the members of the AIAEE. In addition, the JIAEE also reflects philosophical and application orientation in international agricultural and extension education activities carried out by AIAEE membership. In a membership survey conducted by Eaton, Radhakrishna and Diamond (1994), AIAEE members indicated that publications (the newsletter and the JIAEE) of AIAEE reflected relevant issues related to international agricultural development.

Steele (1996) in his vision of AIAEE in the year 2005 indicated that The Journal of International Agricultural and Extension Education will have:

a) become a dynamic, flexible, electronically driven publication; b) attracted a worldwide circulation; c) received significant volume of manuscripts from around the world; d) diversified the contents of the journal to include research-based, philosophical, applied and practical articles, book reviews, commentary, and feedback, etc.; and e) multilingual versions, particularly Spanish, French and Arabic. Abstracts of current issues of the journal have been published in Spanish. Publishing abstracts in French is on the way. Additionally, the leadership team and the Journal Editorial Board is examining the possibility and feasibility of the journal going on-line in the near future (Connors, 2001).

Related Literature

Journals are important channels for the dissemination of research information and are indispensable to educators who are active in research and development and/or teaching. According to Goldsmith (1984), journals provide an avenue for recognition for many researchers since a published journal article is the first formal presentation to the scientific community of an innovation or discovery.

Past issues of journals and conference proceedings offer the opportunity for content analysis of the major themes or trends over the years. In addition, it may also be the best source to the most current state-of-the-art literature in any discipline. Such content analyses of journals and conference proceedings have been undertaken by Radhakrishna and Mbagha (1995); Freer, Clouse, Rocco and West (1994); Radhakrishna and Jackson (1992); Newman (1990); Crunkilton (1988); Moss (1986) and Goldsmith (1983).

In a review of the *Journal of Agricultural Education* (JAE) during the decade 1980-90, Radhakrishna and Jackson (1992) found several publishing patterns. These included: 1) number of articles published in the journal had increased, 2) scholars who publish in the JAE were mostly male and they tend to publish only in six major subject matter topics; 3) most of the articles published had more than two authors, indicating that agricultural educators work together as a team; and 4) authors who published in JAE were most likely to use journals and

books as major sources of citation in their research.

Newman (1990) examined reader opinions of the JAE and indicated that the readers were satisfied with the review process, format, length, quality of articles and problems addressed in the journal. However, readers suggested increasing the number of articles published per year and advertising to offset increasing costs.

Moss (1986) analyzed the contents of papers presented at NAERM for the years 1974-85. Moss found that four content areas had received considerable attention during the years 1974-1985. These were curriculum, teacher attitudes and teacher training, supervised occupational experiences (SOE), and employment opportunities. When examined over a 12-year trend, the subject matter of curriculum has been investigated consistently by agricultural educators. Also, SOE emerged as an important topic in the early eighties. However, a majority of the topics were in the "other" category. Moss concluded that priorities for research in agricultural education are not static (p. 6).

Crunkilton (1988) examined the summaries of research and development activities in agricultural education and research in extension education for six years (1981-82 to 1986-87). He found 67% of the studies were at senior high level, 41% in the area of curriculum/development and 54% statewide in scope. He concluded that "research in agricultural education is focused, but that focus has come about more by accident rather than through planned activities" (p. 327).

Almost seven years have passed since the publication of the first issue of the journal. Has the journal met the needs of its members? Who publishes and what is published in the journal will provide useful insights as we look to the year 2001 and beyond. Further, to what extent are we closer to the vision of AIAEE as predicted by Steele (1996)? A review of the journal since its inception will help us understand where we are, analyze our past efforts, where we would like to be, and what needs to be done in the future. As Knight (1986) indicated, what an organization or a profession publishes in its journal or conference proceedings should be a good indicator of what

is going on with the organization or the profession. In addition, a review of JIAEE would provide valuable insight into the subject matter content published in the JIAEE.

Purpose and Objectives

The major purpose of this study was to analyze the content of articles published in the JIAEE for the years 1994-2000. Specifically, three aspects important to the journal and the organization were studied.

1. A profile of authors who have published in JIAEE.
2. Scope, focus, and program areas of articles published in JIAEE.
3. Subject matter topics addressed by authors who have published in JIAEE.

Methodology

A census of all types of articles (N=160) published in the JIAEE during the years 1994-2000 was considered for the study. A total of 18 issues and 160 articles were analyzed. Of these 160 articles, 101 (63%) were feature articles, 23 (14%) were invited articles, 11 (7%) were commentary articles, and 25 (16%) book review and tools of trade articles (see Table 1). For the purposes of in-depth review, only feature articles (N=101) were examined.

A codebook was developed to enter data from the 101 feature articles. This codebook included information on several variables—gender, title or professional rank, authorship, geographic region, focus, program area, and subject matter topics. For each of the 101 articles, information on these variables was collected and entered. Data were summarized using frequencies and percentages.

Results

Objective 1-- Profile of Authors

Authors who have published in JIAEE are mostly male (79%). In terms of professional rank, a majority of authors (30%) were from the "other" category that represented several private and public organizations, donor agencies (The World Bank, United Nations, Kellogg Foundation, Winrock International, World Neighbors), followed by associate professors (24%), assistant professors (15%), professors (14%), graduate students (9%), and lecturer/instructor (8%). Forty-four percent of the articles had two authors, followed by 31% single author, 22% three authors, and 4% more than three authors (Table 2).

Objective 2—Geographic Region (Scope), Focus and Program Areas

Scope of the articles was related to geographic region--Africa, Asia, Australia, South America, Europe, Middle East, The Caribbean, and the United States. Focus was categorized in terms of a developmental, curriculum, research, and philosophical. Program areas included agricultural education, extension education and international education. Results are shown in Table 3. Twenty-four of the 101 articles (24%) were related to the United States, followed by Africa (23%), Asia (18%), Central/South America (11%), Middle East (7%), Australia (5%), Europe, and The Caribbean (4% each) and others (4%).

Fifty-eight percent of the articles published in the journal had a research focus, followed by a developmental focus (18%), philosophical focus (16%), and curriculum (8%). Furthermore, 57 articles (56%) had an extension education emphasis, 26 articles (26%) an international education/development emphasis, and 18 articles (18%) an agricultural education emphasis.

Table 1

Types of Article Published in JIAEE

Year/Issue	Feature Articles	Invited Articles	Commentary	Book Reviews/ Tools of Trade	Total
1994					
Spring	9	1	--	--	10
Summer	--	--	--	--	--
Fall	10	--	--	1	11
TOTAL	19	1	--	1	21
1995					
Spring	8	--	--	--	8
Summer	--	--	--	--	--
Fall	9	1	--	--	10
TOTAL	17	1	--	--	18
1996					
Spring	6	--	1	2	9
Summer	--	--	--	--	--
Fall	8	--	--	2	10
TOTAL	14	--	1	4	19
1997					
Spring	7	--	2	1	10
Summer	--	5	--	4	9
Fall	6	--	1	2	9
TOTAL	13	5	3	7	28
1998					
Spring	5	--	3	2	10
Summer	--	6	--	--	6
Fall	6	--	2	4	12
TOTAL	11	6	5	6	28
1999					
Spring	8	--	--	--	8
Summer	--	5	--	--	5
Fall	7	--	--	4	11
TOTAL	15	5	--	4	24
2000					
Spring	4	--	2	1	7
Summer	--	5	--	--	5
Fall	8	--	--	2	10
TOTAL	12	5	2	3	22
Grant Total	101	23	11	25	160
Percent	63	14	7	16	100

Note: From 1997 and onwards, outstanding papers were treated as invited papers. Prior to 1997, outstanding papers were grouped under feature articles.

Table 2

Profile of Authors who Publish in JIAEE

Profile	1994	1995	1996	1997	1998	1999	2000	Total/(%)
Gender*								
Male	17	9	12	12	10	12	8	80 (79)
Female	2	8	2	1	1	3	4	21
Total	19	17	14	13	11	15	12	101
Title/Rank*								
Professor	2	2	1	4	3	-	2	14
Associate	4	4	1	3	5	7	-	24
Assistant	4	3	2	2	1	1	2	15
Instructor	1	1	1	1	-	3	1	8
Grad Asst.	3	2	2	-	-	1	1	9
Other	5	5	7	3	2	3	6	31
Total	19	17	14	13	11	15	12	101
Authorship*								
Single	7	5	5	4	2	4	4	31
Two	7	6	6	7	7	8	3	44
Three	5	4	3	2	1	3	4	22
Four or more	-	2	-	-	1	-	1	4
Total	19	17	14	13	11	15	12	101

*First authors and feature articles only

Note: From 1997 and onwards, outstanding papers were treated as invited papers. Prior to 1997, outstanding papers were grouped under feature articles.

Table 3

Scope, Focus and Program Area of Articles Published in JIAEE*

Geographic Region/Focus/ Program Area	1994	1995	1996	1997	1998	1999	2000	Total
Geographic Region								
United States	4	10	2	2	1	2	3	24
Africa	5	2	3	3	4	2	4	23
Asia	4	2	3	1	3	4	1	18
S. America	3	2	2	2	2	-	-	11
Middle East	1	-	1	1	-	4	-	7
Australia	-	-	1	2	-	2	-	5
Europe	-	-	1	-	1	-	2	4
The Caribbean	1	-	-	1	-	1	1	4
Other	1	1	1	1	-	-	1	5
Total	19	17	14	13	11	15	12	101
Focus								
Research	10	7	7	8	7	13	7	59
Developmental	4	4	4	2	1	1	2	18
Philosophical	5	4	3	2	1	-	1	16
Curriculum	-	2	-	1	2	1	2	8
Total	19	17	14	13	11	15	12	101
Program Area								
Extension Ed	12	6	5	8	9	9	8	57
International Ed	4	7	6	2	-	5	2	26
Ag Education	3	4	3	3	2	1	2	18
Total	19	17	14	13	11	15	12	101

*Feature articles only

Note: From 1997 and onwards, outstanding papers were treated as invited papers. Prior to 1997, outstanding papers were grouped under feature articles.

Objective 3--Subject Matter Topics

The titles and contents of the 101 articles were examined to determine subject matter topics (Table 4). Twenty-six articles (26%) dealt with agricultural extension, followed by agricultural education (9%), and topics such as sustainability, curriculum, and global issues (8%

each), women (7%), international agricultural development and evaluation (5% each), technology transfer (4%), indigenous knowledge, youth, small farmers, and collaboration (3% each), student performance and leadership (2% each), and other--dairy, adult education, job satisfaction, and farming systems (3%).

Table 4

Subject Matter Topics of Articles Published in JIAEE

Subject Matter	1994	1995	1996	1997	1998	1999	2000	Total
Ag Extension	5	3	4	5	2	5	2	26
Ag Education	1	2	1	1	-	3	1	9
Sustainability	1	-	1	-	1	3	2	8
Curriculum	-	3	3	1	1	-	1	8
Global Issues	1	3	-	-	2	1	1	8
Women	-	3	-	2	1	-	1	7
International Ag Development	2	1	1	1	-	-	-	5
Evaluation	-	-	-	1	-	1	3	5
Tech. Transfer	1	-	2	-	1	-	-	4
Indigenous Knowledge	2	-	1	-	-	-	-	3
Youth	2	1	-	-	-	-	-	3
Small Farmers	2	-	1	-	-	-	-	3
Collaboration	-	-	-	-	1	1	1	3
Student Performance	-	-	-	1	-	1	-	2
Leadership	1	-	-	-	1	-	-	2
Dairy	1	-	-	-	-	-	-	1
Adult Ed	-	1	-	-	-	-	-	1
Job Satisfaction	-	-	-	1	-	-	-	1
Farming Systems	-	-	-	-	1	-	-	1
Other								
Grand Total	19	17	14	13	11	15	12	101

*Feature articles only

Note: From 1997 and onwards, outstanding papers were treated as invited papers. Prior to 1997, outstanding papers were grouped under feature articles.

Conclusions and Recommendations

Based on the findings of this study, it can be concluded that the journal offers an array of publishing and reading opportunities to members of AIAEE.

Findings indicate a higher percentage of authors who publish in JIAEE are from private and public organizations such as the World Bank, United Nations, Winrock International, and World Neighbors. This is a good trend indicating that the journal is attracting manuscripts from outside academia. Also, a majority of the articles published in the journal had two or more authors, indicating

collaborative efforts and teamwork in conducting research and disseminating findings. Collaborative efforts in and between academia and public and private organizations should be encouraged.

Articles published in the JIAEE indicate a tendency to focus more on research than on developmental, philosophical, and curriculum aspects of the disciplines of agricultural education and extension education. An important question in this regard is whether there should be a better balance of articles among the several foci, or is the current trend focusing research-based articles acceptable? Closely related to this finding is the question of

evaluation criteria used for different foci. A well thought out set of criteria has been established for research-focused articles and appears to be working well. The inadequacy is that the same criteria are used for developmental and philosophy-based articles. Is this appropriate or should separate criteria be developed to evaluate these types of articles submitted for publication in the journal? It is suggested that the editorial board of the journal as well as the leadership of the organization should look into this question.

While articles published in the journal represent all geographical regions of the world, there was a preponderance of articles related to the United States. Most of these U.S. related articles dealt with internationalizing the curriculum and global issues. The statement on the inside cover page of the journal reads ". . . articles intended for publication should focus on international agricultural education and or international extension education." This is the major purpose of the journal, and therefore we must attract manuscripts from U.S. educators and scholars about their work in other countries and educators and scholars from other countries rather than manuscripts addressing local issues and problems.

A variety of subject matter topics in international agricultural and extension education are published in JIAEE, which provides perspectives about the research and philosophical efforts pursued by the members of AIAEE. Most common subject matter topic published is agricultural extension, which is the focus of most research efforts between the U.S. and developing countries. Agricultural education was the next most frequently studied subject matter, followed by curriculum wherein educators engaged in international education have discussed challenges and opportunities for internationalizing the curriculum in U.S. schools, colleges, and universities. In addition, articles relative to global issues/international agricultural development have implications for both the U.S. and the developing world.

At the 1996 AIAEE meeting, the editorial board expressed concern about the number of manuscripts submitted for publication, causing problems in timely publication. It is important to recognize that in the last seven years, a little

over 250 papers were presented at the AIAEE annual conference, but only 124 (feature plus invited articles) made it into the journal (note: some papers may not have been presented at past AIAEE meetings). Even if they made it to the journal, most of them (23 articles) were outstanding research papers. There is a need to encourage members to submit more articles. In his remarks in the inaugural issue of the Journal, Meaders (1994) indicated that the audience for the journal should not be limited to agricultural and extension education professionals, but should encompass other professionals in fields such as sociology, agronomy, agricultural economics, animal science, agricultural engineering, forestry etc. Attracting broader audiences for the journal will help in improved communication and international linkages for mutual benefit. In addition, this will provide a broader scope for the journal and increase membership and circulation.

Educational Importance

This analysis of articles published in the *Journal of International Agricultural and Extension Education* provides a useful perspective to authors and readers of the scholarly interests of international agricultural and extension educators. It also provides useful insights for a broader and more balanced representation of published articles. It also poses some questions on editorial and policy matters for the journal and associations' leadership, answers to which would facilitate the review and publications process.

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A Comparison of the Effectiveness of On-Campus and Off-Campus Training Courses for Agricultural Staff at the International Institute of Tropical Agriculture (IITA)

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Abstract

The study aimed to compare the effectiveness of IITA training courses conducted at on-campus and off-campus locations. A survey research design was used for the study with a population of 210 respondents who attended IITA courses both on-campus and off-campus. Data were collected with the use of questionnaires. The results showed that trainees perceived that there was no difference in the overall assessment of courses and achievement of course objectives of both on- and off-campus courses. The same result was obtained for course design and delivery, which indicates that resource persons at off-campus are as technically effective as their counterparts on-campus. Trainees however perceived a better interaction of resource persons with trainees and better facilities in the on-campus than at off-campus locations. It was therefore recommended that moving of training courses from the headquarters of international centers to off-campus sites should be a gradual process until adequate facilities are provided.

Introduction

The International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria is a research and training institute established by the Ford and Rockefeller Foundations in 1967 before it became one of the centers managed by the Consultative Group on International Agricultural Research (CGIAR). The recognition of training as a fundamental activity of IITA goes back to the very establishment of the institute's Decree Number 32 of July 24, 1967. As a result of this objective, training at IITA began at an early stage of the institute's development. Effective diffusion of new knowledge and technologies developed by the international agricultural systems for successful growth in agricultural production depends upon development of cadres of extension workers whose background includes training in research as well as in communication and marketing (Ruttan, 1982).

Training can help in building national capabilities for agricultural research and food production in Africa by increasing the corps of competent research workers and extension workers in the humid tropics. Training attempts to change trainees' performance through improved knowledge, skills, and changed attitude. Gasser (1991) reported that in addition to courses held on-campus at IITA, courses were also held off-campus either as regional courses attended by participants from many countries or in-country courses attended by nationals only.

Both on-campus and off-campus courses are IITA organized short courses, which run for about two weeks with IITA staff fully in charge of the on-campus courses. On the other hand, the off-campus courses are conducted in collaboration with the staff of national agricultural research systems (NARS), which include research institutes and universities in African countries whose facilities are also used for the courses. The scientists at the collaborating institutions in NARS with the assistance of one IITA staff usually design, manage, and deliver the off-campus courses.

The primary justification for expending time, money, and effort on training is to eliminate or reduce performance deficiencies (Charles, 1990). As a result of this, Davies (1973) indicated that in arranging and allocating training resources for learning, the primary responsibility of the training organization must be to ensure the effectiveness of the training program. The theoretical frame work for this study was therefore based on Davies conceptual model for training effectiveness (Mabey, 1989, Davies, 1973). Adapted to this study, the Davies's model suggests that the criteria or indicators of effectiveness of training are the successful achievement of course objectives, successful overall assessment of the course, quality of design and delivery, and enhanced motivation of the trainees. Effectiveness is taken as the art of doing the right things (Ward & Dettoni, 1974).

There have been however, differences in opinion about the effectiveness of off-campus courses as compared to on-campus courses. Gulley (1997) indicated that decentralization of group training courses off-campus has helped to put IITA research results and improved technologies into the hands of national agricultural research systems' (NARS) researchers and extension staff. According to him, the most important benefit of decentralization of courses off-campus is that training activities would accrue to NARS personnel who will remain within the regions to provide training for years to come with less dependence upon international organizations.

On the other hand, off-campus courses are often perceived to be of lower value than on-campus courses (Murphy, 1997, Olcott, 1991). Wagner and Roland (1992) reported that "even though many people argue that out-door training settings enhance the success of training but their research does not support that assumption." Gogan (1993) also indicated that the effectiveness of NARS-managed off-campus training courses is constrained by limited infrastructures, facilities, and lack of experienced resource persons. Supporting this view, Ajayi (1997), based upon spot assessments of training activities in some African countries, also indicated that decentralization of agricultural staff training off-campus reduces the quality of IITA training due to inadequate facilities at off-campus and inexperienced scientists who plan and deliver the courses.

Evaluation of training courses has always been a usual event at the end of each course at IITA but analysis of the evaluation feedback to compare the effectiveness of on-campus courses to off-campus courses has not been carried out. Such a comparison between on-campus and off-campus training courses would facilitate adequate decision making on where effort should be focused to improve the effectiveness of courses. Learning could be affected either negatively or positively by the design of a meeting environment (Finkel, 1997) and, according to Wheatley (1993), physical comfort in the course venue, which is as important as mental comfort. Similarly, Davis and McCollon (1974) indicated that "the ability to change is directly proportional to the degree of comfort adults feel."

The major objective of the study, therefore, was to compare the perceptions of trainees on courses conducted on-campus and those conducted off-campus, which are managed by staff of national agricultural research systems. Specifically, the objectives were to:

- Compare the level of achievement of course objectives and overall assessment of both on-campus and off-campus courses as perceived by trainees
- Compare the effectiveness of the design and delivery of on-campus and off-campus courses.
- Compare the adequacy of facilities at on-campus and off-campus courses.

Methodology

A survey research design was used for the study. The survey was to obtain the perception of trainees with regard to the effectiveness of on-campus courses as compared to off-campus courses conducted in many African countries. The population of interest for this study was both adult male and female trainees who have attended at least one IITA training course at both on-campus and off-campus. This was based on the assumption that those who have attended courses both on-campus and off-campus would be in a better position to provide their experiences for comparison than those who attended only either on-campus or off-campus course. The researcher obtained from the IITA database 250 names of past trainees that attended both on-campus and off-campus courses, which were from fifteen African countries. All of the 250 past trainees were surveyed. Because the locations of off-campus courses attended by the 250 trainees vary and many, all courses outside IITA campus were therefore grouped as off-campus courses.

The questionnaire was designed to include a Likert-type scale with a five-point scale (1=poor, 2=satisfactory, 3=undecided, 4= good and 5=excellent). Four relevant sections were used for comparison of on-campus and off-campus courses' effectiveness. The first section of the questionnaire was the demographic characteristics of the respondents, which included age, sex, marital status, qualification,

job title, and institution. The second section, which was achievement of set objectives and overall assessment of course, included the following variables: overall assessment of course, planning and management of course, professional benefit to trainees, and extent to which course objectives were achieved. The design and delivery of course that formed the third section included presentation of topics, coverage of subject matter, integration of lectures and practical sessions, interaction between trainees and resource persons, and quality of training materials. The fourth section was the training facilities such as training classroom, accommodations, meals provided, and local transportation arrangements.

The IITA Monitoring and Evaluation Unit established content and face validity of the questionnaire. A test-retest method was used to test the reliability of the questionnaire. The questionnaire was pilot-tested with 30 trainees in one course each at both on-campus and off-campus courses. Cronbach's alpha coefficients ranged from 0.69 to 0.89 for on-campus while off-campus ranged from 0.67 to 0.80.

Two copies of the questionnaire with inscription on each indicating on-campus and off-campus and a cover letter describing the study were sent to each of the identified 250 past trainees by mail using the addresses in the database. In an effort to keep the return rate as high as possible and as a result of international mail difficulties, a follow-up mailing to non-respondents was conducted after two months of the first mail. Persons who had not responded two months after the second mail were regarded as non-respondents. After the two months, the two hundred and ten questionnaires received, which gave a response rate of eighty-four percent, were then used for statistical analysis.

Data were analyzed using SPSS for Windows 6.0. Appropriate descriptive statistics were used including frequencies, percentages, means, and standard deviations. Because data were obtained from the total population of 210 trainees instead of a selected sample, inferential statistics were not used for comparisons of on-campus and off campus courses.

Results and Discussion

Socio-demographic data of respondents
Data analysis in Table 1 showed that a higher proportion of the respondents were between 31 and 40 years of age (54.8%) and there was no participant whose age was below 25. About 82.9% of the respondents were males. The result also shows that a very small percentage (6.2%) of the respondents was single. The table shows that the majority of the respondents had B.Sc./Higher National Diploma (HND) degrees (54.8%) and Ordinary National Diploma (OND) (26.2%). Most of the respondents were researchers (44.3%) and extension officers (35.2). The majority of the respondents were either working in a research Institute or in a Ministry of Agriculture (41.0%) and (31%) respectively.

The result in Table 2 shows that respondents provided slight differences in the means of the overall assessment of achievement of both on-campus and off-campus courses. Three of the variables, planning and management of course, professional benefit to trainees, and overall assessment of course did not provide much difference in their means for both on-campus and off-campus courses. However, there was a higher mean for achievement of course objectives at off campus courses than on-campus courses.

Table 1

Demographic characteristics of the respondents (N = 210)

Variables	Frequency	Percentage (%)
Age		
25 –30 Years	20	9.5
31 - 40	115	54.8
41-50	75	35.7
Sex		
Male	174	82.9
Female	36	17.1
Marital status		
Married	197	93.8
Single	13	6.2
Qualification		
Diploma	55	26.2
B.Sc/HND	115	54.8
M.Sc	32	15.2
PhD	8	3.8
Job Title		
Technician	43	20.5
Researcher	93	44.3
Extensionist	74	35.2
Institution		
Research Institute	86	41.0
Ministry of Agric.	65	31.0
Private institution	11	5.2
NGO	48	22.8

Source: Survey Data.

Table 2

Means and standard deviation for respondents perception of overall assessment and achievement of course objectives (N =210)

Items	On-Campus		Off-Campus	
	Mean	SD	Mean	SD
Overall assessment of course	2.67	0.47	2.65	0.47
Planning and management of course	2.37	0.57	2.27	0.52
Professional benefit to trainee	2.77	0.42	2.75	0.45
Achievement of course objectives	2.61	0.49	2.92	0.70
Grand Mean	2.61	0.49	2.65	0.54

“1 = Poor, 2 = Satisfactory, 3 = Undecided, 4 = Good, 5 =Excellent”

As reported in Table 3, the majority of respondents perceived on-campus courses to be equal to off-campus courses in relevance to effectiveness of design and delivery. This could be an indication that NARS scientists serving as resource persons in off-campus courses are probably effective in course design and delivery as their counterparts in the international center. This is an interesting result because the competence of resource persons in off-campus courses has been a major concern as reported in earlier studies and literature. In regard to the interaction of trainees and resource persons, respondents perceived the interaction in the on-campus courses to be better than off-campus courses, which could be due to greater exposure of resource persons at on-campus courses than the off-campus resource persons.

In terms of facilities, respondents provided higher means for on-campus courses than off-campus courses for three out of the four variables used in the comparison (Table 4). These results agree with the postulation of Dantsey (1993), that trainees who are acquainted with the facilities in the international institutions will find the facilities in the national programs probably less comfortable and inefficient due to better facilities at the international centers. It was interesting, however, to note that respondents preferred the meals in the off-campus courses more than the meals served in the on-campus courses. This might be due to international menus being served at the IITA campus as compared to a local African menu provided at off-campus courses, which trainees might have preferred.

Table 3

Means and standard deviations of respondents' perception of course design and delivery (N=210)

Items	On-Campus		Off-Campus	
	Mean	SD	Mean	SD
Presentation of topics	2.62	0.48	2.56	0.53
Coverage of subject matter	2.50	0.54	2.57	0.54
Integration of lectures and practical sessions	2.41	0.53	2.50	0.66
Quality of training materials	2.42	0.57	2.49	0.52
Interaction between trainees and resource persons	2.80	0.45	2.25	0.79
Grand Mean	2.55	0.51	2.47	0.61

"1 = Poor, 2 = Satisfactory, 3 = Undecided, 4 = Good, 5 =Excellent"

Table 4

Means and standard deviations of respondents' perceptions of course venue facilities(N=210)

Items	On-Campus		Off-Campus	
	Mean	SD	Mean	SD
Classroom	2.65	0.50	2.35	0.58
Accommodation	2.71	0.58	1.61	0.71
Meals	1.86	0.61	2.81	0.54
Local transportation arrangement	2.26	0.69	2.05	0.59
Grand Mean	2.37	0.60	2.05	0.61

"1 = Poor, 2 = Satisfactory, 3 = Undecided, 4 = Good, 5 =Excellent"

Conclusions and Recommendations

The study revealed weaknesses of both on-campus and off-campus training activities. The study showed that, except for meals, trainees preferred facilities on-campus than off-campus. The same applied to interaction of trainees and resource persons and management of trainees. Trainees perceived little difference in the effectiveness of resource persons at either location. The findings of this study, therefore, have some implications for agricultural training organizations as well as policy makers. Based on the findings of this study, the following recommendations are made to improve courses:

(a) There is need to for a review of the policy on accommodation, meals, and local transportation for trainees. All of these factors play an important role in the commitment of trainees to the learning process. In addition, training organizations should ensure that the facilities for off-campus courses be adequate enough to foster learning. Setting up regional training centers by the training institutions like IITA with provision for adequate facilities could be a way out of the perceived problem that on-campus facilities are better than off-campus facilities.

(b) To improve the effectiveness, quality, and for sustainability of training of agricultural staff in Africa, moving courses at the international centers to off-campus is a good effort that would have a long-term significant

impact on the capabilities of NARS to conduct training courses because NARS personnel have now shown to be more educated and experienced than some years back. However, due to the present constraints in the NARS, such as facilities for training, the process of moving training course off-campus by international agricultural centers should be a gradual process.

In view of available evidence from the study, it can be concluded that contrary to expectations, the NARS staff conducting off-campus courses for IITA can serve technically as resource persons equivalent to their counterparts in the international center.

As this study was limited to the trainees' perceptions on the training courses attended, further research is needed to determine the impact of the training courses on the job performance of trainees in their different organizations. This is because there may not be any improvement in trainees' performance in spite of improvement in their knowledge and skills during courses (Jaiswal, 1992). A better comparison of the impact of on-campus and off-campus courses could be determined from such a study.

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Swidden Agriculture in a Forest Society: Livelihood Strategies in the Maya Biosphere Reserve Community of Uaxactún, Petén, Guatemala

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Abstract

Milpa, or slash and burn agriculture, is one of many livelihood strategies utilized by most households in Uaxactún, Guatemala. Participatory Rural Appraisal and Rapid Rural Appraisal revealed that although household livelihood systems are primarily based on the extraction of non-timber forest products (NTFPs), milpa is of fundamental importance. These approaches also suggest that households shift in and out of subsistence as they respond to changes in their sources of cash earnings. Ethnographic linear programming supports this premise, showing that households also modify their livelihood strategies in response to changes in the environment. How households choose to strategize and the intensity with which they participate in each livelihood activity, however, is driven by their composition and the household ratio of consumers to producers. These two factors not only determine their cash and nutritional needs, but also the size of their labor force, enhancing or inhibiting their ability to support themselves.

Introduction

Uaxactún is a community located in Guatemala's Petén, its northern-most department (state) that shares borders with Mexico and Belize. Although the Petén comprises one-third of the country's area, it was largely ignored by the Colonial Spanish and early Guatemalan governments because of its remoteness and inhospitable climate. It was not until the mid-1960s that colonization began in earnest (Schwartz, 1990). Explosive growth continues, driven by severe land shortages in the country's highlands and the return of refugees following Guatemala's civil war.

Uaxactún is located within the borders of the Maya Biosphere Reserve (MBR), designated in 1990 through a cooperative effort between the Guatemalan government, Conservation International, and The Nature Conservancy. The MBR covers more than 1.6 million hectares (ha) and is the largest contiguous tract of tropical forest left within Central America. The reserve

consists of five national parks and three biotypes (biological reserves) surrounded by a large Multiple Use Zone (MUZ). While permanent settlement is not allowed within parks or biotypes, it is permitted in the MUZ. Small-scale agriculture and exploitation of above and below ground resources, subject to certain regulations, are also allowed within the MUZ.

Uaxactún is located in the MUZ some 83 kilometers north of Flores and is a small, relatively isolated community of 136 families (Organización Manejo y Conservación, 1998). The village lies along an unpaved road running from Tikal National Park, 24 kilometers to the south, to the Mexican border some 100 kilometers to the north. This community was originally the area center of a Maya city-state from about 278 to 889 A.D. (Smith, 1950, cited in McNab, 1999). Contemporary civilization followed in the late 1800s and early 1900s when Uaxactún was used as a chicle (*Manilkara zapota*) camp. Today, most families base their livelihoods upon a combination of hunting; wild

allspice (*Pimenta officinalis*) harvesting; xate cutting, an understory palm of the *Chamaedora* species; chicle extraction, used as a base for chewing gum; and milpa, or slash and burn agriculture. It should be noted here that milpa is also used as a descriptor of where maize and other crops are grown, much like the words 'field' or "farm."

Uaxactún was awarded an 83,558 ha community forest concession in early 1998 by the Guatemalan government, formally giving the community management and usufruct rights to all above-ground resources. Under the terms of the concession, the community must meet governmental requirements (outlined in McNab, 1999) for managing the area and pay a lease of \$142,049 over a ten-year period. Taxation of selected non-timber forest product (NTFP) sales, such as xate, is currently generating some income for payment of the lease fee and management of the concession area. The community is also pursuing other income-generating possibilities such as ecotourism and small local industry.

The Wildlife Conservation Society (WCS) has consistently worked with Uaxactún for several years throughout the concession solicitation process as well as in wildlife conservation. Presently WCS partners with two other non-governmental organizations (NGOs) to assist the community with technology transfer, training, and all aspects of concession management. WCS wished to learn the extent to which village households depended upon milpa or swidden agriculture. While milpa was generally perceived to be a subsistence activity, its importance to household livelihoods was not well understood.

Purpose and Objectives

This objective of this study was to determine the relative importance of milpa to households within the context of household livelihood systems (Chambers & Conway, 1992; Hoon, Singh & Wanmali, 1997; Scoones, 1998). This study also sought to determine if milpa's relative importance as a livelihood strategy (Devereux, 1999) changed as intra- and extra-household conditions changed. The following objectives were developed to guide the study: (1) ascertain the relative importance of milpa to other

household livelihood activities, namely harvesting allspice, chicle, xate, and cash employment to Uaxactún's families; and (2) examine the response of modeled households to three different scenarios (a change in the natural environment, a shift in markets for NTFPs, and a new option for local employment).

Methods and Data Sources

Research for this investigation was carried out from July to December of 1998 by the lead author of this study (Litow, 2000). Data gathered were not used to build only a qualitative understanding of how livelihood systems in Uaxactún work, but to descriptively and quantitatively model how households function.

Direct observation, informal individual interviews, Rapid Rural Appraisal (RRA), Participatory Rural Appraisal (PRA), and formal questionnaires were used to gather information about household livelihood systems and strategies, the relative importance of activities comprising those systems, and resources used and provided by household activities. Chambers (1997) contrasts RRA and PRA by suggesting that RRA is utilized to 'find out' or elicit information, where PRA empowers people to use their knowledge, means, and resources to solve their problems without relying on outsiders. The outsider's role in RRA is more investigative in nature, where in PRA it is more facilitative in nature.

For this study, the RRA methods which were used included secondary data, direct observation, expert opinion, livelihood systems diagrams, semi-structured interviews, household time lines, and transect walks. PRA methods included ethnographic drawings, daily and seasonal calendars, trend lines, and matrix scoring and ranking.

Ethnographic linear programming (Bastidas, 2001; Kaya, Hildebrand, & Nair, 2000) was used to simulate the response of modeled households to various scenarios. Traditional linear programming is a method of maximizing or minimizing the outcome of a primary objective relative to selected constraints. For example, if a household wants to earn as much cash as possible, this household will use

available resources to carry out the necessary activities to do so, resources that are also being used to do other things such as produce needed food. The linear program calculates how much of those resources are available after meeting household needs and then calculates how much cash can be earned using the remaining resources.

This method diverges from traditional linear programming in the way the data are collected, and in the sense that socio-cultural parameters, changing nutritional requirements, evolving household compositions, and other factors, are added to enhance the models' dynamism. This, in turn, enables the programmer to build models that better reflect reality. Six actual households and one fictitious "average household" were modeled. This fictitious household was created to help determine whether the use of averages, masking the diversity found in the real situation, can result in misleading conclusions. When the scenarios (a change in the natural environment, a shift in markets for NTFPs, and a new option for employment) were presented, the effect upon each household was analyzed based upon each household's composition, or its unique characteristics in terms of its overall size, its members' ages, and their sex. These characteristics determine household behavior because they affect, among other things, a household's nutritional requirements and its ability to produce food and cash to sustain itself.

Findings

The first objective of this study was to determine the importance of milpa to households. Thirty-three residents participated in this activity. Seventy percent of respondents considered milpa as the most important household activity, and another 27% answered that xate harvesting was most important. Two PRA sessions were conducted where milpa's importance was examined over time. The first group of eight participants rated the importance of milpa much lower over time than other activities. This group was comprised of individuals who worked as laborers on Maya ruin restoration projects during the 1980s. The second group of nine participants, who did not have a history of working as employees, rated milpa as their most important household activity from 1980 – 1998.

Regarding the second objective, the three linear programming scenarios collectively showed several things. First, all six households and the seventh "average household" relied upon diverse sets of livelihood strategies to survive. These strategies were used in various combinations to reduce risk of extreme economic stress and hunger. The diversity of these strategies is paramount to household well being. When one or more elements of the livelihood system fail due to environmental disturbances or economic downturns, households can turn to other options for survival.

Second, the linear programming outcomes also showed that household composition and consumer-to-producer (C/P) ratios (Chayanov, 1986) strongly affect household livelihood strategies (Table 1). Household 1, for example, was able to narrow the scope of its livelihood activities (specialize) and increase its well-being in terms of cash earnings and maize production because it had three able-bodied adult males (favorable household composition) and relatively low household stress levels (a low C/P ratio). Households with less favorable household compositions and higher C/P ratios (Households 3, 4, 5, 6) were driven to participate in a greater number of activities. This is owed to high levels of household food and labor stress, embodied in numerous young and growing children who cannot significantly add to the household's productive capacity but who consume its food. Paradoxically, Household 2's comparatively favorable C/P ratio hides the fact that it is under high levels of stress. Because all but one of its productive members are female, and because culturally women in Uaxactún are unable to participate in most major food-producing and cash-earning activities, this household's composition prohibits its members from functioning at their highest productive potential. Consumer-to-producer ratios must be examined in conjunction with household composition.

Third, linear programming and actual observations showed that households adjust their livelihood strategies in response to adverse environmental change or economic difficulty. This is the case in Scenarios 1 and 2 where normal household activity mixes were disrupted. Their responses ranged from minimizing cash spending and investing more household labor in

agriculture (a return to subsistence), to maximizing discretionary cash earnings by shifting household labor away from milpa into cash-earning activities (a move away from subsistence), or a mix of the two. Fourth, results of these analyses indicated that some decrease in NTFP harvests occurred in Scenario 3 when household members were given the opportunity to work for the community's forest concession (Figure 1). It appears that new employment options may indirectly ameliorate the rate of NTFP exploitation by diverting available household labor away from extractive activities.

Fifth, total milpa area changed very little throughout the three scenarios (Table 2). This indicates that even when bio-physical and socio-economic conditions favor specialization in cash-earning activities, purchasing needed maize, and decreasing labor investment in milpa, households continue raising milpa.

Table 1

Change in the number of household livelihood activities performed by households when comparing the three modeled scenarios^a

Household	Household Consumer to Producer ratio	Number of activities performed in Scenario 1 ^b	Number of activities performed in Scenario 2 ^c	Number of activities performed in Scenario 3 ^d
1	1.6:1	3	2	2
2	1.5:1	2	1	1
3	2.3:1	3	4	5
4	2.3:1	3	4	4
5	2.5:1	3	2 ^e	4
6	3.5:1	3	3	3
7	2.0:1	2	2	4

^a Household activities not included in this table are those undertaken to maintain the household, such as hauling water, cooking, etc., as these remain constant.

^b This scenario modeled household effects based upon changes in the environment.

^c This scenario modeled household effects based upon shifts in markets for NTFPs.

^d This scenario modeled household effects based upon a new employment option.

^e This household would have to drastically reduce food consumption and expenses in order to survive in this scenario

The slight differences in total milpa area comparing Scenario 1 to Scenarios 2 and 3 is attributed to differing household livelihood strategies. In Scenario 1, households were more subsistence-oriented because there were fewer cash-generating options due to bio-physical and socio-economic factors. In the latter two scenarios, households had a greater choice of cash-earning options, and thus, overall, chose to raise less maize.

An important point regarding Table 2 is that the size of Household 7's milpa (the "average household") is often quite different from that of the other six households. While Household 7 is not representative of all households in Uaxactún, it is evident that the size of its milpa in these three scenarios is not representative of the other six households' milpas. In Scenario 1, only Household 3 has a milpa similar in size to that of Household 7. The same pattern emerges in the other scenarios, with two households in Scenario 2 and one in Scenario 3 having similar milpa sizes to Household 7.

Figure 1: Total male labor use in seven modeled households in Linear Programming Scenarios 1-3

Table 2

Changes in Household and Total Milpa Area in Scenarios 1-3^a

Household #	Scenario 1: Changes in Environment	Scenario 2: Shift in Markets for NTFPs	Scenario 3: New Employment Option
1	11.40	12.56	12.56
2 ^b	0.00	0.00	0.00
3	2.00	2.96	1.77
4	4.20	1.33	0.79
5	0.00	0.00	2.72
6	2.90	2.25	2.25
7 ^b	1.98	2.91	1.84
Totals	22.48	22.01	21.93

^a Milpa area measured in manzanas. One manzana approximately equals 0.7 hectares.

^b Note that Household 2 is a poor, exceptionally marginalized, female-headed household that barely survives; Household 7 is the “average household.”

Conclusions, Implications, and Recommendations

It is concluded from the first objective of this study that because individuals in the initial PRA session were receiving a steady flow of cash and likely had little time to work in their milpas, they focused more upon cash-earning activities

outside of work easily undertaken for short lengths of time on weekends or vacations (harvesting chicle, xate, and allspice). Although they still tended to focus on cash activities after restoration projects ended, one notes that milpa began gaining importance relative to other activities as they shifted their livelihood strategies towards subsistence and away from

earning cash. Participants of the second PRA session, who did not have consistent cash earnings, tended to rank xate and milpa equally.

A conclusion related to the second objective is that basing assumptions about how much milpa area households will produce (and need) upon averages is misleading. Milpa size varies according to how much labor households have available and how much maize they need annually, factors that continuously change as household members mature—and hence labor supply—changes. By first analyzing this variability based on household composition, diverse households can later be grouped into household domains of similar characteristics for purposes of aggregation into community characteristics. Finally, these research findings show that milpa is an invaluable and fundamental building block of household livelihood strategies, one which is relied upon at varying levels according to household composition, the socio-economic environment with which it interacts, or bio-physical disturbances. It is important to note that except for the female-headed household, no household in any of the three scenarios stopped raising milpa. Even in times when its relative importance wanes, as in Scenario 3, households continue to rely upon milpa to reduce food expenses and as insurance against oft-occurring times of difficulty.

The diversity of household livelihood systems—and thus livelihood strategies—must be maintained. It is this diversity that allows Uaxactún's families to draw upon numerous survival strategies to sustain themselves over time. The circumstances in which households find themselves are as dynamic as the households themselves. Not all of a household's possible strategies are available or useful in every circumstance, such as when one or more elements of the livelihood system fail; or the circumstance itself may inhibit or prevent use of livelihood strategies or their usefulness as survival tools. It is imperative that households continue to have multiple options to ensure their food and economic security.

With diversity in mind, those engaged in extension programming should use participatory approaches to increase the likelihood of successful planned change. Such approaches

can help people and agencies identify, highlight, and prioritize problems, and determine the best courses of action. Because they are participatory, diverse and complex relationships between households, livelihood systems, and communities are recognized and included throughout diagnostic, problem-solving, and monitoring and evaluation processes. These methods respect and use indigenous knowledge, uncover the role and importance of gender, and encourage bi-directional information flows between assisting agencies and stakeholders.

Ethnographic linear programming can be an integral part of the evaluation of such participatory processes. When done correctly, it is a useful tool that allows researchers, extension professionals, and clients to analyze the intended (and unintended) effects of planned change on individual households and domains of similar households. Together, the results of these participatory approaches and this tool can empower stakeholders in developing solutions more adaptable and applicable to local situations without simplifying the complexities of livelihood systems.

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Evaluation of the Effectiveness of Field Days Carried Out by Agricultural Trainees as a Technology Transfer Strategy

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Abstract

The study evaluated the effectiveness of field days conducted by agricultural trainees as a technology transfer strategy. Fifty-two farmers from two villages where field days had been conducted were randomly selected. Data were collected through interviews. The result of the study showed that 33 (63.5%) of the farmers interviewed, participated in the field days. Among the introduced technologies, the cassava rapid multiplication that had the highest level of awareness (73.1%) also had the highest adoption scores (4.88). There was also a positive significant correlation between awareness and adoption of technologies ($r = 0.408$). Two highly ranked problems inhibiting adoption of technologies were lack of follow-up by extension personnel and insufficient materials for the two newly introduced technologies.

The field days conducted by trainees were found to be effective but there is need for adequate planning with extension staff and only technologies that will be readily available to farmers should be demonstrated.

Introduction

The movement of technology from the laboratory to the field has historically been a significant challenge for extension professionals (Barao, 1992). A Field Day is an extension strategy which agricultural scientists, extension personnel and practitioners use to demonstrate and explain new agricultural technologies to farmers. Field days enable farmers to become aware of and hopefully benefit from scientific and technical innovations. Field days are also often used to compare traditional practices with a new practice or practices (Seevers et. al, 1997 and Van den Ban and Hawkins, 1996). The objective of field day as stated by Gibbons and Schroeder (1983) are to:

- Bring farmers together in a site to gain knowledge and skills in a relaxed atmosphere
- Create awareness in farmers of new developments and research results in agriculture
- Encourage farmers to adopt new technologies to give better yields and increase income.

Concepts of Technology Transfer and Adoption

Several extension strategies have been tried as linkage between research and farmers in Nigeria (Madukwe and Ayichi, (1997). Transfer of technology suggests a whole range of methods where technological knowledge is transmitted from suppliers to recipients. Agricultural technology transfer is a process with multiple functions that include information, teaching, technology supply and technology service (Asiabaka, 1991). Transferring implies conveying information and advice regarding an adoption of technologies and practices covered in field days.

Adoption of new practices on the other hand, involves a time dimension, in which several steps including awareness, interest, evaluation, trial and adoption come into play (Mosher, 1978, Osuji, 1983, Obienne and Anyanwu, 1991). According to Obienne and Anyanwu (1991), there is a new model called the innovation-decision process. It is conceptualized to consist of these four functions: knowledge, persuasion, decision and confirmation. The model implies that for a farmer to adopt an innovation, there are variables pertaining not only to the farmer but also related to the innovation and method of information dissemination that influence farmer's response. These two concepts

discussed above formed the theoretical framework for this study.

Extension staff training and contacts with farmers have been increasingly valued as crucial issues in implementing extension programs (Uwakah, 1985, Arokoyo, 1990, and Baradough, 1993). The International Institute of Tropical Agriculture (IITA), Nigeria has been conducting a course titled "Root Crops Research and Technology Transfer" for many years for researchers and extension personnel from the national programs in sub-Saharan Africa. As part of the training activities, IITA trainers adopted the practice of making the agricultural trainees to conduct informal survey to diagnose farmers' problems. Towards the end of the course, the trainers also made the trainees go back to the same village to conduct a field day to demonstrate new technologies that could solve the identified problems. The objective was to strengthen the knowledge and skills of the trainees in agricultural research-extension linkage, and technology transfer. Two field days were carried out by trainees who were mainly agricultural technicians and extension staff from some African countries for two consecutive years (1997 and 1998) in Ejioku village, Lagelu Local Government, Oyo State, Nigeria. Cassava rapid multiplication technique and use of improved cassava variety (30572) were demonstrated in 1997. In 1998 another different set of trainees who came for the same course demonstrated two different technologies, which were the use of improved cassava variety 4(2)1425 and yam minisett technique.

However, after two years of carrying out these field days, nothing was known about the effectiveness of the field days in relation to adoption of the technologies. According to Barao (1992), "a separate follow-up survey is essential after a reasonable amount of time has passed after field days have been carried out in order to gauge actual practice adoption." Identifying persuasive defects of field days would improve future field days and also facilitate adequate decision-making in using it as a technology transfer strategy. The objective of the study was therefore, to evaluate the effectiveness of field days conducted by agricultural trainees for farmers as a technology transfer strategy. The specific objectives were to:

- Determine the level of awareness of the technologies demonstrated at the field days
- Determine the level of adoption of the technologies transferred at the field days
- Determine the extent of follow-up by extension personnel with the farmers on the technologies after the field days.
- Identify the problems and constraints of adoption of technologies transferred at field days
- Infer the effectiveness and strength of field days carried out by trainees.

Methodology

The data used for the study were collected from a field survey carried out in two villages in Lagelu Local Government area of Oyo State, Nigeria in August 2000. A total of 52 farmers were the respondents for the study. They were made up of those who participated and those who did not participate in the field days carried out by the IITA Trainees in 1997 and 1998. Thirty-three farmers participated in the field days while nineteen did not participate. With the assistance of local extension staff and two contact farmers, respondents were randomly selected from Ejioku, the village where the two field days were carried out and Lalupon, the neighboring village. The neighboring village was included to determine the level of awareness and diffusion of the technologies demonstrated at the field days for other villages other than the village where field days were carried out.

Due to the educational levels of respondents, data were collected using an interview schedule. Face validity of the instrument was by the Monitoring and Evaluation Unit of IITA. To ensure reliability of the instrument, a test-retest method was used with the responses of five farmers at a two-week interval. The instrument was found to be reliable ($r = 0.69$). Effectiveness of the field days was measured through the levels of awareness of the new technologies introduced, adoption of the technologies, ability to teach other farmers by those that attended the field days and follow-up by extension staff after the field days.

Data analysis was carried out using descriptive statistics including frequency counts, and percentages for variables such as: socio-economic, awareness of technologies by farmers and sources of information by farmers. Correlation analysis was also carried out to examine the relationship between some variables and adoption of technologies transferred. Friedman test was used for ranking of reasons provided for not adopting technologies transferred at the field days. An adaptation of Jagne and Patel (1981) model was used to calculate adoption score. The percentage of farmers who adopted a given technology was obtained and the sigma distance was read from the table of normal deviates.

Results and Discussion

Socio-economic characteristics of respondents

Data analysis showed that a higher proportion of the respondents was between 21 and 30 years of age (63.5%) than those above thirty years of age. It can be inferred that there is a predominance of medium aged people among the farmers. Equal numbers of male and female respondents were interviewed. The result also showed that 23.1 percent of the farmers were single. A majority of the respondents had only primary six certificates (48.1%), followed by respondents who did not have any formal education (25%). Table 5 shows the relationship between some farmers' socio-economic characteristics and adoption of technologies demonstrated at the field days. Though the relationships between some of the variables and adoption of technologies are significant, but the low correlation coefficients obtained probably indicate a possibility of small relationships or

the two factors are related to a third factor. Though Obibuaku (1978), Osuji (1983) considered education as a very important factor in the acceptance of new farm practices, there was however no significant relationship between adoption of the technologies and education level of respondents. The same results were obtained for sex and marital status of the respondents. The non-significant relationship was as a result of the direct access to information by the farmers on the technologies at the field days. This is because farmers would have had the opportunity to ask questions at the field days to aid knowledge and skill gain unlike other extension channels such as radio and television where this is not possible.

Awareness of technologies by farmers

Out of the 52 farmers interviewed, 33 (63.5%) of them participated in the two field days carried out in Ejioku village. However, out of the 12 farmers interviewed in Lalupon the neighbouring village, only one farmer participated in the field days. This was due to lack of adequate publicity of the field days in the village as indicated by some farmers. Table 2 shows farmers' awareness of the technologies demonstrated at the field days. Cassava rapid multiplication technique had the greatest awareness (73.1%) among the farmers followed by Yam minisett technique (55.8%). As expected, awareness of the technologies had a positive significant correlation with adoption of the technologies. Less than fifty percent of the farmers were aware of the other two technologies introduced at the field days. The lower level of awareness was probably due to insufficiency of materials for two newly introduced varieties at the field days.

Table 1

Socio-economic characteristics of the respondents (N = 52)

Variables	Frequency	Percentage (%)
Age:		
21 –30 Years	33	63.5
31 - 40	11	21.2
41 – and above	8	15.4
Sex:		
Male	26	50.0
Female	26	50.0
Marital status:		
Married	40	76.9
Single	12	23.1
Qualification:		
No school	13	25.0
Primary six	25	48.1
School certificate	10	19.2
OND and above	4	7.7

Source: Survey Data.

Table 2

Farmers' awareness of the technologies demonstrated at the field days (N = 52)

Technologies	Frequency	Percentage (%)
Cassava rapid multiplication technique	38	73.1
Improved variety 30572	24	46.2
Improved variety 4(2)1425	23	44.2
Yam minisett technique	29	55.8

Sources of information about the technologies

Farmers were asked the sources of information about the technologies to know whether the information on the four technologies was obtained only from the field days carried out by the IITA trainees or from other sources. Table 3 shows most farmers knew about the technologies from the field days (61.5%) and from friends that attended the field days (30.8%). The result agrees with that of Mohammed and Wanaso (1993) who reported that fifty-eight percent of farmers in the Western

Zone of Plateau State Agricultural Development Project in Nigeria got their information through neighbours and friends. Ikejima, et al (1990) also reported that 47% of members of 70 work groups studied obtained information on innovations from the work groups. Table 5 shows that there was a possible relationship ($r = 0.386$) between source of information about the technologies and adoption of technologies. This also agrees with the views of Bogunjoko (1983) that farmers rely on a variety of sources of information to lead them from the awareness stage to the adoption stage.

Table 3

Sources of information about the technologies (N =52)

Sources of information	Frequency	Percentage (%)
Field days by IITA trainees	32	61.5
Other field days	0	0.0
Contact farmers	1	1.9
Friends	16	30.8
Extension staff	3	5.8
Others	0	0.0

Adoption of technologies

The adoption scores of the four technologies demonstrated at the field days are presented in Table 4. Highest adoption scores of 4.89 and 3.6 were found for rapid multiplication technique and yam minisett technique respectively. The high adoption scores obtained for these two techniques was not surprising as many farmers indicated lack of planting materials for cassava and yam as a major problem confronting farmers in the area. Gaining knowledge in how to solve that problem was therefore a welcome idea and many farmers indicated that they have started putting them into practice. The low adoption scores for the two cassava varieties 30572 and 4(2)1425 might be related to the low level of awareness of the two technologies. Secondly, the insufficiency of planting materials for the two varieties at the field days might have discouraged the farmers because the insufficiency factor was the highest ranked problem affecting the adoption of the technologies.

It was observed that not all the farmers who were aware of the technologies adopted them. The level of interest developed by the farmers in the technologies might be responsible for this because the development of interest in a technology by a farmer is a major step in adoption process. Osuji (1983) indicated that the distance of a farmer to the source of practice to be adopted is important for adoption of a new technology. However, the proximity of Lalupon to Ejioku did not have any significant effect on either awareness or adoption of the technologies by the farmers at Lalupon. The result showed that, only one farmer from Lalupon participated in the field days, but the majority of those that were aware of the technologies in the village adopted them.

Table 4

Adoption of the technologies demonstrated at the field days (N=52)

Technologies	Frequency	Percentage (%)	Adoption scores
Cassava rapid multiplication technique	30	57.7	4.89
Improved variety 30572	7	13.50	3.05
Improved variety 4(2)1425	9	17.31	3.26
Yam minisett technique	12	23.00	3.60
Mean adoption level			3.70

Follow-up by extension staff and teaching of other farmers

The result of the study showed that only four farmers (7.7%) indicated that there was a follow-up by extension staff after the field days on the use of the technologies. Table 6 showed that lack of follow-up by extension staff was one of the major reasons for low adoption of some of the technologies. This result agrees with the views of Adesimi and Oludimu (1984) that the smooth adoption of a new technology is crucially dependent upon the availability of extension workers. However, the result of the study showed that 45.5% of those that attended the field days disseminated the technologies by teaching others or shared some of the planting materials distributed at the field days with other farmers. Though the teaching of others had a significant relationship with adoption of the technologies ($r = 0.254$), however with the low correlation coefficient, the significant relationship must have been due to two factors relating to a third factor. This is because, the level of adoption of technologies by farmers who did not attend the field days was too low to have accounted for a significant relationship between adoption and teaching others. The same applies for the high percentage obtained for those who disseminated information to others

Table 5

Relationship between certain variables and adoption of technologies

Variables	Correlation Coefficient (r)
Awareness of new technologies	0.408*
Follow-up/ Contact with extension staff	0.375*
Education	0.199
Marital status	-0.137
Participation in the field days	0.419*
Sex	0.039
Source of information about technologies	0.386*
Teaching other farmers	0.254*

* Significant at 0.05 level of probability

Reasons for not adopting the technologies introduced at the field days

Table 6 shows the mean ranks of factors inhibiting adoption of technologies demonstrated at the field days. The mean ranks from Friedman test ranged from 1.80 to 6.24 in ascending order. Lack of follow-up by extension staff was ranked first as already reflected in the adoption level of the technologies. As shown in Table 5, lack of follow-up by extension staff had a small relationship ($r = 0.375$) with adoption level. This implies that though, the farmers found the field days to be beneficial but the absence of extension staff to give further training to them on the use of the technologies might have led to the neglect of the technologies and therefore low adoption.

The extension teaching methods were ranked least as a major problem for adoption of the technologies. This implies that teaching methods were found adequate and useful for gaining knowledge and skills that could have motivated the farmers to adopt the technologies.

Table 6

Mean rank distribution according to reasons for not adopting technologies

Reasons for non adoption of technologies	Friedman Mean Rank	Ranking position
Lack of follow-up by extension staff for more education	6.24	1st
The introduced varieties were enough to go round the farmers	5.89	2nd
Lack of awareness of technology	4.69	3rd
Technologies knowledge difficult to master	3.96	4th
Technologies not fit our farming systems	3.43	5th
Cost of adoption of the technologies is high	1.98	6th
The extension teaching methods were not understood	1.80	7th

N = 52, df = 6 , Asymptotic significance = 0.0001

Conclusions

Based on the levels of awareness and adoption of the technologies transferred at the field days, the study showed that the field days carried out by agricultural trainees were found to be effective especially among the farmers that attended the field days. However, the benefits of the field days were not felt and did not spread enough among other categories of farmers in the neighboring village due to inadequate publicity

The study also showed that the major problems that prevented high adoption rate of the technologies disseminated at the field days were lack of follow-up by extension personnel and insufficient supply of planting materials for the newly introduced varieties. The result obtained on insufficiency of the varieties introduced at the field days deserves serious considerations. In the first instance, it should be expected that farmers that showed interest in a newly introduced variety would want to have it tested. In a situation that this is not possible could lead to distrust in extension program.

Based on the findings of this study, to make field days more effective and beneficial to farmers as a technology transfer strategy, it is however suggested that:

- There is need for adequate planning and publicity of the field day by the organizers to create awareness among farmers.
- Only technologies that are readily available to be used by farmers should be introduced at field days.

- There is need for full involvement of the extension personnel at the planning stage of field days to have adequate follow up for further education on newly introduced innovations.

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Perceptions of Lorestan Province, Iran Wheat Farmers with Respect to Sustainable Agricultural Practices

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Abstract

Iran's dependence on pesticide and insecticide imports, compounded by a growing population, limited arable land, and high soil erosion, has led to the call by the Ministry of Agriculture, Extension, and others for sustainable agriculture practices. The purpose of this study was to examine the perceptions of wheat farmers with respect to sustainable agriculture in Lorestan Province, Iran. Data were collected in 2000 through personal interviews with randomly selected wheat farmers. Major barriers hampering adoption of sustainable agriculture practices included: Limited financial returns for farmers, limited farmer knowledge of sustainable agriculture principles and methods, low levels of farmer education, government rules and regulations, problems with soil erosion and lack of water, and a low level of Extension agent knowledge with respect to sustainable agriculture. Recommendations include a more participatory approach to the development and delivery of Extension programs.

Introduction

Increasing societal concern about the environmental effects of traditional agricultural practices has increased demand for sustainable practices (Gamon, & Scofield, 1998). Gamon, Harrold, and Creswell (1994) have shown that relative advantage, compatibility, and observability were attributes related to the adoption of sustainable agriculture practices. Williams and Dollisso (1998) noted that, to address the problems of producing food and fiber needed to feed a growing population, sustainable agriculture practices will need to be holistic and systems-oriented.

Sustainable agriculture involves the use of farming systems that are socially acceptable, environmentally sound, and economically profitable (York, 1991). According to Drost, Long, Wilson, Miller, and Campbell (1996), farmers who adopt sustainable agriculture practices do so because they want to be good stewards of the soil, reduce ground and surface-water pollution, produce quality food with reduced amounts of chemicals, and reduce health risks to farm families and livestock. Negative farmer perceptions regarding any one

or combination of sustainable agriculture elements can limit the adoption of such practices. Saliel, Bauder, and Palakovich (1994) wrote that the diverse goals and wide range of practices make it appear that new conceptual and theoretical frameworks are needed to explain why farmers adopt or reject sustainable methods. Decisions to adopt more sustainable practices must be compatible with the existing production system and overcome the resistance to change which many farmers possess (Roling, 1988).

Above all, sustainable agriculture practices must be capable of producing the food needed to feed a growing human population (Borlaug, 2000). According to Borlaug, the world's carrying capacity is dependent on biotechnology. Today's agricultural practices are not sufficient for tomorrow's population and will result in hunger, malnutrition, and starvation, as well as social, economic, and political chaos. Borlaug (personal communication, November 2, 2000) often rhetorically asks audiences, "Without biotechnology, which two billion of you want to get off the earth?" With biotechnology, however, Borlaug (2000) is confident that the world will be able to increase its carrying

capacity to 8.3 billion people by the year 2025 and that such increased food production can be achieved with minimal negative impact on the environment.

Sustainable Agriculture in Iran

Adoption of sustainable agricultural practices by wheat farmers in Iran has been limited. Iran is concerned with wheat yield stability and growth in yields because wheat is its main food source. Iran's limited arable land, and high soil erosion compounded by its growing population is dependent on wheat, pesticide, and insecticide imports. In Iran, sustainable agriculture is gaining popularity among Extension agents, farmers, and various organizations and ministries as a means for helping Iran address its goal of self-sufficiency in the production of food and fiber products (Chizari, Lindner, Zoghie, 1999; Chizari, Lindner, Karjoyan, 1999). Chizari, Lindner, and Zoghie (1999) noted that Extension "agents perceived sustainable agriculture to mean lower chemical inputs, natural resource and environmental protection, effective and efficient agricultural production system, and reliance on organic matter" (p.13). Further, although agents preferred sustainable agriculture practices to traditional practice, they needed to do a better job of diffusing sustainable agriculture principles to farmers. In South Africa, Duvel and Botha (1999) found farmers' needs, perceptions, and knowledge of sustainable agriculture must be considered if such practices are to be effectively and efficiently implemented. In Iran, however, little is known about the perceptions of wheat farmers regarding sustainable agricultural practices. The findings presented in this paper provide information on farmers' perceptions with respect to sustainable agriculture practices that may be useful to agents who are attempting to diffuse sustainable agriculture principles.

In general, a sustainable system of agriculture strives to use resources efficiently, replace renewable resources, and conserve essential nonrenewable resources. The system attempts to balance inputs and outputs by minimizing resource costs and relying more on inputs derived from the farm itself (Van Bers & Robinson, 1993). The success of sustainable agriculture, therefore, depends not just on the motivations, skills, and knowledge of individual

farmers, but on actions taken by organizations and communities working as a whole, which makes the task that more challenging Extension workers (Swanson, Bentz & Sofranko, 1997).

Purpose

The purpose of this study was to examine the perceptions of wheat farmers regarding sustainable agriculture in Lorestan Province, Iran. Specific objectives of the study were to:

1. Describe wheat farmers in the Lorestan Province by demographic characteristics,
2. Measure wheat farmers' perceptions with respect to the usefulness of various Extension agricultural courses conducted by subject matter specialists on sustainable agricultural practices, and
3. Measure wheat farmers' perceptions with respect to barriers hampering adoption of sustainable agriculture practices.

Methods

Wheat farmers ($N=2,600$) in the Lorestan Province, Iran were the target population for this study. A random sample of wheat farmers ($n=335$) was selected from three randomly selected townships of Khoramabad, Salsalah, and Koohdasht (Krejcie & Morgan 1970). The Ministry of Agriculture's Extension Organization Directory was used to locate the wheat farmers in each township within the province.

Lorestan Province has an area covering 31,384 square kilometers and is located in west Iran. It is located at an altitude of between 1,100 to 1,400 meters above sea level. Extensive mountains stretch from northwest to southeast; between the higher ranges are well-watered pockets with lush pastures. Oak forest covers the outer slopes, together with elm, maple, walnut, and almond trees. Lorestan has three unique areas: (1) the cold mountainous area with heavy snow, (2) the central temperate area, which is located in the central parts of mountainous regions in the north and northeast and the flat areas in the south, and (3) the low-lying southern hot area.

The research design for this study was a descriptive survey method. From a review of the literature, the researchers developed an instrument to collect data. The survey was divided into three sections. The first section was designed to gather data on personal characteristics of wheat farmers. The second section was designed to gather data on farmers' perceptions with respect to the usefulness of Extension courses. Responses for this section were categorized using a five-point Likert-type scale: 1=very useful; 2=somewhat useful; 3=neutral; 4=somewhat useless; and 5=very useless. The third section was designed to gather data on farmers' perceptions with respect to barriers to sustainable agriculture practice. Responses for this section were categorized using a five-point Likert-type scale: 1=Very high barrier; 2=high barrier; 3=neutral; 4=low barrier; and 5=not a barrier. Content and face validity were established by a panel of experts consisting of faculty members and graduate students at Tarbiat Modarres University, Iran. A pilot test was conducted with 20 wheat farmers in the township of Aligoodarz in the Lorestan Province three weeks before the study. Questionnaire reliability was estimated by calculating Cronbach's alpha. Reliability for the overall instrument was estimated at .82. Data were collected by two graduate student researchers through personal interviews with 306 wheat farmers in the field from September to November 2000, for a response rate of 91%. Because of the low literacy rates, instructions, concepts, terms, and the Likert-type scales were carefully explained to participants to ensure they understood the purpose of the research, the questionnaire, and how their responses were being categorized. Interviews lasted from 1/2 to 1 1/2 hours. Most interviews lasted approximately 45 minutes.

Findings

The following section presents findings by objective.

Objective 1

The first objective was to describe wheat farmers in the Lorestan Province by demographic characteristics. Approximately 50% of respondents ($n=154$) were over 50 years old. Less than 10% were 30 years old or

younger. On average, wheat farmers had 31 years of experience cultivating wheat. Thirty-three percent of wheat farmers ($n=101$) described themselves as illiterate. Thirty-eight percent of respondents ($n=116$) had some elementary education. Approximately 21% of wheat farmers ($n=65$) had middle school education, and less than five percent had high school or postsecondary education. Eighty percent of the sample ($n=245$) lived in rural villages. The remaining 20% ($n=61$) lived in urban areas. Nearly all respondents were married (96%). All respondents were male. A majority of respondents (75%) farmed 10 hectares or less of agricultural land.

Objective 2

The second objective was to describe wheat farmers' perceptions with respect to the usefulness of various Extension agricultural courses conducted by subject matter specialists. Of the 306 participants, 217 (71%) had participated in Extension programs. Only those who had participated in Extension programs responded to this section. Using percent of "very useful" and "somewhat useful" responses as indicators, the following were the most useful Extension agricultural courses conducted by subject matter specialists (see Table 1.): how to use chemical fertilizer (79%), how to use pesticides and insecticides (73%), use of agricultural machinery (68%), tillage (67%), benefits of crop rotation (65%), and seed treatment (61%).

Using percent of "somewhat useless" to "very useless" responses as indicators, the following were the least useful Extension agricultural courses conducted by subject matter specialists: how to use green manures (78%), planting and cultivation schedules (41%), and benefits of leaving plant residue (40%).

Objective 3

The third objective was to describe wheat farmers' perceptions with respect to barriers hampering adoption of sustainable agriculture practices. As shown in Table 2 and using percent of very high barrier and high barrier responses as indicators, the following were the biggest barriers hampering the adoption of sustainable agriculture practices: Little financial

return to farmers (78%), low farmer knowledge with respect to sustainable agriculture (77%), low levels of farmer education (73%), government rules and regulations (72%), problems with soil erosion and lack of water (68%), and technological limitations (56%).

Using percent of “low barrier” and “not a barrier” as indicators, the following were the smallest barriers hampering the adoption of sustainable agriculture practices: Food security (39%), increasing livestock population (37%), lack of transportation (29%), and growing population (25%).

Table 1

Wheat Farmers’ Perceptions with Respect to the Usefulness of Various Extension Agricultural Courses Conducted by Subject Matter Specialists, Lorestan Province, Iran (n=217)

Extension Agricultural Courses	Very Useful		Somewhat Useful		Neutral		Somewhat Useless		Very Useless	
	f	%	f	%	f	%	f	%	f	%
How to use chemical fertilizers	67	30.9	105	48.4	40	18.4	5	2.3	0	0.0
How to use pesticides and insecticides	53	24.4	105	48.4	41	18.9	18	8.3	0	0.0
Use of agricultural machinery	73	33.6	75	34.5	39	18.0	24	11.1	6	2.8
Tillage	63	29.1	83	38.2	44	20.3	24	11.1	4	1.8
Benefits of crop rotation	48	22.1	93	42.9	58	26.7	14	6.5	4	1.8
Seed treatment	66	30.4	68	31.3	70	32.3	8	3.7	5	2.3
Various methods of weed control	44	20.2	65	30.0	60	27.5	37	17.1	11	5.1
Appropriate amount of seed to use	20	9.2	76	35.1	108	49.8	9	4.1	4	1.8
Methods of controlling soil erosion	28	12.9	68	31.3	89	41.1	27	12.4	5	2.3
Identifying plant diseases	31	14.3	57	26.3	90	41.5	34	15.6	5	2.3
Advantages/disadvantages of fallow	17	7.8	43	19.8	86	39.6	55	25.4	16	7.4
Irrigation	41	18.9	49	22.6	68	31.3	40	18.4	19	8.8
Benefits of leaving plant residues	18	8.3	53	24.4	59	27.3	75	34.5	12	5.5
Planting and cultivation schedules	34	15.7	37	17.1	56	25.8	76	34.9	14	6.5
How to use green manures	8	3.7	17	7.8	22	10.0	54	24.9	116	53.5

Table 2

Wheat Farmers' Perceptions with Respect to Barriers Hampering Adoption of Sustainable Agriculture Practices, Lorestan Province, Iran (n=306)

Barriers	Very High Barrier		High Barrier		Neutral		Low Barrier		Not a Barrier	
	f	%	f	%	f	%	f	%	f	%
Little financial return to farmers	133	43.5	104	34.0	41	13.4	23	7.5	5	1.6
Low farmer knowledge with respect to sustainable agriculture	110	35.9	125	40.8	64	20.9	6	2.1	1	0.3
Low levels of farmer education	100	32.7	124	40.5	70	22.9	11	3.6	1	0.3
Government rules and regulations	124	40.5	96	31.4	52	17.0	27	8.8	7	2.3
Problems with soil erosion and lack of water	79	25.8	128	41.8	78	25.5	19	6.2	2	0.7
Low Extension agent knowledge with respect to sustainable agriculture	96	31.4	104	34.0	72	23.5	30	9.8	4	1.3
Technological limitations	51	16.7	121	39.5	96	31.4	37	21.1	1	0.3
Lack of knowledge about risk management	19	6.2	86	28.1	115	37.6	72	23.5	14	4.5
Farmers' competencies in agricultural practices	44	14.4	74	24.2	126	41.2	48	15.7	14	4.5
Access to technology	65	21.2	50	16.3	124	40.6	49	16.0	18	5.9
Price fluctuation of inputs and agricultural products	32	10.5	69	22.5	136	44.4	48	15.7	21	6.9
Growing population	57	18.6	82	26.8	92	30.1	46	15.0	29	9.5
Lack of transportation	34	11.2	89	29.1	94	30.7	76	24.8	13	4.2
Increasing livestock population	22	7.2	59	19.3	112	36.6	69	22.5	44	14.4
Food security	27	8.8	73	23.9	88	28.8	70	22.9	48	15.6

Conclusions

Based on the findings of the study the following conclusions were drawn.

Wheat farmers perceived courses in how to use chemical fertilizers, how to use pesticides and insecticides, use of agricultural machineries, tillage, benefits of crop rotation, and seed treatment as the most useful Extension agriculture courses. This finding suggests that wheat farmers are not as interested in sustainable agricultural practices as farmers of other commodities, Extension agents, and other people in various organizations and ministries in Iran. Wheat farmers perceived little financial return to farmers, low farmer knowledge with respect to sustainable agriculture, low levels of farmer education, government rules and regulations, problems with soil erosion and lack of water, and low Extension agent knowledge about sustainable agriculture as major barriers hampering adoption of sustainable agriculture practices. These findings support those of Chizari, Lindner, and Zoghie (1999) who found that Extension agents needed more training with respect to sustainable agriculture practices particularly in the area of the economics of sustainable agriculture.

Extension in Iran has traditionally not been seen as a primary information source for farmers. This is due, perhaps, to the inflexibility of Extension programming, and its pedagogical approaches. Farmers throughout Iran have expressed a desire to be more active in program development. The results presented here provide Extension with valuable program planning and evaluative information. In an effort to promote sustainable agriculture practices, Extension policies in Iran should use a two-pronged approach. 1. Extension needs to continue training and development efforts with agents. 2. Extension needs to train and deliver programs based on the identified needs of its clients. Extension in Iran needs to embrace a more participatory approach towards its programming. Wheat farmers' concerns over financial rewards of sustainable agriculture and agents' needs for training on this topic are identified gaps that should be addressed through a participatory training approach.

Borlaug (personal communication, November 2, 2000) frequently cites lack of transportation, infrastructure, and a growing population as limiting factors in the development of agricultural systems and adoption of new practices in developing countries throughout the world. Access to technology, lack of transportation, and growing population were not perceived by wheat farmers as barriers to the adoption and diffusion of sustainable agricultural practices. The biggest barriers were related to governmental control, personal financial exigency, farmer education, and topological problems. It can be reasonably assumed, however, that when farmers are facing personal financial crises, overarching development issues such as transportation, infrastructure, and growing population do not seem very important when they are, in fact, critical factors to development.

The results of this study will help Iran's Extension Service better develop programs based on the identified gaps between farmers' perceptions and the Service's goals and objectives. For example, while Chizari, Lindner, and Zoghie (1999) found that "agents indicated it is better to use green fertilizer, organic matter, and crop rotation than chemical fertilizer" (p.17), farmers indicated that courses on how to use chemical fertilizer were the most useful. A large gap between agent and farmer preferences has been identified. An implication exists that adoption of sustainable agricultural practices by wheat farmers has been, in part, limited because Iran's Extension service has not been very responsive to farmers needs. If Iran's Extension service wants to help wheat farmers adopt sustainable agricultural practices, it should consider implementing courses identified by wheat farmers as important or useful.

Prior to this study, wheat farmers' perceptions toward sustainable agricultural practices had not been studied. The results presented here contribute to the growing body of literature with respect to Extension agents and farmers in Iran (Chizari, Lindner, Zoghie, 1999; Chizari, Lindner, Karjojan, 1999). Iran's Ministry of Agriculture and Extension Service can use these results to understand better the diffusion of sustainable agricultural practices (Gamon, Harrold, & Creswell, 1994). A better

understanding of how sustainable agricultural practices are diffused in Iran and how people and organizations adopt such practices will help the Country attain its goal of self-sufficiency in the production of food and fiber.

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Fiscal Sustainability of Agricultural Extension: The Case of the Farmer Field School Approach - Supplementary Remarks

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Editor's Note: This note provides a few clarifications (originally footnotes) which were omitted for editorial purposes in the course of publishing Quizon, Feder and Murgai (JIAEE, Spring 2001), or QFM henceforth.

Abstract

Agricultural extension programs or pilots based on the Farmer Field School (FFS) approach are being implemented in many developing countries in Asia and Africa. Evidence from the Philippines and Indonesia, two key areas in implementing this extension effort, shows that fiscal unsustainability of the FFS if applied on a large scale is a risk that cannot be ignored. Because of high costs per trained farmer, the amount of funding for extension in the Philippines cannot provide for significant farmer outreach. Farmer-led field schools are viewed by some as a way out of this fiscal dilemma if part of the cost is shifted to the community, but farm survey data from Indonesia indicate that the extent of the takeover of training responsibilities by farmers has been minor. Furthermore, farmer-led schools are still not funded mainly by community resources. The results suggest a need for great selectivity and caution in initiating FFS pilots, with a focus on the fiscal sustainability of the program if the intention is to scale up these activities.

On farmer field schools (FFS)

- (1) It is possible to rely on NGOs to enhance fiscal sustainability, but some NGO's may themselves depend on public funds, and their reach to wide segments of the farming population is limited.
- (2) Van de Fliert's (1993) careful, qualitative evaluation of Indonesia's early FFS experiences covering a limited area during the first cycle of its FFS-IPM program suggests that the ineffectiveness of informal "horizontal communications" was an issue in affecting diffusion of FFS-acquired knowledge by field school graduates at that time. For the Philippines, an in-depth study by Rola, et. al. (2000) indicates that there are no significant transfers of knowledge of FFS-acquired knowledge from FFS graduates to other farmers. A study of an FFS pilot in Kenya (Loevinsohn, et al., 1998) suggests that there has been some sharing of information by FFS graduates with other farmers ("diffused" farmers) who have shown interest in these discourses and claimed to have adopted some of the practices discussed. This Kenya study, which was conducted one season after field schools had been completed, did not assess farmers' understanding of the information shared and its field impact, and did not compare "diffused" farmers to a control group. Consequently, this is not conclusive evidence that the FFS pilot in Kenya led to a significant process of informal diffusion of information from FFS graduates to their non-FFS counterparts.

The Philippine Case

- (3) QFM notes that at existing FFS spending levels in the Philippines, it would take over 15 years to have a million Filipino farmers attend at least one FFS at a total cost of US\$ 47.6 million. These estimates assume that (a) annual program spending remains constant at US\$ 3.0 million, or the government's allocation in year 2000 as indicated in the Community IPM web-site, and (b) FFS costs remain at US\$ 47.6 per trained farmer. Information available suggests that there was very little, if any, direct farmer contribution to the funding of this Philippine program. These computed costs per farmer are within the range of what has been budgeted by FFS promoters for other mainstream prototype FFS

projects that are intended for eventual scaling-up and are expected to rely mainly on public budget and external donor financing. In Africa, for instance, an International Fund for Agricultural Development (IFAD) pilot project (Kenya, Tanzania, Uganda) indicates estimated FFS costs of about \$ 53 per trained farmer, excluding the costs of trainers salaries (IFAD, 1998).

The Indonesia Case

(4) There are questions on whether FFS training by farmer-trainers is likely to continue on a significant scale with the end of the World Bank-assisted IPM Training Project in 1999. In any case, the government is still expected to allocate resources for FFS activities in the post-project phase, but at a lower level. With farmer trainers, the expectation is for the government to provide some back up assistance only, like specialists' services and learning materials.

(5) The two datasets used to analyze FFS in Indonesia are the 1999 SEARCA and 1999 World Bank Surveys. The SEARCA evaluation, commissioned and assisted by Indonesia's National IPM Program Secretariat, administered a farm-level survey in six Indonesian provinces that were key beneficiaries of the National IPM training program. In all, there are 769 FFS graduates and 423 non-FFS farmers in the SEARCA sample. In order to ensure that the survey covered a reasonable number of FFS farmers with certain characteristics, i.e., women FFS participants and non-rice FFS graduates, some villages and/or respondents were purposively selected. Another criterion used for selecting FFS villages and respondents for the survey was whether the training was provided by non-government trainers (farmers or NGO's). Oversampling of such trainers was necessary to ensure a sufficient number of respondents.

The 1999 World Bank survey revisited respondents who participated in a 1991 IPM-FFS survey conducted by the Center for Agro-Socio-Economic Research (CASER) in Bogor. Because program coverage was still limited, CASER's household survey sampled the program's pilot villages and graduates purposely. Non-FFS villages and households were selected randomly from the population of rice-growing areas and households, respectively. The total number of survey respondents was 454, of which 225 were FFS graduates at the time of the 1999 survey. Of these 454 respondents, 347 were randomly selected non-FFS households in 1991. Owing then to the baseline 1991 survey from which it is derived, the World Bank's 1999 FFS Survey contains a disproportional number of PHP-trained FFS graduates from the IPM-FFS pilot phase (i.e., before 1994). Compared to the SEARCA survey however, this survey provides a less biased picture of the extent and kind of FFS coverage during the key program years (i.e., after 1994).

(6) In QFM, FFS costs are estimated at US\$ 62 per Indonesian farmer. This estimate is calculated from (a) actual project costs for training, management information systems, and technical assistance of the Indonesian IPM Training Project and (b) an estimate by a World Bank team of 626,235 farmers trained by the program. If the training of pest observers and extension agents as FFS trainers (assumed at US\$ 1,000 per trainer) were regarded as an investment, and if this cost together with the cost of technical assistance were removed from total project costs, then the cost of FFS training would amount to US\$ 49 per farmer. These figures are compiled from SEARCA and World Bank project documents. These costs per FFS farmer are underestimates since they exclude the base salaries of employees at all levels of government who are employed in the program. The per-school costs indicated by Braun, et al. (2000) are lower because they exclude all program overhead costs.

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TOOLS OF THE PROFESSION

Book Review

Friedman, Thomas L. (2000). *The Lexus and the Olive Tree*. Anchor Books, Random House, Inc.: New York, NY, pb, 490 pgs, \$15.00.

Article Title: Understanding Globalization

We hear a lot about “globalization” these days. Most of the discussion centers on the internet and the global economy, which is often narrowly (and vaguely) understood as the financial operations of multi-national corporations. Friedman, however, describes globalization more broadly as an international system which has replaced the cold war (p. 7). He says it is an integration of markets, nation-states and technologies “...in a way that is enabling individuals, corporations and nation-states to reach around the world farther, faster, deeper and cheaper than ever before, and in a way that is enabling the world to reach into individuals, corporations and nation-states farther, faster, deeper, cheaper than ever before” (p. 9).

“This process of globalization is also producing a powerful backlash from those brutalized or left behind by this new system” (p. 9) In some countries, globalization with “Americanization” of local cultures and is therefore resented (pp. 340-341).

Friedman traces the development of the current system of globalization from the fall of Communism in Europe in 1989. He discusses characteristics of the system: democratization of technology and information, transparency, free market capitalism, and loss of control by national authorities over their populations.

He describes the “electronic herd” of people and corporations who are buying and selling stocks, bonds and currencies. They move to the best market and, therefore, support national economies that are open, flexible and stable. He presents case studies of how globalization has meant “revolution from beyond” for some countries how it has benefitted some countries and penalized others who have not adopted the system fast enough.

Perhaps the greatest weakness of this book is its emphasis on winners and losers. Friedman feels that the U.S. is well positioned to be a “shaper and adapter” thus benefitting from globalization. He is not too sensitive about countries that lack the technological and educational advantages of the U.S. He feels small countries can become winners in globalization if their leaders make the right decisions. Nevertheless, he still seems to assume some variation of the geopolitical power game that was typical of the cold war. Alternatives to that scenario are not discussed in any depth. Nor does he discuss many negative implications of globalization like environmental problems, health issues, religious fundamentalism, loss of languages, food safety, and loss of agricultural diversity.

Still *The Lexus and the Olive Tree* will help us understand our world and the phenomenon we call globalization. It will help us understand the need for local safety nets (p. 449) and for an “activist and generous American foreign policy” (p. 468). It will help us think about the future and the need to balance the Lexus (technology, global markets, global communication, modernization and prosperity) with the olive tree (traditions, values, family, religion, local history and local institutions) (pp. 29-43).

The book also raises management issues which should be interesting to agricultural and extension educators. We, like individuals in successful financial institutions, need to react to globalization by being international, flexible, mobile, transparent and good at collaboration. We need to encourage our universities and organizations to globalize and to have an effective “brand” identity that describes what we do and how we are unique. There is much food for thought.

The book is available through book sellers everywhere. The ISBN number is 0-385-49934-5.

It was originally published in 1999 by Farrar, Straus Giroux, New York.

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Journal of International Agricultural and Extension Education

Cumulative Index for Volume 8

- Ajayi, A.R. Evaluation of Extension Agents' Job Characteristics: A Case Study of Enugu State Agricultural Development Project, Nigeria. Volume 8, Number 3, page 21.
- Ajayi, A. T. A Comparison of the Effectiveness of On-Campus and Off-Campus Training Courses for Agricultural Staff at the International Institute of Tropical Agriculture (IITA). Volume 8, Number 3, page 41.
- Ajayi, M. T. Evaluation of the Effectiveness of Field Days Carried out by Agricultural Trainees as a Technology Transfer Strategy. Volume 8, Number 3, page 57.
- Al-Rimawi, A. S., & Al-Karablieh, K. E. The Role of the Commercial Sector in Agricultural Extension in Jordan. Volume 8, Number 3, page 13.
- Androulidakis, S. Leadership Ability Dimensions in Relation to Rural Women's Personal Characteristics: A Methodological Model For Further Consideration. Volume 8, Number 1, page 39.
- Beilin, R., & Andreato, S. After the Group: Extending the Farmer. Volume 8, Number 2, page 43.
- Dlamini, B. M., & Teoh, C. Partnership Experiences by the University of Swaziland: Implications for Globalization Efforts. Volume 8, Number 3, page 5.
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- Chizari, M., Bahmani, S., & Linder, J.R. Educational Needs of Semimigrant Nomads of Charmahal va Bakhtiari Province, Iran Regarding Sheep and Goat Management and Production. Volume 8, Number 2, page 25.
- Chizari, M., Lashkarara, F., Modarres, T., & Lindner, J.R. Perceptions of Lorestan Province, Iran Wheat Farmers with Respect to Sustainable Agricultural Practices. Volume 8, Number 3, page 65.
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