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Insika Youth Program: Addressing an Educational Crisis in South Africa
   Dennis W. Eaton ................................................................. 2

Education, Credit and the Extension Service: Effects on Small Farmer Productivity in the Lower Shabelle Region of Somalia
   Gary S. Straquadine & Abdullahi Mohamud Haybe ..................... 7

Incorporating Indigenous Knowledge Systems into Agricultural and Extension Education Programs: A Study of the Perceptions of Extension Professionals in India
   Robert A. Martin & B. Rajasekaran .................................... 13

Improving Agricultural Extension through a Systemic Approach: Lessons from the Caribbean Agricultural Extension Project (CAEP)
   Joseph Seepersad ............................................................... 22

Perceptions of Young Farmers Regarding the Role of International Agriculture in Agricultural Education
   Robert A. Martin & Kamal Ali Elbasher ................................ 28

Reaching Malawian Smallholder Farmers with Agricultural Extension Programs: A Case for Increased Use of Women-Farmer Groups
   Vickie A. Sigman, Catherine Chibwana & Isabel Matenje ........... 35

Book Review: Agricultural Extension, Worldwide Institutional Evolution and Forces for Change,
   David G. Acker .................................................................. 42

Village Extension Workers (VEWs), Agricultural Extension Officers, and Contact Farmers Perceptions of VEW Visits Under the Training and Visit (T & V) System
   Rama B. Radhakrishna & Edgar P. Yoder ............................... 44

The Dairy Technology System in Venezuela
   Rubén D. Nieto & Janet L. Henderson .................................... 53

Arresting Deforestation in the Amazon
   Douglas Speicher, Arlen Eting & Lowell Wilson ..................... 65

Creating a Stronger Model for International Youth Exchange: A Case Study
   Arlen W. Eting ................................................................... 70
INSIKA YOUTH PROGRAM
ADDRESSING AN EDUCATIONAL CRISIS IN
SOUTH AFRICA

Dennis W. Eaton, Graduate Assistant
Department of Agricultural and Extension Education
The Pennsylvania State University

Abstract

This article highlights a project undertaken by a rural South African youth organization. The uniqueness of this particular organization was its grass-roots development in the midst of a very demoralizing environment - that of a rural apartheid-based homeland. With the successful organization of community members seeking to improve their living conditions, an urgent request came to enhance career opportunities for the youth. These young people, engaged in a seemingly insurmountable struggle, work hard to become successful in the South African educational scene. The key to the success of this youth organization was engaging the youth in the implementation of African-style democracy to identify and solve their problems. This is a report of their first project and its results.

Introduction

Change in South Africa is coming about at an accelerated rate. It was the February 1990 historic watershed speech of the newly appointed State President, Mr. F. W. DeKlerk that created the momentum. His intention was to put away apartheid (meaning separateness) with all its vestiges and to usher in a "new and just" democratic South Africa (Walker, 1990, p. 14). This created a mixed reception by all South Africans. However, the real show of genuineness prevailed when the long-imprisoned Nelson Mandela was released from prison a few days later. Euphoria characterized the majority of the black population (Cassidy, 1990, pp. 28-29). It was not long before many young people were disappointed! The 1990 academic year was filled with unrest, school boycotts, and strikes rivaled only by the 1976 Soweto uprisings.

The test scores on the end-of-year exams were "...the worst in black education in South Africa" (Taylor, 1991, p. 8).

Today the educational system for black South Africans is in shambles. The unemployment rate is extremely high. A recent IMF paper estimates the nonwhite underemployment rate of 1990 to be 41.7%. The recent and ongoing educational "brain-drain" of emigrating professionals has created a vacuum. What remains is a majority population that is ill-fit to function in a modern and technical South African society (Williams, 1991, p.11). These problems are further exacerbated by the underdevelopment of rural South Africa. The task seems insurmountable considering the impoverished economic, political, and social conditions that exist.

Purpose

The purpose of this article is to describe a youth organization within a non-governmental rural development association and its attempts to address one of its needs. This is a situation where youth have taken an initiative after having been provided a forum and framework in which to function. It "demonstrates the effectiveness of the informal delivery mode of youth development education and its flexibility to respond to local needs" (Rennekamp, 1992).
Statement of the problem

The black population has long realized the inequalities existing in education. Various self-help projects have been undertaken to improve the situation with some promising and hopeful outcomes (Kallaway, 1984, pp. 184-265). The Insika Rural Development Association is one such organization that was initiated in 1983. Insika is a Zulu word which means center pole of the Zulu house. This is the most important structure in the traditional house - equivalent to the keystone. The formation of this organization began when group of farmers approached a trusted community leader requesting him to organize and administer their own perceived agricultural and community needs. After several years of working on projects, Insika grew in number and scope. Eventually funding from interested development organizations further accelerated this organization to be a catalyst for rural improvement.

In 1989, several members approached the director requesting Insika to address the needs of their children. The issue of the young people had become of increasing concern to the Insika members. Many of these youth were illiterate, unable to continue formal schooling, or unemployable due to lack of adequate skills acquisition. With this urgent need at hand, the board of directors agreed to have a youth organization established for the purpose of addressing the needs of their young people. Thus the Insika Youth Program (IYP) was created. The main objectives of Insika Rural Development Association would thus be: to promote the self-help development of member communities in agriculture, basic literacy, and youth.

Method

Insika members, in their respective communities, requested their children to attend an organizational meeting in the winter of 1989. The young people gathered one Saturday morning and the director discussed the idea of starting a youth program that would focus on their critical needs and aspirations. Furthermore, he emphasized that this program was to be organized and run by themselves, thus allowing for leadership development. There was an overwhelmingly positive response to the announcement and an election was held to choose an executive committee. Most of the members chosen for the executive committee were already recipients of an Insika higher education scholarship and as part of this funding were required to spend time, whenever possible, assisting ongoing Insika projects. Subsequent to the election of officers, a lengthy forum followed where needs within their community were identified. The items were recorded and the meeting adjourned. Later, the newly elected leaders met to discuss ways of addressing the issues and to draft a constitution. The foremost need was additional instruction in the formal secondary curriculum. Other needs were skill training for employability and ways to enter and finance education at the college level. However, requests for advancing on to tertiary education initially overshadowed the needs of the un-schooled.

In South Africa, all high school seniors must take and pass examinations in a minimum of six subjects in order to earn their high school diploma. These examinations are centrally administered for all students in the country. In January 1990, the IYP executive committee met to devise a way to address the secondary students’ need to prepare adequately for these end-of-year high school exams. The committee agreed, by consensus, that a winter school should be held during the three week school vacation. Unfortunately, due to improper planning and lack of directed leadership this was not realized. Shortly thereafter—a concerned educator, interested in the ongoing educational crisis, approached the director of the Insika Rural Development Association. His concern about the student strife and the bleak prospects of this year’s academic results lead
him to volunteer his time to encourage the Insika youth. The board of directors, looking for someone to assist the youth, took him on as their IYP coordinator.

Procedure

The IYP coordinator met with the executive committee and the Insika director to determine the ways to address the formal educational needs of the secondary school members. Upon reaching a decision to hold ongoing classes on Saturday mornings, the executive committee and IYP coordinator called an organizational meeting of the relevant members. This enabled all senior secondary school IYP members to have a direct say in the content and control of the Saturday classes. A written questionnaire was issued for members to select the four most crucial subjects to be offered. The data were compiled and presented for discussion. IYP members arranged for their own evaluation and control of the program, and the IYP coordinator was given the responsibility to locate certified teachers from local colleges to volunteer their time to teach.

Classes were conducted from July 1990 to November 1990 to prepare for the National school-leaver examinations held annually in November. Each student attending the classes paid a token fee to cover incidental costs. This cost was R15 ($6) per course for a maximum of R50 ($20) for four courses. External funds provided for an incentive allowance to attract high caliber teachers. These teachers assessed the needs of their students and organized instruction and evaluation to meet those needs as well as the requirements of the syllabus.

Results and Conclusions

The students participating in the five months of readiness classes for the senior certificate school-leavers examination said it was very encouraging to have these sessions. Some of the students were unable to attend their schools due to sporadic uprisings that would occur in their areas. This is due, in part, to South African black youth holding strong allegiances to a political view. Conflicts would therefore arise as a result of the two political parties, the Africa National Congress and the Inkatha Freedom Party, presence in the area. At times the schools would become the focal point of gang wars and thus the normal school routine would be disrupted. Several students suffered intimidation by their peers because of differing political ideologies. Other students, who were able to attend their schools regularly, said they were better prepared to take the external exams due to the high caliber of the teacher/volunteer encouraging them.

Other positive results of the organized nature of this undertaking were the appeals from the un-schooled members requesting relevant programs for them. An educational tour was planned for members to attend a nearby career awareness seminar. Younger members requested English speaking classes to help them in school and to communicate more effectively. A volunteer teacher used a drama approach to involve the members in English speaking parts of various relevant scenarios. Even a choir was established as a form of recreation.

Finally, the students’ examination results were encouraging. To pass the exam the average score from a minimum of six subjects tests must exceed 33%. Most of the students who attended the Saturday classes reported that their average score exceeded 50%. Country-wide only 36% of black pupils passed their exams (Taylor, 1991, p. 8). KwaZulu students exceeded these figures with an overall pass rate of 46% (Shabalala, 1991). One could argue that these young people already exhibited initiative by being willing to better themselves and would therefore perform better than average. Their personal reactions indicated otherwise. They expressed much appreciation for the efforts of the Saturday classes.
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Educational Importance

Black South African youth have been excluded from having a voice in their education. The initiation of a rural youth program has had an impact upon their quality of life. The following are the major results of this program:

1. Young people were allowed to indicate their needs and to choose the curriculum.

2. Young people chose their leaders and allowed them to lead democratically.

3. Leadership was developed through the provision of responsibility and freedom to perform in an environment of encouragement.

4. Success of the program centered on the efforts and initiative of the IYP members with direction and guidance from the IYP coordinator and Insika director.

5. Students were better able to perform on the exams, and many qualified for college-level education who would otherwise not meet the entrance requirements.

6. Additional programs involving non-school IYP members were developed.

7. The following year a guidance coordinator joined Insika to assist school leavers to identify and apply to relevant vocational/academic institutions.

8. Work is currently in progress to establish a youth development program similar to the 4-H program in America. The organization’s desire is to have on-going, non-formal, small group educational programs in agriculture, home economics, literacy and entrepreneurship.

Recommendations

The Insika Youth Program has experienced a fruitful beginning. Success is needed in the rural black communities of southern Africa. Young people need ongoing encouragement to carry on with projects and programs. It is recommended that the academic classes be continued as long as the unrest prevails in the area and the members feel the need for additional instruction. This enhances the opportunities for students to be better qualified for higher level educational opportunities.

The needs of the un-schooled members, and the high unemployment rate, require that there be a skills analysis with subsequent non-formal, vocational instruction. This will help youth be better prepared for local employment opportunities. Very few young people can express themselves adequately in the businesses’ medium of communication (English & Afrikaans). Therefore, language/communications skills enhancement would also be of great benefit. A further recommendation would be to identify small business opportunities and target needs for training in self-employment/entrepreneurship.

Finally, it is important to develop leaders in the membership. The IYP is organized to encourage this through its African democratic decision making process and the identifying and planning of programs. The director of Insika Rural Development Association and IYP coordinator must continue providing the environment for their youth to participate in every aspect of the Insika Youth Program.
References


EDUCATION, CREDIT AND THE EXTENSION SERVICE: EFFECTS ON SMALL FARMER PRODUCTIVITY IN THE LOWER SHABELLE REGION OF SOMALIA

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Abstract

The purpose of this research was to explore the importance of farming systems research and the impact of extension programs in the Lower Shabelle Region in Somalia. The study also examined additional development components, such as education and credit, for small farmers. Personal interviews were conducted with members of three villages of the Lower Shabelle Region. The study focused on the farmers' resources and the main practices they used for maize production. Descriptive statistical analysis was used for the variables under investigation. A linear multiple regression model was developed and used to estimate the effects of different variables on the production of maize. Based on their resources, farmers fit into one large group; but for the extensions services' purposes, they could be broken into two groups. In the regression model, credit was found to be the only significant variable.

Introduction

At the time of independence, East Africa was a net exporter of many food products. However, twenty years after independence, many African states have lost their capacity to feed themselves (Eicher, 1986) due to the failure of agricultural production strategies. Among the most important factors, Eicher found that many states of Africa had given low priority to their agricultural strategies while relying on donor agencies in developed countries to feed their people.

In the last two decades there have been many attempts to infuse traditional agriculture with technological change, to promote growth. Carefully implemented agricultural research can be an efficient source of economic growth and is an important contributor to the achievement of key development objectives. However, there has been a large gap between the actual farmers' yields and the high yields in crop and animal production obtained in research stations. To increase yields, a program concerned with meeting the needs of small farmers is essential. This type of program is known as farming systems research (FSR).

Farming systems research (FSR), while not a separate discipline, provides a focus for the different disciplines involved in agricultural research. FSR advocates the study of farming outside the research station and the testing of new technology under farmers' conditions (Fresco, 1984). Two of the main objectives of FSR are to study the production constraints of small farmers in developing countries through on-farm adaptive research and to create a two-way communication link between research and its various clients (i.e., policy makers, the
private sector, extension services, and farmers) (Stoop, 1984).

The perception that technological change can be an efficient source of growth in traditional agriculture has been a major factor in the notable increase in the agricultural research effort in developing countries. The isolation of small landholders from national research services establishes and strengthens the need for the FSR program. FSR attempts to understand the way farmers make decisions and encourages farmers to participate in the research process. FSR has the capacity to overcome isolation and to strengthen links between researchers and their small-farmer clients (Collins, 1982).

**Purpose and Objectives**

The purpose of this study was to determine the productivity of small-holder farmers, with or without extension services, by determining their yield during Gu (the rainy season from April through June) in 1988. Specifically, a survey was made in the Lower Shabelle Region, one of the major agricultural regions of Somalia with potential for increased productivity. Lower Shabelle is mainly an irrigated area and the major crop is maize. The main objectives of this study were to:

1. Examine how formal education has affected the way farmers manage their input of production and increased yield.
2. Determine the relationship between the availability of formal credit and the productivity of farmers.
3. Determine the effect the extension service has had on maize production in Somalia.

**Methods and Procedures**

The survey for this study was taken from three districts that have the most agricultural potential in the Lower Shabelle Region. This region, which is located in the southern part of the country, also has the best irrigation infrastructure. The target population for this study consisted of small-holder farmers who grew corn during the principal season, Gu, in 1988. Dryland farms were excluded. An important inclusion were the villages where the extension service was imposed since the early 1980s. Because it was impractical and costly to interview all individuals, a cluster sample of the population was used. A random sample of three villages (Awdigle, Segale, and Bulo Sheikh) was taken from the list of villages in the districts of Afgoi, Merke, and Koryoley, respectively. Then five farmers were randomly chosen from a list of farmers in three domains in each selected village. The three domains—contact farmers, follow farmers, and other farmers—were stratified on the basis of their exposure to extension and research services and other input services. Research by Boateng, Busuri and Yusuf (1985) in LSHR also identified three similar domains based on input used and practices—traditional stage, transitional stage, and improved stage. The small sample size was justified by the less variable farm size and agro-climatic characteristics in an irrigated area. Sample size depends on the variability within the population and not on the size of the population (Byerlee, Collinson, Torrez & Lee 1980).

Successful implementation of the questionnaire required a team of capable interviewers, the farmers’ cooperation, and close supervision by the researchers. The questionnaire was carefully translated into the local language, "Somali." In this survey there were six interviewers divided into three groups. Two interviewers were assigned to interview one village sample, or 15 head families, in one of the selected villages. The interviewers, all high school graduates, were trained for nine days at the Farm Management and Training Center (FMETC) in Afgoi. The data were collected by three different visits made early in
the growing season, the second visit, at the milk stage of the crop, and the third during harvest and threshing.

For further investigation of extension impact on farmers improvement in skill and increase of output, a multiple linear regression production analysis was taken. Alpha was set a priori at p = .05.

**Findings**

Somalia, one of the world’s least developed countries, has a greatly underdeveloped agricultural sector. Survey data on output and farm production activities were collected and analyzed from samples in three villages of LSHR of Somalia to determine the input of extension services on agricultural productivity.

### Table 1

**Selected Characteristics of Somali Producers**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Family Size</td>
<td>8.0 people</td>
</tr>
<tr>
<td>Average Family Labor in Farm Work force</td>
<td>2.8 people</td>
</tr>
<tr>
<td>Land Preparation Techniques</td>
<td></td>
</tr>
<tr>
<td>Using Tractors</td>
<td>86.1 %</td>
</tr>
<tr>
<td>Using Hand-hoe (yambo)</td>
<td>13.9 %</td>
</tr>
<tr>
<td>Source of Seed</td>
<td></td>
</tr>
<tr>
<td>Used Improved Seed</td>
<td>91.1 %</td>
</tr>
<tr>
<td>Used Local Seed</td>
<td>8.9 %</td>
</tr>
<tr>
<td>Planting Technique</td>
<td></td>
</tr>
<tr>
<td>Planted in Rows</td>
<td>72.0 %</td>
</tr>
<tr>
<td>Planted Randomly</td>
<td>28.0 %</td>
</tr>
<tr>
<td>Number of Weedings</td>
<td></td>
</tr>
<tr>
<td>Weeded only One Time</td>
<td>7.1 %</td>
</tr>
<tr>
<td>Weeded Two to Three Times</td>
<td>86.0 %</td>
</tr>
<tr>
<td>Weeded Four Times</td>
<td>2.4 %</td>
</tr>
<tr>
<td>Peak Time of Weeding After Germination</td>
<td>21 - 40 days</td>
</tr>
<tr>
<td>Average Number of Plants Harvested Per Hectare</td>
<td>21.656 plants</td>
</tr>
</tbody>
</table>

The descriptive analysis, using cross-section data, gives some useful insights into farming systems in the area. Table 1 provides a useful summation of the more important characteristics.

Some of the farmers used purchased inputs. About 35 percent of the farmers used chemical fertilizer (Urea), and 46.5 percent used insecticide (Basudine 10 G). About 51 percent of the farmers received some kind of credit.

Among the farmers who received credit, over 46 percent of them used formal credit, while only 4.4 percent of them obtained credit through noninstitutional sources. About 69 percent of the farmers can read and write. More than 55 percent of the farmers had some kind of education. Among the farmers who had an education, on the average, farmers had 3.7 years of formal education. A linear multiple regression analysis of inputs used for maize production was done (Table 2).
Table 2

**Estimated Coefficients of the Maize Production Function for LSHR, 1988**

<table>
<thead>
<tr>
<th>Farmers Coefficients</th>
<th>Contact Farmers</th>
<th>Follower Farmers</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 15</td>
<td>N = 15</td>
<td>N = 15</td>
</tr>
<tr>
<td>Intercept</td>
<td>1688.3296</td>
<td>1703.3589</td>
<td>1753.4195</td>
</tr>
<tr>
<td></td>
<td>(295.1255)</td>
<td>(310.9179)</td>
<td>(347.0462)</td>
</tr>
<tr>
<td>Farm Size</td>
<td>46.5583</td>
<td>50.0739</td>
<td>49.7697</td>
</tr>
<tr>
<td></td>
<td>(48.5099)</td>
<td>(48.0729)</td>
<td>(47.6726)</td>
</tr>
<tr>
<td>Labor/Land</td>
<td>122.4350</td>
<td>126.2757</td>
<td>118.7797</td>
</tr>
<tr>
<td></td>
<td>(94.6043)</td>
<td>(95.5132)</td>
<td>(96.6356)</td>
</tr>
<tr>
<td>Credit</td>
<td>595.3788*</td>
<td>627.2650*</td>
<td>602.0181*</td>
</tr>
<tr>
<td></td>
<td>(287.4869)</td>
<td>(278.2907)</td>
<td>(288.6822)</td>
</tr>
<tr>
<td></td>
<td>(33.8136)</td>
<td>(34.0223)</td>
<td>(34.0482)</td>
</tr>
<tr>
<td>Tractor</td>
<td>170.1418</td>
<td>237.1131</td>
<td>195.4627</td>
</tr>
<tr>
<td></td>
<td>(470.5886)</td>
<td>(442.7940)</td>
<td>(462.4474)</td>
</tr>
<tr>
<td>Extension</td>
<td>132.6606</td>
<td>-22.8487</td>
<td>-95.5186</td>
</tr>
<tr>
<td></td>
<td>(316.1071)</td>
<td>(286.5310)</td>
<td>(302.1913)</td>
</tr>
<tr>
<td>R2</td>
<td>0.214</td>
<td>0.211</td>
<td>0.212</td>
</tr>
<tr>
<td>R2 adjusted</td>
<td>0.090</td>
<td>0.086</td>
<td>0.088</td>
</tr>
</tbody>
</table>

**Note.** Standard errors appear in parenthesis.

* Significant p = .05
This analysis attempted to estimate the functional relationship between output of maize and observed inputs used. The result of the regression analysis showed the coefficients of farm size, labor-land ratio, credit, and education to have the expected sign (positive). For the coefficient of extension service, which divided farmers into three groups (contact farmers, follower farmers, and other farmers), only contact farmers had a positive coefficient. Among the variables used, only credit was statistically significant at a 0.5 level to all farmer domains.

Conclusion and Recommendations

This investigation found no significant variation among the farmers in land holdings. However, the regression analysis showed a larger coefficient for those farmers with small-holdings (follower farmers), compared with the other two groups. In addition, the coefficient of labor-land ratio for the follower farmer, who had the highest ratio, was a positive coefficient. A combination of these two variables suggests these farmers are small-holder farmers who are labor intensive.

Access to credit and availability of inputs to small farmers encouraged increased production. The significance of credit to these small farmers indicates that government and/or development agencies should consider the importance of credit and input services to small farmers at an early stage to improve productivity.

Based upon this research and the opinion of the authors, education affects the productivity of small farmers through motivation and independent access to production information. Education, therefore, helps them in making the proper decisions concerning available inputs. Somalia script was written in Latin for the first time in 1973. There is no adult education or vocational training in the country, so the curriculum for the country's elementary schools does not meet the needs of small farmers for encouraging developmental change. In addition, there are no regular agricultural-extension publications, such as bulletins or journals, designed to transfer information and train small farmers. The insignificant contribution of education is a result of a lack of appropriate curriculum for adult education, particularly for rural people, and a lack of written materials.

Tractor ownership was the only capital item examined in the study using regression analysis. The coefficient had a positive sign but was not statistically significant. This could be explained because tractors are used only one time in the season for land preparation. In addition, this might suggest the farms in the survey area are labor intensive rather than capital intensive.

The extension service was the main focus of the study, and its coefficient in the regression analysis showed a positive sign for the contact farmers. Only contact farmers have direct contact with extension agents. The other two groups not directly contacted by extension had a negative sign on the extension coefficients. Neither of the latter groups were statistically significant. In a country where there is no viable and consistent agricultural research and an inefficient flow of appropriate technology to the small farmers, the contribution of the newly established extension would be limited. While the positive contribution for contact farmers is encouraging, it suggests a need for further change.

References


INCORPORATING INDIGENOUS KNOWLEDGE SYSTEMS INTO AGRICULTURAL AND EXTENSION EDUCATION PROGRAMS: A STUDY OF THE PERCEPTIONS OF EXTENSION PROFESSIONALS IN INDIA

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Abstract

The overall purpose of this study was to identify the perceptions held by agricultural extension professionals in India regarding indigenous knowledge systems and to develop an appropriate model for using indigenous knowledge. The research design used for this study was a descriptive survey method as well as a participant observation method. A survey questionnaire was used to collect information regarding extension professionals’ perceptions of selected indigenous knowledge concepts. The extension professionals, irrespective of their hierarchies, were found to be aware of the value of indigenous knowledge systems. Factors that are essential for revitalizing the agricultural extension system are identified. A model to integrate indigenous knowledge systems into agricultural and extension education is explained.

Introduction

Dissemination of technologies to increase agricultural production using the conventional transfer of technology (TOT) system has often failed to consider the natural environment (e.g., local watersheds), indigenous knowledge systems (e.g., indigenous soil classification), and resource endowments (e.g., labor availability) around which resource-poor farmers normally operate (Warren, Slikkeveer, Titilolo, 1989; Chambers, 1989; Rajasekaran & Martin, 1990; Gupta, 1991). Continuing intensive agricultural production strategies, while neglecting these grass-roots factors, may worsen the physical, natural, and human environment of resource-poor farmers of the developing world.

An indigenous knowledge system is knowledge-based on awareness, familiarity, conceptualization, and beliefs acquired by local people through an accumulation of experiences, non-formal experiments, and an intimate understanding of the environment of a given culture, at a specific geographical location and during a specified period of time (Rajasekaran, 1992). Indigenous knowledge systems are learned ways of looking at the world (McClure, 1989). A farmer’s knowledge regarding many aspects of agriculture is often broad, detailed, and comprehensive, although this is not always the perception among agricultural scientists and extensionists (Thruston, 1992).

Attitudes generated by the TOT paradigm have precluded learning indigenous knowledge from resource-poor farmers. Reasons for non-adoption of innovations resulting from the conventional TOT paradigm have been attributed to characteristics of small-scale farmers or an inadequate delivery system but seldom to the characteristics of the innovations themselves (Waters-Bayer, 1989).
Technologies recommended through agricultural extension programs are often based on research conducted at regional research stations and usually overlook indigenous agricultural knowledge (Rajasekaran & Martin, 1990). Higher-level extension administrators are less interested in learning from village extension workers (VEWs) about farmers’ cultural practices, preferring to hear about the successful adoption of technologies developed from research stations. There is a tendency to view VEWs as mere messengers, ignoring the fact most of them were raised in villages and spent their childhoods on small-scale farms, absorbing the indigenous agricultural knowledge for a given solution (Warren, 1991). VEWs represent an interface between farmers’ knowledge and formal agricultural knowledge (Waters-Bayer & Farrington, 1990).

Farmers are mainly seen as the recipients of extension recommendations but not the originators of either technical knowledge or improved practice (Moris, 1991). Farmers’ informal experimentation has long been underperceived (Rhoades & Bebbington, 1988). Farmers’ priorities have not traditionally been considered while conducting on-farm research trials (Rajasekaran & Martin, 1990). Farmers are familiar with testing alternate coping mechanisms to avert extreme conditions such as droughts and floods, and researching diversified food production techniques.

Incorporating indigenous knowledge systems into agricultural and extension education programs is essential for (1) understanding the ‘emic’ perspectives of local people; (2) bridging the communication gap between outsiders and insiders; (3) recognizing the accomplishments of local farmers; (4) making outsiders familiar with local conditions and abstract terms; and (5) increasing the participation of farmers and their organizations in integrating, utilizing and disseminating what already exits (Rajasekaran, 1991).

Understanding local agricultural knowledge would strengthen the extension process, particularly by drawing upon the experience of expert farmers and other persons regarded by the community as being particularly knowledgeable about the environment (Compton, 1989). Hence, understanding farmers’ knowledge allows a framework of reference for increasing the effectiveness of agricultural and extension programs (Scoones, 1989).

It is evident from the aforementioned theoretical framework that agricultural and extension education program effectiveness would be improved if extension professionals had a greater awareness of indigenous knowledge systems. Thus, it is essential that efforts be taken to utilize indigenous knowledge systems while developing agricultural and extension education programs. However, without understanding the perceptions of extension professionals who play a crucial role in implementing these programs, it is difficult to proceed further in this direction. Hence, it was decided to conduct a survey among the agricultural extension professionals regarding their perceptions of indigenous knowledge systems in India.

Purpose and Objectives

The overall purpose of this study was to identify the perceptions held by agricultural extension professionals in India regarding indigenous knowledge systems and to develop an appropriate model for using indigenous knowledge. The specific objectives of the study were:

1. To identify the importance of selected indigenous knowledge concepts as perceived by agricultural extension professionals;

2. To identify the use of indigenous knowledge in agricultural extension programs as perceived by agricultural extension professionals;
3. To compare perceptions regarding indigenous knowledge systems according to various levels of extension professionals; and

4. To develop a model for incorporating indigenous knowledge systems into agricultural and extension education programs in India.

Methods and Procedures

The study was conducted by researchers at Iowa State University. The research design used for this study was a descriptive survey method as well as a participant observation method. The target population for this study was 962 agricultural extension professionals of the state of Tamilnadu, India. Cluster sampling procedures were used to draw the sample. There are 24 districts in Tamilnadu state and two districts were randomly selected (ten percent of the population). The sample size was 96 agricultural extension professionals. All the extension professionals belonging to the two districts (clusters) were included as the sample for the survey (Thiruvannamalai District=44; Madurai District=52).

A survey questionnaire was developed for the study by the researchers and it was reviewed for content validity by a panel of experts in agricultural and extension education. Cronbach's alpha reliability coefficient values for the instrument were 0.9635 and 0.9042 for the two scaled portions of the instrument. The questionnaire, containing 26 statements related to indigenous knowledge systems, was used to collect the data from the respondents. A Likert-type scale with points ranging from 1 (Low) to 5 (High) was used to collect information regarding extension professionals' perceptions of selected indigenous knowledge concepts. Zonal workshops in both the districts were attended by the researcher to collect the data directly from the respondents. The zonal workshops are the meeting points where the extension personnel receive technological recommendations from the agricultural research scientists. The extension personnel represent three different hierarchies: Assistant Directors of Agriculture (divisional level), Agricultural Officers (block level), and Village Extension Workers (village level). Requests were made earlier to attend the workshops for data collection. The last half-hour of the workshops was allocated to complete the questionnaire. The researcher attended all of the sessions of the one-day workshops. The information obtained from the workshops was used to interpret some of the data.

Mean scores and standard deviations were computed for all the indigenous knowledge statements to determine the level of agreement regarding selected indigenous knowledge statements as perceived by agricultural extension personnel regarding using indigenous knowledge in agricultural extension programs. A t-test was conducted to identify the differences among the various hierarchies of the agricultural extension system at .05 alpha level of significance.

Results

The extension personnel were grouped into two categories for analytical purposes. The Assistant Directors of Agriculture and Agricultural Officers were grouped as "extension administrators." The Village Extension Workers were termed as "field-level extension workers." Table 1 shows the mean ratings and standard deviations regarding the extent to which selected indigenous knowledge statements were important to extension personnel in India. Out of 8 statements, 5 statements were important to extension personnel. The statement, 'extension workers'
Table 1

Means and Standard Deviations Regarding the Extent to Which Selected Indigenous Knowledge Statements Were Rated as Being Important to Extension Personnel in India (n=96)

<table>
<thead>
<tr>
<th>Indigenous Knowledge Statements</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension worker’s knowledge of local traditions should be given consideration</td>
<td>4.46</td>
<td>0.64</td>
</tr>
<tr>
<td>Scientists continue to ignore farmers’ risk aversion strategies</td>
<td>4.29</td>
<td>6.76</td>
</tr>
<tr>
<td>Diversified food production is one of the strategies of small-scale farmers</td>
<td>4.11</td>
<td>1.17</td>
</tr>
<tr>
<td>Farmers’ varying production goals should be considered before designing on-farm research trials</td>
<td>4.06</td>
<td>1.19</td>
</tr>
<tr>
<td>The feedback from extension to research is usually the weakest part of the information systems</td>
<td>4.03</td>
<td>1.19</td>
</tr>
<tr>
<td>Indigenous knowledge of women in agricultural production is not given due regard by society in general</td>
<td>3.89</td>
<td>1.25</td>
</tr>
<tr>
<td>Technological interventions normally overlook the critical linkages among soils, climate, livestock, trees, and crops</td>
<td>3.23</td>
<td>1.42</td>
</tr>
<tr>
<td>The traditional Technology transfer model is appropriate for locally diversified farmers’ food production systems</td>
<td>2.81</td>
<td>1.79</td>
</tr>
</tbody>
</table>

Note.  1 = Not important; 2 = Low importance
3 = Neutral; 4 = Highly important; 5 = Very highly important
Table 2.

Means and Standard Deviations Regarding Incorporating Indigenous Knowledge Systems Into Agricultural and Extension Education Programs (n=96)

<table>
<thead>
<tr>
<th>Statements Regarding Incorporating Indigenous Knowledge Systems into Extension Programs</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension workers must learn how to identify and evaluate indigenous knowledge systems</td>
<td>4.38</td>
<td>0.87</td>
</tr>
<tr>
<td>Training programs must be conducted to explain the methodologies for recording indigenous knowledge</td>
<td>4.33</td>
<td>1.12</td>
</tr>
<tr>
<td>Effective and systematic approach to elucidate feedback information on farmers' problems, constraints regarding technologies</td>
<td>4.21</td>
<td>1.84</td>
</tr>
<tr>
<td>Incorporate indigenous knowledge component into zonal workshops and bi-weekly training programs</td>
<td>4.17</td>
<td>1.90</td>
</tr>
<tr>
<td>Farmers' forums must be conducted by extension workers to elucidate indigenous knowledge</td>
<td>4.11</td>
<td>1.22</td>
</tr>
<tr>
<td>Identifying informal local-level farmer organizations</td>
<td>4.06</td>
<td>1.33</td>
</tr>
<tr>
<td>Extension workers must support farmer-to-farmer information exchange</td>
<td>3.86</td>
<td>1.41</td>
</tr>
</tbody>
</table>

**Notes.** 1 = Not important; 2 = Low importance; 3 = Neutral; 4 = Highly important; 5 = Very highly important

Knowledge of local traditions should be given considerate importance with a mean rating of 4.46. The statement, "The technology transfer model is appropriate for locally diversified farmers' food production systems" was rated low by the extension personnel. The mean rating was 2.87. With respect to statements regarding incorporating indigenous knowledge systems into agricultural and extension education, 6 statements received mean ratings of 4 and above (Table 2).

The statement, "extension workers must learn how to identify and evaluate indigenous knowledge systems" was rated by extension personnel with a mean rating of 4.38. The statement, "extension workers must support farmer-to-farmer information exchanges" received a more neutral rating with a mean of 3.86.

The perceptions of extension administrators differed statistically using a t-test from the
field-level extension workers regarding the statement, "incorporate indigenous knowledge component into zonal workshops and bi-weekly training programs" (Table 3). Zonal workshops and bi-weekly training programs are two pipelines of the research-extension delivery system. The extension administrators might not want to disturb the existing system. In other words, making changes in the system is a policy decision. The extension personnel belonging to two different hierarchies did not differ statistically regarding other statements pertaining to incorporating indigenous knowledge systems into agricultural and extension education programs.

It was somewhat surprising to find that the extension personnel, irrespective of their hierarchies, were found to be somewhat aware of the value of indigenous knowledge systems. The limitations of the existing technology transfer paradigm were also recognized by the extension personnel. With respect to incorporating indigenous knowledge systems into agricultural and extension education programs, the extension personnel perceived that three factors were essential for revitalizing the existing agricultural extension system: (1) Exploiting extension workers' knowledge of local traditions; (2) Training the extension administrators and field-level workers in the methodologies for recording indigenous knowledge systems; and (3) Strengthening the feedback mechanism from farmers to extension and then to researchers.

Conclusions and Recommendations

There is much to be learned from farmers. Agricultural extensionists must be provided opportunities to learn the methodologies for systematically recording the indigenous agricultural knowledge available in every community. We can build upon these new sensitivities to understand farmers' perspectives of risk, how they define their problems and needs as well as their goals and objectives, and how these can provide the basis for an interactive extension program rather than one focused on top-down dissemination of information.

A model to integrate indigenous knowledge systems into agricultural and extension education has been developed based on the findings of the study (Figure 1). Training, recording indigenous knowledge, feedback, and integration are the four units of the proposed model. Establishing a national resource center for dissemination and training of indigenous knowledge provides the starting point for the model. The concept of establishing a national resource center was developed by Professor Michael Warren, Director of Center for Indigenous Knowledge for Agricultural and Rural Development (CIKARD). He has pioneered the establishment of ten national indigenous knowledge centers so far in Nigeria, Mexico, Philippines, Indonesia, Australia, Kenya, Benin, Nepal, Ghana, and Sri Lanka. The role of the national resource center is to act as a clearinghouse for collecting, documenting, and disseminating information on indigenous knowledge on agricultural and rural development. Once extension administrators are trained on the methodologies for recording indigenous knowledge, they can develop training programs for field-level extension workers considering the local cropping conditions and socio-cultural environments. A training manual is essential for introducing the methodologies for identifying and recording indigenous knowledge systems into agricultural extension educational settings. Separate sessions could be allocated during the zonal workshops and bi-weekly training programs to educate the methodologies for recording indigenous knowledge systems.

Participant observations, unstructured interactions, participatory meetings, and indigenous taxonomies are some of the examples of the methodologies for recording indigenous knowledge systems. The details of these methodologies are described in Warren & Rajasekaran (1991). Using these
methodologies, the field-level extension workers are expected to identify and record indigenous knowledge systems pertaining to agricultural production in their respective areas. The indigenous knowledge systems thus collected should be fed back to the extension-research system via bi-weekly training programs and zonal workshops. Integrating indigenous knowledge systems and research station technologies form the final

Table 3

T-values analyzing the differences in perceptions between various hierarchies of extension professionals regarding incorporating indigenous knowledge systems into agricultural extension programs (n=96)

<table>
<thead>
<tr>
<th>Statements Regarding Incorporating Indigenous Knowledge Systems into Extension Programs</th>
<th>Extension administrators</th>
<th>Field-level workers</th>
<th>T-value</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension workers must learn how to identify and evaluate indigenous knowledge systems</td>
<td>4.21</td>
<td>4.47</td>
<td>.74</td>
<td>.462</td>
</tr>
<tr>
<td>Training programs must be conducted to explain the methodologies for recording indigenous knowledge</td>
<td>4.42</td>
<td>4.15</td>
<td>.78</td>
<td>.440</td>
</tr>
<tr>
<td>Effective and systematic approach to eludicate feedback information on farmers' problems, constraints regarding technologies</td>
<td>4.06</td>
<td>4.22</td>
<td>.22</td>
<td>.830</td>
</tr>
<tr>
<td>Incorporate indigenous knowledge component into zonal workshops and bi-weekly training programs</td>
<td>3.86</td>
<td>4.34</td>
<td>2.82*</td>
<td>.047</td>
</tr>
<tr>
<td>Farmers' forums must be conducted by extension workers to eludicate indigenous knowledge</td>
<td>4.21</td>
<td>3.90</td>
<td>.82</td>
<td>.427</td>
</tr>
<tr>
<td>Identifying informal local-level farmer organizations</td>
<td>4.12</td>
<td>3.97</td>
<td>.96</td>
<td>.365</td>
</tr>
<tr>
<td>Extension workers must support farmer-to-farmer information exchanges</td>
<td>3.76</td>
<td>3.92</td>
<td>.71</td>
<td>.449</td>
</tr>
</tbody>
</table>

Note. *Significant at 0.05 level
unit of the proposed model. After receiving the feedback information concerning indigenous knowledge systems, the research station scientists should systematically classify the data/information according to disciplines (for instance, crop varietal selection, soil health care practices, water management). On-station and on-farm research projects should be conducted by the respective discipline scientists based on the classified indigenous knowledge systems. For example, the plant breeders may use indigenous knowledge regarding crop varietal selection. Sensitizing the agricultural and extension education community to learn from resource-poor people and their understanding of the natural resource environments should be one of the essential principles of agricultural and extension education programs in the years to come. Devaluing indigenous knowledge systems as "low productive," "primitive," and "old" is no longer a useful attitude. Dissemination of research station technologies is essential to increase agricultural production, but they should be carefully built on the foundation of indigenous knowledge of resource-poor people in order to successfully accomplish the mission of food security and the preservation of natural resources for future generations.

References


IMPROVING AGRICULTURAL EXTENSION
THROUGH A SYSTEMS APPROACH: LESSONS FROM THE
CARIBBEAN AGRICULTURAL EXTENSION PROJECT (CAEP)

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Abstract

The article draws from the experiences of a major extension project funded by USAID which aimed at improving extension services in seven countries in the Eastern Caribbean. It takes the position that the widely accepted success of the project was due largely to the use of a systems framework in conceptualizing the "problem" and implementing solutions. The goals of the project are first outlined followed by discussions on the process of and findings from, situational analyses. These findings formed the basis of Phase 2 of the project which focused on institutional strengthening, training, staffing and the provision of needed resources. The centerpiece of the next phase was demonstration districts aimed at demonstrating how an effective extension system can operate using an optimum resource management approach. Here, as also discussed elsewhere in the paper, the strength of a systems perspective is also quite evident.

Introduction

Improving extension services has continued to present many challenges to national and international agencies involved in such efforts. Approaches in the past have included transplanting models from the "developed" to the "developing countries" and more recently, from one developing country to another, particularly the Training and Visit System. At long last, however, the view that there is no one "best approach" seems to be gaining ground. A recent World Bank document (The World Bank, 1990, p. 6) pointed out that "there can be no universal model, or blueprint for extension" and enunciated four organizational principles, one of which was "situation specificity." Later, the UNDP (United Nations Development Programme, 1991) carried that position a step further and proposed that "the UNDP approach should be to strengthen the existing national extension system... rather than to recommend a totally new approach" (p. 57).

This article briefly discusses the Caribbean Agricultural Extension Project (CAEP) which has been widely regarded as a success. As the discussion will show, CAEP bears out the positions stated in the two documents just mentioned. It was designed to fit the local situation and the overall approach was to strengthen the national extension systems in the project countries. Given the acceptance of the view that the project ought to be situation specific, it soon became clear that it would be necessary to use a "systems framework" to better understand the extension systems and the context in which they were embedded. The paper highlights CAEP's use of the system perspective although other points will become evident. For example it also illustrates the "extension process" at work; the project started with a situational analysis and followed through with the basic steps in extension program development. At each step, too, there was adequate consultation among the external agencies, the local institutions and the beneficiaries.
What does "system perspective" mean? According to Friedrich and Hall (1990), first, it emphasizes the need to view a situation as a whole and not as separate parts. Holism is, thus, a recurring theme. Second, it recognizes the interactions of components inside the system as well as the effect of the immediate external environment upon the system in the process of transforming inputs to outputs. To extrapolate, if one is attempting to change one component, then it will be necessary to look at interactions with the other components as well as external factors. Finally, the system perspective also stresses "systems hierarchy", whereby every system is part of a larger system and itself composed of sub-systems.

Goal and Purpose

CAEP was designed and conducted by the following:

(a) the local agency, the Department of Agricultural Extension, University of the West Indies (UWI);

(b) the collaborating U.S. institution, the Midwest Universities Consortium for International Activities (MUCIA); and

(c) USAID, the funding agency.

Its goal was to improve the economic and social well-being of small-farm households through an increase in the value of agricultural production, increased productivity and the generation of agricultural employment. The purposes were two-fold: to increase the effectiveness of national public and private sector extension systems in bringing about farmer adoption of appropriate technologies; and to improve the long-term effectiveness of UWI to support national extension services. At its inception, the project covered Belize and seven Eastern Caribbean States (Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Kitts-Nevis, Saint Lucia, St. Vincent and the Grenadines); Belize later withdrew from the project.

CAEP spanned the period, 1986-1989 and consisted of three phases as follows:

1. Phase I, from 1980-82, which was basically diagnostic in nature.

2. Phase II, from 1982-85, aimed at implementing some of the major recommendations from Phase I on improving extension services in the participating countries.

3. Phase IIa, from 1986-89, in which extension demonstration districts were established and the Farm and Home Management Approach was initiated.

Phase I-Situational Analysis

As the extension process advocates and in line with what has been suggested by some recent publications on international extension (e.g. The World Bank, 1990; Zijl, 1991), the first step must be to understand what exists - what is the situation and why it is as it is. Thus, situational analyses were carried out in each of the project countries, with special emphasis on national and private sector extension systems and their linkages with other related organizations. These analyses involved consultations with a wide spectrum of organizations and individuals working in agricultural and rural development.

The analyses identified strengths and weaknesses of the systems and developed country profiles on:

(a) human resources - numbers of staff and levels of skills in the organization;

(b) material resources - vehicles, communications equipment etc.;
(c) technical and other support services available to these systems; and

(d) linkages with research and marketing agencies as well as others involved in rural development.

Out of the analyses emerged National Extension Improvement Plans which subsequently formed the basis of Phase II of the project.

Phase II-Implementing National Extension Improvement Plans

Phase II concentrated on three major areas: institutional strengthening/building; training; staff positions in critical areas; and the provision of equipment and other material resources.

Institutional Strengthening

From the perspective of the project, it was not necessary nor desirable to improve extension services by the wholesale introduction of new models or approaches. Rather, CAEP’s approach was to work with the existing organizations, a strategy which has been endorsed recently by UNDP (United Nations Development Programme, 1991). Thus, the project provided assistance in streamlining the operations of extension services, which in many cases led to varying degrees of restructuring within the organizations. In this regard, a major accomplishment was the separation of regulatory functions involving the enforcement of rules, supervision of credit, etc., from extension functions so that "extension staff" no longer had to carry out responsibilities that could conflict with their role as friend/adviser to farmers. There were, of course, a number of other project activities which aimed at streamlining operations, for example, the development of proper job descriptions for front-line and other staff, improvements in supervision and administrative procedures, and the development of improved long-range and short-range plans to guide the activities of extension organizations.

For extension in the field to be effective, there must be adequate communications support. Thus, CAEP assisted in the establishment of national communication units (NCUs) in each of the project countries, as well as a Regional Extension Communications Unit (RECU); RECU’s primary role was to coordinate and support the work of the NCUs. The communication units not only assisted in the wider dissemination of agricultural information through print and radio, but also produced visual aids to improve the effectiveness of educational delivery in individual and group settings.

CAEP was also instrumental in the establishment of several formal consultative mechanisms, both at the regional and national levels, to guide not only extension programming, but also agricultural development efforts as a whole. At the regional level, the work of the project itself was guided by the Regional Agricultural Extension Coordinating Committee (RAECC), which met every 18 months to review the CAEP’s work and to chart future directions.

The core of RAECC was comprised of Ministry officials and farmer representatives from each country participating in the project. However, recognizing that extension cannot operate effectively in isolation, representation was also sought from other agricultural related agencies in the region. Thus, RAECC did not confine its deliberations and recommendations, to purely project or extension matters, but dealt with other key elements in the agricultural development mix. In a similar proactive vein, CAEP brought together on a regular basis senior officials of research and extension organizations in the region on a semi-annual basis in an attempt to achieve a more effective coordination of their activities.
At the country level, the project encouraged and facilitated the establishment of National Agricultural Planning Committees (NAPC) comprised of broad representation from the public and private sectors to help chart directions for agricultural development in each country. The NAPCs in turn set up sub-committees on extension, research and other areas to advise the general body. At the community level, district extension advisory committees were formed to advise an extension program.

Training

Since CAEP was conceived as basically a "technical assistance project" the majority of its activities focused on training. While greater emphasis was placed on training the front-line staff since they were the ones in daily contact with farmers, it was recognized that the organizational climate must be supportive for the field staff to put what they have learnt into practice. Consequently, training was conducted for personnel at the middle and upper tiers as well. Training for the front-line staff focused on both process areas - program development, extension methods, group dynamics, farm management - and a wide range of content areas.

Most of the training took the form of short courses, seminars, workshops and the like. However, a need for specialized professional training for field staff who had been out in the field for a few years, was strongly apparent. Consequently, a one-year Diploma in Agricultural Extension was established at UWI, with assistance from CAEP who also provided scholarships to students from participating countries. The diploma covered extension topics, community analysis, rural sociology, and communications. Students were also required to conduct a research project on areas of specific concern to their organizations. Extension staff were consequently reminded that they were professionals and thus, they should have a professional approach to their jobs. While appropriate training provided the base for increasing professionalism, it was felt that other measures were also needed. Consequently, the project initiated an Excellence in Extension program, whereby outstanding extension officers in each country were selected and given special recognition. CAEP also encouraged and supported the development of professional associations as a further move to build professionalism in extension organizations.

CAEP was also involved directly in farmer training, particularly in subject-matter sessions on topics such as soil conservation, pest management, and so forth. Apart from the "knowledge transfer" aspects, the aim was also to strengthen the learning process through the active participation of both extension officers and farmers at the same event. Farmer participation was viewed as a key element in CAEP's work plan and thus, training geared at strengthening the group process was conducted for both farmers and extension staff.

Resources

The project provided a few staff positions in critical areas - communications, farm management and marketing - as well as several short-term positions as consultants. However, it was not deemed desirable to fund positions in the Ministries of Agriculture, although staff shortages existed. This was based on concern for the long-term sustainability of the project, and well-founded suspicion that such a move would weaken the existing systems, by pulling staff away from them. That concern, too, was reflected in the initial reluctance to fund equipment and other material resources, which would tend to detract from the technical assistance nature of the project. However, it soon became obvious that the lack of the
necessary "tools" to do the job would hamper the progress of the project and thus, communications equipment and some vehicles were provided. Recognizing, also that the lack of mobility of field staff was a basic constraint, the project provided motorcycles in some countries and initiated a revolving loan scheme for the purchase of vehicles in others. The provision of such resources, no doubt, gave a boost to the project through increased political support and greater visibility associated with this exercise.

Phase IIA-Demonstration Districts

At the end of Phase II, it was recognized that although significant gains had been made, the changes were rather fragile and thus, more time and effort was needed for consolidation. Thus, funds were made available to continue project activities. However, the centerpiece of CAEP IIA was the demonstration districts which were established in project countries to demonstrate how an effective and efficient extension system can operate using an optimum resource management approach, rather than by depending on a lot of extra external inputs.

The systems perspective was also very much operative in work with the demonstration districts. In an attempt to get a holistic and systemic view of the situation prior to the development of work programs, rapid reconnaissance surveys or sondexos using multi-disciplinary teams were conducted. Out of these emerged recommendations for dealing with problems not only for extension, but for research, marketing, and other areas, which constrain agricultural development in the district. Consistent with the rationale for using demonstration districts, the work plans emphasized a Farm and Home Management approach. This approach basically involved assessments of:

(a) resources possessed by the farm family
(b) how those are deployed in relation to the goals of the farm family; and
(c) what technologies could be introduced to improve farm incomes, without impairing other aspects relating to family welfare.

Beyond CAEP

Although CAEP ended in 1989, in view of the important changes achieved, a successor, project known as the Agricultural Research and Extension Project (AREP) was developed involving both UWI and the Caribbean Agricultural Research and Development Institute (CARDI). AREP provides an opportunity to continue with some of the activities, although the level of funding is much lower than previously. A new element is the formalization of the research-extension linkage, where both the extension and research institutions were placed together for technology development and transfer activities.

The continuity and levels of funding particularly in the early phases, no doubt, played an important part in the widely acknowledged success of the project. Astute leadership, team work, good cooperation from the Ministries of Agriculture and the participatory style used at different levels were also essential ingredients in the mix. However, the conceptualization of CAEP using a systems perspective, provided the necessary framework within which the other factors could operate. The approaches discussed above, merit serious attention in any consideration of strategies to improve extension services in the less industrialized countries of the world.
References


PERCEPTIONS OF YOUNG FARMERS REGARDING THE ROLE OF INTERNATIONAL AGRICULTURE IN AGRICULTURAL EDUCATION

Robert A. Martin, Professor
Kamal Ali Elbashar, Research Assistant
Department of Agricultural Education and Studies
Iowa State University

Outstanding Research Presentation

This paper is one of four outstanding research papers from the Ninth Annual Meeting of the Association for International Agricultural and Extension Education, Arlington, VA, U.S.A., March 18, 19 & 20, 1993.

Introduction

An understanding of international agriculture is critically important to every one who works in the agriculture sector. A high degree of knowledge is requisite for future workers in the agriculture sector and a thorough understanding of world agricultural issues is no less important to those who seek careers in agriculture (Wood and Rosati, 1990). The need for an awareness of the global nature of the agricultural industry has become one of the major needs of our time. It has become increasingly apparent that if a person is to be considered educated in agriculture, he/she must be cognizant of the interrelationships of various agricultural systems and governments, cultures and societies in which they function. No longer it is sufficient to know how to produce food and fiber and conduct or manage the many tasks in today's agricultural industry (Martin, 1989).

The cognitive information concerning the international agricultural technologies that farmers possess has not been widely investigated. Nor has the literature revealed any studies concerning the relative understanding of these issues. In a study of educational programs for young and adult farmers, Martin and Bia (1986) found that while there was a general recognition for the need to help young farmers, they did not find a single study regarding the role of international agriculture in agricultural development and education in Iowa. Since young farmers are an important part of the agricultural community, their perceptions toward the role of international agriculture must be identified. These perceptions can be assessed through the current agricultural education programs being offered to young and adult farmers in Iowa. It was with these concerns in mind that this study was conducted. This study could serve as a basis for revision of present agricultural education programs and could provide a basis for the development of new educational programs in international agriculture at secondary and post-secondary educational institutions.

Purposes of Study

The primary purpose of this study was to identify and assess international agricultural knowledge and skills needed by Iowa young farmers. A secondary purpose was to determine perceptions of young farmers regarding international agriculture issues and how agricultural education and extension systems could enhance a global agricultural awareness among Iowa farmers. Specifically the study sought to identify the importance of selected topics related to international agriculture, to identify the level of interest of Iowa young farmers in studying selected topics in international agriculture, to identify the perceptions of young farmers regarding selected issues in international agriculture, and
to compare topic area importance, educational interest levels and perceptions based on selected demographic data.

Methodology

Data collection was accomplished through the use of a mail questionnaire, follow-up letters and phone calls, respectively. The population of this study included all members of the Iowa Young Farmers Educational Association (IYFEA). The 1991 membership was about 200 young farmers (Iowa Young Farmers Educational Association, 1991). The final list of members consisted of only 158 members who qualified for this study. The questionnaire included four major categories and 35 related topics. Respondents indicated the degree of importance and level of interest regarding each topic on a five-point Likert-type scale ranging from one (not important/no interest) to five (very important/very interested). Respondents indicated their perceptions regarding selected issues in international agriculture on a five-point Likert-type scale ranging from one (strongly disagree) to five (strongly agree).

Of the 158 young farmers in the population, 51 responded to the initial mailing. Through the follow-up mailing and phone calls, an additional 35 questionnaires were returned for a total response of 86 self-selected respondent questionnaires or 54.4% of the total population. The final response rate of 54.4% was considered to be adequate given the fact that, traditionally, farmers do not respond well to surveys (Lasley, 1985; Howe, 1981). The data were analyzed using means, standard deviations, frequencies and percentages. Cronbach's Alpha reliability coefficients were determined for each of the major three scales as follows: importance scale = 0.94, interest scale = 0.96, and 0.70 for the perception scale. The coefficient values were deemed to be sufficiently high to proceed with analysis and interpretation. According to Nunnally (1982), an alpha greater than 0.65 is the minimum recommended for research purposes.

Findings

Importance scale mean ratings ranged from a low of 2.16 to a high of 4.60 on the 5 point scale. Interest scale mean ratings ranged from a low of 1.86 to a high of 3.97. A rating of 2.50 or lower was considered to be of low importance and/or interest. A rating of 3.50 or higher was considered to be very important or of high interest to respondents. The findings suggested that most of the topics in the four broad areas (livestock production, crop production, horticulture, and general agriculture) were confirmed by the respondents to be important. As a group, they rated most of these topics with a mean rating of three or above, a rating of "some" or above in the importance scale. On the importance scale, it was observed that two topics in livestock production (marketing of livestock and health and diseases) received a rating of four or above. The remaining topics in livestock production were rated between 2.67 and 3.44. Five topics in crop production received a rating of 3.50 or higher. The remaining topics in crop production were rated between 2.99 and 3.36. It was also observed that topics related to livestock, crop production, and agribusiness education such as marketing, pests and diseases, crop pesticides, new crop varieties and chemical safety problems in other countries received the highest ratings in the four broad areas (Tables 1, 2, 3 & 4). The relatively low rating of selected topics in horticulture such as landscaping and turf management was observed in this study (Table 3). These findings were consistent with an earlier report indicating that the low ratings in horticulture topics may be due to lack of knowledge concerning these topics for young farmers and/or a lack of emphasis on these topics in the educational program (Omer, 1987).
The level of interest in studying selected topics in international agriculture indicated the highest rated topic was "marketing of livestock production" (3.97), followed by health and diseases, breeding and reproduction, production management, and feeding systems. Interest in crop production topics produced data which indicated five topics received a rating of three or above. These were as follows: (1) new crop varieties, (2) pests and diseases, (3) pesticides, (4) marketing systems and (5) crop production management in other countries (Tables 1, 2, 3 & 4). The results of interest ratings in horticulture were relatively low. These results were consistent with the earlier report by Omer (1987). The general agriculture topics which received a mean score of 3.5 and above were: government programs, government regulations, agricultural credit, and natural resources (Table 4). On most of the topics in the four broad areas the respondents were between "interested" and "somewhat interested" (3 or above) in studying international agriculture related topics. This finding indicated that most of the topics in the four areas were confirmed to be of interest to the respondents. Three significant differences were found in the level of interest in program areas in international agriculture when the respondents were compared by the type of farmer (full-time vs. part-time). The differences were detected at the .05 level concerning agricultural topics in crop production, horticulture, and general agriculture. In each of these areas, part-time farmers indicated higher levels of interest in international agriculture as related to these topics than full-time farmers.

The respondents were asked to indicate to what extent they agreed or disagreed with fifteen statements concerning international agriculture issues in providing assistance to young farmers. The statements were rated on a five-point Likert-type scale where one indicated a maximum degree of disagreement and five indicated a maximum degree of agreement. The general perceptions of farmers included a strong indication for some form of a global outreach program in agricultural education. The six highest perception statements dealt with this issue. The preference was for educational programs offering some international agricultural topics. The low ranking of the statements "even if agricultural training were offered, agricultural practices would not change" and "U.S.A. farmers have no need for international technical knowledge" could be interpreted in a positive manner. The relatively low ratings suggested disagreement with both statements which means that there was a potential that agricultural practices could be improved with the introduction of international agriculture training programs and U.S.A. farmers could learn some international technical knowledge which might help in crop and livestock production. The low rating of perceptions regarding job and business opportunities in agriculture in other countries indicated a lack of confidence in the present level of economic activity in agriculture, specifically, and perhaps economic development, in general, around the world. In summary, the findings show that the respondents were, in general, between "neutral" and "some" agreement regarding the perception statements on international agriculture issues.

As a group, farmers participating in this study were highly educated, their income was fairly high, most were full-time farmers, and the majority were between 20 and 39 years of age. These findings are important for agricultural educators who need to be responsive to the needs of Iowa young farmers when educational programs are being developed. Farmers indicated that most of the selected topics related to international agriculture in the four broad areas were important. They perceived the importance of topics related to livestock
Table 1

Importance and Level of Interest in Selected Topics in Livestock Production in International Agriculture as Rated by Iowa Young Farmers

<table>
<thead>
<tr>
<th>Topic</th>
<th>Importance Mean</th>
<th>Importance S.D.</th>
<th>Interest Mean</th>
<th>Interest S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing of livestock</td>
<td>4.60</td>
<td>0.96</td>
<td>3.97</td>
<td>1.02</td>
</tr>
<tr>
<td>Health and diseases</td>
<td>4.01</td>
<td>0.87</td>
<td>3.29</td>
<td>1.08</td>
</tr>
<tr>
<td>Breeding and reproduction</td>
<td>3.44</td>
<td>0.88</td>
<td>3.19</td>
<td>1.16</td>
</tr>
<tr>
<td>Use of computer</td>
<td>3.19</td>
<td>1.01</td>
<td>2.83</td>
<td>1.05</td>
</tr>
<tr>
<td>Production management</td>
<td>3.10</td>
<td>0.92</td>
<td>3.04</td>
<td>0.97</td>
</tr>
<tr>
<td>Feeds and feeding</td>
<td>3.04</td>
<td>0.90</td>
<td>3.00</td>
<td>1.06</td>
</tr>
<tr>
<td>Production records</td>
<td>2.86</td>
<td>0.94</td>
<td>2.76</td>
<td>0.93</td>
</tr>
<tr>
<td>Record keeping</td>
<td>2.76</td>
<td>0.99</td>
<td>2.68</td>
<td>0.97</td>
</tr>
<tr>
<td>Group Summary</td>
<td>3.37</td>
<td>0.90</td>
<td>3.09</td>
<td>1.03</td>
</tr>
</tbody>
</table>

Notes. Scale: 5 = very important/interested; 4 = important/interested; 3 = somewhat important/interested; 2 = of little importance/interest; 1 = not important/no interest.

Table 2

Importance and Level of Interest in Selected Topics in Crop Production in International Agriculture as Rated by Iowa Young Farmers

<table>
<thead>
<tr>
<th>Topic</th>
<th>Importance Mean</th>
<th>Importance S.D.</th>
<th>Interest Mean</th>
<th>Interest S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of pests and diseases</td>
<td>4.32</td>
<td>0.80</td>
<td>3.51</td>
<td>1.02</td>
</tr>
<tr>
<td>Crop pesticides</td>
<td>3.64</td>
<td>0.94</td>
<td>3.33</td>
<td>1.03</td>
</tr>
<tr>
<td>Marketing of crops</td>
<td>3.63</td>
<td>0.91</td>
<td>3.28</td>
<td>1.04</td>
</tr>
<tr>
<td>New crop varieties</td>
<td>3.63</td>
<td>0.88</td>
<td>3.51</td>
<td>1.05</td>
</tr>
<tr>
<td>Chemical safety</td>
<td>3.56</td>
<td>0.97</td>
<td>3.06</td>
<td>1.06</td>
</tr>
<tr>
<td>Crop Prod. Management</td>
<td>3.36</td>
<td>0.90</td>
<td>3.17</td>
<td>1.05</td>
</tr>
<tr>
<td>Soil fertility</td>
<td>3.13</td>
<td>0.99</td>
<td>2.87</td>
<td>1.01</td>
</tr>
<tr>
<td>Crop prod. records</td>
<td>3.04</td>
<td>0.97</td>
<td>2.77</td>
<td>0.98</td>
</tr>
<tr>
<td>Use of computer</td>
<td>2.99</td>
<td>1.12</td>
<td>2.81</td>
<td>1.08</td>
</tr>
<tr>
<td>Group Summary</td>
<td>3.48</td>
<td>0.94</td>
<td>3.15</td>
<td>1.03</td>
</tr>
</tbody>
</table>

Notes. Scale: 5 = very important/interested; 4 = important/interested; 3 = somewhat important/interested; 2 = of little importance/interest; 1 = not important/no interest.

Fall 1994
### Table 3

<table>
<thead>
<tr>
<th>Topic</th>
<th>Importance</th>
<th>S.D.</th>
<th>Interest</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit production problems</td>
<td>3.10</td>
<td>0.98</td>
<td>2.34</td>
<td>1.12</td>
</tr>
<tr>
<td>Vegetables produ. prob.</td>
<td>3.09</td>
<td>1.00</td>
<td>2.36</td>
<td>1.08</td>
</tr>
<tr>
<td>Landscaping problems</td>
<td>2.23</td>
<td>0.96</td>
<td>2.01</td>
<td>1.02</td>
</tr>
<tr>
<td>Turf management problems</td>
<td>2.16</td>
<td>0.86</td>
<td>1.86</td>
<td>0.85</td>
</tr>
<tr>
<td><strong>Group Summary</strong></td>
<td><strong>2.64</strong></td>
<td>0.95</td>
<td><strong>2.14</strong></td>
<td>1.01</td>
</tr>
</tbody>
</table>

**Notes.** Scale: 5 = very important/interested; 4 = important/interested; 3 = somewhat important/interested; 2 = of little importance/interest; 1 = not important/no interest.

### Table 4

<table>
<thead>
<tr>
<th>Topic</th>
<th>Importance</th>
<th>S.D.</th>
<th>Interest</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government programs</td>
<td>3.96</td>
<td>0.89</td>
<td>3.62</td>
<td>1.04</td>
</tr>
<tr>
<td>Water quality</td>
<td>3.94</td>
<td>1.02</td>
<td>3.45</td>
<td>1.16</td>
</tr>
<tr>
<td>Natural resources</td>
<td>3.92</td>
<td>0.91</td>
<td>3.50</td>
<td>1.13</td>
</tr>
<tr>
<td>Government regulations</td>
<td>3.90</td>
<td>0.88</td>
<td>3.59</td>
<td>1.09</td>
</tr>
<tr>
<td>Air quality</td>
<td>3.90</td>
<td>1.06</td>
<td>3.37</td>
<td>1.15</td>
</tr>
<tr>
<td>Agricultural credits</td>
<td>3.73</td>
<td>0.91</td>
<td>3.53</td>
<td>1.05</td>
</tr>
<tr>
<td>Leadership in agriculture</td>
<td>3.68</td>
<td>1.06</td>
<td>3.31</td>
<td>1.10</td>
</tr>
<tr>
<td>Human relations in agri.</td>
<td>3.60</td>
<td>1.00</td>
<td>3.17</td>
<td>1.10</td>
</tr>
<tr>
<td>Financial planning</td>
<td>3.51</td>
<td>0.96</td>
<td>3.22</td>
<td>0.98</td>
</tr>
<tr>
<td>Wildlife management</td>
<td>3.44</td>
<td>1.08</td>
<td>3.13</td>
<td>1.04</td>
</tr>
<tr>
<td>Taxes</td>
<td>3.37</td>
<td>0.94</td>
<td>3.14</td>
<td>1.04</td>
</tr>
<tr>
<td>Decision making process</td>
<td>3.28</td>
<td>0.88</td>
<td>3.05</td>
<td>0.95</td>
</tr>
<tr>
<td>Land tenure systems</td>
<td>3.13</td>
<td>1.05</td>
<td>3.01</td>
<td>1.04</td>
</tr>
<tr>
<td>Computer use</td>
<td>3.12</td>
<td>0.99</td>
<td>2.90</td>
<td>1.04</td>
</tr>
<tr>
<td><strong>Group Summary</strong></td>
<td><strong>3.61</strong></td>
<td>0.97</td>
<td><strong>3.29</strong></td>
<td>1.06</td>
</tr>
</tbody>
</table>

**Notes.** Scale: 5 = very important/interested; 4 = important/interested; 3 = somewhat important/interested; 2 = of little importance/interest; 1 = not important/no interest.
and crop production and agribusiness education such as marketing, pests and diseases, new crop varieties and chemical safety problems in other countries, as the highest ratings in the four broad areas. Farmers were primarily interested in international agriculture topics which dealt with livestock production, crop production, general agriculture, and horticulture, in descending order. The general perceptions of the farmers included a strong indication for some form of a global outreach program in agricultural education and extension. Most of the observed differences involved part-time farmers who indicated higher levels of interest and perceived some statements related to international agriculture significantly higher than full-time farmers. Farmers rated international agriculture topics related to the environment (government programs, government regulations, water quality, natural resources, air quality, etc.) fairly high on the importance and interest scales.

Recommendations

Results from this study indicate that: (1) agricultural education should be delivered with a global perspective to meet the needs and interests of local agricultural producers; (2) educational programs should be planned and/or revised for present and future young farmers to emphasize the international agriculture topics with highest priority (i.e. marketing, new varieties, etc.); (3) agricultural education should initially focus on approved basic practices in other countries which deal with environmental issues; (4) agricultural education should offer educational programs including farmer exchange programs to help farmers understand and learn more about international agriculture; (5) this study supports more international content in education programs, therefore, topics related to international agriculture should be taught in schools and colleges; (6) various factors need to be considered in planning programs in international agriculture, for example, type of farmer and the planning involved.

Educational Implications

High priority ratings for the importance and interest in topics related to livestock, crop production and agribusiness education such as marketing, pests and diseases, and new crop varieties in other countries reflect the current situation among the members of IYFEA. This finding is consistent with a study conducted by Omer (1987) in which the farmers' use of extension was studied. This study should encourage agricultural educators to plan and/or revise current educational programs to emphasize the international agriculture topics with highest priority. The general perceptions of participants in this study included a strong indication for some form of a global outreach program in agricultural education. This finding is significant because it represents strong support for "internationalizing the curriculum". The data also indicate that part-time farmers consider traveling abroad to visit farmers and training programs in international agriculture as a trend among Iowa farmers because of their current involvement in several international agricultural trade agreements (e.g. Russia, Japan, etc.). Finally, the data indicate that Iowa young farmers want more international agriculture education and they are willing to participate in any educational programs dealing with this issue. This study gives more evidence that international agriculture is a critical issue deserving more emphasis in adult education.

References


REACHING MALAWIAN SMALLHOLDER FARMERS
WITH AGRICULTURAL EXTENSION PROGRAMS;
A CASE FOR INCREASED USE OF WOMEN-FARMER GROUPS

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Idaho, USA

Catherine Chibwana, Women’s Program Officer
Isabel Matenje, Women’s Program Officer
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Outstanding Research Presentation

This paper is one of four outstanding research papers from the Ninth Annual Meeting of
the Association for International Agricultural and Extension Education, Arlington, VA,

Introduction

A global critique of agricultural extension
holds that its efforts are directed towards, or its
benefits are accrued by, the relatively
large-holder rather than the smallholder farmer.
This is of particular concern in Malawi where
the average farm size is about 1.1 hectares,
about one-half of farms are less than one
hectare, and about 5% of farms are over three
hectares (Ministry of Agriculture, 1990).

The overall aim of Malawi’s National Rural
Development Program V is to increase the
farm productivity and the quality of life of
smallholder farmers. Malawi’s Ministry of
Agriculture (MOA) administers this program
through its research, extension, and other
departments. During 1986-1992, the Malawi
Agricultural Research and Extension (MARE)
Project provided technical assistance to further
build MOA capacity to reach national rural
development aims. The Project, led by the
Consortium for International Development, was
funded by Government of Malawi and United
States Agency for International Development.
An institution-building project, MARE focused
on research, training, and extension within the
context of smallholder agriculture. Moreover,
it emphasized further strengthening the
Women’s Programme in the MOA Department
of Agricultural Extension and Training
(DAET). Women farmers are an explicitly
identified client group of Malawi’s Department
of Agricultural Extension and Training.
Women farmers are the nation’s primary
producers of food (Koopman, 1989, p. 2).
They account for two-thirds of all full-time
farmers responsible for the daily food supply
(Chibwana, 1989). They make numerous
agricultural production decisions. Recent
survey results report that extension staff and
local leaders estimate women make at least
one-half of agricultural production decisions
(Culler, Patterson, & Matenje, 1990). They are
involved in both food and cash crop
productions. A review of several studies
suggests "that in households where cash crops
are grown, women do as much work as men,
often doing activities believed to be done only
by men" (Ngwira, 1987, p. 25).

Malawi’s smallholder women farmers advise,
and the literature confirms, they typically face
land, labor, and capital constraints to increasing
their agricultural production (Culler et al. 1990;
Ariza-Nino, 1991; Koopman, 1989). This is
particularly so for female household-heads,
although there are variations in constraints among female household-heads (Rao Gupta, 1990).

In Malawi, intensification of the effort to reach and respond to rural women's agricultural needs and opportunities began around 1981 with the reorganization of the MOA Women's Programme. Delivering extension programs via Women's Groups is central to this effort.

Women's Groups are organized primarily for the purpose of interacting with the agricultural extension service. They are a critical contact point for field-level extension agents. Both men and women agents organize and interact with Women's Groups. Primarily agriculturally-focused, these groups aim to increase production in such diverse crops as maize, vegetables, sunflower, and cotton. Income-generating activities and home and farm management skills are also included in the extension offering. Group members are women only. Members may obtain agricultural credit through their Women's Group, although not all Women's Groups opt to do so.

Purpose of the Paper

The purpose of the paper is to report and discuss research findings which explore the following question. How effective are Women's Groups in reaching smallholder farmers, compared to other extension methods used in Malawi to reach smallholder farmers? The paper reports data on land holding size of farmers, who are members of Women's Groups, and compares these data with the land holding size of farmers reached through other extension methods. These other extension methods include: personal visits, field visits, demonstrations, meetings, and day training courses taken together. For purposes of this paper, these other extension methods are identified by the term, customary extension methods.

Methods and Data Sources

Individual interviews, Focus Group Interviews, and a Participatory Action Research group interviewing technique were the primary data collection methodologies used in the field-based study. A desk review of secondary data was also conducted.

Based on a stratified sampling procedure, primary data were collected in Malawi during 1992 from 30 Extension Subject Matter Specialists, 73 extension field-level agents (Farm Home Assistants and Field Assistants), and 162 women farmers belonging to extension-organized Women's Groups. The membership of groups interviewed included both females residing in male-headed households (F in MHH) and female household-heads. Female household-head (FHH) is defined as a woman who is living alone without a male because of being widowed, divorced, abandoned, unmarried, or polygamous or, a women who has a husband who returns to the home less than once a month (National Statistical Office, 1984). Data were collected from five of the eight Agricultural Development Divisions (the geographic framework for organizing extension). During group interviews with women farmers, women reported the number of hectares they cultivated during the last growing season.

Secondary data, from unpublished data in Malawi's 1987/88 Annual Survey of Agriculture, Worktable 8.3 on Extension Participation Rate by Holding Size Category were analyzed in the study. This survey provided data on (1) number of farmers surveyed by land holding size and (2) percent of farmers surveyed, in each land holding size category, reached through any of the customary extension methods of personal visits, field visits, demonstrations, meetings, and day training courses. To determine the percentage of all farmers surveyed and reached by customary extension methods by holding size.
category, the following computations were made: The number of farmers reported in each holding size category was multiplied by the percentage of farmer's reported reached in that holding size category through any of the customary extension methods. This gives a new distribution which can be converted to percentages.

In order to compare data from women farmer's on area cultivated with survey data on land holding size, the figures women reported on area cultivated were increased by a correcting factor. The correcting factor used is based on earlier survey data showing that for male-headed households, an average of 6% of land held was uncultivated and for female-headed households, an average of 8% of land held was uncultivated (Spring, 1984, p. 80). Thus, reported figures on area cultivated were increased by 6% for women residing in male-headed households and by 8% for female-headed households.

**Findings**

Table 1 shows the land holding size of members of Women's Groups surveyed. The data indicate that of all farmers reached through Women’s Groups, about one-fifth hold less than .5 hectares and over one-half hold less than 1 hectare. Of the female household-heads reached through Women’s Groups, about one-quarter hold less than .5 hectares and the very large majority of about fourth-fifths hold less than 1 hectare.

<table>
<thead>
<tr>
<th>Client holding size category Ha</th>
<th>Cumulative % female household-head</th>
<th>Cumulative % female in male-headed household</th>
<th>Cumulative % all females in women’s groups (N of cases: 162)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - &lt; .5</td>
<td>25</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>.5 - &lt; 1.0</td>
<td>79</td>
<td>38</td>
<td>54</td>
</tr>
<tr>
<td>1.0 - &lt; 1.5</td>
<td>85</td>
<td>56</td>
<td>68</td>
</tr>
<tr>
<td>1.5 - &lt; 2.0</td>
<td>93</td>
<td>70</td>
<td>80</td>
</tr>
<tr>
<td>2.0 - &lt; 2.5</td>
<td>97</td>
<td>83</td>
<td>89</td>
</tr>
<tr>
<td>2.5 - &lt; 3.0</td>
<td>100</td>
<td>94</td>
<td>97</td>
</tr>
<tr>
<td>3.0 - &gt; 3.0</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 2 displays the land holding size of farmers reached through customary extension methods. The data suggest that of farmers reached through customary extension methods, about one-tenth typically hold less than .5 hectares and about one-third hold less than one hectare. About three-quarters of farmers reached hold less than two hectares.

### Table 2

<table>
<thead>
<tr>
<th>Client holding size category Ha&lt;sup&gt;a&lt;/sup&gt;</th>
<th>% of all farmers surveyed by holding size category (N of cases: 5,182)&lt;sup&gt;a&lt;/sup&gt;</th>
<th>% of all farmers surveyed and reached by customary methods by holding size&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Cumulative % of all farmers reached by customary methods by holding size&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - &lt; .5</td>
<td>24</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>.5 - &lt; 1.0</td>
<td>28</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>1.0 - &lt; 1.5</td>
<td>20</td>
<td>23</td>
<td>58</td>
</tr>
<tr>
<td>1.5 - &lt; 2.0</td>
<td>12</td>
<td>16</td>
<td>74</td>
</tr>
<tr>
<td>2.0 - &lt; 2.5</td>
<td>6</td>
<td>10</td>
<td>84</td>
</tr>
<tr>
<td>2.5 - &lt; 3.0</td>
<td>3</td>
<td>5</td>
<td>89</td>
</tr>
<tr>
<td>3.0 - &gt; 3.0</td>
<td>7</td>
<td>11</td>
<td>100</td>
</tr>
</tbody>
</table>

**Notes.** Customary extension methods defined as: personal visit, field visit, demonstration, meeting, day training course.

<sup>a</sup>Data Source: ASA 1987/88 Worktable 8.3 (unpublished data).

<sup>b</sup>Data Source: based on ASA 1987/88 Worktable 8.3.

Statistical comparison of data in Tables 1 and 2 shows the distributions of land holding size between farmers reached through Women’s Groups and farmers reached through customary extension methods are significantly different ($X^2=35$, $p<.1\%$). Proportionately more smallholders are reached through Women’s Groups than through customary extension methods. These distributions are shown in Figure 1. Differences illustrated in Figure One are largely due to the land holding size of the female household-head members of Women’s Groups surveyed. An average of 40% of group members were female household-heads. Nationally, data show about one-third of all households in Malawi are headed by females (Ministry of Agriculture, 1982; Culler et al. 1990). Earlier data indicate the average percent female household-heads in the specific areas and districts surveyed is 36% and 31% respectively (Ministry of Agriculture, 1982). This suggests Women’s Groups are very effective mechanisms for reaching women farmers who are heads of households.

Comparatively, while just over one-third of the clients reached through customary methods

38

Journal of International Agricultural and Extension Education
Figure 1. Distribution of extension clients by holding size.

typically hold less than one hectare, over one-half of clients reached through Women’s Groups typically hold less than one hectare. For those extension clients with even smaller holdings (less than 0.5 hectares), Women’s Groups reach about twice the percentage of these farmers reached through customary methods. The point illustrated in this paper is not that Women’s Groups reach women farmers. The data could have shown Women’s Groups reach mostly large-holder women farmers. However, the data clearly show Women’s Groups are notably more successful than are the customary extension methods studied in reaching smallholder farmers and these smallholder farmers are women.

Discussion

The available data strongly support the premise: As an extension method, Women’s Groups are more successful in reaching smallholder farmers than are collectively the extension methods of personal visits, field
visits, demonstrations, meetings, and day training courses. From a policy and resource-investment perspective, the question of whether Women's Groups are as effective as other group methods currently used in Malawi to reach smallholders deserves further consideration.

Farmer Clubs, traditionally organized to obtain access to and as the primary channel for agricultural credit, are widespread in Malawi. Reported figures for 1990/91 show there were about 11,000 Clubs, with members who received agricultural seasonal credit (Chibwana, 1992). Of these members, about 70% were men and 30% were women (Chibwana, 1992). There is little evidence to suggest Farmer Club members are the "smallest of the small" smallholders. To the contrary, Ariza-Nino states: "Members constitute in fact the larger and more progressive farmers in the smallholder subsector" (1991, p. 15). This is confirmed by Koopman who indicates the category of farmers, with over two hectares of land, has nearly exclusive access to credit for fertilizer and improved seeds (1989, p. 6).

The MOA is aware of and actively addressing this situation. In order to expand the reach of extension to a broader farming clientele, current extension policy supports the Block Extension System (BES) of which Women's Groups are a component. BES adapts Training and Visit and organizes farmers based on geographical areas called Blocks. Extension agents, deployed by Block, are expected to meet with both men and women farmers belonging to the particular Block and to demonstrate practices in the Block garden or on farmer fields (Matenje, 1991). Farmers, organized by Blocks, are often referred to as farmers in Farmer Groups/Mixed Groups. Women are encouraged to join these groups. There is currently very limited data available on land holding size of farmers in Farmer Groups/Mixed Groups. To the extent the holding size of clients reached through the customary extension methods of meetings and demonstrations, the available data tentatively suggest Women's Groups reach proportionately more smallholders than Farmer Groups/Mixed Groups. Women's Groups are a component of the BES. Farmers, who are members of Women's Groups, may well be reported as being reached through demonstrations and meetings. However, it does not appear their participation is sufficiently high to substantially influence the proportional distribution of clients reached by land holding size.

Conclusions

In Malawi, utilizing Women's Groups as a method of extension outreach, substantially increases agricultural extension's chances of achieving its goal of serving the smallholder farmer. In other African nations--where the policy aim is to target smallholders, where women farmers are making substantial contributions to agricultural production, and where the sociocultural context is similar to Malawi's--organizing and utilizing Women's Groups provides a concrete strategy for policy implementation.

Educational Importance

Further developing the skills, men and women extension staff need to better serve women farmers, will result in improving extension's capability to reach smallholder farmers. This can be accomplished through pre-service and in-service formal and non-formal agricultural education. Skills needed include those required:

- To carry-out gender analysis of farmer activities, resources and constraints, and benefits and incentives.

- To organize and sustain Women's Groups, as a specific extension method.
• To utilize functional teaching techniques for working with women farmers considering their high illiteracy rate.

• To practice professional methods of interpersonal communications between agents and women farmers.

• To understand and to develop appropriate strategies for addressing sociocultural constraints to farmer/agent interaction.

• To apply team building concepts so that men and women agents can effectively collaborate in their work with women farmers.

References


BOOK REVIEW


David G. Acker, Director
Office of International Research and Development
Oregon State University

Agricultural Extension: Worldwide Institutional Evolution and Forces for Change presents a multi-faceted view of a fundamental paradigm shift confronting agricultural extension. Large, centrally controlled, publicly funded agricultural extension services, once accepted as an essential instrument for rural change, are being forced to alter their traditional ways of doing (or not doing) business. One of the central themes of the book is the response of public sector agricultural extension organizations to the growing role of the private sector as a viable source of complementary extension services. Timely issues such as public-private collaboration, organizational restructuring, harnessing of new communication technology, and the role of farmers in technology development and extension are presented by 26 contributing authors in 22 chapters.

Emerging models of agricultural extension need to be put through the sieve of socio-economic and political realities and this volume lures such debate into the public arena. To what extent should the state subsidize agricultural producers with inexpensive information? What happens to subsistence farmers when fees are introduced for extension services? Can systems composed of multiple institutions be effectively coordinated to provide a range of services to a variety of producers? Will communication technology help to promote the democratization of information or will it have the opposite effect?

Treatment of these and other related issues forms the content of this book.

Agricultural Extension: Worldwide Institutional Evolution and Forces for Change is highly appropriate as a text for graduate level courses dealing with international agricultural extension. It is suggested reading for decision makers with responsibility for public and private non-formal education focusing on dissemination of information for economic development. It is not a "how-to" manual and may be of marginal utility to front-line practitioners of agricultural extension services in developing countries.

The book has been promoted as a source of worldwide perspectives on agricultural extension. Indeed, the table of contents reads like a Who's Who in Agricultural Extension. The 26 contributing authors provide a number of different views of agricultural extension performance under different management models. However, it is worth considering several questions. To what extent are these authors representative of extension thinkers and practitioners in both industrialized and developing countries? Is there a distinction between the views of well known names in international agricultural extension and the large pool of those involved in agricultural extension in developing countries who are less frequently heard from? Is it possible that the published thinking on agricultural extension has been inadvertently influenced by those who have easy access to publishing outlets? Are
authors from developing countries at a
disadvantage in terms of sharing lessons
learned from their own regions? In the case of
this volume, roughly three-quarters of the
authors were associated with institutions based
in industrialized countries. While these views
are very valuable, it is worth asking: do the
perspectives presented in this book more fully
represent the views and experiences of donor
organizations and those authors from
industrialized countries who frequently work
with developing countries? Rivera and
Gustafson provide needed balance to this
discussion in their chapter entitled "New Roles
and Responsibilities for Public Sector
Agricultural Extension: The Impact of
Multi-Institutional Activities."

One especially valuable aspect of the book is
the access it provides to extension contacts
worldwide. An example of this is found in the
book’s 26 page reference list.

There is little question that the price of the
book (Dfl. 260 or approximately $ 133.50) has
had a negative impact on its circulation. This
cost precludes the possibility of individual
ownership for many readers in industrialized
countries and, as one might expect, for most
individuals in developing countries.
Availability through libraries will undoubtedly
be the major means of access for most users.
The publisher and donors may want to
overcome this obstacle by contributing copies
to extension policy-makers and institutions of
higher agricultural education in developing
countries. The recommendation that it be used
as a graduate text in extension education
courses still stands; the price of the book
nearly insures that this won’t happen.

Although this book was published two years
ago it has not received the wide attention it
deserves. This review was prompted to
reinforce its importance as one of the best
snapshots of thinking on extension in the early
1990s. William M. Rivera is to be commended
for his continued effort to bring volumes on
agricultural extension to the attention of
practitioners, educators and policy makers.
Professionals in the field are already looking
forward to his next book. His collaboration
with Susan G. Schramm on his previous book
and with Daniel J. Gustafson on the volume
under review, along with his ability to craft a
cohesive presentation from disparate
contributions, demonstrate a noteworthy ability
to bring quality authors and their ideas into
print.
VILLAGE EXTENSION WORKERS (VEWs), AGRICULTURAL EXTENSION OFFICERS, AND CONTACT FARMERS PERCEPTIONS OF VEW VISITS UNDER THE TRAINING AND VISIT (T & V) SYSTEM

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Edgar P. Yoder, Professor
Department of Agricultural and Extension Education
The Pennsylvania State University

Outstanding Research Presentation

This paper is one of four outstanding research papers from the Tenth Annual Meeting of the Association for International Agricultural and Extension Education, Arlington, VA, U.S.A., March 24, 25 & 26, 1994.

Abstract

This study examined the perceptions of VEWS, AEOs and contact farmers relative to: 1) promoting group action; 2) effectiveness of VEW visits and; 3) message conveyance and adoption under the T&V system in Mandya district of Karnataka, a state in south India. In addition, whether or not the type of land (irrigated or dry) farmed by clients was a factor in perceived effectiveness of VEW visits was also examined. The results of the study indicated significant differences between the three group’s perceived effectiveness of VEW visits. VEWS perceptions were significantly higher than AEOs and contact farmers for all the three areas. VEWS perceived that they were effective in all the three areas regardless of working in irrigated or dry land areas. Similarly, AEOs were in agreement with VEWS. However, contact farmers perceived that VEWS in irrigated areas were significantly more effective than VEWS in dry land areas.

Introduction

The Training and Visit (T&V) system of extension was first introduced in India in 1978. According to Benor, Harrison, and Baxter (1984), the T&V system is designed to change attitudes and opinions of farmers, increase their knowledge and understanding, and result in adoption of improved practices that increase production. Under the T&V system, schedules of work, duties and responsibilities of extension personnel are clearly specified and closely supervised at all levels. The characteristic features of the system are: 1) professionalism, 2) single line of command, 3) time-bound work, 4) regular and continuous training, and 5) close linkage with research (Benor et al. 1984).

Under the T & V system, the transfer of know-how (research findings) evolved by agricultural scientists is achieved through "training" and "visits." Training provides for the transfer of technology from researchers and scientists to VEWS. The "visits" provides for the transfer of know-how from VEWS to contact farmers through a scheduled program of visits to a fixed number of contact farmers. In turn, these contact farmers are supposed to disseminate the information to fellow farmers.

The role of VEWS, agricultural extension officers (AEO) and contact farmers deserve special mention in the context of this study. The village level extension worker (VEW) is a critical link in the transfer of technology from research stations to the farmer's field. The VEW’s role is to educate, train, and persuade
farmers to adopt new ideas and use improved practices. In addition, the regular visits by VEWs to the farmer’s field is a must, because T&V emphasizes regular training of staff and programmed visits to farmers. During these visits, the VEWs have to put forth greater efforts in identifying the farmer’s problem(s), identifying appropriate technical solutions, and recommending practices that help farmers to improve production. A competent VEW should possess adequate knowledge of agriculture subject matter and also possess a knowledge of principles, methods and techniques of extension education.

The AEO has two basic functions: 1) to review and assist in the organizational aspects of the job of the VEW which may include scheduling and timing of visits, organization of meetings, maintaining diaries, etc.; 2) to provide technical support to the VEW, especially to see that production recommendations are effectively taught to farmers and assist the VEW in situations where the VEW is not in a position to address the problem(s). In general, the major role of the AEOs is to help VEWs to increase their effectiveness (Benor et al. 1984).

Since frequent contact between VEW and all farmers in a village is not possible, VEW selects a group of farmers called “contact farmers.” These contact farmers are selected by VEW and AEO, in consultation with local village leaders and elders. According to Benor et al. (1984), the contact farmer should possess the following characteristics: 1) represent the socio-economic and farming conditions; 2) regarded by other farmers as able and worthy of imitation; 3) practicing farmers; 4) willing to adopt relevant recommendations on part of their lands; 5) represent different types of families.

A number of researchers have examined various aspects of the T&V system. Some have investigated the effectiveness of visits by VEWs under the T&V system. Natarajan, Perumal and Nagaraja (1991) found that the majority of the extension workers expressed satisfaction over the extension worker’s visits relative to regular visits (72%), transfer of message to farmers (55%), bringing field problems to fortnightly training sessions (70%), conduct of program (83%), regular review of work (80%), advance publication of day, time, place and purpose of VEW visits (69%).

In a study of VEWs in North India, Singh and Israel (1989) reported that 60% of contact farmers and 72% of non-contact farmers perceived that the visits of VEWs to farmers’ field was not as per schedule, resulting in failure to provide timely and adequate help and guidance to farmers. They suggested, to be effective, VEWs should comply with their scheduled visits.

Samarasinghe, Lawrence, Gartin and Odell (1990) evaluated the effectiveness of VEW visits in Sri Lanka. Findings indicated that VEWs were very positive regarding the effectiveness in developing group action among farmers. Similarly in regard to effectiveness of visits, VEWs strongly agreed that their visits were effective and they carried a relevant technical message on each visit. Findings also indicated that age, education level and work experience of VEWs were significantly associated with effectiveness of VEW visits. Older VEWs (over 40 years of age) were significantly greater in their agreement than younger VEWs relative to promoting group action. VEWs with higher education levels (more than a diploma) perceived that it was easier for them to identify field problems than VEWs with baccalaureate degrees. VEWs with more work experience (more than 5 years) agreed that they have greater confidence in developing and preparing teaching aids, and possess more knowledge in technical subject matter than did those with less work experience.
The success or failure of the T&V system, to a large extent, depends on how effective the VEWs are in educating farmers to adopt improved agricultural practices. Thus, this study was designed to determine the effectiveness of the VEW’s visits under the T&V system as perceived by VEWs themselves, their immediate supervisor, the AEOs and contact farmers who receive the information.

Purpose

The primary purpose of this study was to examine the effectiveness of VEW visits as perceived by VEWs themselves, AEOs and contact farmers relative to: 1) promoting group action; 2) effectiveness of VEW visits and; 3) message conveyance and adoption under the T&V system. In addition, whether or not the type of land (irrigated or dry) farmed by clients was a factor in perceived effectiveness of VEW visits was also examined.

Methodology

The subjects for the study consisted of a random sample of 68 VEWs, 15 AEOs, and 61 contact farmers in Mandya district of Karnataka, a state in south India. The instrument developed by Samarasinghe et al. (1990) was modified and used to collect data for the study. Face and content validity was established using three extension education faculty members at The Pennsylvania State University. The instrument contained two sections: 1) effectiveness of VEWs in promoting group action, visits to farmer’s fields and message conveyance and adoption, measured on a Likert-type scale that ranged from 1 "strongly disagree" to 5 "strongly agree," and 2) demographic information.

Data were collected through personal interview method. Data provided by these 68 VEWs, 15 AEOs and 61 contact farmers were usable. Data were analyzed using means, percentages, and ANOVA. A post-hoc reliability analysis indicated that the instrument is reliable (Cronbach’s alphas were .84 for promoting group action; .95 for message conveyance and adoption and .86 for effectiveness of VEW visits.

Results and Conclusions

One way analysis of variance (ANOVA) and Scheffe procedures were used to examine differences in effectiveness of VEW visits as perceived by VEWs, AEOs and contact farmers. Results are presented in Tables 1 and 2. Significant differences were found between the three group’s perceived effectiveness of VEW visits. Results of the Scheffe test revealed that VEWs were significantly different from AEOs and contact farmers relative to promoting group action, making VEW visits and message conveyance and adoption. In all the three areas, VEWs perceptions were significantly higher than AEOs and contact farmers. Overall, no significant differences were found between AEOs and contact farmers’ perceptions. However, AEOs’ ratings of VEWs promoting group action was lower than contact farmer ratings. It is interesting to note that AEOs’ ratings relative to farmers sharing information from VEW among their group and farmers successfully conducting group activities were much lower than VEWs and contact farmers (Table 1).

A two-way analysis of variance was performed to determine whether or not the type of land (irrigated/dry land) made a difference in the three groups perceived effectiveness of VEW visits relative to promoting group action, making VEW visits and message conveyance and adoption. The results of the two-way ANOVA are shown in Table 4. Examination of Figure 1 revealed that significant interaction existed among the variables group.
<table>
<thead>
<tr>
<th>Item</th>
<th>Contact</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VEWs</td>
<td>Farmers</td>
<td>AEOs</td>
<td>F</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean^a</td>
<td>Mean^a</td>
<td>Mean^a</td>
<td>Ratio</td>
<td>Prob</td>
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<tr>
<td><strong>Promoting Group Action</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VEW encourages farmers to develop group action</td>
<td>4.31A</td>
<td>3.92B</td>
<td>4.06BA</td>
<td>5.58</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>VEW visits encourages exchange of ideas among farmers &amp; VEW</td>
<td>4.46A</td>
<td>4.05B</td>
<td>3.86C</td>
<td>10.93</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Farmers understand the role of VEW</td>
<td>3.95A</td>
<td>3.72A</td>
<td>3.43A</td>
<td>2.88</td>
<td>0.059</td>
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<tr>
<td>Group action makes it easier to change attitudes of farmers</td>
<td>4.12A</td>
<td>3.98A</td>
<td>4.00A</td>
<td>0.54</td>
<td>0.581</td>
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</tr>
<tr>
<td>Farmers share information obtained from VEW among their group</td>
<td>3.37A</td>
<td>3.41A</td>
<td>2.93A</td>
<td>1.56</td>
<td>0.212</td>
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<tr>
<td>Farmers have a desire to help others within the group</td>
<td>3.31A</td>
<td>3.49A</td>
<td>2.64B</td>
<td>4.76</td>
<td>0.010</td>
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<tr>
<td>Farmers conduct group activities successfully</td>
<td>3.61A</td>
<td>3.08B</td>
<td>3.05B</td>
<td>5.12</td>
<td>0.007</td>
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<tr>
<td>Farmers participate in group activities successfully</td>
<td>3.67A</td>
<td>3.10B</td>
<td>3.14B</td>
<td>5.47</td>
<td>0.005</td>
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<tr>
<td>Farmers perform successfully in group activities</td>
<td>3.58A</td>
<td>3.20B</td>
<td>2.93A</td>
<td>3.85</td>
<td>0.023</td>
<td></td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td>3.80A</td>
<td>3.53B</td>
<td>3.25B</td>
<td>7.38</td>
<td>0.009</td>
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<tr>
<td><strong>Effectiveness of VEW Visits</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visits to farmer groups help VEW to identify farmers’ needs</td>
<td>4.46A</td>
<td>3.92B</td>
<td>4.23B</td>
<td>12.73</td>
<td>0.001</td>
<td></td>
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<tr>
<td>Visits help the VEW identify field problems</td>
<td>4.42A</td>
<td>4.00B</td>
<td>4.33B</td>
<td>10.59</td>
<td>0.001</td>
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<td>Visits help the VEW identify field requirements</td>
<td>4.18A</td>
<td>3.97B</td>
<td>4.27CA</td>
<td>5.82</td>
<td>0.004</td>
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<tr>
<td>VEW makes visits according to the fixed schedules</td>
<td>4.51A</td>
<td>3.03B</td>
<td>3.50C</td>
<td>43.20</td>
<td>0.001</td>
<td></td>
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<tr>
<td>VEW recognizes farmers’ towards resistance to change</td>
<td>4.19A</td>
<td>3.29B</td>
<td>3.73B</td>
<td>19.77</td>
<td>0.001</td>
<td></td>
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<tr>
<td>VEW provides effective solutions(s) to farmers’ technical problems</td>
<td>4.48A</td>
<td>3.51B</td>
<td>4.20CA</td>
<td>25.32</td>
<td>0.001</td>
<td></td>
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<tr>
<td>VEW visits influence a change in farmers practices</td>
<td>4.38A</td>
<td>3.79B</td>
<td>3.93B</td>
<td>9.52</td>
<td>0.001</td>
<td></td>
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<tr>
<td>VEW visits influence a change in farmer attitudes</td>
<td>4.21A</td>
<td>3.84B</td>
<td>3.73B</td>
<td>5.15</td>
<td>0.007</td>
<td></td>
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<tr>
<td>VEW visits facilitate contacts with non-progressive farmers</td>
<td>4.29A</td>
<td>3.90B</td>
<td>4.00B</td>
<td>7.58</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Farmers and VEW decide on key points to be stressed in the extn. programs</td>
<td>3.86A</td>
<td>3.21B</td>
<td>3.20BC</td>
<td>9.19</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Mobility is a problem in making visits to farmers</td>
<td>4.14A</td>
<td>3.26B</td>
<td>3.67B</td>
<td>10.48</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td>4.27A</td>
<td>3.60B</td>
<td>3.89B</td>
<td>36.56</td>
<td>0.001</td>
<td></td>
</tr>
</tbody>
</table>

**Notes.** Mean could range from 1 (strongly disagree) to 5 (strongly agree). Means followed by the same alphabet are not significantly different from each other.
Table 2
ANOVA Results for Message Conveyance and Adoption

<table>
<thead>
<tr>
<th>Item</th>
<th>VEWs Mean</th>
<th>Farmers Mean</th>
<th>AEOs Mean</th>
<th>F Ratio</th>
<th>F Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical information provided by the VEW is timely</td>
<td>4.47A</td>
<td>3.42B</td>
<td>3.87BC</td>
<td>29.02</td>
<td>0.001</td>
</tr>
<tr>
<td>Technical information provided by the VEW is effective</td>
<td>4.29A</td>
<td>3.57B</td>
<td>4.00B</td>
<td>12.40</td>
<td>0.001</td>
</tr>
<tr>
<td>Technical information provided by the VEW is adequate</td>
<td>4.04A</td>
<td>3.34B</td>
<td>3.87B</td>
<td>8.33</td>
<td>0.004</td>
</tr>
<tr>
<td>VEW has improved the technical knowledge of the farmer</td>
<td>4.38A</td>
<td>3.74B</td>
<td>3.80BC</td>
<td>11.77</td>
<td>0.001</td>
</tr>
<tr>
<td>VEW uses a variety of teaching methods to educate farmers</td>
<td>4.19A</td>
<td>2.98B</td>
<td>3.40BC</td>
<td>24.09</td>
<td>0.001</td>
</tr>
<tr>
<td>Adoption of innovations has helped farmers increase production</td>
<td>4.45A</td>
<td>3.79B</td>
<td>4.13B</td>
<td>11.83</td>
<td>0.001</td>
</tr>
<tr>
<td>VEW generally carries a relevant technical message</td>
<td>4.48A</td>
<td>3.67B</td>
<td>3.86BC</td>
<td>15.36</td>
<td>0.001</td>
</tr>
<tr>
<td>VEW disseminates latest research information to farmers</td>
<td>4.46A</td>
<td>3.62B</td>
<td>4.00B</td>
<td>18.09</td>
<td>0.001</td>
</tr>
<tr>
<td>VEW provides information throughout the production cycle</td>
<td>4.39A</td>
<td>3.29B</td>
<td>3.80B</td>
<td>24.33</td>
<td>0.001</td>
</tr>
<tr>
<td>VEW reviews adoption of previous recommendations during visits</td>
<td>4.19A</td>
<td>3.47B</td>
<td>3.71B</td>
<td>9.63</td>
<td>0.001</td>
</tr>
<tr>
<td>VEW devotes sufficient time to educate farmers during visits</td>
<td>4.32A</td>
<td>3.27B</td>
<td>3.28BC</td>
<td>22.41</td>
<td>0.001</td>
</tr>
<tr>
<td>VEW is competent in preparation of teaching aids</td>
<td>4.16A</td>
<td>2.88B</td>
<td>3.43BC</td>
<td>32.40</td>
<td>0.001</td>
</tr>
<tr>
<td>VEW is technically competent</td>
<td>4.47A</td>
<td>3.52B</td>
<td>4.00B</td>
<td>22.74</td>
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<tr>
<td>VEW has helped farmers to change their practices</td>
<td>4.33A</td>
<td>3.60B</td>
<td>3.86B</td>
<td>14.07</td>
<td>0.001</td>
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<tr>
<td>VEW is provided with facilities to prepare teaching aids</td>
<td>3.01A</td>
<td>2.49B</td>
<td>3.28B</td>
<td>4.63</td>
<td>0.011</td>
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<tr>
<td>Overall</td>
<td>4.22A</td>
<td>3.32B</td>
<td>3.64B</td>
<td>30.81</td>
<td>0.001</td>
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Notes: *Mean could range from 1 (strongly disagree) to 5 (strongly agree). Means followed by the same alphabet are not significantly different from each other.
Table 3
Means and Standard Deviations for Promoting Group Action, Effectiveness of VEW Visits and Message Conveyance and Adoption by Group and Land Type Farmer Client

<table>
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<tr>
<th>Group</th>
<th>Irrigated</th>
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<td>SD</td>
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<td>M</td>
<td>SD</td>
<td>n</td>
<td>M</td>
<td>SD</td>
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<tr>
<td>VEW</td>
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<td>3.83</td>
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<td>68</td>
<td>3.80</td>
<td>.57</td>
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<td>CF</td>
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<td>3.75</td>
<td>.39</td>
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<td>3.28</td>
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<td>.36</td>
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<td>3.19</td>
<td>.74</td>
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<td>72</td>
<td>3.80</td>
<td>.40</td>
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<tr>
<td><strong>Effectiveness of VEW Visits</strong></td>
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<td>.38</td>
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<td>3.38</td>
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<td>3.90</td>
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<td>15</td>
<td>3.88</td>
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<tr>
<td>Total</td>
<td>72</td>
<td>3.89</td>
<td>.38</td>
<td>72</td>
<td>3.84</td>
<td>.40</td>
<td>144</td>
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<tr>
<td><strong>Message Conveyance &amp; Adoption</strong></td>
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<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>VEW</td>
<td>31</td>
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<td>.40</td>
<td>37</td>
<td>4.22</td>
<td>.44</td>
<td>68</td>
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<td>CF</td>
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<td>.57</td>
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<td>3.67</td>
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<td>15</td>
<td>3.64</td>
<td>.60</td>
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<tr>
<td>Total</td>
<td>72</td>
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<td>.49</td>
<td>72</td>
<td>3.72</td>
<td>.58</td>
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Table 4
Two-Way ANOVA of Promoting Group Action, Effectiveness of VEW Visits and Message Conveyance and Adoption by Group and Land Type Farmer Client

<table>
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<th>Source</th>
<th>df</th>
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<td>2.326</td>
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<td>45.304</td>
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<tr>
<td>Total</td>
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<td>49.666</td>
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<tr>
<td>Effectiveness of VEW Visits</td>
<td></td>
<td></td>
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<td></td>
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<td>13.096</td>
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<td>Group by land type</td>
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<td>1.330</td>
<td>6.795</td>
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<tr>
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<tr>
<td>Total</td>
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<td>42.559</td>
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<td></td>
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<tr>
<td>Message Conveyance and Adoption</td>
<td></td>
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<td></td>
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<td>Group</td>
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<td>Error</td>
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<td>Total</td>
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<td>86.738</td>
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Fall 1994
Figure 1. Interaction of promoting group action, effectiveness of VEW visits, and message conveyance and adoption for group and land type.
(VEW/CF/AEO) and land type (irrigated/dry land). VEWs perceived that they were effective in promoting group action, in making visits to farmer’s field and message conveyance and adoption regardless of whether they worked in irrigated or dry land areas. Similarly AEOs were in agreement with VEWs (Table 3). However, contact farmers perceived that VEWs working in irrigated areas were significantly more effective in all the three areas (promoting group action, making visits to farmer’s fields and message conveyance and adoption) than VEWs working in dry land areas. The differences in perception scores of contact farmers were more pronounced for message conveyance and adoption, followed by promoting group action and making visits to farmer fields. Three possible reasons could explain this perception. Traditionally, extension workers have targeted resource rich farmers in irrigated areas for publicizing their extension programs and give more emphasis to farmers in irrigated areas. Lack of adequate transportation facilities to efficiently reach farmers in time and the relationship that extension workers have with others in the area may have lent support to this perception.

Educational Importance

Overall, it appears that both VEWs, AEOs and contact farmers have positive perceptions about VEW’s effectiveness in: 1) promoting group action, 2) visiting farmer’s fields; and 3) conveying messages that help adoption of improved practices. However, three areas needs attention.

First, a need exists for training VEWs and farmers in the area of promoting group action. For VEWs, such training should focus on motivating farmers to successfully participate and perform in group activities. For farmers, such training should focus on providing hands on experiences to conduct and participate in group activities that enhance the decision making behavior of farmers.

Second, in dry land areas, timely visits and conveyance of messages are crucial because farmers, to a greater extent, depend on rains for their agricultural operations unlike farmers in irrigated areas. Because of this reason (often called gambling in monsoon), VEWs have to make their visits as scheduled and prepare appropriate recommendation plans. If VEWs are not in a position to make visits in time, then the very purpose of giving advice to farmers may prove fruitless. Therefore, VEWs in the dry land areas should consider to a greater extent the weather reports in advance and plan their visits to the field. Such forecasting and planning will help VEWs to provide more timely advice and recommendations to farmers.

Third, VEWs in dry land areas should be provided with adequate facilities in terms of transportation, and teaching materials to visit farmers in time and advise them on the recommendations. Their timing of visits is especially crucial if the visit is to achieve maximum educational benefits.

References


Fall 1994
THE DAIRY TECHNOLOGY SYSTEM IN VENEZUELA

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Janet L. Henderson, Associate Professor
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The Ohio State University

Outstanding Graduate Research Presentation

This paper is the outstanding graduate research paper from the Tenth Annual Meeting of the Association for International Agricultural and Extension Education, Arlington, VA, U.S.A., March 24, 25 & 26, 1994.

Abstract

The purpose of the study was to describe the agricultural technology system in Venezuela. The objectives of the study addressed agricultural policy, technology development, technology transfer, and technology utilization. Government documents and 80 face-to-face interviews with policy makers, researchers, extension agents, and dairy farmers were the data sources. The following strengths and weaknesses of the Venezuelan agricultural technology system were identified: funds allocated for public agricultural research and extension are adequate; agricultural credit is available; a strong base for farmer organizations exists; current pricing policies favor dairy processors and discriminate against producers; funds allocated for research and extension programs and salaries are insufficient; the research agenda overemphasizes export crops and overlooks the livestock subsector; farmer organizations are passive in influencing agricultural policies; few researchers and extension agents possess advanced degrees; adoption rates are low for practices requiring high investments, specialized equipment, and sophisticated management skills; and linkages among research, extension, and farmers are weak.

Introduction

Strong governmental policies are required for promoting and sustaining agricultural growth. The effectiveness of an agricultural technology system depends upon sound policies that support the agricultural sector. Formulating solid agricultural policies requires input from all parties involved in the system—policy makers, researchers, extension agents, farmers, and agribusinesses (Schuh, 1987). A major concern of many developing countries is increasing agricultural productivity. Although research plays a critical role in generating technologies that raise production levels, research has been criticized for ignoring the production problems faced by small and medium-scale farmers and for neglecting to conduct site-specific, adaptive studies (Kaimowitz, 1991; Roberts, 1987; Cernea, Coulter, & Russell, 1985). One of the functions of extension is to transfer developed technologies and provide feedback from the users to the research subsystem. Extension has been criticized for lacking a clear mission, incurring excessive bureaucratic procedures, and being unresponsive to the problems and concerns of farmers (Rivera, 1991; Axinn, 1988; Baxter, 1987; McDermott, 1987). One of the main purposes of an agricultural
technology system is to increase the adoption of improved practices by targeted clientele; adoption levels are affected by many factors, such as input costs, interest rates, and profitability. Users of agricultural technology need to be actively involved in the development and trial of improved practices (Compton, 1989; Pickering, 1985b). Strong linkages must exist among policy makers, researchers, extension agents, and farmers to ensure continued development.

Many research studies neglect to depict the relationships that exist among and within the various components of national agricultural technology systems. Analysis of agricultural technology systems should not be limited to isolated aspects, but rather the system should be examined comprehensively as a functional unit. A systems approach allows for a holistic examination of the interdependent components of an agricultural technology system.

Investigating the strengths and weaknesses of a technology system provides a composite portrait of the system and identifies specific areas needing attention (United Nations Development Programme, 1991; Roling & Engel, 1991; Waugh, Hildebrand, & Andrew, 1989).

Purpose and Objectives of the Study

The main purpose of this research study was to describe the agricultural technology system in Venezuela with an emphasis on the dairy industry. Dairy was chosen as a focus for the study because Venezuela is not self-sufficient in dairy production (Piñate, 1992). Milk production represented 21% of the total value of Venezuelan agricultural products in 1991 (Federación Nacional de Ganaderos de Venezuela, 1992). Milk production levels decreased by 4.3% from 1989 to 1992 and the amount of milk available per capita has decreased by 45% over the past six years (Piñate, 1992). Venezuela imported 27% of the total milk consumed in 1991 and a projected milk deficit of 1 billion liters is expected by the year 2000 (Piñate, 1992).

Eighty percent of the milk processed in 1990 was in the form of powered milk and cheese (Ministerio de Agricultura y Cría, 1990). The major dairy breed in the country is a cross between the Zebu and Brown Swiss or Holstein. Feed concentrates are seldom fed to traditional dairy breeds due to the low rate of economic return; dairy cattle are usually fed low quality forages on home-grown pastures. Although large-scale farms represent 11% of the total number of dairy operations, they account for 44% of the total milk production (Oficina Central de Estadística e Informática, 1988).

A qualitative macro-systems model referred to as the Analytical Framework (Peterson, Sands, & Swanson, 1989) was used to guide and organize the research study. The purpose of the Analytical Framework is to provide a broad overview of an agricultural technology system using a series of indicators and measures. The objectives of the study addressed the four components of an agricultural technology system identified by the Analytical Framework: policy, technology development, technology transfer, and technology utilization. The policy component examines those external factors that directly impact an agricultural technology system, including the utilization of technology by farmers. The objectives for the policy component focused on the government's investment in agriculture, pricing policies for agricultural products, credit availability for farmers, and farmer participation in decision making. The technology development component is the subsystem that is devoted to applied and adaptive research. The objectives for the technology development component focused on access to external sources of knowledge, human resources for agricultural research, research budgets, and allocations to agricultural commodity research. The technology transfer component refers to the transfer activities related to agricultural knowledge and inputs. The objectives for the technology transfer component concentrated on
access to technology from research, human resources for transfer activities, supervision and administration of extension personnel, time and budget allocations for technology transfer, and methods of technology dissemination. The technology utilization component refers to the use of agricultural technologies by farmers, with an emphasis on small holders. The objectives for the technology utilization component focused on the adoption of selected dairy technologies, farmer access to technology, and availability of technology to farmers.

Methodology

The design for the study was descriptive research. This research study examined the linkages among the four major functional components of the Venezuelan agricultural technology system, with particular attention to the strengths and weaknesses of the technology system.

Data were gathered from two main sources. Secondary data were gathered from government documents and primary data were collected through face-to-face interviews with people representing each of the four major components of an agricultural technology system. Data gathered from governmental documents had some limitations in terms of availability, consistency, and completeness. To substantiate the information gathered from government documents, members of the following agricultural groups were interviewed: a) policy-makers (n=7), represented by administrators from the Ministry of Agriculture at the national and state levels, b) researchers (n=22), represented by professional agricultural researchers (Ph.D., M.S., B.S. or equivalent) and research technicians (Diploma and Certificate levels) from the National Institute for Agricultural Research, c) extension agents (n=18), represented by agricultural agents and assistants from the Ministry of Agriculture at the state and local levels, and d) dairy farmers (n=33), represented by small (< 20 cows), medium (20-59 cows), and large producers (> 59 cows) and selected members of dairy farmer organizations. At the national level, interviewees were selected based upon the position they held. At the state and local levels, a convenient sample of extension agents, researchers, and dairy farmers was selected for the interviews.

Two sets of instruments were used to collect the research data. The first set of instruments consisted of 25 data gathering sheets designed to collect secondary data from government documents. The published document entitled A Field Manual for Analyzing Agricultural Technology Development and Transfer Systems (Swanson & Peterson, 1989) was used to guide the construction of the data gathering sheets. The second set of instruments consisted of three interview schedules developed by the researchers. The primary intent of these interviews was to provide more in-depth information to help understand the linkages among the components of the Venezuelan agricultural technology system. Moreover, interview schedules were designed to go beyond the secondary data by addressing possible suggestions for linkage improvement among researchers, extension agents, and farmers.

The data gathering sheets were considered valid instruments based on a series of case studies that used the macro-systems model (Peterson et al. 1989; Peterson, Zuloaga, Swanson, Uquillas, & Crissman, 1988). The indicators and measures of the systems model have been found to be effective and efficient in describing agricultural technology systems in several countries, including Malawi, Ecuador, Mexico, and Taiwan. A panel of experts established content validity of the interview schedules. Reliability of the data sources was determined by the following methods: a) interview schedules were used to confirm the accuracy of the data gathered through secondary sources, b) multiple interviews were administered to capture a full range of opinions.
and perspectives of the Venezuelan agricultural technology system, and c) data were examined, whenever feasible, over a 10-year period to display trends.

Research data were collected in three phases: a) administering an introductory survey (n=16) during the Summer of 1991 with the purposes of describing Venezuelan dairy farmers on selected demographic characteristics, determining major problems and issues facing the Venezuelan dairy industry, and assisting in the design of the interview schedules, b) interviewing top-level administrators at the Ministry of Agriculture and the National Institute for Agricultural Research and gathering secondary data from government documents at the national level, and c) interviewing researchers, extension agents, and dairy farmers at the state and local levels. Phases II and III were conducted from November 20 to December 20, 1992.

Descriptive statistics were used to analyze the quantitative data. Percentages, frequencies, ratios, and index and access scores were calculated. Data obtained through the interview schedules were arranged by patterns and trends that emerged from the responses to the interview questions.

Results

The Agricultural Policy Subsystem

Government expenditures for agriculture in Venezuela averaged 4% of the Gross National Product (GNP) during the last 10 years; this percentage is similar to other Latin American countries (Peterson et al. 1989). The percentage of the Venezuelan Agricultural Gross Domestic Product (AGDP) invested in agricultural research averaged 1% or less between 1984 and 1992; extension expenditures were 4% during the same time period. These figures correspond with data from other developing countries (Swanson, Farmer, & Bahal, 1990). Retail milk prices in Venezuela have been approximately twice as high as farmgate milk prices for the past six years. The gap between feed concentrate and milk prices is very low. Sixty-four percent of the farmers interviewed indicated that they had credit; however, the amount of paperwork involved was unreasonable, interest rates were high, and credit was not available in a timely manner. Even though a strong farmer organizational base exists with open membership, decision making, and elections, the organizations are generally controlled by large-scale producers and dairy processors. Farmers interviewed perceived that the organizations are extremely passive and have little influence in formulating dairy policies.

The Agricultural Research Subsystem

Accessibility to external sources of technical dairy information by agricultural researchers is low; contact with external sources of technology is indirect, infrequent, and primarily limited to central-level scientists. The ratio among Ph.D., Master's and Bachelor's degrees for agricultural research in Venezuela is 7:49:44 compared to a desirable ratio of 20:40:40 (Peterson et al. 1988). The ratio of agricultural technicians to research scientist is 1:1; the recommended ratio of technicians to research scientists is to 2:1 (Peterson et al. 1989). Thirteen percent of the public agricultural research budget is allocated to programming efforts for crop and livestock production which is far below the recommended levels of 35% to 40% (Peterson et al. 1989); the remaining 87% of the budget is allotted to salaries and capital investment. Although the livestock subsector accounts for two-thirds of the AGDP, 21% of the research studies focus on the livestock area. Interview data confirmed that the public research agenda is oriented toward export crops rather than domestic crops and livestock, especially dairy.
The Agricultural Extension Subsystem

Three-fourths of the extension personnel interviewed indicated that direct contact between public research and extension personnel never occurred or was on an ad hoc basis. Although 47% of extension personnel have a university degree, less than 5% have a Master's or Ph.D. degree. Even though some extension personnel specialize in specific technical areas, the Subject Matter Specialist position does not exist in the Venezuelan public extension subsystem. The majority of the extension personnel interviewed stated that annual evaluations are conducted and the results are distributed, but not discussed. Pay is not awarded on a merit basis and promotions are not based on performance. The time spent on educational activities by the extension personnel interviewed averaged 49%, one-fourth of their time was devoted to non-educational, regulatory activities, while the remaining 25% was allocated for administrative duties. The amount of funding allotted to programs and salaries is extremely inadequate according to the extension personnel interviewed. In addition, agents interviewed stated that extension salaries are far below other institutions in the public and private sectors. The group activities most frequently used by extension agents to transfer technical information to farmers were demonstrations, meetings, and seminars; the average number of demonstrations conducted per extension field agent per year was 12. Flip charts, posters/bill boards, and leaflets/fact sheets were the types of media most frequently used to transfer technical information. The public extension subsystem does not use the radio as a means for transferring technical information.

The Technology Utilization Subsystem

Although the majority of the farmers in the study had knowledge of mastitis prevention (85%), improved forages (97%), feed concentrates (94%), and artificial insemination (100%), those practices that required higher input costs, modern equipment, specialized personnel/skills, and sophisticated management abilities were adopted less frequently. Prevention of mastitis was adopted by 79% of the farmers interviewed, followed by the use of improved forages (73%), feed concentrates (36%), and artificial insemination (36%). The main reasons cited by the farmers for the low adoption rates were: high cost, lack of equipment/facilities, lack of information, and low quality inputs. High school and university courses and educational programs conducted by the public extension subsystem were the most frequently mentioned information sources for learning about the practices regardless of farm size or the specific dairy practice. The farmers in the study were located an average of 28 kilometers from the nearest agricultural supply outlet, with a range between two and 70 kilometers.

Major Problems Facing the Venezuelan Dairy Industry

Respondents representing policy makers, researchers, extension agents, and dairy farmers were asked to identify the major problems facing the Venezuelan dairy industry. The main problem mentioned was unfavorable governmental policies, such as low milk prices, high input costs, elimination of dairy subsidies, a lack of low-interest agricultural credit, a monopoly in the milk processing industry, a lack of continuity in governmental support for research and extension programs, and a high reliance on imported dairy products. Another area of concern was milk production constraints, including a lack of dairy breeds suitable for the tropics, poor dairy management practices, a lack of high-protein forages, herd health problems, a shortage of dependable labor, and a deficiency in updated dairy technology.
Improving Linkages among Researchers, Extension Agents, and Farmers

Several suggestions for improving the linkages among researchers, extension agents, and farmers were provided by the respondents: a) integrating extension and research activities by collectively establishing short and long-term priorities, b) developing a joint plan of work to coordinate ideas and programs, c) establishing regular meetings between research and extension to discuss research results and extension issues, d) assigning extension personnel to research stations to conduct transfer activities, e) organizing an advisory committee at every research station that includes researchers, extension agents, and farmers, f) encouraging interdisciplinary work groups between research and extension personnel, g) conducting research based upon the needs of specific regions, h) working directly with farmers to assess clientele needs, i) collectively conducting surveys to diagnose "real" problems to be researched, j) creating experimental substations throughout the country, k) spending more time in the field and less time in the office by researchers/extension agents, l) establishing dairy specialist positions in each state, m) conducting courses and seminars that focus on regional differences, n) coordinating research/extension efforts with regional universities, and o) conducting field trials by research and extension.

Conclusions, Implications, and Recommendations

The Agricultural Policy Subsystem

The Venezuelan government's financial commitment to the agricultural sector is too low to promote growth and sustain development. If funding for the agricultural sector is inadequate and unsteady, then governmental policies will have little impact on production and productivity (The World Bank, 1990; Baharsjah, 1985; Pickering, 1985a). Increasing and maintaining the percentage of the Venezuelan government's total budget allocated for agriculture to a minimum of 5% is recommended to attract more people to agriculture and stimulate growth in the sector.

Funding levels, as a percentage of the AGDP, appear to be adequate for developing and disseminating new technologies and improved practices. Adequate funding levels and increased governmental support for research and extension will result in increased agricultural output (Compton, 1989). Maintaining current expenditures for agricultural research and extension is recommended to encourage self-sufficiency and less dependence on imports for the Venezuelan agricultural sector.

Current pricing policies for dairy products favor the dairy processor and discriminate against the producer. When the input/output price ratio is unattractive, the incentive to use new technology and modern inputs is reduced (Schuh, 1987). Increasing the farmgate milk price in relation to the retail price and expanding the feed concentrate to milk price ratio are recommended to attract farmers to the dairy industry and to promote the use of improved inputs.

Although agricultural credit is available, interest rates are high, loan application procedures are excessive, and availability of credit is untimely. When credit policies and procedures do not favor the agricultural sector, many farmers are unable to purchase and use improved inputs (Schuh, 1987). To increase farmer use of agricultural credit, the Venezuelan government should set interest rates that correspond to the profitability of agricultural enterprises. In addition, shortening and simplifying the loan application process is recommended to increase credit use by farmers.

Venezuela has a strong base and structure for farmer organizations as evidenced by the high index ratings and farmer interviews. The needs of small and medium-scale farmers are not
likely to be addressed by policy makers, unless farmer organizations represent all levels of producers. Medium and small-scale farmers must become more proactive and united in voicing their problems and concerns through farmer organizations (The World Bank, 1990; Pickering, 1985b). The Venezuelan public extension system could assist medium and small-scale farmers by providing educational programs in the areas of leadership development, decision making, organizational management, and policy formulation.

The Agricultural Research Subsystem

Public researchers have limited access to direct sources of external dairy technology and information. A lack of direct access to external knowledge and technology delays the technology development process and results in unnecessary research investments for developing countries. To maintain a viable national research subsystem, scientists must network with colleagues throughout the world to keep up to date and to use resources more efficiently (Cernea et al. 1985). Increasing direct and frequent contact with the International Agricultural Research Centers (IARCs) and other external research institutions is recommended to ensure continued growth of the Venezuelan public research subsystem. Contact with external sources of technical information should also be made available for researchers at the local experiment stations.

The current number of public researchers with advanced degrees (i.e., Master’s and Ph.D.) is extremely low. The educational level of scientific staff and technicians is positively related to the performance of research institutions; a critical mass of qualified scientists is necessary for long-term technology development (Peterson et al. 1989). Increasing the number of Ph.D. scientists to the recommended level is suggested for strengthening the public agricultural research capacity in Venezuela.

The monies allocated for public research programs are insufficient to fulfill the goals and objectives of the Venezuelan agricultural research institute. Similarly, monies allotted for salaries are not competitive with comparable public and private institutions. When programming budgets are below the recommended levels, research activity and productivity are severely restricted. A study jointly conducted by the United Nations Development Programme and Food and Agriculture Organization for the United Nations (FAO) reported that the disproportionate allocation between salaries and programming expenses is a major factor contributing to the under-utilization and low motivation of research personnel (Peterson et al. 1989). Without adequate programming support, research staff are not able to design, implement, and complete scientific investigations. Reducing the portion of the research budget allocated for salaries by "freezing" vacant positions is recommended to increase the monies available for research programming.

The public agricultural research agenda overemphasizes export crops and overlooks the domestic crop and livestock subsectors, especially dairy. The amount of investment in specific commodities should correspond to their contribution to the AGDP (Swanson & Peterson, 1989). Research programs that emphasize export commodities for foreign exchange establish a high concentration of large-scale, resource-rich farmers, neglect small-scale farmers, and create food shortages (Peterson et al. 1989). As stated by the World Bank (Peterson et al. 1989), investment in domestic food crop research increases the quality of life in rural and urban areas and creates a surplus for possible exportation. Not only economic factors, but also social and resource-use issues must be considered when setting research priorities (Peterson et al. 1989). Reallocation of research personnel and programming budgets to the livestock and...
domestic food crop subsectors is recommended to reduce dependency on foreign food imports.

The Agricultural Extension Subsystem

The linkages between the public agricultural research and extension subsystems in Venezuela are weak, informal, and inconsistent. Without strong linkages between the research and extension subsystems, agricultural development will be hindered (Roling & Engel, 1991; Colle, 1989; Waugh et al. 1989; Cernea et al. 1985). When research and extension linkages are poor, the prospects of research findings reaching the farmers and accurately assessing farmer needs are unlikely (Baharsjah, 1985; Pickering, 1985a). The realization of the mission and objectives of the research and extension subsystems is hampered when the two institutions work in isolation. Establishing a formal research/extension communication network with strong administrative support is recommended to link the two institutions.

Personnel with Ph.D. or Master’s degrees are under-represented in the public extension subsystem. The disparity between the educational levels of researchers and extension agents is not conducive for joint efforts. The lack of personnel with specialized graduate degrees weakens the agricultural technology system, in general, and prevents effective communication between the research and extension subsystems (Rivera, 1991; Axinn, 1988; McDermott, 1987; Pickering, 1985b). Increasing the number of extension personnel with graduate degrees and establishing a Subject Matter Specialist position within the extension subsystem is recommended to improve the human resource capacity of extension and research-extension linkages. The appraisal and compensation systems of the Venezuelan extension subsystem do not encourage motivation, job satisfaction, and quality performance among extension personnel. The fulfillment of the goals and objectives of an organization are threatened by the inefficient management of human resources (Peterson et al. 1989). When evaluation procedures and criteria are established and distributed, but not applied, then employee trust, motivation, and performance are jeopardized (Kaimowitz, 1991). The recruitment and retention of qualified personnel is hindered by weak compensation systems; maintaining an effective organization depends partially upon the presence of positive incentives (Fisher, Schoenfeldt, & Shaw, 1990). Designing an evaluation process that provides opportunities for improving job performance is recommended to maximize employee potential in the public agricultural extension subsystem in Venezuela. Revising the current compensation system of the extension institution to be based on performance rather than seniority is recommended to improve the recruitment and retention of qualified personnel.

Extension field agents do not devote sufficient time to educational activities that promote the utilization of new technologies and improved practices. When too much time is spent on non-educational activities, the main purpose and objectives of an extension subsystem are not fulfilled (Swanson & Peterson, 1989). In addition, as a consequence of spending too much time in the office, extension field agents lose credibility and are unable to accurately assess farmer needs (Axinn, 1988). Recognizing the importance of the educational function of the extension subsystem is recommended to increase the amount of time devoted to the transfer of new technologies. Streamlining the quantity of paperwork, reducing administrative reporting, and decreasing regulatory duties are also recommended to encourage a more efficient use of the extension agents’ time.

Funding levels allocated for public extension programming appear to be insufficient to carry out technology transfer activities in Venezuela; similarly, salaries for extension personnel do not seem to be competitive with personnel from similar institutions. The transfer of improved technologies to farmers may be detained when disproportionate amounts of monies are designated for salaries, programs, and capital expenditures (Rivera, 1991; Wilson,
1991; Peterson et al. 1989). When insufficient amounts of funding are assigned for extension programming, field agents lack teaching materials, transportation, equipment, supplies, and communication devices to effectively perform their responsibilities (Peterson et al. 1989; Axinn, 1988). Low salaries and inadequate benefits are related to high employee turnover and low motivation and job satisfaction and performance (Fisher et al. 1990). Increasing the amount of the budget allocated for extension programming is recommended to ensure the adequate transfer of new technologies and improved practices by extension field agents. Raising the salary levels for field agents to a more competitive base is recommended to recruit and retain qualified personnel.

Extension field agents are reaching a high percentage of the farming population through a variety of group activities. The overall capacity of an extension subsystem to transfer new technologies is enhanced by contacting a majority of the farming population using a variety of dissemination techniques. The more individual and group activities held, the greater the likelihood that farmers will adopt new technologies (Peterson et al. 1989). Increasing the number of individual farm visits and group activities by extension field staff, especially to small-scale farmers, is recommended to encourage the utilization of new technologies and to accurately assess the problems and concerns of all farmers.

The Technology Utilization Subsystem

The dairy farmers in the study are aware of the major practices for improving milk production: artificial insemination, feed concentrates, improved forages, and mastitis prevention. Although knowledge of an existing practice does not guarantee its usage, awareness is a first step in the adoption process (United Nations Development Programme, 1991; Rogers, 1983).

Adoption rates are low for artificial insemination and feed concentrate; these two dairy practices require higher financial investment, specialized equipment, and sophisticated management skills. If increased productivity is a high priority for the agricultural sector, then the barriers impeding the adoption of improved technologies need to be removed (Kaimowitz, 1991; Roberts, 1987; Feder, Just, & Zilberman, 1982). Addressing the economic, political, social, institutional, and infrastructural factors preventing the adoption of new practices is recommended to improve productivity and increase farm income.

Agricultural supply outlets are distributed throughout the country and are accessible to the dairy farmers in the study. The close proximity of farm households to supply outlets facilitates the use of new technologies and modern inputs.

General Recommendations

This study attempted to examine in a holistic manner the strengths and weaknesses of the Venezuelan agricultural technology system with an emphasis on the dairy industry. Through the comprehensive description of the system as a functional unit, the linkages among policy makers, researchers, extension agents, and farmers were found to be weak or non-existent. Several constraints were identified that are hindering the progress of the agricultural sector in Venezuela. To improve the Venezuelan agricultural technology system, the following recommendations are proposed: a) establishing governmental policies that provide a long-term commitment to the agricultural sector will secure the design, implementation, and completion of research and extension programs; proactive and influential farmer organizations will help to ensure continuity of agricultural programs and services during administrative changes; b) the public research and extension subsystems should consider forming a national committee composed of small, medium, and large-scale farmers and representatives from private and public agricultural agencies/industries to design the national agenda for the agricultural sector; developing short and long-term strategic plans.
will help to determine the role that the agricultural sector should play in the Venezuelan economy and in the welfare of the population for the 21st century; c) examining the philosophy, mission, goals, and objectives of the public research and extension subsystems will ensure compatibility with the agricultural needs and priorities of the country; identifying the populations that should be served by the public research and extension subsystems and assessing clientele needs will ensure the effective use of human and financial resources and the design of the research and extension agendas; and d) implementing on-farm adaptive research on a trial basis at selected experiment stations will improve the linkages among researchers, extension agents, and farmers and enhance the credibility of public agricultural personnel among farmers. If the weaknesses in the Venezuelan agricultural technology system are not addressed and corrected, then the agricultural sector will remain depressed, non-competitive, and inefficient.

References


ARRESTING DEFORESTATION IN THE AMAZON

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Outstanding Research Presentation

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Abstract

This article describes research completed by Mr. Speicher for his Master’s thesis under the supervision of Drs. Wilson and Ething. He determined how cattle farmers manage their resources (land, labor, cattle), so that he could evaluate their current practices and make appropriate recommendations for improved practices. As a result of the study he recommended a “silvopastoral” system which included fast growing, shade tolerant grasses, leguminous trees serving as live fences, and rotational grazing. Implementation of this system has great potential to counteract deforestation in areas of the Amazon Basin where cattle ranching is the dominant land use.

Introduction

Deforestation is one of the major environmental issues of our time. The impact of deforestation in the Amazon has been heavily publicized and discussed. The most widespread practice that has led to deforestation among all Amazonian countries is cattle ranching (Hecht, 1981). Cattle ranching remains the dominant land use in the Amazon Basin because of: (1) its low labor intensity compared to raising crops, (2) government incentives, (3) high rates of inflation, (4) an increasing demand for beef, (5) a stable price for beef, and (6) the maximization of short term gains (MacLean-Stearman, 1983; Fearnside, 1985; Hecht et al., 1988; Browder, 1988). If future deforestation is to be prevented, two questions must be answered. Is deforestation inevitable for cattle ranching? What alternatives can be offered to ranchers to counter deforestation?

Purpose of the Study

In order to answer those two questions, the purposes of the study were to determine how cattle farmers manage their resources (land, cattle, labor), to evaluate their present practices, and to make appropriate recommendations. The objectives were: (1) to describe practices and attitudes of cattle farmers in Morona Santiago, Ecuador related to management of land, cattle, and labor; and (2) to identify specific steps to improve the cattle ranchers’ resource management and production efficiency.

Site Selection and Description

Morona Santiago, Ecuador was selected as the study site because of its location in the Amazon, its widespread cattle industry, and because of one of the researchers’ familiarity with the region. Morona Santiago is one of the five provinces located in Ecuador’s Amazon Region and is the leader in cattle
production among the five provinces (Cento de Reconversion Economica del Azuay, 1988). Cattle ranching is the primary economic activity in the province which occupies 90% of the forest areas cleared for agriculture or roughly 338,900 hectares (Sistema Estadistico Agropecuario Nacional, 1991). Cento de Reconversion Economica del Azuay (1988) estimates that 225,000 head of cattle are present in the province. The major effects of cattle ranching in the province have been deforestation and the depletion of soil resources.

Method

A purposive sample of 44 individuals involved in cattle ranching in the area was selected for interviews. A random sample was not possible due to constraints including distances, accessibility by existing roads, lack of information on the total population, expense, and the farmers' unwillingness to divulge information to strangers. Selection criteria for 37 of the 41 ranchers included in the sample were: (1) physical availability, (2) a willingness to participate in the study, (3) farm size of less than 50 hectares or less, (4) herd size of less than 50 head or less, (5) cattle production was the main income activity, (6) the rancher or his family directly cared for the cattle on a daily basis, and (7) the rancher owned the land. The remaining four ranchers were selected because they were participating in an agroforestry project sponsored by CREA-DDMS, a governmental agency similar to agricultural extension. These four ranchers were interviewed to compare their resource management practices to the other ranchers who utilized the "traditional" system (animals are tie grazed, little preventative health is practiced, feed supplements are administered sporadically or not at all, genetic advancement is lacking, management is labor intensive, and agency assistance is lacking).

The last three members of the sample were the director and two employees of CREA-DDMS. They were interviewed for their assessment of the problems facing the ranchers and for their recommendations. All members of the sample were selected by one of the researchers who was familiar with the area and the population after investing three years in Morona Santiago as a Peace Corps Volunteer specializing in livestock problems of small-scale ranchers.

Data were collected using a cassette tape recorder and a descriptive survey instrument developed by the researchers. The instrument consisted of 49 questions divided into five sections: (1) background information on the rancher, (2) land management practices, (3) cattle management practices, (4) amount and type of labor used, and (5) sources of knowledge and technical information.

Background information included name and age of respondent and the location of the farm (canton, parish). Questions on land management practices included types, ages and uses of pasture plots, soil types, grass and tree varieties used, and effect of cattle on the pastures. Cattle management questions included number and breed of livestock, use of fencing, method and frequency of the administration of water, salt, minerals, and preventative medicine, breeding techniques, age and weight of calves when weaned, and maintenance of records. Labor management questions asked for number of people employed plus family members who work on the ranch, hours per day spent on livestock care, types of tasks performed, and time required for each task. Under the category "sources of knowledge and technical information," respondents were asked about how they originally learned to care for livestock, who they consult for problems, their degree of satisfaction with their current system of cattle production, and reasons for any changes made in the system.

Results

Land management basically deals with pasture grasses and trees. Most of the ranchers (80.5%) had deforested greater than 70% of their land for pasture. Three grasses, shown
Table 1
Pasture Grasses Used

<table>
<thead>
<tr>
<th>Grass</th>
<th>Head/hectare</th>
<th>Regrazing time in months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imperial (Axonopus scaparius)</td>
<td>1.0</td>
<td>7.2</td>
</tr>
<tr>
<td>Elephant (Pennisetum purpureum)</td>
<td>2.2</td>
<td>3.5</td>
</tr>
<tr>
<td>Setaria (Setaria sphacelata)</td>
<td>3.7</td>
<td>1.7</td>
</tr>
</tbody>
</table>

in Table 1, were grown. These data came directly from the interviews. The data were verified by the researcher’s experience in the region and by government professionals who work directly with the ranchers.

Imperial grass was the most common pasture used (95.1% of the ranchers), yet this grass was the least productive and very time consuming to maintain. Setaria, a relatively new grass in the area, was used by a minority of the ranchers (31.7%). However, these ranchers reported that setaria grass is easier to maintain, does not decrease in quality or quantity over time (with proper management) as the other grasses do, and does not degrade the soil. The reasons for the reported differences between these grasses will be explained in the following paragraphs. Imperial and elephant grasses had a long regrazing time since they were predominately grazed in a reproductive stage, while setaria had a much shorter regrazing time since it was grazed in a vegetative stage. Imperial and elephant grasses were not grazed during the vegetative stage to avoid problems such as poor intake of the grass, pasture depletion, and diarrhea. On the other hand, these problems did not occur with setaria grass, thus it was grazed during the vegetative stage to prevent a decline in nutritional quality. Cattle ranchers reported that maintaining imperial and elephant grasses in a productive state was a very time consuming process since weeds and secondary regrowth were cut back manually on a daily basis to guarantee pasture survival and longevity. Ranchers utilizing setaria grass did not encounter these problems, therefore no maintenance was required to keep setaria in a productive state.

The production declines of imperial and elephant grasses and the more stable production levels of setaria grass can be explained by the three grasses’ shade tolerance. Imperial and elephant grasses have a very low shade tolerance growing best in open areas, while setaria grass grows best in well shaded areas, as shown in Table 2.

Because of imperial and elephant grasses’ low shade tolerance, ranchers reported leaving very few trees in their pastures. Given the average age of these pastures (20 years), and the lack of trees, their yields would be expected to decline (due to soil degradation) in the absence of inputs such as fertilizer or nitrogen fixation, as described by Sanchez and Salinas (1981) and Fearnside (1980).

Since setaria grass grows best in well shaded areas, the potential for planting trees exists. All ranchers reported leaving trees standing for purposes such as shade, lumber, and firewood when establishing a new pasture. However, only four ranchers, those working with CREA-DDMS, were actively planting trees in conjunction with setaria grass. Their principal reasons for planting trees were for nitrogen fixation, living fences, forage, and lumber.
Table 2

Pasture Preference to Light Intensity

<table>
<thead>
<tr>
<th>Grass</th>
<th>% Open areas</th>
<th>% Partially-shaded</th>
<th>% Well shaded %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imperial</td>
<td>66.7</td>
<td>33.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Elephant</td>
<td>57.9</td>
<td>36.8</td>
<td>5.3</td>
</tr>
<tr>
<td>Setaria</td>
<td>0.0</td>
<td>15.4</td>
<td>84.6</td>
</tr>
</tbody>
</table>

Cattle management mainly consisted of tie-grazing the cattle. The main reasons reported for tie-grazing were: (1) to prevent pasture damage and eventual loss, (2) since it was customary, and (3) since no fences were in place to restrain the cattle. Only two of the 41 ranchers maintained their cattle loose within fenced pastures of setaria grass. These two ranchers provided salt, water, and minerals free choice. The other ranchers provided these necessities sporadically if at all. Less than 50% of the ranchers treated their cattle for internal parasites. Only 30% of the ranchers kept any records at all.

Labor management for the two ranchers using setaria grass and fenced pastures was relatively easy. For the other ranchers labor intensity was much higher since the cattle had to be moved frequently and the pastures maintained by cutting back secondary growth and weeds on a daily basis. Salt, water, and minerals had to be administered directly to each animal.

Technical assistance received from government agencies was nonexistent for 88% of the ranchers. For most ranchers technical assistance came primarily from family members or neighbors. Only the four ranchers working with CREA-DDMS reported assistance from a governmental agency. These four were satisfied with their current production systems while 78% of the ranchers were not satisfied. The most common changes desired were to improve the pastures and the breed of cattle.

Other interesting data were collected as a part of this study. Only the data directly pertinent to the purposes of this article are reported here.

Conclusions and Recommendations

The researchers concluded that the "silvopastoral system" being tested by CREA-DDMS and the four ranchers should be implemented on a wide scale. This system includes (1) planting fast growing, shade tolerant grasses such as setaria or dallis grass (Paspalum dilatatum); (2) planting leguminous trees to allow for live fences, nitrogen fixation, improving soil physical properties, providing for shade, and allowing for diversification of production; and (3) implementing a rotational grazing program where parcels could be rested and regrazed to improve pasture production and reduce soil compaction.

To supplement this system the researchers recommended other management steps including (1) free access of cattle to water, salt, and minerals; (2) regular deparasitization; (3) animal treatment areas and restraining chutes to make treatment easier; (4) record keeping; (5) proper calf care practices; (6) regular weight estimation using a tape measure; and (7) introduction of better quality reproducers into the herds. These steps should be implemented with the support of CREA-DDMS, Peace Corps Volunteers, and The German Agency for Social and Technical Cooperation, agencies that are already working in the Province but
could strengthen their efforts through cooperation.

Educational Importance

The silvopastoral system and the recommended management steps have already been introduced on a small scale in Morona Santiago. The practices are appropriate for the ranchers, economically feasible, culturally acceptable, environmentally sound, and can arrest deforestation in Morona Santiago. If ranchers can more efficiently use their existing pastures, they will have less pressure to clear new parcels for pasture. The researchers have also observed other sites in the Amazon Basin (in Ecuador, Bolivia, and Brazil). They believe that this silvopastoral system, or a variation, has the potential to arrest deforestation in these areas as well. For other areas outside Morona Santiago, the researchers recommend the same process of small scale introduction, evaluation, adaptation, and diffusion by cooperating agencies.

References


CREATING A STRONGER MODEL FOR INTERNATIONAL YOUTH EXCHANGE: A CASE STUDY

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Outstanding Research Presentation

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Abstract

Youth exchanges across national boundaries can be powerful learning experiences. Both 4-H and FFA have experimented with different types of group exchanges. This article reviews the tour group model, the work team model, the 4-H ambassador model, and an improved model developed between 1991 and 1993 through a W.K. Kellogg funded project. Through collaborative planning, implementation, and evaluation between Land Grant institutions in the United States and partner universities in Mexico, this new model was developed to strengthen the educational value of youth exchanges and to give participants experience in community development.

For the first time in history, a majority of the Latin American nations have democratically elected leaders. Also for the first time, national education planners in Africa, Asia, Latin America, and Eastern Europe can seriously focus on long-term educational goals including youth development through non-formal educational programs.

On too many occasions, during the last thirty years, the author has witnessed the failure of non-formal educational programs for youth and the demise of effective programs. Some of those failures have been due to political turmoil, national priorities which favored military spending, or economic recession. Programs that were started during the 1960s and seemed to be working have been terminated or absorbed into bureaucratic structures in a "watered down" form.

One effective international non-formal education program was the International Farm Youth Exchange (IFYE) which was started in 1948 under the direction of the National 4-H Council. This program placed young adults, ages 19 to 25, with host farm families to live and work together for six months while learning a language and culture and promoting world peace. Subsequently, IFYE was changed to International 4-H youth exchange and expanded to include non-farm families. Due to the success and popularity of IFYE a group exchange called IFYE Ambassador was added. This was a short term exchange (4-5 weeks) for youth 14-19 years old. These youth traveled in groups of approximately 15 with an adult chaperon. They combined touring with a host family experience in the host country. In 1992, the National 4-H Council decided to terminate their administration of both IFYE programs. IFYE alumni were able to find a private group based in Phoenix, Arizona, to assume administration of the IFYE program and resume the IFYE Ambassador program a year later.
Many types of work or study exchange programs have been initiated over the years. Some of these are very successful. Since they are usually individual exchanges, however, the effectiveness varies greatly from one participant to another and for the specific conditions in the country visited. For many individuals these experiences are positive and life-changing. For others they are little more than tourist experiences that lead to misconceptions and limited positive learning.

International group exchanges for youth can be powerful learning opportunities. Most international travel opportunities, however, have several problems. (1) They are so expensive that many families cannot afford to send their youth. (2) The educational quality is difficult to control. (3) They seldom address development issues at the local level. (4) They are often conducted by travel agencies whose commercial interests supersede educational considerations.

The Tour Group Model

An illustration of these problems can be found in the tour group model (Figure 1). A travel agency plans the tour as a business venture. The agency hires a guide (i.e., a teacher of vocational agriculture) who is identified with the target client group (i.e., FFA youth). More emphasis is placed on publicity and recruitment than on selection and orientation. Typically selection is determined by the first 25 youth to pay the trip deposit which is set high enough to discourage withdrawal from the program. The guide might hold one orientation meeting which will mainly focus on documents and logistics. Travel is one-way. Participants stay in hotels (and only rarely with a host family for a few days). Sometimes the local young farmer organization helps arrange tour stops at members’ farms. Evaluation, if any, is limited to a brief questionnaire, on participant satisfaction, at the end of the tour. Even at this low level of educational programming participants learn much from the non-formal learning experiences (planned, organized, and intentional but not a part of the participants’ school work) and even more from the informal learning experiences (unplanned observations, conversations, and interactions). Little effort is made to conduct “debriefing” of participants at the end of their tour so that they may put their experiences in perspective.

A variation of the tour group model is the “work team.” This concept is used particularly by church organizations to provide volunteer labor, usually church related, in another country. The work team can also be an effective learning experience. This varies greatly depending on the participants, the organization, the purpose of the trip, orientation, and many local conditions.

![Figure 1. Tour Group Model.](image-url)
The 4-H Ambassador Model

The National 4-H Council improved the tour group model. Its model (Figure 2) was developed over several years and involves collaboration among the national, state, and county levels in the United States as well as cooperation with organizations similar to 4-H in other countries.

The National 4-H Council negotiated with organizations in other countries to determine destinations, cost, and subject matter focus for the outbound delegations. The range of destinations was then announced to state 4-H coordinators and county 4-H agents. In 1992, the destinations and foci included Spanish language study in Spain, equestrian experience in Brazil, environmental issues in Costa Rica, food preparation in France, natural resource study in Australia, literature and culture of England, and marketing local products in Italy. Costs ranged from $1,975 for Costa Rica to $3,995 for Australia. The programs in the European countries averaged about $3,100. The state coordinators of international programs then screened applicants and sent their application files to the designated staff member at the National 4-H Council. When 15 applications (from any combination of states) were received for a particular destination, a chaperon would be selected (by National 4-H Council using a similar application form) and the delegation would be complete.

The state 4-H coordinator would provide some outbound orientation for the participants in that state and recruit host families for inbound delegations from other countries. Further orientation was provided just prior to departure for all delegations meeting at the National 4-H Center in Chevy Chase, Maryland. Orientation covered information on the country, information on 4-H in the U.S., role plays on cross-cultural effectiveness and communication, hints on packing and photography, and assistance with all of the documents needed to travel. A standard “code of conduct,” defining acceptable behavior while traveling, was signed by each delegate. Each exchange lasted four or five weeks and included a combination of tours and host family experiences. Funding for delegates was the responsibility of the delegate’s family. In many cases state or county 4-H funds or fund raisers were used to assist the delegates.

From the perspective of the National 4-H Council, these exchanges were reciprocal. Once the Council sent a delegation to Spain, it was committed to host a delegation from Spain in a subsequent year. From the delegates’ point of view, however, they were involved in a one-way exchange. Very rarely did a delegate to Spain subsequently host a delegate from Spain.

Delegates were encouraged to give public presentations on their 4-H ambassador trips. Some delegates, who received state scholarships to travel, were required to give a number of talks which served as a form of education for local 4-H members who were not able to travel abroad as well as publicity and recruitment for future exchanges. Preparing and presenting these talks also gave the traveler an opportunity to summarize and conceptualize the travel experience and its implications to his or her life. In this way the public presentations served as a debriefing step for the travelers.

Evaluation of the exchanges varied by year and by state. Most state coordinators evaluated participants’ responses to their orientation program. In many cases a "trip report" was required by the state coordinator four weeks after returning to the United States. The National 4-H Council evaluated its orientation and asked chaperons for anecdotal information to indicate problems encountered on the exchange. A longitudinal study of the cost effectiveness was conducted by accountants at
Figure 2. 4-H Ambassador MODEL.
the National 4-H Council. In 1992, this exchange was terminated by the National 4-H Council because of fiscal losses over the last several years. The educational value of these exchanges, however, was clearly superior to the tour group model. The 4-H ambassador model has had considerable impact since it was successfully employed by many states for several years.

A New Approach

In 1990, the W.K. Kellogg Foundation awarded almost $398,000 to the National 4-H Council to strengthen linkages between land grant universities and universities in Mexico in order to develop creative youth exchanges which would involve youth in community development. This grant enabled the National 4-H Council to develop a new model for youth exchange which would provide opportunities for youth who had not been able to afford exchanges under the 4-H ambassador model.

Purpose

The overall purpose of the exchanges was to develop an improved youth exchange model which would overcome the problems of models currently used by 4-H and FFA. The objectives of the project and each of the five partnerships were to: (1) strengthen linkages between the partner institutions, (2) further cross-cultural understanding and friendship between people in Mexico and the United States, (3) promote international development through study and the exchange of human and technical resources, and (4) build a model for a low-cost international exchange for youth that emphasized educational impact and contribution to community development.

Procedure

The National 4-H Council selected five partnerships each comprised of a U.S. land grant university and a Mexican university. Each partnership (University of Arizona - National University of Mexico, University of Minnesota - University of Oaxaca, Penn State University - University of Monterrey, Texas A & M University - University of Coahuila, and University of West Virginia - University of Guanajuato) implemented its projects in slightly different ways. In general, however, the same process was followed.

1. In the first year of the grant, institutional linkages were built. A program planning process was used to define needs and priorities, and a written plan was developed. This was done by: (a) developing and refining the joint project proposals, (b) meeting with all universities and representatives of the National 4-H Council in Guanajuato to facilitate face-to-face contacts and beginning planning for a 1992 summer exchange, and (c) completion of the planning process by exchange visits of faculty and volunteer leaders to each other's campus, and exchange of letters and telephone messages.

2. Participants were selected and oriented (budgets determined that the delegation size would be about 20 participants).

3. Community development projects were selected for the delegations in each of the Mexican and U.S. sites.

4. The exchange was implemented with the Mexican delegation visiting its U.S. partner state for two weeks to live with host families and work on the designated community development project. Then the U.S. delegation followed its Mexican guests back to Mexico. The roles of guests and hosts were reversed for the last two weeks while the delegations worked on community development projects in each Mexican state.

5. Extensive evaluation took place at various points of the projects. Pre- and post-evaluation questionnaires were prepared by the National 4-H Council to assess changes in skills, knowledge,
and attitudes of participants. These were supplemented by quarterly reports from each university, interviews and site visits by independent evaluators hired by the W. K. Kellogg Foundation, questionnaires sent by National 4-H Council to the parents of participants, and focus group interviews conducted with participants a few weeks after the end of the exchange. Local activities such as orientations, community development activities, and host family reactions were also evaluated.

6. Each of the project coordinators from the ten institutions submitted an end-of-year report and met in Monterrey, November 18-20, 1992, to compare notes on successes and shortcomings of the 1992 exchange, and plan for the 1993 exchange.

An Improved Exchange Model

From the discussions among the ten project coordinators in November, 1992, a new model emerged. Since it was first proposed by the representatives of Penn State and the University of Monterrey to describe the process that they used, it is called the UDEM-PSU Model. The experience of the other four partnerships, however, was similar and their ideas were incorporated into the model described in Figure 3.

Collaboration was emphasized from the beginning. Constant communication meant that partners agreed on most of the decisions related to the exchanges. The Mexican institutions always had the last word concerning activities in Mexico and the U.S. institutions always had the last word concerning activities in the U.S. Collaboration was also included in the local planning for this exchange. Interested youth, their families, and county agents assisted in planning and policy development.

A thorough program planning process was followed beginning with needs assessment and continuing through the determination of priorities, objectives, organization of resources, specific plans, implementation, and evaluation. Unlike the IFYE Ambassador model, planning for the UDEM-PS included county 4-H agents and local volunteers and youth. Those who were involved in hosting and traveling were involved in planning, determining dates, and setting policies.

The grant enabled each partner to recruit lower-income participants and representatives of diverse ethnic groups. Orientation was done locally and at the state level. Local orientation was led by county agents and chaperons who had experience in Mexico and with other 4-H international exchanges. At the state level orientation was done during two day-long meetings. In addition to paperwork and logistics, the orientation included the culture of the other country, and information and skills in community development principles and techniques, and helped build teamwork among participants.

A board game similar to Trivial Pursuit, called "Living in Mexico," was designed at Penn State to help introduce youth and chaperons to Mexican culture. This game requires players to answer questions about currency, meals, etiquette, travel, shopping, survival, Spanish, religion, geography, weather, and everyday life at home. Copies of the game were given to each county delegation for use, when they chose, to help in preparations for the exchange.

County 4-H agents helped participants choose an appropriate community development project for the two weeks that the Mexican delegation was in their state. In Mexico the exchange
Figure 3. UDEM-PS MODEL.
coordinators helped their youth to choose an appropriate community development project for the binational teams while they were in Mexico. During the exchange schedules were developed at each site. These schedules balanced participant involvement in four important activities: (1) the local community development project, (2) participation in family activities and time to get acquainted with the host family, (3) interaction in social situations with youth from the new culture who were not a part of the host family, and (4) individual reflection. Each participant was asked to keep a personal journal of reflections, questions, and observations.

The last component of this new model is "debriefing." Upon return home each participant was invited to a state meeting for evaluation and debriefing. During the debriefing delegates were led, through group discussion, to put their experiences and their new attitudes toward the other country in perspective. They were helped to see that visitors to another country typically experience four stages of perception: (1) the euphoric stage where everything is new, fascinating, and wonderful; (2) the culture shock stage where the charm wears off and the new country is compared to one's home country with the result that the new culture appears to be inferior; (3) the survival stage where the foreigner realizes that stage two is oversimplified and that survival depends on a more objective and accepting response to the positive and negative aspects of the new culture; and (4) the assimilation stage, usually after the visit has been completed, where the traveler is able to reflect on the experience and to decide which of the new skills, knowledge, and attitudes acquired will be retained and become a part of one's life incorporating a new world view.

Results

The extensive evaluations provided ample evidence that each objective had been met. Linkages between each of the partner universities were clearly strengthened. Project coordinators were named at each site. Each coordinator formed a committee to plan and implement the exchanges. In four of the U.S. universities the project coordinator was an extension specialist whose duties included the administration of international youth exchanges. For the Mexican institutions, no convenient faculty position existed. In each case an individual was named coordinator; but most of these individuals experienced an overload of responsibilities. Sustainability of the new exchange model, therefore, was threatened. Due to the position of most of the Mexican coordinators this exchange needs continuing financial support at the Mexican end. At any rate, a cadre of Mexican educators has gained experience in conducting youth exchanges.

Multiple evaluation approaches documented improvements in the knowledge, skills, and attitudes of participants. A simulation game was developed by Penn State faculty to teach the community development process to 4-H audiences. This game not only provided knowledge during orientation of participants but also helped youth gain community development skills by leading them through the planning process. The game was used again when the Mexican delegation arrived and met with their hosts to learn about the community development projects which they would collaboratively pursue in the U.S. Subsequent evaluation proved that participants learned the community development process from playing the game, then applied the knowledge to their community development activities.

The local community development projects provided experience in international community development with all of the accompanying differences in language and culture. Projects included large scale operations like the day camp in Monterrey for poorer neighborhood kids. In addition to the 46 participants in the Penn State/Monterrey team, this camp involved over 100 faculty and university students who planned and conducted the day camp for three weeks for approximately 3,000 campers from ages six to twelve. The camp was repeated in
1993 with similar numbers of participants involved.

At the other extreme were individual projects such as the U.S. high school student and her Mexican counterpart who organized and led a two-week workshop for inner-city youth in a "city parks and recreation" class on cross-cultural understanding through dance, drama, and food. They carried out their project alone with the only assistance coming from the local 4-H agent and an adult who volunteered to chaperon the Pennsylvania group to Mexico. In between those extremes were projects by county teams of four U.S. youth and four Mexican youth on environmental awareness, urban landscaping, constructing culture kits, and organizing mini-fairs and workshops on 4-H projects and Mexican culture.

Cost of the exchange was kept low. Some of the adult chaperons paid their entire airfare ($300-$600) and hosting expenses for their Mexican guests. Most of the youth paid half of the airfare. A few of the youth and chaperons had all fees paid by the grant. Ethnic and economic diversity of participants was achieved through recruitment and selection criteria which were enforced by the National 4-H Council in selecting the states to receive grants. These criteria were also used by some of the states in the selection of youth participants and chaperons. Even though Kellogg funding through the National 4-H Council ended after the 1993 exchange, four of the five partnerships planned exchanges for 1994.

Conclusions

The objectives set by the W. K. Kellogg Foundation as a condition for their grant were met. The pre- and post-assessments of participants documented changes in skills, knowledge, and attitudes related to Mexico, international issues, and community development. Focus group interviews of participants, upon their return, clearly indicated strengthened friendships between citizens of the two countries. The new youth exchange model developed addresses the weaknesses of previous youth exchange models. Lower income youth can afford this type of international experience. The model provides a much stronger non-formal educational opportunity without reducing any of the opportunities for informal learning. The educational aspects of the exchange are not allowed to be diluted by commercial (travel company) considerations. Development issues are directly addressed by bicultural teams who work on community development projects in both countries.

In an increasingly multi-cultural world, learning about other cultures and developing cross-cultural survival skills is a critical need for tomorrow's world citizens. International group exchanges for youth are one of the most effective means of multi-cultural education. The disadvantages of expense and lack of quality control must be overcome if these exchanges are to be made possible for all youth. This paper describes a systematic attempt to address the problems with current international youth exchanges and find a stronger model.

A model for a low-cost youth exchange was developed which is unique. This model can be easily duplicated at the state, county, or community level for exchange groups to international destinations. The funds provided by the grant can be replaced by local fund raising. More than 15 community development projects, which were planned and conducted by youth, were successfully piloted. Educational quality was maintained by careful selection and orientation of participants, by collaborative planning among U.S. and Mexican educators, and by providing one chaperon for every eight participants.

This youth exchange model also addresses important issues of cross-cultural communication, jobs, and marketing. The community development skills which youth learned are directly relevant to vocations and professions. Workers of all types need to be
aware of the global implications of their work and lives. Workers need to understanding the importance of planning (analyzing a complex situation, determining priorities, setting goals and objectives, assessing resources, writing a plan, implementing the plan, and evaluating the plan). Citizens of the world need to understand that they can contribute to the local, district, state, regional, national, and global communities, to which they belong, in a concrete way—-that they can make a difference individually and in groups.

These skills, knowledge, and attitudes are particularly important in Mexico and the United States at a time when Mexicans and U.S. citizens are exploring the implications of the "North American Free Trade Agreements." They are important world wide as conditions constantly change—-as new problems and opportunities continually emerge.

Finally, global citizenship through 4-H, FFA, and other non-formal educational programs for youth must continue to receive support from the organizations and institutions on which they depend. Economic difficulties mean that educational institutions will cut programs. They must have models of successful programs which can address the long term economic pressures. Otherwise they may eliminate the very programs that provide the long term solutions to the short term economic pressures.
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