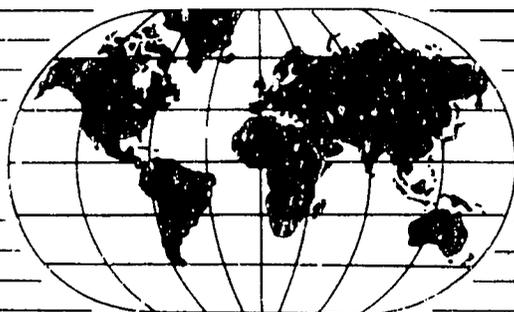


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Professional Papers Presented
at the First Annual Meeting
of the Association for
International Agricultural Education

National 4-H Center
Chevy Chase, Maryland
April 26, 1985



Association for International Agricultural Education. . .
a professional association committed to strengthening
agricultural and extension education programs and
institutions in developing countries

A REPORT ON THE FIRST ANNUAL MEETING OF THE ASSOCIATION
FOR INTERNATIONAL AGRICULTURAL EDUCATION (AIAE)

An Executive Board Report,
Association for International Agricultural Education

The Association for International Agricultural Education held its first annual meeting at the National 4-H Center in Chevy Chase, Maryland on April 24-26, 1985. Fifty-nine agricultural educators and related international development specialists participated in the two-day conference. The participants represented 20 U.S. universities, five developing countries (Cameroon, Egypt, Iraq, South Korea, and Venezuela), the U.S. Agency for International Development, the World Bank, the U.S. Department of Agriculture, and two private consulting firms.

The conference program featured a one-half day workshop on AID procedures, an update of AID projects and activities in agricultural education and rural development, a presentation of professional papers session, and an AIAE annual business meeting. Nineteen professional papers were presented and discussed in three concurrent sessions. A limited number of 1985 AIAE Conference Proceedings (primarily professional papers presented) have been assembled for sale and distribution. Individuals wishing to purchase a set of Proceedings should send a check or money order for \$7.50, payable to the Agricultural Education Program, University of Massachusetts, to: William L. Thuemmel, Agricultural Education, 431 Hills House North, University of Massachusetts, Amherst, MA 01003.

According to evaluations completed by conference participants, the overall program was rated as a very successful and worthwhile event. Plans are being made to hold a similar conference in the Washington, D.C. area during spring of 1986. AIAE officers and executive board members for 1985-86 are as listed:

Officers

Chairperson - William L. Thuemmel, University of Massachusetts
Vice Chairperson - David J. Riley, Sam Houston State University
Secretary-Treasurer - Lennie H. Gamage, Future Farmers of America

Executive Board Members

Janet L. Henderson, Ohio State University
O. Donald Meaders, Michigan State University
Hugh F. Rouk, Oklahoma State University
Burton E. Swanson, University of Illinois

The new AIAE membership year begins on July 1, 1985. Membership dues for 1985-86 will remain at the following rates: regular members, \$10; international members, \$5; student members, \$3; and honorary members, no fee. Further information about AIAE can be obtained by contacting any of the Association's officers or executive board members. The next open business meeting of the Association for International Agricultural Education will be held from 12:30 to 2:30 P.M. on Saturday, December 7, 1985 in conjunction with the Annual American Vocational Association Convention in Atlanta, Georgia.

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OFFICIAL PROGRAM

FIRST ANNUAL MEETING OF THE ASSOCIATION FOR
INTERNATIONAL AGRICULTURAL EDUCATION (AIAE)

April 24-26, 1985
National 4-H Center
Chevy Chase, Maryland

Conference Chairperson: Burton E. Swanson, University of Illinois
Program Chairperson: William L. Thuemmel, University of Massachusetts

Wednesday, April 24, 1985

3:00-5:00 P.M. Registration (Colorado Room)

5:00-8:30 P.M. Reception--Dinner--Keynote Address (Washington Room)

Chairperson: Burton E. Swanson, University of Illinois

Speaker: Cynthia S. Perry, Chief, Education and Human Resources Development Division, Office of Technical Resources, Bureau for Africa, USAID

Topic: Planning for University Development in Africa

Thursday, April 25, 1985

8:30-9:45 A.M. AID Procedures Workshop (Colorado Room)

Coordinator: Kenneth Alan Smith, Acting Coordinator, International Development Management Center, College of Agriculture and Life Sciences, University of Maryland

9:45-10:15 A.M. Refreshment Break

10:15-12:00 M. AID Procedures Workshop Continued

12:00-1:15 P.M. Lunch

1:15-4:40 P.M. AID Projects and Activities: Opportunities for Agricultural Educators (Colorado Room)

Moderator: William L. Thuemmel, University of Massachusetts

30 minutes Speaker: Edna L. McBreen, Agricultural Education Officer, Education and Human Resources Development Division, Office of Technical Resources, Bureau for Africa, USAID

- 30 minutes Speaker: John R. Shields, BIFAD Staff Analyst, Country Programs Division, Board for International Food and Agricultural Development, USAID
- 20 minutes Speaker: Thomas L. Wilson, Agricultural Development Officer, Agriculture and Rural Development Division, Office of Technical Resources, Bureau for Asia, USAID
- 2:35-3:00 P.M. Refreshment Break
- 20 minutes Speaker: Dwight Steen, Deputy Chief, Rural Development Division, Office of Development Resources, Bureau for Latin America and the Caribbean, USAID
- 20 minutes Speaker: Wilbur G. Thomas, Chief, Agricultural Development Division, Office of Technical Support, Bureau for Near East, USAID
- 20 minutes Speaker: Harlan Davis, Deputy Director, Office of Agriculture, Bureau for Science and Technology, USAID
- 20 minutes Speaker: Anthony Meyer, International Communications Specialist, Office of Education, Bureau for Science and Technology, USAID
- 20 minutes Moderator's Summary
- 6:30-8:30 P.M. Reception--Dinner--Keynote Address (Washington Room)
- Chairperson: Burton E. Swanson, University of Illinois
- Speaker: Charles J. Maguire, Senior Training Specialist, World Bank
- Topic: Agricultural Education and the World Bank

Friday, April 26, 1985

- 8:00-8:15 A.M. Presentation of Professional Papers (Colorado Room)
- Chairperson: William L. Thuemmel, University of Massachusetts
- Topic: Orientation and Introductions
- 8:15-9:45 A.M. Concurrent Session A: Agricultural Schooling/Extension Education (Colorado Room A)
- Chairperson: Robert E. Julian, University of Wyoming
- Facilitator: Janet L. Henderson, Ohio State University
- Discussant: O. Donald Meaders, Michigan State University

- 20 minutes Speaker: Martin B. McMillion, Virginia Polytechnic Institute and State University
- Topic I: Agricultural Development for Whom?
- 20 minutes Speakers: Gilbert A. Long and Gordon L. Beckstrand, Utah State University
- Topic II: A Training Program for Extension Agent Participation in Farming Systems Research
- 20 minutes Speakers: Joyce Endeley and James A. Knight, Ohio State University
- Topic III: The Effect of Colonization on Rural Women in Africa and the Implications this Presents for Agricultural Education
- 9:45-10:15 A.M. Refreshment Break
- 10:15-11:45 A.M. Concurrent Session B Continued
- 20 minutes Speaker: Young Joo Kim, Oklahoma State University
- Topic IV: Strategies for Effective Dissemination of Research Findings from International Agricultural Research Centers as Perceived by Center Staff and by International Students at Oklahoma State University ✓
- 20 minutes Speakers: Terry Hardt, USAID/Khartoum and Brian D'Silva, USDA/Washington
- Topic V: Relationship Between Research, Extension, and the Adoption of Innovations in African Agriculture: Lessons from Nigeria, Sudan, and Zaire ✓
- 20 minutes Speaker: Richard W. Tenney, Cornell University
- Topic VI: Rural Youth--Key to Agricultural Technology Transfer
- 8:15-9:45 A.M. Concurrent Session C: Educational Programs on U.S. Campuses/ Meeting Developing Country Needs
(Washington Room)
- Chairperson: Hugh F. Rouk, Oklahoma State University
- Facilitator: William B. Richardson, Louisiana State University
- Discussant: Clifford L. Nelson, University of Maryland
- 20 minutes Speaker: Maurice P. Hartley, Rutgers University
- Topic I: New Partnerships Between U.S. Universities, International Agricultural Research Centers, and National Institutions in Less Developed Countries: A Research and Training Model

Universal Principles of Extension

by Norman E. Tooker
University of Nebraska-Lincoln

The purpose of this paper is to focus attention on problems of Extension programs in developing countries and to propose principles which must be adhered to if Extension is to be successful whether it be in developing countries or elsewhere.

Most people who are familiar with the Extension Service programs as they have been conducted in the United States over the past half century or more would agree that the Extension Service has been a successful means of transferring new technology to rural people. However, in many cases in developing countries, Extension efforts have been considered to be less than successful in far too many cases.

One might ask several questions relating to Extension programs in developing countries:

- 1) Why have they not been successful in many cases?
- 2) Where Extension programs have been successful in developing countries, why have they been successful?
- 3) What principles must be adhered to if Extension programs are to be successful under any setting whether it be in a developing country or a country which has already reached a high level of development?
- 4) Are these principles the same as those which have been used in successful Extension programs in the United States?

Many people say that Extension programs as we know them in the United States cannot be transplanted into developing countries and be successful. Perhaps we must look beneath the veneer of expensive audio-visual presentations and multi-color bulletins to see successful Extension programs. If Extension in developing countries is to reach the goals for which it is charged -- to improve the way of life of its target audiences, we must identify and adhere to basic principles or concepts.

Educational Importance: The need for increased success in development programs in Africa and other developing areas of the world is well documented. Many millions of dollars will be spent in the next few years on development programs in agriculture in the less developed countries. Many of these programs will involve Agricultural Education and Extension programs. Furthermore, important decisions about Extension having great impact on rural people in developing countries will be made by officials, both American and indigenous country nationals, who are perhaps not totally familiar with the workings of Extension programs.

It is the purpose of this paper to set forth these Extension principles so that they can be readily brought, in concise form, to the

attention of people who will be making decisions about Extension programs in developing countries. It is important that sound decisions be made about Extension programs because of the large sums of money that will be spent on those programs, but more important, it is imperative that Extension programs be successful in helping solve problems in the developing nations. Indeed, there is danger that the entire concept of Extension education might be abandoned if the programs are not successful, and a great tool for development of rural people could go unused by developing nations.

Principles to be Addressed: Perhaps the two most important keys to Extension success were best expressed by Dr. Douglas Ensminger when he was asked why many Extension programs in developing countries were not as successful as they could be. Dr. Ensminger's reply was, "Extension programs in developing countries have not been successful in many cases primarily because those in charge of the programs did not go high enough and they did not go low enough." (2)

1. Start High. Those who are organizing Extension programs need to go to the top levels of government to get support and backing. If that support is not present and adequate funding is not available, Extension programs cannot be successful. Dr. Nyherere of Tanzania stated that "tackling the problem of poverty in the world is first and foremost a matter of political will and determination --- but the question is --- not whether there should be changes in the present economic situation, changes will come one way or another, the questions is when, how, they will be brought about." Dr. Nyherere predicted that "if changes that are to alleviate the plight of the poor do not come from the established political leadership and institutions, they will surely come from the people who have been denied an opportunity to earn a living and to live free from the fear of hunger." (4, p.vi)

With positive changes in policy, adequate and enthusiastic support by upper levels of governments, and proper involvement of the people on the land in helping to develop their own educational programs, the inevitable changes that are to occur can take place in an orderly and constructive way.

2. Go Low Enough. Extension workers need to go to the grassroots level to get problems identified. To begin to plan extension programs they need to build from the ground up, then it becomes the people's program. The people themselves are more enthusiastic and can identify more precisely the problems facing them than any outside person regardless of their educational level. Good programs start with involving people in the task of identifying problems. If one considers Maslow's "hierarchy of needs," it is logical that as people's basic needs for food and self-preservation are met, other higher needs need to be met also. Being involved in the determination of one's own destiny, relating to others, and pursuing greater dreams are important. These higher needs can be met by involving people in

helping to determine their own problems and felt needs. Local opinions reflect the customs, successes and problems as perceived by those affected most, the local people.

"In most developing countries two nations clearly are emerging within a single nation. With few exceptions the policies and development strategies followed by the developing countries have contributed to the emergence of an elitist culture alongside a culture of poverty." (4, p.vii)

3. Subject Matter Should Be Research-Based. The technical subject matter being transferred to the farmers of developing countries, as in the more developed countries, must be based on research. That research can be basic research, applied research, library research, yes, even research borrowed from a neighboring country, provided it is totally relevant to the indigenous situation. It is important that the technology being transferred be research-based, but it is also equally important that that research be totally relevant to the local conditions. There is much research in the libraries that may be totally irrelevant to situations in developing countries (10). While it is important that the subject matter be research-based, one must not ignore time-tested and proven local customs and methods of production. The introduction of change must be studied in light of all the possible ripple effects that can result from that change. Local methods of production many times rest on fragile economic and ecological balances.
4. Start Where the People Are. It is important that Extension workers become clientele-oriented. Extension workers must begin at the clientele levels of sophistication considering the needs, local organization, economic viability, and considering the expertise of the Extension worker himself or herself (1, p.10). One must fully understand the local methods of production, resources and constraints and successes before one can move ahead in the task of helping farmers adopt new technology. Such observations can also provide valuable feedback to researchers so that research can be more precisely designed to meet local needs.
5. Extension Workers With Appropriate Background. It is important that Extension workers have backgrounds appropriate to the communities in which they work. They must know and understand their clientele and clientele's problems. They must be people with whom the clientele can relate comfortably.

The Extension worker does not necessarily need to be indigenous to the community in which he/she works, but must be able to earn the trust and respect of the local clientele. Witness the thousands of success stories of Peace Corps volunteers who came halfway around the world from ethnic, racial or cultural backgrounds very different from their clientele's background to carry on successful development projects. At the same time one must recognize that within developing

countries there may be ethnic or tribal differences scarcely recognizable by outsiders, but very real to local clientele. These differences need to be recognized and considered in selecting Extension workers.

It is appropriate that the Extension worker live within the community in which he or she works, or have the mobility to allow them to visit the cooperating communities easily.

6. Seek Out and Harness Local Leadership. In every community there are individuals to whom others in the community look for leadership. These have been commonly called "opinion leaders." They should be used both in planning Extension programs and in carrying out those programs. Appropriate and proper use of the local leadership can make for successful Extension programs. Ignoring these "opinion leaders" may in fact be the reason for failure of some programs. Much more could be said about this topic, but the basic important concept is that local leadership needs to be brought in to the planning process and be involved in carrying out Extension programs if development projects are to be successful.

7. Measure Results - Evaluate Periodically. It is important that appropriate evaluation take place at the beginning of Extension programs and periodically, perhaps annually thereafter. Such evaluation can serve many useful purposes such as:
 - Become a mile-marker to measure against in the future evaluations.
 - Measure the progress of the Extension programs.
 - Monitor Extension employees and their accomplishments and give those employees a feeling of accomplishment.
 - Become a record for future historical purposes.

Such evaluation can include progress in production levels, income improvement, observed improvements - such as improvements in health, improvements in buildings or facilities, and observation of cooperator attitudes and comments.

8. Report Results Periodically. The results of Extension programs need to be reported and recorded periodically. The reports might include the measure of results enumerated above and should be made available to:
 - The recipients of the program, the local farmers and families who are involved in the Extension program, so that they can have the feeling of accomplishment and the feeling of progress. This helps them to adopt new practices that have been successful and to be in a better position to help in planning new programs in their community.
 - Reports should go to top level officials so that they can see the

results taking place in the rural areas. Such reports might include tours of success projects by top-level officials. The composit of many small local accomplishments add up to large accomplishments nationwide.

- Reports should go to the Extension workers at all levels so that the Extension workers can have a feeling of success and accomplishment, and it also serves as a monitor at all levels as to the progress of the Extension program. This, too, can be of assistance in helping to plan future programs and needed research.

9. Use Demonstration Methods. Demonstration methods in all their variations must be used in presenting new technology to farmers. These might include actual demonstrations of "how to," or practice in developing new skills, the layout of demonstration plots, the use of tours, and the use of demonstrations followed by actual participation by the cooperators. This method of involving people in helping people to help themselves is more apt to make use of all of their senses and enhance their learning and eventual adoption of new technology. The concept of "teach and visit" used successfully in the Philippines is one variation of the use of the demonstration method.

Use Extension Methods In Various Combinations to Deliver Programs

- Extension workers must be trained in the use of teaching techniques, audio-visual use, and outreach techniques. They must understand the adoption process and be able to plan their outreach programs accordingly.

A Rogers study quoted by Fliegel indicates that the most important predictor of success of village programs was the extent of change agent effort. Active outreach is critical. Second, the change agents orientation to local needs was important. And last, credibility of the information presented by the change agent was highly important, and farmers attach highest credibility to result demonstrations (4, p.7).

Extension workers at all levels must understand the place of mass media in an Extension program. Mass media can create awareness and play an important role in the diffusion process but is not the only answer to persuading farmers to adopt new technology. It is only one of the tools an Extension worker needs in "his/her bag of tricks" for carrying out Extension education at the farmer level.

"Change agents who take the initiative to reach farmers, who are sensitive to farmers' needs, and who can demonstrate improved technology that fits farmers' needs, will be successful in persuading farmers to change. The bottom line is not either the improved technology or the well-organized extension-teaching effort, but both." (Fliegel, 1, p.7).

10. Build In a Reward and Recognition System. A reward and recognition system is necessary for both the Extension workers, and for their clientele. For the Extension worker, recognition can include an opportunity to share their successes in written form or verbally with their co-workers or superiors. The Extension Service in the Gambia, for example, publishes a monthly newsletter containing success stories written by field staff. This affords an opportunity to share successes but also serves as a form of recognition for the authors. Recognition can also take the form of promotions, pay incentives, opportunities for further study or many other positive support methods.

Clientele also need to be recognized for their successes, leadership, and cooperation. Recognition can be for individuals or communities, and can take many forms, but it is a valuable and necessary incentive in the adoption of change, and often overlooked.

The modern look to administration includes the involvement of lower echelons of workers in the planning process, decentralization of decision making, and encouragement of two-way communication. The development of such management organizations (MOs) can enhance worker and participant satisfaction and effectiveness. Fully operational MOs do not exist in the agricultural agencies of most LDC governments (1, p.28). Management By Results (MBR) needs to be encouraged because of the overall effectiveness and efficiency of the organization, but also for the satisfaction and encouragement that can accrue to the workers and participants. A fully operational MO makes use of rewards and recognition as positive incentives in every day operation.

11. Incorporate Adequate Pre-Service and In-Service Training for All Extension Staff - Extension staff members at all levels need to have adequate and appropriate technical training. Those working directly with farmers need to be able to advise farmers on the farmers' total "system" needs (1, p.29). Indeed, they must be able to work as generalists to meet the needs of their clientele (7, p.5). The "Teach and Visit" system has been used successfully in some settings to help Extension workers keep abreast and learn appropriate new technology.

Extension specialists need to be trained in more detail in more narrow fields to serve as advisors in special skill areas. Continuous staff "inservice training" is essential to keep extension workers in a "continuous improvement" state so that they can continue to meet the increasing needs of their clientele.

We often hear about "technology transfer systems" as being synonymous with Extension programs, but the transfer of technology is not enough, we have to be concerned with and bring about social changes as well. In a recent talk by A.I.D. Administrator McPherson, he stated,

"...we cannot narrowly define education as that which takes place in a classroom, or a health clinic ... or even in a rice field when new technologies pass from our hands to theirs."

"Education and training is gained by exposure to a whole spectrum of both technological and social advances. It is, after all, people who shape societies and energize a nation's future." (9).

While the acquisition and continuous improvement of technical knowledge is important for the Extension worker, it is important that they also become equally skilled in bringing about social change. They need to be able to view in a broader sense the farmer's needs as well as those of his or her family and community (6, p.5).

12. Cooperation and Coordination With Other Agencies and Organizations .

While the involvement of other agencies, community organizations and social structures has long been used as an Extension program delivery technique in the United States, it perhaps is more than a technique. It is a necessary ingredient that can help make efficient use of available resources and bring those resources to bear on difficult development problems. Such cooperation and coordination ranges all the way from interrelationships between international funding agencies, governments, in-country agencies and private sector organizations, to involvement of local groups and leadership as decision makers and opinion leaders. The involvement of local groups and individuals in the program planning process is but one aspect of this principle.

Perhaps the most important relationship which needs to be cultivated in developing countries is a close working relationship between Extension and agricultural research organizations. In most LDCs these two entities exist in separate governmental agencies or even in separate ministries. How a close working relationship between research and extension could be fostered may vary considerably from one country to another. Management structures for such coordination do not exist in most LDCs (1, p.28). Indeed, in many developing countries the organizational structure of agencies tends to arise from a patronistic order or a "top down" structure (1, p.24).

"Initial attempts to modernize such self-serving organizations result in administrative organizations, but these still operate from a patronistic legacy, and are characterized by intense inter-agency rivalry and empire building." (1, p.24).

The development of positive and complementary interaction between extension and research organizations in some situations may take time, but is a necessary condition for efficient and effective technology transfer and development.

13. Regulation and Education Must Be Separated. The extension worker who must work closely with the farmer and gain the respect and confidence of the farmer must not also be charged with the responsibility of enforcing government regulations or the distribution of credit or supplies.

Developing countries need to set up a knowledge base and invest money in a system closely tied to it, and protect that system from political influences and other governmental tasks that can cause it to lose credibility (1, p.12).

"... knowledge transfer is basically an educational job, and an educational relationship is fragile. It must be built upon a hard-earned reputation of being a reliable source of information, and this can be destroyed easily." (1, p.12).

It is important to remove from the extension service in any country as much of the service-oriented activity and the tasks of providing direct agricultural inputs as possible (1, p.11).

In short, the extension worker's role is to educate not regulate.

14. Be Satisfied With Many Tiny Successes. In many cases Extension programs in developing countries have been viewed as "not successful." Perhaps one of Extension's greatest problems has been the result of unrealistic expectations. (1, p.9). Whorton states that we "know how to harness the creative and inventive forces of science and technology but have not been fully successful in technology diffusion ..." (1, p.6). In many cases Extension programs have been successful, only to decline after the sponsoring agency project is terminated. Some donor agencies used a "quick fix" approach to development with short term (three to five years) crash projects. (1, p.22). Were the expectations for quick and large successes unrealistic? Hickman, as quoted by Watts and Claar, states:

"Again and again in Bolivia, Peru, and Ecuador, I saw the projects with 'little people' working. When it is 'my cow' or 'my pig,' the care is great, the results are good. When it is a big project at a university, no one seems to care. I watched the faces of almost 100 campesino farmers in Bolivia as they organized their own association, elected their officers, debated their by-laws and employed their director. They represented 980 others. Their pride was obvious." (1, p.6).

Success for Extension programs needs to be measured as many small successes at the farmer level rather than as the final answer to a grandiose overall cure-all program. A few little pills swallowed is better than a big pill spit out (8).

Perhaps more realistic time frames and expectations need to be considered. Ensminger indicates that it is necessary to understand

the actual span of time required as well as the actual process involved in transforming traditional societies. He further indicates that such change may take three generations (4, p.101).

Some educators indicate that the best time for change is "between generations." Others challenge that by saying, "Yes, but we cannot ignore the current generation -- we must change them too."

15. Involve Both Men and Women. Most development programs in Less Developed Countries have been conducted by men for men, and have not made special efforts to reach women. Women, in most developing countries, make substantial contributions of time, money, and expertise to raising food (11). They need greater access to Extension services and training, agricultural inputs such as affordable credit, and reliable land rights. African women, for example, contribute up to 80 percent of all farm labor, manage one third of the farms, and tend virtually all of the kitchen gardens, yet they are often excluded from agricultural aid.

"Sudanese women, who do much of the agricultural field work, are unlikely ever to have seen a governmental rural extension agent, most of whom are men." (7).

It is not acceptable in many cultures for men Extension workers to communicate with women farmers. Women, therefore, have received little of the Extension program benefits accorded to men. In many communities there is an outmigration of men who take employment in other areas, leaving the women to do the farming (5).

Women in rural areas are potentially the most valuable resource for planning and implementing rural development programs such as agriculture, health, family planning, nutrition and quality of life. As they become more involved in planning and implementing such programs they will have a more direct concern for the quality of rural life (4, p.92).

It would seem appropriate to make a greater effort to train and use more women in agricultural Extension programs as Extension workers. To use women Extension workers to reach women farmers would provide a greater "pay off" in technology transfer and social change than has been realized in past development programs.

Extension programs in the United States have involved women as committee members, in the planning process and as program participants from the very beginning of Extension work. Perhaps that has been an important factor in the success of Extension as we know it in this country today.

CONCLUSION AND RECOMMENDATIONS. The literature contains much to support these fifteen principles of Extension as being sound approaches to conducting Extension programs. In view of sporadic or questionable past successes of Extension programs in developing countries, and in anticipation of greater future expenditures for development programs, it is important that these principles be further refined and understood by those who fund and initiate new development programs.

Claar and Watts state:

"Perhaps most critical of all is the need for developing nations and donor agencies to recognize that extension, even though it is dealing with largely illiterate people, is a sophisticated function that must be very carefully designed and operated. Personal contact, credibility, access, the use of demonstration method, and a clientele-oriented approach are all conditions noted by Rogers to explain success differentials in extension approaches. Favorable circumstances can be set up by careful organization and management, but they are fragile and can be easily destroyed by ignoring the principles that underlie such relationships." (1, p.13).

No claim is being made that these fifteen proposed Universal Principles of Extension are a final and complete list, or that they are stated in final form, but I do contend that these principles must not be ignored if Extension programs are to be successful in the transfer of technology or in bringing about social change whether it be in a developing country setting or elsewhere. They perhaps need to be discussed, debated and polished into a final form.

I am not proposing that Extension Programs as they are conducted in the United States be transplanted intact to developing countries. But I do contend that if these fifteen principles are each put to their best use, an Extension program has a very high probability of being successful. The in-country methods of observing each of these underlying principles is what will make each Extension program unique. Each Extension program can be tailored to local needs and still be in step with these principles.

It would seem to this writer that if donor agencies such as U.S.A.I.D., The World Bank, FAO, and private foundations are to pour billions of dollars into development programs, some of which include Extension-type programs, that it behooves all of us, especially those in international programs work with universities, to perfect the underlying principles of Extension, to make them known to development officials, and to put them to use in the design and implementation of Extension programs in developing countries. Programs observing these principles need to be carried out in concert with input from in-country governmental and Extension officials.

"It is critical that...initial...efforts with greater extension involvement be successful." (1, p.39).

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ASSESSMENT OF PROFESSIONAL COMPETENCIES NEEDED BY
EXTENSION AGENTS IN DEVELOPING COUNTRIES:
CASE STUDY IN SWAZILAND*

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Ministry of Agriculture and Cooperatives, Pennsylvania
State University, Tennessee State University, and USAID.

INTRODUCTION

Only a limited number of developing countries have made any noticeable progress in increasing agricultural production (Byrnes, 1972). After 14 years of rural development and millions of Emalangeni* (E), Swaziland has barely reached the limited few (Hunting Technical Services Limited [HTS], 1983). Although rural development has enhanced the living conditions of rural Swazis, farm production data show no appreciable per land unit increases during the last 14 years (Consortium for International Development [CID], 1983; HTS, 1983). This, even though the Agricultural Extension Service has been expanded and strengthened in both manpower and training. However, the Government of Swaziland (GOS) remains committed to making the Agricultural Extension Service the primary transfer agency of technical agriculture and family living information. Thus, Swaziland's future as a developed, self-sufficient nation is directly tied to the effectiveness of the Agricultural Extension Service.

Getting farmers to adopt new technology has been primarily an educational goal requiring instructional techniques rather than promotion, advocacy, and persuasion (Byrnes, 1972). The aim of all extension workers has been to teach people living in rural areas how to raise their standard of living through their own efforts, using their own resources of manpower and materials with minimum assistance from the government (Savile, 1965).

Education has been briefly defined as the process by which desirable changes are produced in people's behavior (Bradfield, 1966). If technical production/ family living information leading to the enhancement of one's well-being were available, that information has to be presented in a way that the clientele would accept, if positive behavioral change was to result. Educational, cultural, and social barriers must be understood, respected, and surmounted for change to occur (Bradfield, 1966). Knowledge of technical information was of vital importance, but without the ability to convey that technical information to the farmer or homestead family, time, investment, and the knowledge itself were lost. The purpose of this study was to determine the professional competencies needed by Extension Agents (Workers) in Swaziland with implications for sub-Saharan Africa.

LITERATURE REVIEW

Review of recent literature on extension training in Swaziland and the Sub-Saharan Africa illustrated the need

*Monetary unit of the Kingdom of Swaziland. E1 (one Emalangeni) equals approximately \$.60 (sixty U.S. cents).

and provided guidance for the the study. A baseline survey (Easter, 1983) conducted in late 1982 found that skills, knowledge, and attitudes in methodology were weak, not competence in technical subject matter. The findings did

not infer that training in technical subject matter should be excluded, but that the performance of the Extension Service was lessened due to the inability of the Extension Workers to convey the knowledge they had. This was further reinforced by the Rural Development Areas Programme (RDAF) evaluations in 1983 (CID, 1983; HTS, 1983).

Results of the 1984 Agricultural Extension Training Needs Survey (Easter, 1984, February) reported the perceived inservice training needs of the Service's frontline supervisors and agents. Both groups were asked to prioritize their technical (subject matter) and professional (extension methodology) training needs. Response to the need for technical training was predictably strong, as was the very strong request for methodology. Of 150 specific training needs listed, 16 supervisors requested extension methodology needs 79 (53%) times and technical agriculture 71 (47%) times. Of the 710 specific training needs listed by 83 frontline generalist agents, 505 (71%) requests were for technical and 205 (29%) for extension methodology. Both supervisors and frontline agents recognized the need for a technical base and being able to effectively convey that technical message to clientele. These findings were further supported by the planning seminar for Phase III of Swaziland RDAF in March, 1984 (Government of Swaziland, 1984). Seminar participants concluded that (p. 32) "present graduates of extension preservice training lack adequate training in extension methodology". The seminar was conducted for and by higher eschelon administrative extension staff. The need for professional competence was recognized at all levels.

The identification of professional extension competencies as a basis for designing preservice and/or inservice programs had an extensive base in the United States (Gonzalez, 1982). Significant studies by Beeman, Cheek, McGhee and Gryotis (1979) and Gonzalez (1982) were conducted in Florida and Pennsylvania, respectively.

Internationally, many had approached the question of professional competence (Al-Zaidi, 1979; Boonruang, 1973; Karami, 1979; Sabihi, 1978; Smitananda, 1958; Umahak, 1980), but only Ayewoh (1983) and Ongondo (1984) have directly addressed the issue. Ayewoh (1983) assessed the professional extension competencies needed by extension agents in the Bendel State of Nigeria. He asked a combined stratified and clustered random sample of extension agents how they perceived 61 selected professional competencies on degree of need, who would benefit the most, and when the competency should be learned. He found that all extension

personnel perceived that the clientele would benefit from the extension agents competence in administration and supervision, program planning, program execution, program evaluation, communication, and understanding human behavior. It was apparent to Ayewoh (p. 107) "that professional competency training programs designed for the intellectual and professional growth of the extension agents would benefit both the organization and clientele." He recommended (p. 108) "that appropriate and practical instructional materials and behavioral objectives should be developed and/or adapted for the 59 competencies identified in the study for use in institutions preparing extension personnel."

Ongondo's (1984) study identified and verified the professional competencies needed by intermediate agricultural extension personnel in Kenya. Respondents to Ongondo's questionnaire rated 97.8 percent of the identified professional competencies as being of "high importance" in the operation of a successful agricultural extension program (p. 150). Ongondo interpreted the "high" ratings as an indication of extension personnels' concern for improving agents expertise in extension methodology. He recommended the competencies identified be included in the curriculum of Kenya's extension preservice and inservice training faculties. He further recommended that such training programs should emphasize the practical application of the competencies to be learned.

METHODOLOGY

The target population of this study consisted of local extension workers, local extension supervisors, and district/national staff in the Swaziland Ministry of Agriculture and Coopertives. Because it was impossible to draw a random sample at the time of the study, data collection meetings were conducted that in effect surveyed the entire population.

There were 192 useable questionnaires completed representing a total of 375 (determined after data collection) extension personnel. Useable questionnaires completed by local extension workers represented 50 percent of the total population; 72 percent for local extension supervisors; and 32 percent for district/national staff.

Because there was no mailing list available and finance records did not connect pay grade to position, no random sample could be identified. It was further deemed impossible to obtain any appreciable return from a mailed questionnaire. This in part because of irregular mail service and, more importantly, the small liklihood of the extension personnel to voluntarily receive, complete, and return a mailed form of any kind. Alternatively, all extension personnel (local agents, local supervisors, and

district/national staff) were requested by the Senior Agricultural Officer to attend a Training Data Collection meeting in their area. Eighteen meetings were conducted throughout Swaziland.

A limitation with data collection and in verifying that the sampled population did in fact represent actual population was the lack of follow-up of non-respondents. As there was no list of extension personnel to draw a random sample from, there was no list to check the actual respondents against. This, combined with a once in 150 year cyclone (hurricane), that immobilized the nation, kept the researcher from completing a follow-up of non-respondents.

A "closed form" questionnaire was developed to obtain information needed. Because the study was a part of a broader departmental endeavor, the questionnaire reflected continuity with Gonzalez's questionnaire (1982). The basic format and terminology was modified and adapted to Swaziland. Besides biographical data, the 151 professional competencies sequenced within nine categories: administration, program planning, program execution, teaching, communication, understanding human behavior, maintaining professionalism, evaluation, and 4-S youth were evaluated.

A Likert-type scale of 1 to 5 was used. One (1) denoted that a competency "did not apply", while two (2) through (5) represented a scale from "low" to "very high" value regarding the respondent's need to perform the competency in his/her present position. Secondly, respondents indicated whether the competency should be learned through preservice or inservice training. Space was provided for additional professional competencies, not found in the questionnaire, to be noted and rated. Written and oral instructions for completing each section were provided. The instrument was validated in Swaziland and backed with data of Ayewoh's (1983), Gonzalez's (1982), and Ongondo's (1984) studies.

FINDINGS

Findings from the surveyed demographic characteristics showed that the Swaziland Agricultural Extension Service was a young service; 78.9 percent of the personnel were between the ages of 20 and 34 years. Personnel were predominantly male (68.6), with women representing 31.4 percent. The majority (68.6 percent) of extension personnel held the Certificate as their highest level of education attained. The majority, 83.2 percent, of the staff spent their youth on a rural homestead.

Because 4-S was a relatively new program, nearly all (97.3 percent) of the respondents lacked any experience

with 4-5. Concurrently, 82.4 percent responded that they devoted less than 25 percent of their time working with 4-5.

Over one-half (55.9 percent) of the extension force were "frontline" personnel, and 14.6 percent were frontline supervisors. In congruence with what one would find in a relatively "young" extension service, 54.8 percent had less than five years of extension experience. When the group with 5-7 years of experience was included, nearly three-quarters (73.6 percent) had less than eight years of experience. Concurrently, 82.3 percent had been in their present extension position five years or less.

As expected, 61.2 percent of the respondents were stationed in RDAs. With increased resources from every sector, manpower or infrastructural, the RDAs were at the forefront in the development of Swaziland, and the agricultural Extension Service was the major component in that development effort.

Some type of previous work experience was prevalent among the extension work force. Approximately one-half (43.5 %) of the respondents had previous agricultural work experience. The majority, 56.4 percent noted previous non-agricultural work experience. Most of the experience was less than one year in duration.

With two years in the Swaziland Agricultural Extension Service, the investigator found respondents ratings of the professional extension competencies predictable. With understanding of the job responsibilities of the different positions, respondents perceptions as to the value of the various competencies was consistent with the duties of their positions, age groups, and duty stations. Competencies that were being highlighted in inservice training during the researcher's tenure, tended to be valued equally high on the questionnaire.

Hypothesis 1 examined perceived differences among the competencies between district/national staff, local supervisors and local agents. As might be expected local agents rated many administrative competencies lower than district/national staff and local supervisors. Having less administrative responsibilities, local agents rated only 20 percent of the administrative competencies as being of "moderate" to "high" value in their present position.

An indicator of the extension staff's concern for improving their overall program was evident in their responses to program planning and execution. All program planning competencies were scored as being of "moderate" and "high" value. All respondents highly rated competencies that effected the organization of daily, weekly, monthly, and annual activities. Program execution scores reflected traditional roles of the different

positions. Completing monthly/annual reports, using techniques to effect change, and conducting farm visits were rated with "high" value by all three groups. Only competencies relating to the assignment and arrangement of transportation were substantially lower.

Teaching competencies represented the instructional techniques used by the Swaziland Extension Service personnel. During the researcher's tenure in Swaziland, group discussions (method demonstrations), meetings, seminars, and field days (or trips) represented the primary techniques utilized. Teaching competencies were rated higher by the frontline (local) staff and local agents than the district/national staff. With their work on the frontline with farmers and farm families, teaching plays a significant role in the daily activities of the frontline staff.

Communication competency ratings revealed a tendency for extension personnel to rate the more personal (face to face) skills higher. Communications among staff, writing messages, and speaking to individuals or groups, were scored at greater values than those those skills less personal in nature. Overall, the local agents rated most of the communication competencies of moderate value. An observation of technological progress was noted with "use of the telephone". Extension personnel with access to a phone continually rated its value higher than those without access.

Understanding human behavior scores, from the researcher's experience, were highly representative of the Swazi culture. When dealing with human behavior, the culture is very considerate, conscious, and moral. Tremendous patience is offered in respecting and understanding the actions of another. All competencies were rated of "moderate" to "high" value with no substantial differences between the three personnel groups.

Scored "low" to "moderate" in value, maintaining professionalism competencies were characteristically scored higher by the district/national staff and local supervisors than the local agents. Evaluation competencies were rated "moderate" in value overall. Because 4-S was relatively young in Swaziland and had been the responsibility of specialists only, personnel rated 4-S competencies "low".

Hypothesis 2 examined the competencies for differences by selected demographic characteristics between program areas of responsibility. Agriculture and home economics extension personnel consistently rated the competencies higher than community development extension personnel. When one reviews the limited preservice training (a four-month adhoc training course instead of the formal one-, two-, or four-year courses of study required of

agriculturalists and home economists) available for personnel in community development, the lower ratings of community development personnel were understandable. Between years of experience and among age groups there were no significant differences in the ratings of the competencies. Between sexes, males rated all competency categories higher than females. Among educational levels attained, predictably the higher the education the higher the rating for competencies in a given category. The last characteristic studied was between personnel working in those areas receiving and those not receiving development funds. Personnel in Rural Development Areas rated all categories higher than their counterparts in non-development areas.

With regard to when training should take place, district/national staff and local supervisors tended to support inservice training of local agents for developing the needed extension competencies. Local agents were non-committal, rating preservice and inservice training equally as the time training should take place. District/national staff and local supervisors indicated a greater emphasis for inservice training.

SUMMARY

In summary, there were no substantial differences in the perceptions of the professional extension competencies when examined by individual's position, area of responsibility, experience, age, sex, educational level attained, and whether or not located in an RDA area. There were explainable consistencies of how the groups rated the competencies. An exception to this was for the variable sex. The investigator had no plausible reason, from his two years of experience with the Swaziland Agricultural Extension Service, to explain why males consistently rated all competency categories higher than females. Possibly women were simply more critical in their appraisal of the competencies.

Data indicated that 4-S competencies were consistently rated low. If 4-S is to be the viable youth organization that it can be, perceptions regarding the value of 4-S must be increased.

Formal training of respondents was consistently related to higher ratings of the competencies, as would be expected. There continues to be a need for formal training of extension personnel and to upgrade and improve the formal training and the educational level of the extension staff. This was further substantiated in the responses between areas of responsibility. Agricultural and home economics extension personnel have had quality preservice training programs for nearly ten years, community development personnel have had none. Agricultural and home

economics personnel had a better understanding of extension methodology and the need (value) for the professional competencies.

A significant factor in the overall ability of a staff to efficiently and effectively perform their assigned duties is the general aura of support that surrounds them. Personnel in Rural Development Areas rated all competency categories higher than personnel in Non-Rural Development Areas. When examined by individual competencies, RDA personnel rated 78.7 percent of the competencies higher. Of the 32 competencies valued higher by Non-RDA personnel, eight were 4-S competencies. In non-development areas, a lone frontline agent was responsible for all extension activities, whether representing general or speciality areas. This broad responsibility could account for an increased understanding of and the value the non-development personnel placed on 4-S activities. Although the difference was not substantial the difference did exist.

Personnel indicated that inservice training was the most appropriate time for developing a majority of the competencies. It was not concluded that all preservice training should be eliminated, but that more emphasis should be placed on inservice training. In this regard the Swaziland Cropping Systems Research & Training Project should, in effect, accomplish this.

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AGRICULTURAL TRAINING AND FOOD PRODUCTION IN AFRICA

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Earlier studies call for a massive training and retraining effort to meet the staffing needs of Third World agricultural research and extension systems and effectively promote agricultural development (Oram & Bindlish, 1981; World Bank, 1981). In Africa in particular, the effort required to provide quality agricultural training for men and women will be substantial.

This paper focuses on intermediate agricultural training in Africa. Intermediate agricultural training is defined as formal training/education that prepares students primarily for employment in agriculturally-related positions which require less than the first university-degree (i.e., Bachelor of Science). The paper outlines the potential impact of strengthened agricultural training on African food production. A set of statements are examined in order (1) to trace the flow of the potential impact of training on components of the food production system and (2) to indicate where, in this system, increased recognition of the role of women in African agriculture can contribute to the overall impact of training.

Data presented on African intermediate agricultural training are from survey research findings I have earlier reported (Sigman, 1984). In this research, a total of 1,459 formal intermediate and higher agricultural and home economics education institutions were surveyed; 689 questionnaires from 80 Third World countries were returned useable, representing a response rate of 47%.

Statement I: Men and women African farmers and farm workers, along with other people and other circumstances and situations, impact food production in Africa.

Tentative estimates vary widely, but Tinker (1979) suggests that one-third of farm managers in Africa south of the Sahara are women, with even higher percentages recorded in some countries: 54% in Tanzania and 41% in Ghana (p. 12). Revised estimates indicate that women account for 46% and 31% of the agricultural labor force in Sub-Saharan and North Africa respectively (Dixon, 1982). Research results also indicate that women not only perform agricultural tasks (planting, weeding, harvesting); they also participate in agriculturally-related decision-making (Mickelwait, Riegelman, & Sweet; 1976).

Increasingly it is recognized that examples, such as these, are representative of broader documentation available in the literature on women's substantial role in the agricultural sector. Many of us do know that women work in agriculture. The pressing question is how to, not whether to, assist them in improving their agricultural productivity.

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Statement II: There is a relationship between agricultural productivity and education.

Human capital, or the investments in education embodied in a population, appears to be a major source of economic growth and agricultural development (Schultz, 1961, 1964, 1971). Recent research demonstrates the positive relationship, for men farmers, between education and agricultural productivity (Jamison & Lau, 1982). Several years of education has been shown, in at least one African case, to positively effect the agricultural productivity of women farm managers (Moock, 1976). Thus, empirical evidence supports the contention that increasing agricultural productivity includes increasing the level of education held by men and women farmers.

Statement III: Government agricultural extension services, through field-level extension staff, are largely responsible for delivering nonformal agricultural education to farmers.

Additional institutions may be responsible, yet government agricultural extension systems are well-known and widely-institutionalized mechanisms for providing nonformal agricultural education to farmers. Staudt (1975-76) presents a specific example from Kenya of how traditional communications patterns may constrain extension's ability to effectively reach women farmers.

In farms where there is a man present, women farmers may benefit from agricultural services because the presence of a man places the farm within the communication network of the extension service. But farms managed by women, and those represent a sizeable portion of farm households, are not in those networks and are thus ignored. (p. 91)

While extension is the delivery mechanism, most frequently field staff (i.e., extension agents and village level workers [VLW's]) are directly involved with farmers and educational programs. Review of Swanson and Rassi's (1981) research on national extension systems shows: (1) Field staff positions represent the large majority of 85% of Third World extension positions and (2) women account for 3% of general agricultural extension field staff in the nine African countries providing disaggregated data on program staffing patterns. Where Nigerian figures are included, the percentage increases to 7%.

This finding and Staudt's statement indicates that while extension institutions and field staff may be responsible for farmer education, they may need new or altered delivery methods in order to reach women farmers effectively. In addition to issues of equity of representation in extension, there is the suggestion that women extension agents may have access to local women's communications networks and thus, are able to utilize these networks to more effectively reach women (Ashby, 1981).

Statement IV: Intermediate agricultural schools are primary providers of preservice formal training for extension field staff.

Approximately 11 and 14 years of formal education is generally required of Third World extension VLW's and agents respectively (based on Swanson & Rassi, 1981). Based on entrance requirements and duration of program in intermediate agricultural schools, my research shows a substantial proportion of graduates of intermediate agricultural schools graduate with approximately 11 to 14 years of formal education. Thus, in theory, intermediate institutions provide the educational qualifications necessary for extension field staff. This research also indicates that, in practice, intermediate schools are very important suppliers of personnel for government extension services. Over two-fifths of graduates enter employment with these services, suggesting extension tends to hire field staff from intermediate schools.

Findings from my research indicate: In 1978-79, women account for 10% of students in the 93 African intermediate agricultural schools examined. Since many field staff employment opportunities in extension services appear to be contingent on intermediate agricultural training, women's extension employment opportunity is limited by the low rate of their participation in intermediate agricultural training.

Conclusions

The potential impact of strengthened intermediate agricultural training in Africa on African food production can be summarized as follows. Through strengthening agricultural training at the intermediate level, the skills of a substantial proportion of future field extension staff will be improved. Students who graduate from intermediate training to work in extension systems will be better prepared to help farmers increase their agricultural productivity and meet the demand for increased food production in Africa.

I have indicated where the increased recognition of women's role in agriculture can contribute to the overall impact of training on food production. African women are farmers: managers, workers, decision-makers. Their agricultural productivity appears to be positively influenced by education.

Government extension services are the institutions largely responsible for delivery of agricultural education to farmers. Extension field staff, agents and village level workers, are the people who have the most direct contact with farmers. Field staff positions represent the large majority of extension positions. It appears that under some conditions and circumstances, women extension staff may be most effective in reaching women farmers. In nine African countries, women account for 3% of general agricultural extension field staff.

Extension systems require qualified personnel to staff their agricultural field-level positions. Intermediate agricultural training provides the educational qualifications necessary for employment in field-level positions and it appears that extension systems tend to hire field staff who have graduated from intermediate training. In Africa, women account for 10% of students in intermediate agricultural training.

I suggest that intermediate agricultural training can impact food production in Africa. Further, I suggest that human resource development investments for both men and women can increase the positive impact of training.

Translating the recognition of women's role in African agriculture into action and impact calls for improving educational opportunity in agriculture for women in Africa. By improving women's educational opportunity in intermediate agricultural training, the number of women qualified for employment in extension potentially increases. Extension systems benefit from improved educational opportunity in agriculture for women because more women will be prepared and qualified for employment in extension systems. Thus, more women will have the opportunity and the skills to assist extension systems in their demanding task of providing agricultural education to both men and women farmers so that farmers can increase their agricultural productivity.

The development and implementation of strategies which support growth in women's participation in intermediate agricultural training are critical. Three specific recommendations are put forward to advance women's educational opportunity.

1. Institutional admissions, recruitment, and selection policies be reviewed in order to determine if and ensure that: (a) adequate places are available for women in agricultural training and (b) women are actively encouraged to enroll in them. Additionally, intermediate institutions frequently have boarding facilities for students. Availability of appropriate facilities for women are necessary.
2. Parents' knowledge of and involvement in women's educational activities be broadened. Parent and student school-related activities should be provided and parents should be encouraged to participate. It seems some parents, even if financially able, are less willing to send intermediate-school age women to school than they are willing to send college-age women to college. Parents' support of women's education in intermediate agriculture may increase as their understanding of students' educational lives is broadened.
3. Targeted growth rates for women's participation be established by individual institutions. By establishing goals for growth in women's participation, institutional attention is focused, guidelines are provided, and progress can be measured. There are alternative approaches to developing target rates for growth in

women's participation. Where overall growth in student enrollment is not possible, or not warranted, reallocate places available in training so that the proportion of women students increases. Where enrollment is to expand, ensure compound growth in women's participation as this increases their opportunity. Where planning new institutions, identify target proportions of men and women students and pursue these enrollment patterns.

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Strategies to Enhance Productive
Relationships Between Extension Personnel
and University Faculty in Developing Nations

Introduction

While it is largely true that many, if not most of the developing countries have been giving a high priority to the development of extension programs in agriculture, it must also be recognized that the preparation of individuals to carry on this work has sometimes been a bit difficult. The tremendous task of adequately preparing people to work in the Extension field in Agriculture would seem to almost mandate an increasing allocation of resources, both physical and human to the accomplishment of securing an enlightened and enthused agricultural sector. This highlights the need for a considerable degree of cooperation with training Institutions preparing workers for jobs in Agricultural Extension. It is within this relationship that a crucial element exists in the bringing of scientific discoveries to the farmer, and in bringing about eventual adoption and application of these new techniques to his farming operations.

Rationale For The Study

The distribution of developing countries while concentrated in Asia and Africa, also must include Central and South America as well as the Caribbean and Islands of the Pacific. Generally speaking, the so-called third world contains those countries where per capita income is below \$829.00 per year. However, a number of countries where per capita income is somewhat higher are still considered to be developing countries, particularly when the relatively per capita income of the farmer is considered. Nations selected for the study did include selection from a wide spectrum of geographic locations as well as economic levels. The study was restricted to nations

where recognized efforts were being made to develop the agricultural sector.

Although each of the nations selected for the study have their own distinctive agricultural extension operation, there are certain commonalities among them as to function, operation, and problems of delivery. For example, although there is a wide gap between Haiti and Saudi Arabia in terms of per capita income, problems of maintaining an effective agricultural extension services would appear to apply in a similar manner in each country. In a similar manner, it must be recognized that programs of study specifically in agriculture and agricultural education, differ considerably among nations. Requirements for graduation vary as well as required curricular content. Nevertheless in planning for this study, it was recognized that enough commonality exists in both functioning agricultural extension programs and extension training programs to provide a basis for identification and study of strategies and practices which hold promise for achievement of better final accomplishment.

Purpose of the Study

The central purpose of the study was to determine perceptions regarding the relative effectiveness of selected strategies which may enhance the preparation of agricultural extension workers in each of six selected developing nations. These perceptions were limited to two groups: (1) personnel in national agricultural extension programs and (2) administrators and faculty responsible for preparatory training in extension located in an institution of higher education. Perceptions to be determined were centered on the nature and extent of mutual concern and involvement for each strategy or practice and sought responses as to the extent it (1) currently existed and (2) was desirable for the future.

A major objective was to determine both differences and commonalities in perceptions of selected strategies to enhance preparation of extension workers as held by (1) administrative and supervision personnel in extension and (2) agricultural administrators and faculty of selected institutions preparing student to serve as extension administrators and/or workers. A concomitant purpose was to prepare a simple model illustrating the nature and extent of joint activities and mutual relationships which are recommended between the agricultural extension department and agricultural administration and faculty in institutions with responsibility for preparing extension personnel.

Study Design and Procedure

The study was designed to be largely a survey type of investigation. After a through review of pertinent literature, six developing nations were selected to represent various areas. Letters were sent to a selected graduates of Agricultural Extension Department at O.S.U. currently residing in each of the selected sic nations, requesting names and addresses of those people holding positions of responsibility both in colleges and universities, and in the national agricultural extension services. From this list, a mailing was made to each of the persons selected to serve as respondents. In some instances the addressed envelopes were combined in a single package and sent to the selected alumnus for distribution. Those responses to secured were collated and analyzed. A simple model was developed to be used as a basic design to formulate instruments to obtain responses upon which to be used as basis for making recommendations for improvement of working relationship between colleges and universities training institutions and the national Agricultural Extension services., see Figure 1.

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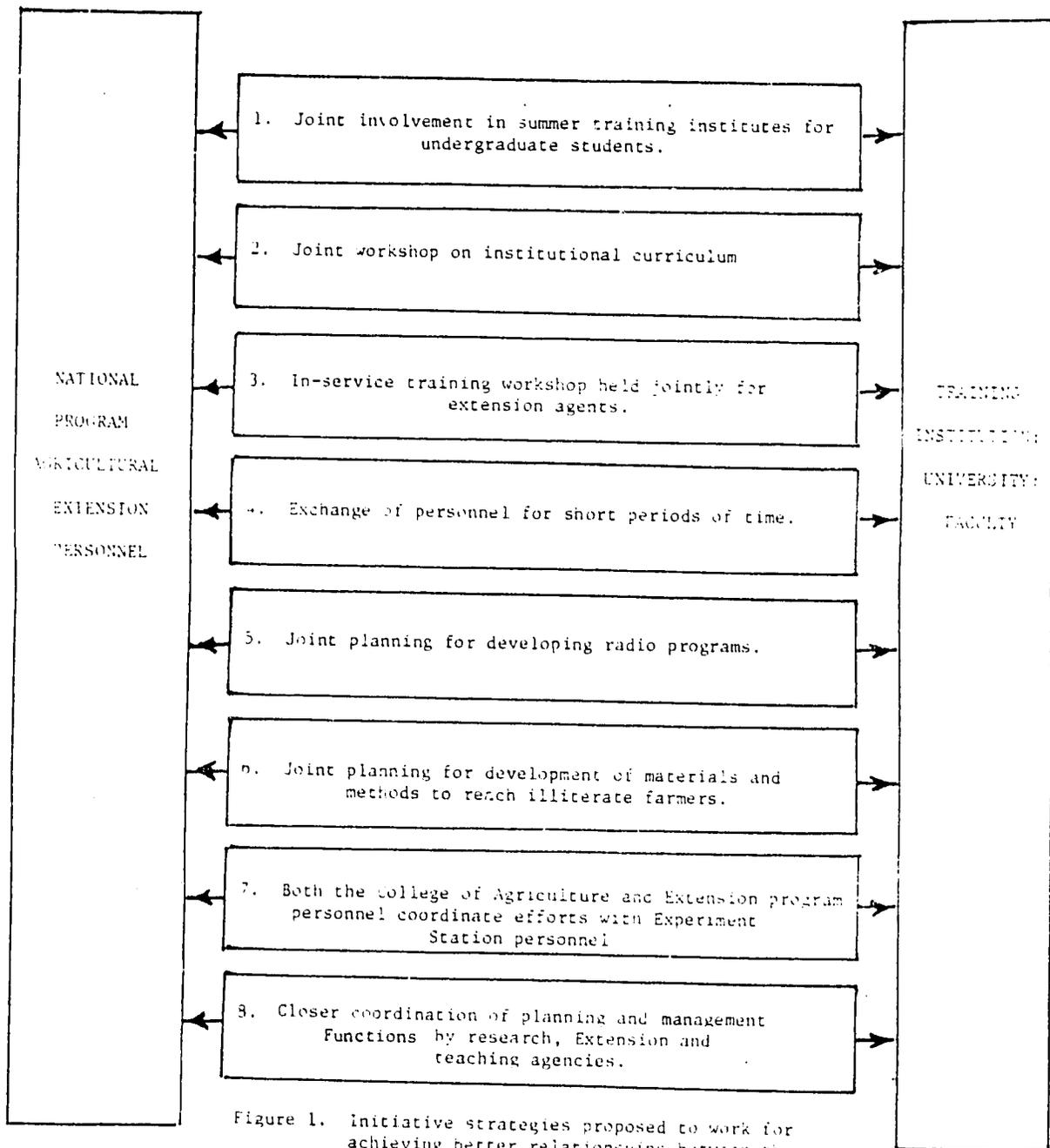


Figure 1. Initiative strategies proposed to work for achieving better relationships between the two agencies

TABLE 1

IDENTIFIED SELECTED STRATEGIES
OR PRACTICES FOR ENHANCING
RELATIONSHIPS BETWEEN EXTENSION
PERSONNEL AND UNIVERSITY FACULTY

STRATEGY OR PRACTICE	STRATEGY OR PRACTICE
1. Faculty members who teach extension subjects at college and universities spend some time working in various areas of national extension program work.	10. Periodic conferences for all personnel of extension, training institutions and experiment stations to become better acquainted with each other and to share learning experience.
2. National Extension administrators help college or university administrators design college curriculum to train future extension workers at the college level.	11. Extension with the cooperation and assistance of the training institution, develop radio programs to reach farmers with needed agricultural information.
3. Results of college or university research which would be helpful to extension workers be made available to the workers on a systematic basis.	12. Extension and the training institution work jointly to develop materials and methods that extension agents could use to reach illiterate farmers.
4. Extension administrators and staff members be used in parts of the college teaching program for future extension workers.	13. Closer coordination of planning and management functions by research, extension, and teaching agencies.
5. Colleges and universities provide in-service training programs for extension workers.	
6. A period of practical field experience be a part of the college course for the student prior to graduation, as a part of the requirement for becoming an extension worker. (This may be similar to "summer training" programs or "student teaching.")	
7. Extension, training institutions and agricultural experiment stations cooperate in developing programs with useful and practical information that would help farmers improve their situations.	
8. Extension, training institution and the experiment station work jointly in determining needs of farmers.	
9. Extension and training institutions cooperate in evaluating results of overall joint efforts.	

As shown in Table 1 strategies or practices finally selected after validation by a "jury" technique totaled thirteen. These thirteen were listed in the questionnaire, requesting respondents to check (1) extent present usage and, (2) extent of desirability. When collating and analyzing returns categories were established with corresponding numerical limits. These limits are shown in Table 2.

Table 2
Categories Determined by Mean Score Values

Usage Response Categories	Scale Numerical Value	Range of Numerical Limits for Categories
Great usage	4	3.5 - 4.0
Frequent usage	3	2.5 - 3.49
Occasional usage	2	1.5 - 2.49
Little usage	1	1.0 - 1.49
Not used	0	0.5 - 0.99

Desirability Response Category	Scale Numerical Value	Range of Numerical Limits for Categories
Highly desirable	4	3.5 - 4.0
Very desirable	3	2.5 - 3.49
Desirable	2	1.5 - 2.49
Slightly desirable	1	1.0 - 1.49
Not desirable	0	0.5 - 0.99

Major Findings of the Study

Demographics of the Respondent Groups.

Respondents represented only six developing countries but for each country they were divided into two categories (1) administrative and supervisory personnel of the national agricultural extension service and (2) immediate administrators and department faculty of universities or colleges where the majority of extension workers were being trained. It was determined that a total of 41 extension personnel were in major responsible positions of administration in the six nations surveyed. In a like manner, it was determine that 59 individuals were serving either or an immediate administrators (department head) or as a faculty member teaching courses and advising students engaged in study preparing them to become an extension workers.

Of the nations from which responses were received, the percentages of responses from extension personnel were Iraq 100%, Saudi Arabia 100%, Egypt 100%, Nigeria 100%, Haiti 83.33%, Korea 83.33%, and combined nations 95.45%. For faculty member responding the percentage for each nation was Iraq 100%, Saudi Arabia 50%, Egypt 100%, Nigeria 83.33%, Haiti 66.66%, and Korea 100%, and from the combined nations faculty members return was 84.74%.

Extent of Percent Usage and Desirability of Selected Strategies or Practices

A major objective of this study was to secure and analyze perceptions and judgements as to the extent to which selected strategies or practices were found to be presently used and in a like manner to obtain perceptions and judgements as to the extent of desirability of these same strategies. These perceptions were obtained for each of the

13 selected strategies or practices, as listed in part A of the questionnaire.

Extent of Present Usage of
Selected Practices or Strategies:

Table 3 provides combined perceptions of each of the two groups of respondents, as to the extent of present usage of each selected strategy or practices by a listing of both extension and faculty identification of strategies according to categories in which they perceived them as currently belonging. Responding extension personnel agreed with university faculty, that practices numbered 1, 2, and 4 were not used, and both groups also agree that practices 3, 5, 10 were "little used." While university faculty indicated that practices 11, 12, and 13 were "not used." Extension personnel felt that they had "little usage." Again, it was determined that while extension personnel recognized practice number 6, was "occasionally used" university faculty reported that this practice was "frequently used." Extension personnel recognized practice number 9 as being "not used"; university faculty felt that the same practice had "little usage." Likewise, it was interesting to discover that while extension personnel considered practices number 7 and number 8 as "occasionally used," university faculty recognized them as only given "little usage."

Judgments as to Extent of Present
Usage of Practices or Strategies

University faculty identified five of the practices as "not used," while extension personnel only two as not being used. It is notable that several of the items identified by faculty as "not used" were those which might call for more initiative effort on the part of extension personnel. An

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TABLE 3
 COMBINED RESPONSES AS TO
 EXTENT OF PRESENT USAGE

STRATEGY OR PRACTICE NUMBER	<u>EXTENSION PERSONNEL</u> Response by Category				<u>UNIVERSITY FACULTY</u> Response by Category			
	NU	LU	OU	FU	NU	LU	OU	FU
1	X				X			
2	X				X			
3		X				X		
4	X				X			
5		X				X		
6			X					X
7			X			X		
8			X			X		
9	X					X		
10		X				X		
11		X			X			
12		X			X			
13		X			X			
Number in Category	4	6	3	0	6	6	0	1

TABLE 4
 COMBINED RESPONSES AS TO
 ASSESSMENT OF EXTENT OF DESIRABILITY

STRATEGY OR PRACTICE NUMBER	<u>EXTENSION PERSONNEL</u> Responses by Category			<u>UNIVERSITY FACULTY</u> Responses by Category		
	D	VD	HD	D	VD	HD
1		X			X	
2		X			X	
3			X			X
4 ¹		X			X	
5		X			X	
6			X			X
7			X			X
8			X		X	
9		X			X	
10		X				X
11		X			X	
12		X				X
1		X				X
Number						
<u>in Category</u>	0	9	4	0	7	6

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example would be practice number 11, which calls for assistance from training institution for the extension effort to develop radio programs to reach needy farmers. University faculty were in almost unanimous that they did not contribute to the development of such programs, and consequently identify practice as "not used." Apparently extension personnel there was some usage even though it might be remote. The same evaluation, it might be made with regard to the categorization of a number of practices. For example, faculty recognized practice number 6. A period of practical field experience be a part of the college course for the student prior to graduation, as "frequently used," extension personnel identified it as only "occasional usage." Obviously, university faculty being involved more directly with the planning and implementation of the training programs were more prone to see these as being more readily available. In a like manner, it can be noted that while university faculty did say practice number 9, extension and training institutions cooperate in evaluating results of overall joint efforts, had "little usage." Extension personnel admitted that as a practice it was, "not used."

Judgements as to Extent of Desirability
of Practices or Strategies.

When identification and categorization with regard to the extent of desirability of the practices were concerned, it was found that the extent of the agreement between the two groups was much more pronounced. While extension personnel identified four practices as "highly desirable," their counterparts at the university recognized six practices as being "highly desirable." Conversely, Extension personnel categorized nine practices as being "very desirable" as compared to faculty categorization of seven. It should

certainly be of note that neither respondents group categorized any practice as being only "desirable," "slightly desirable" or "not desirable."

It was most interesting to note that while neither of the groups found any of the thirteen to be "not desirable" or even merely "desirable," they were in agreement that six of the practices were "very desirable." Those rated "very desirable" by both groups were practices number 1, 2, 4, 5, 9, and 11. The two groups were also in agreement that three of the practices were "highly desirable," these included practices number 3, 6, and 7. It should further be noted that while university faculty rated practice number 8, as being "very desirable," extension personnel felt even more strongly that they viewed the practice as being "highly desirable." In a reverse manner, university faculty felt that practices numbered 10, 12 and 13 were deemed "highly desirable," while the same practices were valued somewhat less by extension personnel rated them "very desirable." In summary, it should be noted that for the entire thirteen practices, respondents in each of the two groups accepted the fact that in terms of desirability each identified practice or strategy was felt to be very effective means for achieving a much more profitable relationship between the two agencies.

Conclusions

1. It was concluded that each of the thirteen selected strategies or practices which were identified by "jury" technique was valid since most all respondents classified them as either "very desirable," or "highly desirable." Only four items were listed by respondents from one or two countries as being merely, "desirable."

- No responses were made which anticipated any practice as being "slightly desirable" or "not desirable."
2. It must be further concluded that at the present time usage of most of the thirteen strategies can be only viewed as meager. Respondents from only two countries recognized any of the practices as being "frequently used," these relating to only five separate practices. "Occasional usage" was listed by four nations for three items or less. Only two nations listed "Occasional usage as many as four practices, while four nations listed "occasional usage" for only three practices.
 3. It was further concluded that faculty perceptions were more prone to be limited in terms of usage, but slightly more positive in terms of desirability.
 4. It was also concluded that among the nations, both for extension personnel and university faculty that perception of usage was more pronounced for respondents from Korea. However, from standpoint of Extension personnel, respondents from Iraq were by far the more positive that a majority of practices were "occasionally used." Faculty members from this country were not in agreement as to this extent of usage.
 5. Among the thirteen items, the two most "frequently used" were (1) a period of practical field experience be a part of the college course for the student prior to graduation and (2) Extension training institutions and agricultural experiment stations cooperate in developing programs to help farmers improve their situation.
 6. Among the thirteen practices, practice number 3, "results of university research which would be helpful to extension workers be made available to the workers on a systematic basis," practice number 6, "A period of practical field experience be a part of the college course for the student

prior to graduation," and practice number 13, "Much closer coordination of planning and management functions by each of the three agencies in order to promote efficiency," appeared to be those deemed most desirable by two both extension personnel and university faculty.

Recommendations

1. It is recommended that this study expanded to include more developing countries, and further that returns from the countries be stratified into a possible three or four categories, these according to the extent to which development has been achieved.
2. It is further recommended that a summary of the finding of this study be made available to each of the responding group in the countries participating in the study. It is hoped that where possible joint conferences might be held with the two groups, extension personnel and university faculty. It is further anticipated that a small manual can be developed for use by these two groups in developing nations.
3. It is further recommended that administrative and other functioning personnel in experiment stations be definitely included in conferences and workshops as a third entity participating in evaluation and planning.
4. It is also recommended that continued effort be made to implement and maintain the training and visit system (T&V system) in extension operation in developing countries. Findings of this study seem congruently applicable to those practices involved in the extension T&V system.
5. It is recommended that since there is indication within the findings of the study that each of the two groups were not always well aware of the nature and extent of

the other's involvement as well as the extent of services rendered, that Ministries of Agriculture and universities give immediate attention to exploring ways in which the groups can become more cognizant of the role which each group plays or should play in promoting the welfare of the agricultural sector of their nations.

6. Underguarding all previous recommendations is one that a coordinated effort be made to engage the joint activities as depicted in Figure 1.

Extension Education as Perceived by Educators and International
Students of Extension Education: A National Study

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Extension Education as Perceived by Educators and International Students of Extension Education: A National Study

There are millions of people living in the rural Third World who face a variety of constraints related to health, nutrition, marketing and technology. In order to better the condition of life for these people, the ultimate goals would be to alleviate rural poverty, promote rural development and improve farming systems and practices. To achieve these goals, rural people should be provided with education through which "community members come together to identify their problems and needs, seek solutions among themselves, mobilize the necessary resources, and execute a plan of action or learning or both" (Compton and McClusky, 1980, p. 229). The premise of this paper is that the Extension Education System (EES) could provide the rural Third World with information regarding social, economic, cultural, and human needs of people and then assisting them to utilize the information in order to achieve community education for development and make life better for themselves.

Purpose

This study was designed to describe international extension education as perceived by educators and international students of extension education.

Methodology

The research was a descriptive survey in the form of a national census study.

Subject Selection

The directors of the Cooperative Extension Services in the 50 states identified a total of 27 universities, as of Winter of 1982, in their states offering graduate programs in extension education. The 27 schools served as the frame of the investigation and 26 of the schools participated in the study. The two populations in the study were extension educators (N = 108) and graduate international students of extension education (N = 115), as of Fall of 1982. This was a census study of both populations.

Instrumentation

Two five-part survey instruments, one for the educators and one for the students, were developed by the researchers. Parts one and two for both groups were related to college preparation program in extension education. Parts three and four for both groups contained selected characteristics, policies and responsibilities of the EES in the context of the Third World. The last part gathered demographic data about the respondents and was different for each group. A panel

of experts examined and approved the content validity of the instruments. The first four parts of the instruments were pilot tested in order to test their reliability. The pilot test data attested to the reliability and internal consistency of the four parts of the instruments which were designed to measure the perceptions of the respondents regarding international extension education (Cronbach's Alpha = .93). A four-point Likert-type scale, four being the highest and one being the lowest, was adopted for this study.

Data Collection and Analysis

The data for this study were collected through the use of a mail questionnaire. After conducting a series of follow-up procedures (Dillman, 1978), 93.5 percent (N = 101) of the educators and 85.2 percent (N = 98) of the students completed and returned the questionnaire to the researcher. A 10 percent random sample of the nonrespondents was interviewed by telephone. No significant difference between the respondents and nonrespondents was observed. Therefore, findings of the study were generalizable to the populations. Descriptive statistics were used to summarize and interpret the data.

Results

Profile of the Extension Educator Group

There were 101 extension educators who participated in the study. The age of the educators ranged from 29 to 66 years; the average age was 47 years. The majority (91.1 %) of the educators were male. More than half of the educators (53.5 %) had professorial rank. The average educator had 15 years of work experience in extension education with a range from zero to 41 years. Years of teaching extension education courses, as reported by the educators, ranged from zero to 30 years, with 7.7 years as the mean. The majority of the educators (53.5 %) had some kind of overseas experience; however, only 29.7 percent had work experience in extension education outside the United States. Less than half (41.6 %) of the educators had some proficiency in a foreign language.

Profile of the Graduate International Student Group

There were 98 graduate international students from 33 countries who provided data for the study. Fifty-one percent of the students were from Asia, 35.7 percent from Africa, and 13.2 percent from South and Latin America. The age of the students ranged from 24 to 46 years, with 33 as the average age. The majority (90.8 %) of the students were male. Sixty of the students (61.2 %) were in Master's programs while 38 (38.8 %) were in Doctoral programs. The number of years studying in the United States ranged from one to eight years, with 3.1 as the mean. While 73.5 percent of the students had work experience in extension education in their home countries, only 21.4 percent were found to have had practical training in the United States; 88.3 percent of them indicated a willingness to acquire work

experience while studying in the United States. The majority of the students (89.8 %) reported being satisfied with their academic programs in the United States.

Program Development Processes

Five processes related to extension education program development (Lawrence et al., 1974) were included in the first part of the instruments and respondents were asked to indicate the level of importance of each of the processes (Table 1).

Table 1

Means and Standard Deviations for Extension Education Program Development Processes

Course Topics	Educators (N=101)		Students (N=98)	
	Mean*	S.D.	Mean*	S.D.
1. Developing an institutional framework for program development	3.86	.35	3.89	.32
2. Documenting the extension program (program determination)	3.96	.20	3.96	.20
3. Developing an annual plan of work	3.92	.27	3.75	.48
4. Implementing the program	3.78	.41	3.50	.60
5. Evaluating the program	3.82	.40	3.80	.43

* 4 = very important; 3 = somewhat important;
2 = slightly important; 1 = not important

Course Topics in Extension Education

In the second part of the instruments, both populations were provided with 20 course topics related to extension education and asked to indicate their level of necessity for graduate international students of extension education in order to assist them in learning and performing the foregoing processes. Table 2 shows the mean scores for the course topics.

Policies and Characteristics

The third part of the instruments was comprised of selected policies and characteristics of the EES as related to the Third World (Axinn and Thorat, 1972; Rogers, 1971); the respondents were asked to indicate their level of agreement or disagreement regarding each one.

Table 2
Mean Scores for the Extension Education Course Topics*

Course Topics	Educators (N=101)	Students (N=98)	Combined (N=199)
	Mean	Mean	Mean
1. Program Planning and Development	3.93	3.88	3.90
2. Evaluation of Extension Programs	3.84	3.87	3.85
3. Administration and Supervision of Extension Programs	3.55	3.73	3.64
4. Teaching Methods and Techniques	3.61	3.60	3.61
5. Diffusion of Information on Agricultural Technology	3.37	3.60	3.48
6. Extension Methods for Third World Countries	3.49	3.42	3.45
7. Adult Learning Theories	3.41	3.46	3.43
8. Use of Visual Materials in Communication of Agricultural Concepts	3.30	3.50	3.39
9. Research Methods and Design	3.17	3.52	3.34
10. Staff Development	3.20	3.44	3.31
11. General Statistics; Analysis and Interpretation of Data	3.12	3.41	3.26
12. Educational Programs in Agriculture for Third World Countries	3.26	3.27	3.26
13. Rural Community Development	3.00	3.48	3.24
14. Internship in Cooperative Extension Service	3.20	3.23	3.21
15. Education for Rural Development	2.97	3.39	3.17
16. Agriculture in Third World Countries	2.93	3.10	3.01
17. Concepts and Theories in Rural Sociology	2.82	3.10	2.96
18. Youth Program Management	2.81	3.05	2.93
19. World Food and Population Problems	2.84	2.81	2.82
20. World Food Economics	2.63	2.68	2.65

* 4 = Essential; 3 = Desirable; 2 = Optional; 1 = Not Needed

Both populations agreed that the EES can assist the entire rural social system (production, supply, marketing, governance, research, and education/extension) to develop by providing more attention to the producers, marketers and suppliers of the rural social system. Both populations strongly agreed with the concept that a combination of the sponsor and the clientele should establish the policies for agricultural extension programs and a combination of "top-down" and "bottom-up" program development should be used in the EES. While the educators disagreed with the notion that the sponsor (e.g., ministry of agriculture) should establish the policies for agricultural extension programs, the students agreed with the notion. Both populations disagreed with the concept that the clientele (e.g., small farmers) should establish the policies for agricultural extension programs. Both populations disagreed with "top-down" program development and agreed with "bottom-up" program development. Both populations agreed that highly successful extension education programs result when the 1) cost of recommended practices to farmers was low, 2) recommended practices were relatively simple, 3) benefit to farmers was immediate, 4) benefit of recommendations to farmers was high, and 5) local people selected front line agents. They also agreed that the success of an agricultural extension program in any particular locality tends to be directly related to the extent of personal contact between the people of that locality and the staff of the Extension Education System.

Educational Needs of Rural People

There were seven educational needs of rural people (Coombs and Ahmed, 1978) included in the fourth part of the instruments and the respondents were asked to indicate whether they agreed or disagreed with the concept that the EES could fulfill the listed educational needs. Both populations agreed that the EES could fulfill the educational needs of rural people in the following areas: 1) application of new production inputs, 2) food storage, processing and preservation, 3) knowledge and skills for family improvement, 4) civic skills, 5) supplementary skills for farm maintenance and improvement, and 6) farm business management. While educators disagreed that the EES is responsible for providing rural people with general or basic education, the students agreed that such education should be provided.

Conclusions and Recommendations

Although the results of this investigation were only generalized to the two populations of the study, other professionals interested in international extension education could also benefit from the findings, conclusions and recommendations of the study.

1. The participants of this study agreed that it would be very important for extension education program planners to know and perform the processes related to extension education program development. Therefore, an effective graduate education program should assist the international students of extension education in the following areas:

- a. Philosophy of extension education.
- b. Needs assessment procedures: Who are the clients and how to collect, analyze and interpret data in order to identify and prioritize needs?
- c. Annual plan of work: What are the proper educational objectives in order to fulfill the needs, and what are the strategies to achieve the objectives in order to make the necessary individual and social changes likely?
- d. Program implementation: How to implement the plan of work and coordinate the activities of the Extension Education System?
- e. Program evaluation: How to collect, analyze and interpret data in order to determine the effectiveness of the activities of the Extension Education System, and to propose further changes in the needs assessment procedures, annual plan of work and program implementation techniques.

The twenty course topics identified in this study could assist the graduate international students of extension education to learn and perform the foregoing competencies, and to become better extension education program planners.

2. A typical rural social system is comprised of six functional components: production, supply, marketing, governance, research and education/extension. These components must be perceived as the subsystems of the rural social system which are mutually dependent upon each other. Changes in one subsystem are likely to affect the behavior of other subsystems; and survival of the rural social system is dependent upon the well being of the subsystems. Thus attention should be given to all of them.
3. Citizen participation should be regarded as a vital factor in achieving community education for development. Results of this study indicated that a combination of the sponsor and the clientele should establish the policies for extension education programs.
4. Community development projects should be directed toward groups rather than individuals in order to simplify many of the extension education tasks (e.g., reaching all farmers, reducing inequity, alleviating logistical problems; creating social interaction).
5. The overbuilding syndrome should be avoided while developing extension education programs. Projects should be directed toward fulfilling the immediate needs of the public which then would be a good incentive in encouraging them to pursue the long-term objectives of the programs aimed at enhancing rural development.

6. The participants of this study indicated that the Extension Education System could fulfill the following educational needs of rural people:
 - a. application of new production inputs (e.g., varieties, improved farm practices, etc).
 - b. Knowledge and skills for family improvement (e.g., health, nutrition, home economics, child care, family planning).
 - c. Supplementary skills for farm maintenance and improvement.
 - d. Food storage, processing and preservation.
 - e. Farm business management.
 - f. Civic skills (e.g., knowledge of how cooperative, local and national government function).

Community education for development could certainly assist rural people in becoming critical and conscious individuals, active agents and breaking away from the traditional fatalism and feelings of powerlessness which exist in the rural Third World. A humanistic responsibility of true educators is to assist rural people in reaching that end, and the Extension Education System could play a crucial role in accomplishing such a task.

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Characteristics of intermediate agricultural schools in Africa, Asia, and Latin America

Timothy Koehnen

Introduction

The assessment of instructional programs occurs at all levels of formal education. Educational assessments attempt to review particular programs from primary to graduate level. The need for an assessment of the effectiveness of educational programs at intermediate agricultural schools in Africa, Asia, and Latin America can be supported by the lack of baseline data on selected characteristics.

The paper will present selected characteristics of intermediate agricultural schools in Africa, Asia, and Latin America. The particular characteristics will describe the institutions as well as assist in assessing the instructional program. Intermediate agricultural schools are categorized as upper-secondary to post secondary levels of formal education with one to four year curriculums. The investigator will report the minimum education requirements for entry so as to operationally define the institutions in Africa, Asia, and Latin America.

School farm size has been selected to demonstrate the land resources committed to these intermediate agricultural schools involved in instructional programs. Ahalt (1951) looked at farm size in a study of school farms in the North Atlantic Region. The size of the school farm and the number of schools with farms can demonstrate the commitment in this component of the intermediate agricultural schools.

Adequate facilities (school farm) and equipment are important in teaching agricultural skills as well as developing agricultural knowledge. The perceptions of directors at these institutions of the adequacy of facilities (school farm) and equipment can assist in assessing the instructional program. Facilities and equipment are considered to be essential part of an effective agricultural instructional program. In fact, Amodoi (1982), Bice (1980), Burnett and Smith (1983), and Sidney (1968) and others have stressed the importance of assessing facilities and equipment in the instructional program.

In this study, staff qualification is an important characteristic that is to be described. An important component in the instructional program is the administrators, professional staff, and technical support staff at these institutions. The effectiveness of the instructional program depends to a great degree on the staff members at these institutions. The paper will report staff numbers and qualifications for the responding institutions in Africa, Asia, and Latin America.

The paper will also look at the perceived adequacy of instructional materials at these institutions and the problems of instructional material availability. The information can assist in assessing the financial resources available for obtaining appropriate educational materials. Instructional materials can enhance the effectiveness of an instructional program. Veselka (1980), Katrlík (1980) and others have used the adequacy of instructional materials as a characteristic for assessing the instructional program.

The final characteristic to be reported in this report is the employment of graduates, or in other words, where are the graduates

employed. This characteristic is being used to assess the instructional program of these intermediate agricultural schools through the institutional graduate output. The employability of students is the major objective of these schools. Student outputs from these schools can help to assess the effectiveness of the instructional program. Doty (1979) assessed technical education programs through the employability of the student.

In summary, there is a very limited data base on the effectiveness of the instructional programs at intermediate agricultural schools in Africa, Asia, and Latin America and baseline data on these schools is needed to describe their instructional programs.

Objectives of the Study

The purpose of the study is to describe the differences and similarities of minimum education requirements for entry, school farm size, facilities (school farm) and equipment, instructional materials, qualifications of staff, and the employment of graduates by geographical region. More specifically, the objectives were to determine the

1. Size of school farms and the perceived seriousness of such school problems as lack of tools, equipment, livestock, and other capital items by geographical region.
2. Assessment of instructional materials by geographical region.
3. Nature and scope of the problem of instructional material availability.
4. Qualifications and numbers of staff in the intermediate agricultural schools.
5. Employment of graduates by various categories.

Methods

The design of this study is based upon survey research methods. The questionnaire was mailed to an identified population of intermediate agricultural schools. A table follows with a list of countries where institutions responded by returning a questionnaire.

In the first mailing, an appropriate questionnaire (English, French, Portuguese, and Spanish) was mailed with a cover letter, a return envelope, and international reply coupons. Institutions that mailed back the questionnaire within the first six weeks were checked in by a filing card system, and were not included in the follow-up mailing. The next phase was the mailing of the first follow-up letter to those institutions where questionnaires had not been returned. Then after one month, a second follow-up letter requested a reply from non-responding institutions. The final mailing contained an additional questionnaire, cover letter, postage reply coupons, and envelope.

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The total number of institutions contacted from the three regions of the world was 445. The analysis is based upon the response rate of 235 institutions. The overall response rate was 53%. The sample was stratified by the major geographical regions of Africa, Asia, and Latin America.

Table 1
Countries that Represent Intermediate
Agricultural Schools in the
Sample

Africa	Asia	Latin America
Algeria	Cyprus	Argentina
Cameroon	Indonesia	Belize
Chad	India	Brazil
Congo	Israel	Chile
Ethiopia	Jordan	Costa Rica
Gambia	Korea, Rep. of	Dominican Rep.
Ghana	Malaysia	Ecuador
Ivory Coast	Nepal	El Salvador
Kenya	Philippines	Guyana
Lesotho	Syria	Honduras
Liberia	Thailand	Jamaica
Madagascar	Yemen, PDR	Martinique
Mali		Mexico
Malawi		Nicaragua
Mauritania		Panama
Morocco		Trinidad and Tobago
Namibia		Uruguay
Niger		Venezuela
Nigeria		
Rwanda		
Senegal		
Sierra Leone		
Sudan		
Swaziland		
Tanzania		
Tunisia		
Zambia		
Zimbabwe		

Results

The findings of the Illinois Research Project are divided into six major areas and are presented in the following sections.

Minimum Education for Entry

Table 2
Three Categories of Minimum Education Requirements
for Entry by Geographical Region

Geographical Region	8-9 years	10-11 years	12-13 years	N
Africa	13	42	20	75
Asia	8	16	26	50
Latin A.	87	7	8	102
Total	108	65	54	227

Farm Size and Assessment of Facilities(school farm) and Equipment

1. The mean size for school farms in Africa is 244 hectares, in Asia 153 hectares, and in Latin America 339 hectares. The overall farm size is 262 hectares.
2. Not all schools reported having a school farm, in Africa five of the 75 institutions reported not having a school farm; in Asia four of the 57 institutions reported not having a school farm and in Latin America twelve of the 103 did not have a school farm.
3. Twenty of 235 institutions did not respond to the assessment of facilities(school farm) and equipment.

Table 3
Perceptions of Seriousness of School Farm Problems as
Lack of Tools, Equipment, Livestock, and Other
Capital Items by Geographical Region

Geographical Region	Serious Problem	Somewhat a Problem	Not a Problem	N
Africa Nos.	22	24	23	69
Asia Nos.	20	14	20	54
Latin Nos.	33	35	24	92
Total Nos.	75	73	67	215

Assessment of Instructional Materials

1. 15 institutions did not respond to the assessment of instructional materials.

Table 4
Perceptions of Directors on the Assessment of
Instructional Materials by Geographical Region

Geographical Region	Very Adequate	Somewhat Adequate	Inadequate	N
Africa Nos.	8	38	26	72
Asia Nos.	8	26	18	52
Latin Nos.	42	46	8	96
Total Nos.	58	110	52	220

Nature and Scope of Problems of Instructional Material Availability

1. Institutional directors that felt their instructional materials were adequate did not respond to the question of instructional material availability. Africa, Asia, and Latin America have the following percentages that did not respond to the items; 16%, 26%, and 56% respectively.

2. 64% of the institutions responded to the ranking of the problems of availability.

3. The following table demonstrates the ranking.

Table 5
Directors Ranking of the Problems of Availability through
the One Response by Geographic Region

	Geographical Regions		
	Africa	Asia	Latin America
Ranking			
Instructional materials are available, but the institution cannot afford to purchase them.	20	20	15
The reference library for students and teaching staff is very inadequate.	18	16	12
Adequate instructional materials simply are not available.	13	2	9
Instructional materials are available, but are not appropriate for the agricultural conditions of the country.	6	4	7
Instructional materials are available, but are quite out of date.	4	3	2
Total	61	45	45

Qualifications and Numbers of Staff in Intermediate Agricultural Schools

1. Staff qualification in the study consist of five categories; faculty with less than a B.Sc., faculty with a B.Sc., faculty with the title of Ingenieur Agronome, faculty with a M.Sc. or equivalent, and faculty with a Ph.D.

2. The faculty consist of administrators, professional teachers, and technical support staff.

3. Africa had 151 Ph.D.'s out of a total for all regions of 216 Ph.D.'s.

Table 6
Staff Numbers per Category
by Geographical Region

Geographical Region	Faculty with less than a Bachelor of Science Degree	Faculty with a Bachelor of Science Degree	Faculty with the Title of Ingenieur Agronome	Faculty with a Masters Degree	Faculty with a Doctorate
Africa Nos.(61)	1121	403	82	233	151
Asia Nos.(45)	782	1059	61	497	39
Latin Nos.(45)	2353	1158	376	190	38
Total Nos.(203)	4256	2620	519	920	228

Employability of Students through the Employment of Graduates

1. Employment of graduates as an outcome indicator utilized the following categories which are presented in the following table.

Table 7
 Mean Percentage Distribution of Employment of Graduates
 by Geographical Region

Graduates Employment	Geographical Regions		
	Africa (58)	Asia (40)	Latin America (67)
Government Extension Service	71%	54%	24%
Teaching in Schools	7%	9%	7%
Technical staff at an educational or research institution	7%	6%	6%
Agricultural development bank	2%	4%	10%
Agribusiness firms	3%	7%	18%
Farming or farm management	11%	4%	13%
Non-agricultural employment	1%	2%	1%
Continue their education	5%	16%	20%
Unemployed	1%	3%	6%
Other	1%	6%	4%

Conclusions

Based on the responses of the study, the investigator was led to the following conclusions.

1. Africa and Asia regions differ from the Latin America region which has a larger proportion of entrance requirements at 8 to 9 years of formal education.
2. Latin America region has larger land resources invested in their intermediate agricultural schools than Africa or Asia.
3. A major resource commitment in all regions can be found toward the school farm (facilities); where 90% of the institutions reported having a school farm.
4. A majority of institutions in the survey require greater resources to purchase instructional materials; Latin America has less of a problem than the other regions.
5. In all regions, the majority of staff fall within the Bachelor of Science Degree, or less than this degree, implying a need for in-service training.
6. The institutions that responded as to where their students were employed indicate a diversity of opportunities. However Africa has a greater percentage of students employed in the public sector.

Closing

In closing, the institutional directors in Africa, Asia, and Latin America are generally similar in their responses to the selected characteristics used in the assessment of the instructional programs. However, Latin America appears to have less of a problem involving instructional material availability.

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SUGGESTIONS FOR STRENGTHENING SECONDARY AGRICULTURAL
EDUCATION IN FIVE CARIBBEAN ISLAND NATIONS: ANTIGUA,
DOMINICA, GRENADA, ST. LUCIA, AND ST. VINCENT

by

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"The rate of emigration as percentage of natural increase (in population)...1950-79... (was) 74.3 in Grenada; 58.4 in St. Vincent; 57.5 in St. Lucia; 54.9 in Dominica; and 42.9 in Antigua...young people stand on the shores of their islands waiting for the ship that would take them abroad." Tirbani Jagdeo

Out migration of people is a symptom of some problems. On the positive side it is a source of earnings which when sent "home" contribute to the economics of the countries. The out migration represents a significant "brain drain" which cannot be measured in terms of lost vigor, creativeness, and vitality to both the public and private sector.

The present shortage of agriculturalists to fill government posts in extension, research, and teaching in these Windward and Leeward islands has many roots. This paper focuses on one of the root causes of the shortage...the absence of a strong, viable program of agricultural instruction in the secondary schools. There are other causes which are beyond the scope of this paper, such as a shortage of post secondary institutions effectively teaching agriculture, the low priority placed on agriculture through government budgets and policies, the competition for employment of agriculturalists posed by multinational organizations and donor countries, and out migration as noted in the opening quotation.

The central thesis of this paper is that the strengthening of instruction in agriculture at the secondary school level is essential for development of an adequate supply of willing and able agriculturalists for achieving the agricultural development goals. Further, it is argued that the strengthening of agricultural education in the secondary schools is dependent upon two major points: first, the entire primary and secondary school programs must be strengthened, and second, there must be a significant improvement in the interface, or interaction between the ministries of education and ministries of agriculture.

Background Information

The island nations in the Caribbean tend to be relatively small, new as independent nations, striving for national identity, and in need of cooperative efforts with each other in order to succeed with their efforts for agricultural development. The need for

cooperative efforts are sometimes overshadowed by their desire for national identity.

TABLE 1. Selected Information of Five Caribbean Island Nations: Antigua, Dominica, Grenada, St. Lucia and St. Vincent.

Factor	Country				
	Antigua	Dominica	Grenada	St. Lucia	St. Vincent
Year of Independence	1981	1978	1974	1979	1979
Area:					
Sq. Miles	171	290	133	238	150
(Sq. Kilom.)	(442)	(751)	(344)	(616)	(388)
Population (000)	80	80	115	121	126

Sources: UNESCO Statistical Yearbook, 1984; The World Book Encyclopedia, 1982; and World Development Report 1984.

This paper provides some suggestions for improving the current situation in formal agricultural education for two purposes: first, to help achieve established societal goals for agricultural development; and second, to enhance the opportunities for career advancement of individuals interested in agricultural careers.

Shortage of Agriculturalists

The shortage of agriculturalists is critical but it is not new. Henderson (1976) in a study which included the then seven territories reported "...40 percent of the established professional posts..and 20 percent of the established (intermediate) posts are vacant and nearly 60 percent of the (intermediate) posts are filled by untrained personnel." (1:20) Henderson's report revealed that over the next 10 years there was a need for 757 additional persons trained in agriculture at the intermediate (diploma) level or above. Or an annual need of approximately 75 persons. (See Attachment A for additional details for each island.)

Edmunds (1983) reported vacancies in more than 125 posts and a projected three-year training need of more than 618 agriculturalists, or 203 per year, for the same seven islands studied by Henderson. And Edmunds did not include the ministries of education in his study with their needs for teachers of agriculture at primary, secondary and tertiary schools. However, as shown by data in Table 2, the annual needs had grown from 76 to over 200 as reported in the two studies. (2:19)

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TABLE 2. Comparison of Agricultural Manpower Needs for Seven Leeward and Windward Islands in Studies by Henderson (1976) and Edmunds (1983).

	Total Posts	Posts Vacant	Projected Needs		
			10-Yrs.	3-Yrs.	Per Year
Henderson	638	149	757	...	75.7
Edmunds	656	111	...	618	206.0

Sources: Report to CIDA/Canada Training Awards Project Coordinator: Training Needs in Agriculture in the Leeward and Windward Islands by J.E. Edmunds, June 1983, p. 19.
Trained Manpower Needs in the Agricultural Sector Leeward and Windward Islands by T.H. Henderson, 1976, pp. 25-26.

Primary and Secondary Education

The educational system in each of the five countries is based on the British model. In general, this includes the first two years of primary schooling called Infant 1 and Infant 2 followed by five years called Standard I, II, III, IV and V. These seven years in level one are followed by level two divided into first stage (Forms I, II, and III) and second stage (Forms IV and V). An external examination at the end of Standard V is used for measurement of progress and determination of eligibility for entrance into the second level (Form I). Students with the better scores have the opportunity to enter the more prestigious secondary schools. Not all students pass this examination. For example in one country, Antigua, data were available regarding the number of students enrolled in Standard 5 (called Junior 5), the number who took the examinations and the number who passed for the school years 1977 and 1978. In order to pass the examinations the students had to score 50% or more in three subjects (Language, mathematics, and general science) or 50% or more in Language and mathematics, or a score of 50% in any two subjects and an aggregate score of 150.

	<u>1977</u>	<u>1978</u>
No. students enrolled, Standard V	1113	1210
No. students who entered examination	918	1128
No. obtaining 50% or more:		
in English	172	359
in math	255	489
in gen. sci.	400	593

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The data available did not show the actual number of individual students who PASSED the examination each year. Most likely less than 50 percent of the students enrolled actually passed through one of the three alternative routes to a PASS.

The secondary students, i.e. those in Forms I through V, must pass external examinations at the end of Form V in order to gain admission to the next higher levels of schooling. Many different examinations are available but those most commonly used appear to be the CXC (by the Caribbean Examination Council), the Cambridge General Examination of Education (Ordinary Level), and the London General Examination of Education (Ordinary Level).

The examination results for secondary students were reported in Antigua. The Form V students took the "0" Level examinations (Cambridge or London). The success of students is generally measured in terms of the number of "passes" received in the different subjects. The most important subjects appear to be English, mathematics, biology, and chemistry out of the eighteen or so subjects available. In 1977 and 1978 none of the Antigua students studied for the examination in agriculture. Additional detailed data are presented in Attachment D. Out of more than six hundred (623) students enrolled in 1976-77 and five hundred (527) in 1979-78, less than 30 percent of the total students passed three or more of the examinations, as shown below. For example, 131 students passed only two exams in 1977. The data reported do not indicate how many passed all three exams in English, mathematics and biology. However, the biology exam was passed by only 34 in 1977 and by 40 in 1978. The mathematics examination was passed by 60 in 1977 and 35 in 1978. One could correctly conclude that if passes in both biology and mathematics were required for entrance into post secondary or higher education, relatively few individuals would have qualified. In addition, the proportion of those students who would seek additional education in some field of agriculture would likely be very small, perhaps none.

Year	Number of Subjects Passed "0" Level								
	1	2	3	4	5	6	7	8	3 or More
1977	153	131	69	29	14	5	0	0	117
1978	132	115	88	26	20	9	4	0	147

Source: Antigua Educational Statistics, 1976-78, p. 75

The primary and secondary schools differ between the island countries as well as having wide differences in the quality of instruction among the schools in each country. In general:

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1. The primary and secondary school teachers are under qualified for their assignments. The teachers for Infant 1 and Infant 2 as well as for Standard I, i.e. the first three years of the primary education, are the least qualified of all the teachers.
2. The physical facilities vary widely from very old, poorly maintained buildings to relatively new structures.
3. The learning atmosphere is poor due to too many students per teacher and per room; and the absence of sufficient basic books for the subjects being studied.
4. The poor performance of students on the science examinations is a consequence of inadequate preparation on the part of the students, unqualified teachers, lack of science textbooks, and absence of laboratory programs.

Agricultural Education

Agriculture is included as a subject in the curricula at both the primary and secondary school levels. The ministries of education for St. Lucia, St. Vincent and Grenada each have one or more persons assigned responsibility for supervision of the agricultural education programs. Those seven persons (St. Lucia, 1; St. Vincent, 1; and Grenada, 5) have certificate or above levels of education in agriculture. However, neither Antigua nor Dominica has an agriculturally trained person assigned specifically for supervision of agricultural education programs. There was evidence of national planning for agricultural education programs in those countries which had assigned, and trained, agricultural supervisors.

The educational preparation of agricultural teachers in the secondary schools was generally very deficient. Some of the teachers of agriculture had received no post secondary instruction of any kind; and had not studied agriculture as a subject in secondary schools. They had recently graduated, passed three or more subjects in the "O" level examination, or CXC; and were now employed to teach agriculture to the first year students in Form I.

There were encouraging signs at several schools, even though the teachers lacked preparation in agriculture. At one secondary school in Dominica, a small secondary school with approximately 65 students, the headmaster serves as the agricultural teacher. A man with science training and with vision as to what he wants schooling to accomplish, he was observed to have students engaged in practical work in gardening, goats, and poultry. A low-cost solar dryer for bananas and copra had been constructed and was working. Plans were being made to have students develop projects at home next year in lieu of adequate land at the school for student projects.

The headmaster at another school showed the results of excellent cooperation with the parents of the children. Although the school lacked tools and equipment, the parents would loan equipment to the schools for teaching agriculture. Agriculture was a required subject for all students in the secondary school. The headmaster's positive attitude toward agriculture was a key factor in the positive accomplishments with very limited resources.

An agricultural teacher at one school reported regularly receiving an agricultural information letter from the Extension Service, Ministry of Agriculture. One extension agent, recently returned from E.C.I.A.F. with a diploma in agriculture, was accompanied on some of his planned work with students and teachers of agriculture in the schools. He gave demonstrations and lectures, along with distribution of plant materials.

The agricultural supervisors in two countries had prepared plans of work and plans for teacher workshops, and even for some pilot schools as a means of strengthening the teaching of agriculture. One of the supervisors, while I accompanied him to visit schools, identified ways that one school had involved the community with the agricultural program. At that school the farmers assisted the school in preventing theft from student projects (praedial larceny). Such thievery was generally reported to be a major problem at most schools in all five countries visited.

Many more experiences could be reported which reflect problems and some prospects for improvement of agricultural education at the secondary school level. However, one situation observed in Grenada should be mentioned because of its potential for the future.

The primary schools enroll students, as usual, in the seven grades: Infant I and II and Standard I through V. However, in addition, they accept students into Forms I, II and III who failed to pass the examinations for entrance into the regular secondary schools. These schools are called all-age primary schools. Agriculture is one of the subjects of instruction for these students, just as it is a subject in the regular secondary schools. The potential for agricultural education is great through both kinds of secondary schools.

Most of the teachers of agriculture indicated needs for more land for use with student "practicals"; tools and equipment for student use; fencing of land to improve security; instructional materials; and they wanted opportunities to upgrade their own knowledge and skills. When questioned about how these changes would affect the outcomes of instruction, the most frequent responses were to the effect that more students would be able to pass the examinations.

Technical Education in Agriculture

Four of the five countries have post secondary agricultural education programmes. The institutions and countries are:

Clifton Dupigny Community College, Dominica
Mirabeau Agricultural Training School, Grenada
St. Lucia College of Agriculture (formerly known as
Agricultural Cadet Training School), St. Lucia
St. Vincent Technical College, St. Vincent

Two of the four are administered by the Ministry of Education (in Dominica and St. Vincent) and the two others are administered by the Ministry of Agriculture (in Grenada and St. Lucia). The diplomas for graduates from the St. Lucia College of Agriculture are awarded jointly by the Ministry of Education and the Ministry of Agriculture.

These diploma-level programmes are characterized by a lack of appropriate facilities, few full-time instructors, many part-time instructors, emphasis on vegetable crops and plantation crops, and few students. Some new facilities are under construction at the Mirabeau Agricultural Training School; and St. Lucia has plans for re-siting the College of Agriculture with major changes in the staffing and curriculum patterns.

Edmunds (1983) described the programmes in the five countries as follows:

"(In Antigua) there are no formal training programmes and the Ministry (of Agriculture) depends on on-farm learning attachments for its officers." (p. 6)

"...from discussions with Grenada officials, it would appear that the country has a very dynamic training programme both locally and overseas. It is noted that most of the Agricultural Extension staff have been locally trained." (p. 18)

"The local training programme (in St. Vincent) needs to be considerably improved to service the agricultural community and unless there is a major training thrust within the next three years, this country will not be able to adequately service its agricultural community." (p. 13)

"...the various Statutory Boards dealing with agriculture (in Dominica are) at present inadequate to provide the necessary technical backup and to service the agricultural development plans that are envisaged." (p. 16)

"St. Lucia has a long tradition of a sustained National Cadet training in agriculture...the recent appointment of a full-time local Principal will enhance the programme." (p. 16)

Additional details regarding the present situation and prospects for technical (diploma) level agricultural education programmes must be reserved for another paper. The information presented is perhaps, sufficient to illustrate some potential for using the technical schools for the preparation of teachers of agriculture

Recommendations for Strengthening Secondary Level Instruction in Agriculture

The strengthening of agricultural instruction in secondary schools is desired as a means of helping achieve the national goals for agriculture and to help individuals prepare for careers in agriculture. With those twin purposes clearly accepted, the recommendations can be made for strengthening the programme.

The recommendations are made in terms of an agricultural education programme which is part of both the educational system and agricultural system. The secondary schools, under the jurisdiction of the Ministry of Education, have agricultural instruction as one part of the total curriculum. The instruction in agriculture is only a part of the instruction which the students receive. It builds on, or is complementary and supplementary to, instruction in language, social science, mathematics, science and all the other parts of the curriculum. In other words, the strengthening of agricultural instruction involves more than just the work of the teachers of agriculture.

The instruction in agriculture is a part of the total efforts for improving agriculture. The Ministry of Agriculture has policies and programmes for production, marketing, processing, research, information, and education. The Ministry conducts educational programmes through the extension service, special workshops and short courses. The formal instruction in agriculture conducted by the secondary schools is part of a larger agricultural system.

The recommendations for strengthening secondary agricultural educations programmes in Antigua, Dominica, Grenada, St. Lucia and St. Vincent include:

Ministries of Education

1. Clarification of the national goals and purposes of agricultural education.
2. Designation of personnel within the ministry with responsibility for supervision and administration of agricultural education.
3. Upgrading of professional and technical qualifications of persons who teach agriculture.
4. Review the curriculum and course materials for instruction in agriculture so as to incorporate emphasis on various crops, livestock, marketing and farm management practices which are appropriate in that nation.
5. Provide land, tools, and equipment for the instruction recommended in the curriculum and courses.

6. Develop instructional materials to be used by teachers in the instructional programme.
7. Regularly conduct follow-up studies to determine the educational and occupational attainments of students who complete, and also the early leavers from, the agricultural instruction.
8. Develop a memorandum of agreement/understanding with the ministry of agriculture regarding cooperation and assistance for strengthening and maintaining the agricultural education programme.

Ministry of Agriculture

1. Develop a memorandum of agreement/understanding with the ministry of education regarding cooperation and assistance for strengthening and maintaining the agricultural education programme. (E.g. Provide plant materials and other resources to teachers.)
2. Regularly discuss the goals and policies for agriculture with the key officials in the ministry of education. (These goals and policies have implications for course content, updating of teachers of agriculture, development of instructional materials, etc.)
3. Consider use of secondary school students during holidays in work-study roles at research stations, livestock farms, and other installations under the jurisdiction of the ministry of agriculture.

Strategy for Implementation

If desired change is to occur, the plans must be made to acquire the resources needed, to mobilize the concerned people, and to set realistic targets for accomplishments. In general, each of the island-nations must develop their own plans. They already are at different stages of planning and development. They each have some specific approaches to their programmes which should be encouraged.

A regional workshop should be organized to (1) discuss the objectives for teaching agriculture in the secondary schools; (2) identify the resources available for teacher training; (3) identify the instructional resources available; and (4) identify people with special expertise who could be utilized in the national efforts to strengthen the instruction in agriculture.

For example, the newly established (1983) Agricultural Teacher Education Center, attached to the Eastern Caribbean Institute of Agriculture and Forestry (E.C.I.A.F.) in Trinidad has three well-qualified persons for conducting teacher education in agriculture. There are two secondary school administrators in Dominica who have demonstrated enthusiasm and expertise regarding agricultural education. Teachers of agriculture on each island can be identified who have above average excellence in teaching. Officials with responsibilities for supervision of agricultural education in three of the ministries of education can be identified who have much to offer for planning and conducting stronger agricultural education programmes.

Three general characteristics should be maintained in the implementation plans. First, the key persons for actual implementation of programmes should be directly involved in the development of plans. A sense of ownership must be developed with the plans. Second, the plans should have both short-range and long-range components. They should be phased in terms of what is realistic given the available personnel and local resources. Third, the resources from external funding sources should be sought so as to fit into the national plans.

Excellent recommendations have been made in the past for strengthening the teaching of agriculture in the schools. Varying levels of accomplishment have been achieved in each of the countries. It is expected that the amount of progress made during the next 10 years in each country will be dependent upon many factors only one of which is the priority given to strengthening the agricultural education programmes.

Note: The primary basis for this paper was a seven-week assignment in the Caribbean during October-November 1984. At that time the author was a consultant to the Caribbean Agricultural Extension Project for a study of the agricultural education programmes in cooperation with the ministries of agriculture and education in Antigua, Dominica, Grenada, St. Lucia and St. Vincent. For more information the reader is referred to the series of five reports cited in the list of Sources and Notes.

Sources and Notes

1. Henderson, T.H. Trained Manpower Needs in the Agricultural Sector Leeward and Windward Islands. St. Augustine, Trinidad: The University of the West Indies, Department of Agricultural Extension, 1976, 59 pp. Henderson gathered data from (a) ministries of agriculture and education, (b) officials of agricultural commodity organizations, (c) agricultural banks, and (d) marketing boards and other organizations.

2. Edmunds, J.E. Report to CIDA/Canada Training Awards Project Coordinator: Training Needs in Agriculture in the Leeward and Windward Islands. June 1983, 53 pp. plus Appendix. Edmunds gathered information mainly from ministries of agriculture plus national agricultural enterprises and projects. Also included in his study were deans and principals of agriculture at University of West Indies, St. Augustine, Trinidad; Eastern Caribbean Institute of Agriculture and Forestry (E.C.I.A.F.), Arima, Trinidad; Guyana School of Agriculture; REPAHA, Guyana; and College of Agriculture, Jamaica. The needs for agriculturally trained persons in primary and secondary schools were not included in the study.

3. A series of reports by O. Donald Meaders based on a seven-week consultancy in the Caribbean during October-November, 1984. Observations and Recommendations for Strengthening Agricultural Education: Antigua. Draft, November 1984, 15 pp.

A Report on Development and Strengthening of Agricultural Education in the Commonwealth of Dominica. March, 1985, 23 pp.

A Report on Development and Strengthening of Agricultural Education in Grenada. March, 1985, 28 pp.

Agricultural Education in St. Lucia: Some Observations and Recommendations. October, 1984, 9 pp.

Observations and Recommendations for Strengthening Agricultural Education in St. Vincent. October, 1984, 11 pp.

4. Jagdeo, Tirbani. "Caribbean teenagers--their shortcomings are society's" People Vol. 12, No. 1, 14-17 (1985).

ATTACHMENT A

Present Staffing and Projected 10-Year Needs and Level of Training in Each of Seven Windward and Leeward Islands

Island	No. Staff in Post			Vacancies		10-Year Projected Needs	
	Grad.	Inter-mediate	Un-trained	Grad.	Inter-mediate	Grad.	Inter mediate
Antigua	9	6	16	5	12	13	29
Dominica	16	16	7	6	12	18	76
Grenada	6	31	50	8	21	9	91
Montserrat	7	5	13	2	0	6	12
St. Kitts	0	5	5	6	10	7	23
St. Lucia	17	33	104	8	46	48	134
St. Vincent	8	17	47	5	8	4	32
Total	63	113	313	40	109	105	397
Total Estimated Ten-Year Needs						142	615

Source: Trained Manpower Needs in the Agricultural Sector Leeward and Windward Islands by T.H. Henderson, pp. 52-58.

- Notes:
1. Total estimated ten-year needs includes provision for filling vacancies, filling additional (new) posts, and provision of intermediate level training for presently employed un-trained staff.
 2. Definitions for levels of training were:
 Graduate--professional training at the university first degree level.
 Intermediate--para-professional or technical training typified by the two-year diploma programmes.

ATTACHMENT B

Staffing and Training Needs in Seven Caribbean Countries

Country	Staff in Post			Vacancies		Staff in Training		Training Needs 3-Year Projection	
	Grad.	Intermediate		Grad.	Intermediate	Grad.	Intermediate	Grad.	Intermediate
		Local Trained	Overseas Trained						
Antigua	23	36	21	6	18	2	4	32	76
Dominica	26	--	45	4	--	11	7	34	65
Grenada	22	102	11	11	16	15	19	41	98
Montserrat	15	2	11	3	2	3	--	7	28
St. Kitts	11	10	35	--	4	6	11	15	54
St. Lucia	26	46	49	16	28	10	14	39	89
St. Vincent	9	1	44	3	--	3	14	13	27
Totals	132	197	216	43	68	50		181	437

*Source: J.E. Edmunds. Report to CIDA/Canada Training Awards Project Coordinator: Training Needs in Agriculture in the Leeward and Windward Islands, June 1983, pp. 19.

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ATTACHMENT C

General Certificate of Education, Ordinary Level Results,
All Entries by Subject, June 1977 & 1978: Antigua

Subject	Examination Results				
	1976-77			1977-78	
	Entered	Sat	Passed	Entered	Passed
English language	467	460	205	384	172
English literature	286	283	60	258	110
French	81	81	36	71	20
Spanish	20	19	4	23	8
History	426	417	182	327	153
Geography	222	220	73	207	73
Commerce	9	9	2	24	2
Mathematics	233	228	60	150	35
Chemistry	128	122	32	98	18
Physics	47	47	15	31	11
Biology	196	195	34	207	40
Human & Social Biology	170	165	74	128	67
Cookery (Food & Nutrition)	69	68	31	64	41
Needlework	7	7	2	--	--
Woodwork	11	11	2	9	1
Accounting	2	2	1	1	0
Religious studies	112	110	42	84	50
Art	2	2	0	3	2
Additional math	--	--	--	23	12

Source: Antigua Educational Statistics, 1976-1978.

ATTACHMENT D

General Certificate of Education, Ordinary Level Results,
All Entries by Subject, June 1977 & 1978: Antigua

Examination Subjects	Number of Students				
	1976-77			1977-78	
	Entered	Sat	Passed	Entered	Passed
English language	467	460	205	384	172
English literature	286	283	60	258	110
French	81	81	36	71	20
Spanish	20	19	4	23	8
History	426	417	182	327	153
Geography	222	220	73	207	73
Commerce	9	9	2	24	2
Mathematics	233	228	60	150	35
Chemistry	128	122	32	98	18
Physics	47	47	15	31	11
Biology	196	195	34	207	40
Human & Social Biology	170	165	74	128	67
Cookery (Food & Nutrition)	69	68	31	64	41
Needlework	7	7	2	--	--
Woodwork	11	11	2	9	1
Accounting	2	2	1	1	0
Religious Studies	112	110	42	84	50
Art	2	2	0	3	2
Additional math	--	--	--	23	12

Source: Antigua Educational Statistics, 1976-1978.

A Critique of Papers by Al-Kafagy,
Kowzekanani and Miller, and
Koehnen

by

O. Donald Meaders, Professor
Agricultural and Extension Education
Michigan State University, April 26, 1985

The three papers offer considerable "food for thought." The first two papers dealt with agricultural extension and the third paper dealt with intermediate agricultural schools. There may be more interrelationships among the three papers than either meets the eye or was evident by the ear. The Al-Kafagy paper focused perceptions about desired relationships between personnel in the Extension Service and the faculty/administration in higher education institutions which provided pre-service education for extension workers. The Kouzekanani and Miller paper looked at concepts and content areas for preparation of extension workers. And the Koehnen paper looked at characteristics of intermediate agricultural institutions which, by the employment record for their graduates, provide employees for the government extension services.

The story about the six blind men and the elephant might be appropriate. You may recall that the blind men were trying to decide what it was that was blocking their path. One, touching the elephant's tail said, "It's like a rope." Another touching the elephant's leg said, "It's like a tree." Another, feeling the elephant's side said, "It's like a wall." The fourth, touching an ear said, "It's like a big leaf." The fifth, touching the moving trunk said, "Really, it's like a curved large snake." Finally, the sixth blind man, touching a tusk said, "Really, it's like a curved metal tube." All were right but not one alone could describe the elephant. These three papers may each be addressing a part of the same "whole" system.

Al-Kafagy gathered data by utilizing the network of graduates from the Oklahoma State University Department of Agricultural Extension, resident in six developing countries: two Middle East countries, Iraq and Saudi Arabia; two African countries, Egypt and Nigeria; one Caribbean nation, Haiti; and one Asian country, Korea. The World Bank (1982) listed those countries as "middle income economies" except for two: Haiti which was "low income economy" and Saudi Arabia which was "high income oil exporter country."

The thirteen selected practices, though approved by the jury of experts as appropriate, may have had quite different meanings to the respondents in different countries. (Remember the blind men and the elephant!) And it would be helpful to the paper if the criteria for selection of the jury were made explicit as well as the number of jury members.

The opinionnaire provided respondents an opportunity to express two kinds of opinions: first, the extent to which each of the 13 practices were used within their countries; and second, the extent to which each of the 13 practices were desirable. Even though the author identified equal intervals for the responses, the nature of the data do not really permit such an assumption of equal intervals for the responses.

The population which was identified by the researcher was only generally identified to the reader. The reader was told there were 49 extension administrators from six countries and 59 university administrators and faculty. The distribution of these by country was not reported. Nor was a definition provided for extension personnel "in major responsible positions of administration."

One other question arises regarding the defined population. Four of the identified strategies included reference to experiment stations. I am curious as to why only extension administrators and university faculty were included as potential respondents. Is it any less important to have the perceptions of the experiment station directors regarding cooperation with the extension service and universities for the preparation of materials?

The presentation of the findings was done in a simple, straightforward manner. Perhaps the simplicity obscured some of the findings, or made it more difficult for the readers to grasp the full meanings from the paragraphs. A suggestion would be to identify the most positive findings, by concept not just by number, and to present these explicitly to the reader. For example, one of the 13 items was identified by the faculty as getting frequent usage. The same item, plus two more were identified by the extension administrators as having occasional usage. These two additional items were rated by the faculty as having "little usage." The three were in brief:

1. Requirement of a practical field experience in the pre-service extension training program.
2. The extension, research, and training institutions cooperate for the development of practical programs for farmers.
3. The extension, research and training institutions jointly determine the needs of farmers.

The discussion of the findings would have been enhanced by starting with a designation on the "model" of the administrative responsibility for each of the thirteen practices. (Who is on top and who is on tap.)

The findings regarding the "desirability" of the practices were quite positive. All thirteen items were reported to have been viewed by the respondent as either "Very desirable" or "Highly desirable." Or to say it another way, they were in favor of "motherhood and apple pie."

However, as a researcher, I wondered if there really were such unanimous results country to country, and by institutions within countries. How much variation was there within the responses by each category of respondents for each item?

The conclusions seem to be the area for which some caution must be urged. For example, the conclusion numbered 2 contained reference to country data which had not been presented. The conclusion probably is correct but the reader has not been provided any data previously for drawing the same conclusion. Other conclusions seemed to be drawn from data which were not presented.

One other kind of caution is expressed regarding the conclusions numbered 5 and 6. Perhaps there are errors in each of the tables which causes the conclusions to appear to be in error.

The recommendations for an additional study with greater refinement for analysis of data could be quite interesting. Especially if the population included representatives from all three types of institutions (extension, research, teaching); and the stratification included the nature or characteristics of the existing extension system.

There are other studies which have dealt with the training and visit system as an approach to extension program operation. Since this study did not deal with that approach, I think it best not to include this recommendation (#4).

In conclusion, this study helps clarify (a) the acceptability of the general principle for a close working relationship between the functions of knowledge generation and knowledge dissemination; and (b) the absence or limited accomplishment in the areas of coordination and cooperation among extension training institutions and the institutions responsible for extension programs. Greater use needs to be made of previous studies,

reports and publications which are descriptive of existing programs. The author is to be commended for making a personal beginning in the study of an important set of concepts.

The Kouzehanani and Miller paper is based on a study of the views of international extension education by two different populations: first, persons in U.S. institutions teaching in graduate programs in extension education and second, graduate international students in the same U.S. institutions studying extension education.

The research procedures (or process) were clearly described: identification of populations, development of the two five-part survey instruments, use of a panel of experts (nothing reported about the criteria for selection of the panel!), statistical tests for instrument reliability and internal consistency, data collection procedures (the relatively high rates of response from both populations is commendable!), and the use of descriptive statistics to summarize and interpret the data.

But I am troubled by the elephant and the blind men. I am not even sure about the elephant! Why am I troubled? First let's look carefully at the core of concepts which were to be studied. Five processes related to extension education programs were drawn from the U.S. context. The respondents were asked to indicate "the level of importance" for each of five processes as course topics.

1. Developing an institutional framework for program development
2. Documenting the extension program (program determination)
3. Developing an annual plan of work
4. Implementing the program
5. Evaluating the program

Next the respondents were asked to respond to 20 more specific topics as to "their level of necessity for graduate international students of extension education in order to assist them in learning and performing the foregoing processes." These were labeled "Course Topics" but perhaps would be more appropriately labeled "Topics for Courses." (See Table 2, p. 4 in paper).

Next, the respondents were asked to indicate "their level of agreement or disagreement" regarding "selected policies and characteristics of extension education systems as related to the Third World". The specific policies and characteristics were not listed but perhaps consisted of approximately 15+ items.

Finally, the respondents were asked to respond as to their level of agreement or disagreement with whether or not the extension education system could fulfill "seven educational needs of rural people (directly engaged in agriculture)." The report of findings deals with six areas of need, the seventh area is not identified. (Coombs, p. 17: Knowledge of government services, policies, programs, targets.)

Now, what is the elephant? The recommendation #1 appears to be correctly based on the data collected and reported. However, is the elephant a U.S. elephant, an Asian elephant, or an African elephant? The recommendations seems to be based on assumptions about the similarity of the role of the extension agent and of the operational context for the extension program. In one sense it is like having an objective to "teach the principles of agricultural science" while claiming to develop the competencies for applying the principles. Or perhaps the recomenations should be interpreted to mean that the international students should develop the competencies to perform the program planning functions WITHIN THE U.S. MODEL.

The other recommendations should be interpreted within the limitations of different political, economic and social systems. A paper by Pickering ("An overview of agricultural extension and its linkages with agricultural research: The World Bank experience" presented February 18, 1985 at the West Africa Seminar on Agricultural Extension, Ivory Coast) contains reference to six approaches to rural extension, namely:

- the commodity focused approach
- the community development-cum-extension approach
- the technical innovation centered approach
- the training and visit system approach
- the "animation rurale" approach
- and several other, more or less overlapping, approaches

My point is that though the underlying principles, general principles, need to be identified, their identification is a long distance from the competencies needed to implement the principles through practices appropriate in different political, economic, social and cultural situations.

The authors are to be commended for taking a first step in looking at the perceptions of extension education faculty and students who are together attempting to communicate. What appears to be concensus may in reality be a major gap in communication.

The paper by Koehnen is based on survey data received from 235 institutions out of an identified population of 445 institutions worldwide (excluding the United States). The survey focused on

descriptive data about school farm size, staff qualifications and minimal levels of education required for student entrance. In addition, opinion data were sought about problems with (adequacy and appropriateness of) tools, equipment, livestock and other capital items; adequacy and availability of instructional materials; and the employability of the graduates.

The six objectives appear to be supportive of the overall purpose of providing selected baseline data for describing intermediate agricultural schools, by regions, worldwide.

One additional item, if it could have been secured would have added an important detail to the baseline data: the objectives for each of the institutions. In other words, what are the objectives which would in turn provide a basis for measuring outcomes anticipated by those who manage the institutions.

The role of intermediate agricultural schools within both the educational and agricultural systems of each country need to be clarified. We are well aware of the upward tendencies for junior colleges to become colleges and for colleges to become universities. The defined role of an intermediate agricultural school might be quite different from country to country. Likewise the level of human resource development in the country, or the extent to which persons professionally trained in agriculture are available for placement, will directly impact on the nature of the qualifications of faculty at intermediate schools of agriculture.

The report on the study should be widely distributed to institutions in developing countries and to interested donor organizations. Before it is distributed there are refinements which I believe could be made to make the data even more meaningful.

One of the refinements which would be very helpful to the readers would be some additional distinctions regarding the level of programs within specific institutions. In other words do some of the institutions have more than one level of program, i.e. programs which require different amounts of schooling for entry? Then the information about placement of graduates might be linked to the level of the program in which they participated

The presence or absence of a school farms is useful information. In addition, what is the purpose of the school farm? Is the farm primarily used as a source of revenue to help pay the bills to operate the school? Or is the farm to serve as an outdoor laboratory for the students? The data about amount of land is very helpful as a key to the "potential" for use in conjunction with the curriculum.

There appears to be a small problem with the responses for ranking the availability of instructional materials. The five categories for response are not mutually exclusive. And one of the five items refers to a library rather than specifically to availability of materials. The potential confusion, if the respondents were asked to check only one item, may have contributed to the low level of response.

The information about qualifications of the staff appear to be quite helpful. However, based on a recent experience by the reviewer in the Caribbean, a distinction between full-time and part-time staff would add a desirable dimension to the data. Often the part-time staff are very valuable but also may create many problems. The problems are associated with continuity in courses, lack of a sense of responsibility for teaching, and others.

Africa had 75 (32%) of the institutions which responded and 23% of all staff reported. Asia had 57 (24%) of the institutions which responded and 29% of all staff reported. Latin America had 103 (44%) of the institutions which responded and 48 percent of the staff. Even though the African based institutions had 66% of all the faculty with doctorates, I have an uneasiness about those figures. I wonder if most of those were concentrated in a few institutions. The other data would make it appear that perhaps the African institutions were really understaffed. Additional information would be needed in order to look more specifically at the productivity of the institutions (number of students, number of graduates and occupational placement of the graduates).

The conclusions drawn by the research seem modest and within the scope of data presented. If the nature of the data collected permit additional analyses I would encourage such treatment of the data before wide distribution of the results.

This is a good beginning with a nearly impossible task: the collection of data about a specific type of agricultural education institutions from a world-wide perspective.

Overall Comments

Now, more about the elephant and the blind men. The formal and non-formal agricultural education programs, and the basis for the curriculum and programs have been the subjects for these three reports. The larger picture or holistic approach for understanding the specific programs which were reported is difficult to envision. The difficulty, in part arises from the topsy-turvey nature of the parts in the larger concept.

Coombs and Ahmed in 1974 asked for a systemwide view of agricultural education. They wrote that "agricultural education is largely segregated--institutionally, professionally and organizationally--from other fields of learning..." (p. 238) More than 10 years later, not much progress has been made in putting some focus to the agricultural knowledge dissemination institutions. And very little progress on national fronts for putting focus to both the agricultural knowledge generation and knowledge dissemination. In other words research, teaching and extension are fundamentally isolated in most developing countries.

These three studies touch upon parts of what must eventually become a systematic approach to developing and disseminating agricultural knowledge, acknowledging the in-country characteristics of political, economic and social systems as well as culturally related factors.

Perhaps than we could all see the elephant more clearly rather than just touching the parts.

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Agricultural Development for Whom?

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Economic development projects in agriculture have all too often had a negative effect upon the subsistence farm families who make up much of the population in developing countries. Efforts to help large plantation owners to produce export crops improves the life of people in the capital and port cities of a developing country and frequently the country providing the aid. The purpose of this paper is to document through references from a variety of sources how and why programs have been detrimental to the peasant farmers of the world and the importance of giving a major share of technical assistance to them.

The topics to be covered in this paper are:

1. New colonialism
2. Urban bias
3. Socio-cultural considerations
4. Understanding the peasant farmer
5. Staffing extension position
6. Educating agriculturalists to prevent "brain drain"
7. Providing credit sensibly
8. Implications for educational and technical assistance

1. New Colonialism

World Bank assistance and other sources of aid are designed to be, and have been, cost effective to the aid source. If aid is cost effective to the aid source, one has to wonder how beneficial the assistance is to the developing country. Western countries continue to mine the natural resources and human resources after independence as thoroughly as in colonial times, the difference being that they have less responsibility for the disruption of society and the environment than before.

The relationship between rich and poor countries is increasingly commercial (Struggle for Economic Development, p. 392) Delmonte and other food companies are growing crops in Mexico and elsewhere for the U. S. market. Mexicans can only eat the strawberries that cannot be exported to the U. S. Even strawberries that go to Europe come to the U. S. first because of the hold U. S. firms have on strawberry growing in Mexico. Multinational agribusiness took up where colonial powers left off. These firms do not own the land. Local people grow on contract, thus leaving no property subject to nationalization.

The Bengal famine of the 1940's was because of export at high prices. There was enough food, but it was sent out of the country (Lappe', 1977). Lappe' (1977) reported that Costa Rica sold so much beef for American hamburger that it was not producing enough milk for its population.

2. Urban Bias

Cities exploit rural areas by getting cheap food, and foreign exchange from them. Even the children of the rural areas become the medical doctors of the cities either within the

country or in the developed countries. The owners of large plantations are the willing accomplices of the urban elite.

A World Bank book (1975, 29) had this to say, "too often government policies discriminate against development, particularly in agricultural development in rural areas. They are designed to provide assistance to manufacturing and processing industries or to raise government revenues. As such they tend to raise the cost of agricultural inputs, relative to output prices, making innovation unrewarding and highly risky for the farmer."

3. Socio-cultural Considerations

Even in the United States contour farming was slow to be adopted because it did not look tidy. When the appeal was made that fathers hand their land intact to sons, it worked. The sociologist and the anthropologist must team with the technician and economist or little progress will be made. Socio-cultural considerations are necessary to introduce techno-economic changes.

In Sumatra in 1939 an attempt was made to introduce the threshing machine. It failed because threshing by feet was a social occasion. That was where young people met partners. (Timmer, 1982).

A social impact statement, similar to environmental impact statements required in the United States would be appropriate for all projects in developing countries. An economic impact statement would be appropriate as well, but should not be a joint committee and joint report because of the possibility of dominance by the economists.

4. Understanding the Peasant Farmer

Peasants are rational. We must allow for security when we try to understand decision making. For a subsistence farmer, average projected return over a number of years is less important than the need to maintain a basic minimum level in every year. Peasants could earn more averaged across years if they planted millet alone, but they mix in beans in case of millet failure. That way, at least they won't starve (Rural Development, 1982). Diamond (1984) described peasants as having pride, cultural dignity, personal integrity and the skills necessary for survival. The presence of the peasants is proof of their skills of survival under past circumstances.

Peasants try to maximize the net utility of work and leisure. The object is to have enough to live on. Labor is not thought of as an input.

A Russian by the name of A. V. Chayanov who was placed in charge of a Russian flax growing project during World War I discovered that regular accounting methods could not be applied (Chayanov, 1966). Ninety percent of crop land in 1916 belonged to peasants, thanks to the Emancipation of the Serfs in 1861. Labor was provided by the families and there was little alternate use of labor. Use of labor which was abundant on most farms and had no money value placed upon it could vary to meet consumption needs. Once needs were met, further labor was less likely to be expended.

A labor-consumer balance was the heart of Chayanov's theory. "Each family strikes a rough balance or equilibrium between the degree of satisfaction of family needs and the degree of drudgery

of labor." (Chayanov, p.xvi) Maintaining a constant level of well-being was the objective of the peasant.

In summary, the peasant farmer cannot risk the well-being of the family by making sudden and radical changes in practices. Changes must be seen as having the likelihood of satisfying family needs. If the family does not recognize a need or have an adequate incentive, changes are not likely to take place.

5. Staffing Extension Positions

Both subsistence agriculture and the factory-in-the-field must be served by extension activities. The commodity approach to extension staffing is common, but the other approach which uses general agents with specialists for back up is necessary, especially to be of help to the peasant farmer.

Extension agents should never be in an enforcer role, otherwise people will be uncooperative and distrust the agent. Incentives, not penalties, are necessary and people giving advice must be trusted. They must be perceived as helpers of the people. Timmer(1982) indicated that when people are asked to produce more when they do or see a need for more, or even more income, they suspect the extension worker of being interested in increased taxation. Extension personnel must work with the farmers in the situations which they find them to first solve small problems which are recognized by the farmers, thus proving their intentions of helping farmers to help themselves.

6. Educating Agriculturalists to Prevent "Brain drain"

An education is a one-way ticket out of agriculture in developing countries and to some extent in all countries. Three-R education makes farmers' sons not want to get their hands

dirty (Timmer, 1982). What is needed is some vocational education along with three-R education which builds an appreciation of agriculture. Reserving part of an education for the adult level will prevent people from leaving the community. Furthermore, education for adults has the potential of immediate return, whereas the return of education invested in children is delayed. Streeten (1966, p.65) said, "Education, which is now often advocated as a panacea, may simply result in a group of educated unemployed and unemployables, as in India. Equipment may lie unused and unmaintained. Irrigation water flows unused and reservoirs are silting, because 'investment' has not been coordinated with the right kind of education..."

There is a need for professional agriculturalists to work with farmers. Robert McNamara in a 1973 Nairobi speech (World Bank, 1975, p.96) said, "There is scarcely a single developing country which does not produce too many lawyers, but there is no developing country which produces enough extension agents." He went on to say that in the U.S. there is one extension agent for each 400 farmers while in developing countries there is one extension agent for each 8,000 farmers.

7. Providing Credit Sensibly

Peasant farmers and other farmers have been placed in debted bondage by their landlords, their governments, and other lenders. Admittedly, the local money lender performs a valuable service because small farmers cannot cope with the paper work to get loans from larger lending sources. Lending to small farmers is expensive. According to a World Bank report (1975) it is necessary to get 15-22 percent interest to pay for such loans.

Reasonable credit needs to be provided for those who have been charged exorbitant rates. Subsidized interest is one possible solution. Credit should be viewed as an integral part of a continuing process to help(not force)farmers to adopt appropriate technology. A better way for providing help to peasant farmers is to make grants for inputs such as fertilizer. Such grants of inputs must be reliable in quality and timeliness.

8. Implications for Education and Technical Assistance

Agricultural assistance programs should help the common people in the country being assisted. The programs should be analyzed to see if their effect will be to destabilize the peasant society and worsen the situation. Causing peasants to grow export crops, especially non-food crops or causing them to have to work on large plantations to grow export crops is seldom to the advantage of the peasant.

Assistance is not for the sake of agriculture or education but for the sake of people--their nutrition, health and well-being. Assistance must help the people in general. Assistance is not for the sake of the elite, the plantation owner, multinational agribusiness, the aiding country or the benefit of the agricultural education experts of the aiding country.

Informal education for adults that is consistent with the social situation and which utilizes local input and cooperation is desirable. Informal continuing education is not education for export as is more formal education. If it were possible to provide the highest educational opportunity for nearly all,

every person having reasonable ability would be removed from the rural area.

Large-scale agriculture can be undertaken for improved nutrition of the people or it can be undertaken to exploit the rural people for the benefit of the elite. Both plantation agriculture and peasant agriculture need assistance. Assistance to peasant farmers and their families should have a high priority.

Agricultural development should ultimately be directed toward the masses. The masses in the developing countries make their living directly from the land. They are the subsistence farmers. The market economy may collapse because of a variety of reasons, but the subsistence farm families that have a long history of survival should be aided in their survival. Improvement in their numbers and condition should be a goal, if not the goal of aid programs.

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A TRAINING PROGRAM FOR EXTENSION AGENT PARTICIPATION
IN FARMING SYSTEMS RESEARCH

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Introduction

Farmer involvement must be a part of the total coordinated effort, where Research, Training and Extension work closely together to resolve the many constraints that beset each farmer. This wholistic program-development approach is called Farming Systems Research/Extension.

The individual farmer becomes the focal point for Farming Systems Research/Extension programming, where Research and Extension and the farmer work closely together to provide support to a more natural approach to technology development, where each farmer is assisted to move from his/her real situation to a more ideal condition, based on his/her ability and/or economic feasibility.

If Farming Systems Research/Extension is to be an effective tool for program development, all who are involved must not only understand the process for involvement but must also be able to work together as a team. Basic to this understanding and commitment is a knowledge of how each person can/should be involved and how they can best work together to resolve the many constraints of each farmer.

The Field Extension Agent is a key team member for correlating this programming effort. He/she must have both technical subject matter skills as well as program development process skills. Many of the Somali Field Extension Agents have had fairly good theoretical subject matter training, but generally little practical application. If they have had any Extension training, it has usually been the kind that shows how to deliver a technical package to a farmer or a farmer group-- usually by lecture or demonstration. Not only does the Field Extension Agent have very little practical experience, he also has very limited (generally none) training or experience in any problem-solving procedure or technique. I found the Field Extension Agent's work fairly well on the classroom chalkboard, but resemble a Chinese Fire Drill when first attempting field application.

Because Farming Systems Research/Extension demands a team effort (including the farmer, extension agent, and researcher), it is imperative that the Field Extension Agent provide the crucial liaison support to this problem-solving team. In so doing, it is most important that he/she has the appropriate skills to carry out this liaison function of diagnosis, design, testing, and recommendation.

Problem Solving--An Effective Tool

The participative problem-solving mode of teaching requires a nearly equal teacher-to-student relationship that is not generally practiced in Third World Countries. The kind of group decision making practiced is, in its best example, a learning group mode that cooperatively identifies important questions that represent problems are relevant and important to the participants and also, therefore, to the teacher. The teacher provides a rationale and structure within which

students, guided by the teacher, identify solutions and evaluate criteria, weigh the relative value of the criteria, and, individually, select an answer (alternative solution). Ideally, the ensuing debate has as its purpose the best solution as supported by logic, not by consensus or compromise. All of this process requires group goal setting, a clear understanding of purpose, full and free discussion, and appropriate confrontation for the purpose of finding the best answer. The teacher must assume a helping posture, not a directing one. I found the Somali Extension staff very adept at understanding and implementing this kind of informal group process. The training component of this research, training, and extension has been successful to a degree not yet true for research and extension.

Purpose

The training program described in this presentation was conducted in January and February, 1985, in Somalia as a part of Utah State University's Extension support of the Agricultural Extension and Farm Management Training Project.

The Agricultural Extension and Management Project is a multi-donor project that includes Applied Research, Training, and Extension. To be well developed, the Extension effort depends on the functions of Applied Research and Training. The emphasis being given to Applied Research includes both the farmer and all levels of Extension from the Field Extension Agents to the District Extension Officers to the Regional and National Extension Officers. This approach to program development is called Farming Systems Research/Extension. Farming Systems Research is seen as the method to define appropriate recommendations.

Training for Field Extension Agents is conducted by District and Regional Extension Officers for two days each month. Annual four-week training is provided for Regional and District Extension personnel and for Subject Matter Specialists. Additional seasonal training is conducted as deemed necessary by on-site staff.

The assignment was to conduct a training program designed to prepare extension agents to work effectively as part of a Farming Systems Research program. To accomplish this, the following objectives were identified:

1. Develop critical thinking ability.
2. Teach problem-solving teaching skills.
3. Teach retention and transfer theory.
4. Orient to Farming Systems Research.
5. Define role expectations of extension agents as team participants in Farming Systems Research.
6. Apply teaching method practice to maize production technology and training of Field Extension Agents during monthly two-day training.

The project rationale specified observation of District Extension staff conducting January monthly training in the Middle and Lower Shebelle regions, Johar and Janale, followed by 19 days of training. On completion of training, observation of the subsequent regional February

monthly training was to be evaluated and pre- and post-assessment comparison made to evaluate change attributable to the workshop conducted.

The questions used to compare the two monthly training sessions were:

1. Were team members used to teach?
2. Was content appropriately timed to enable communication to reach farmers prior to the activity trained for?
3. Were problem-solving methods used as a teaching approach?
4. Did discussion take place during presentation?
5. Was there any mix of skill training with classroom presentation?
6. Was the next Monthly Training planned or tentatively planned during this Monthly Training?
7. Was there evidence of any determination of FEA skill level prior to deciding what to teach and how to teach it?
8. Was systematic procedure used to obtain farmer adoption percent as guide for selecting what to teach?
9. Was any pre-assessment made during present Monthly Training to determine emphasis for next Monthly Training?
10. Was there any evidence during lesson presentation to determine/manage the skill/interest level of individual participants and make appropriate adjustments?
11. Did SMS/DEO (Instructor) make (ask for student) conclusions, focus, summarizations, extension of subject matter (methods to reach farmers) and generalizations?
12. Was a time schedule developed/followed?
13. Was the subject matter broken down into small but meaningful increments to insure retention?
14. Did presentation include Try-Out/Practice step?
15. Was the Followup/Review/Evaluation step included?
16. Did the Instructor prepare the participants at the beginning of the presentation?
17. Is there any evidence that a team approach is being used to reach individual farmers (SMS/DEO/FEA/Farmer), i.e., what methods do we/should we use to extend information/practices to farmers?

- a. Need identification
- b. Sharing/extending information
- c. Evaluation
- d. Etc.

18. Did sufficient first-time learning take place?

The 1985 annual training program for District and Regional Extension Officers and Subject Matter Specialists was the second annual training program conducted by the Project. The first such program focused on a Model for Change and taught the Somali staff how to develop instructional objectives.

This 1985 annual training was conducted as a combination of theory and practice. Each agent taught two lessons and critiqued several presentations. Problem solving was demonstrated by videotape models of problem-solving teaching modes and by the workshop leader. Simulated meetings between field agents and farmers were demonstrated using District Extension Officers and Subject Matter Specialists as participants.

The participative problem-solving teaching mode demonstrated, taught, and practiced in this training focused on farming practices and agronomic inputs to increase production and profit. Irrigated maize production, in the Lower Shebelli Region (Janale), provided a specific focus on one crop. The agronomist was available throughout the 19-day workshop to act as a resource while Jobs, Operations, and Key Steps-Key Points lists were developed within the problem-solving process of group activity. Staff members' beliefs regarding practices and inputs to recommend were challenged as to how certain they were of those recommendations. Confrontation, as a positive element of learning-group activity, was reinforced. Three days were devoted to field activities focused on planting in straight rows, laying out a field for disc plowing, laying out a comparison trial, sampling and harvesting a comparison trial, and calibrating a backpack sprayer.

The participants developed Job Sheets for seven pre-selected production practice processes, expanded them into Key Step-Key Points lists to fit a teaching format taught as "Steps Leading to a Process," and then were asked to expand this to a complete lesson. Finally, the agronomist edited their lists and these became support resource materials that had, because of the participant involvement in their involvement, real meaning and usefulness.

Field exercises were conducted to demonstrate field layout for disc plowing, calibrating backpack sprayers, planting in rows, laying out trials, and sampling and harvesting comparison trials.

Educational Implications

The results of the training program were gratifying. During the Janale two-day Monthly Training in January preceding the annual training program, the Subject Matter Specialist did all the teaching of Field Extension Agents. In the February monthly training, four District

Extension Officer, who had never before participated in the teaching, made excellent presentations. They used good discussion techniques, including problem solving and strong participation by the Field Extension Agents/students. The instructors used student input to define problems to be solved and used good structuring techniques to guide discussion. A combination of classroom and field application was used. Simulation of extension agent interaction with a farmer, to obtain cooperation in conducting a comparison trial on the farmer's land, was conducted. They had initially practiced this activity during the annual training conducted between the January and February monthly training sessions.

The District Extension Officers in the Middle Shebelle Region taught selection of appropriate tillage--Yambo or Disc Plow--in a variety of example situations using a combination of advantages/disadvantages to introduce the lesson and the possibilities/factors problem-solving method to select among yambo, disc harrow, disc plow, and mold board plow for particular soil problems. Again, four District Extension Officers participated in the teaching. Good discussion resulted from the participative problem-solving techniques used.

Pre and Post-Assessment

The following results were obtained from the pre- and post-assessment conducted during the February, two-day, monthly training prior to the 19-day annual training and the subsequent February training of Field Extension Agents conducted after annual training. The criteria used provide some idea of the objectives for the 19-day annual training. The criteria were evaluated on a three-point scale--low, medium, and high. The combined evaluation for both regions is Appendix. Table 1 illustrates the progress made from the January monthly training workshop conducted in the Johare region reported in this paper to the post-assessment conducted by the trainees following the workshop.

Orientation and preparation for Field Extension Agent support of Farming Systems Research/Extension was emphasized during the last portion of the training program. The results of this training can only be assessed during the remainder of the Project as Farming Systems Research is implemented. Participants were informed of the pilot project surveys recently conducted in three villages to identify Domains and Standard and Target Farmers prior to team activity to design and test farming practices and finally to recommend farming practices. The Extension staff were told of their necessary participation as an important member of a team effort, to support the Farming Systems Research/Extension process to improve farm production.

Table 1

Pre and Post-Assessment to Evaluate the 19-day Training Program
Johare (Middle Shebelli) Region

Criteria	January			February		
	Low	Med	High	Low	Med	High
1. Were team members used to teach?	x				x	
2. Was content appropriately timed to enable communication to reach farmers prior to the activity trained for?		x			x	
3. Were problem-solving methods used as a teaching approach?	x					x
4. Did discussion take place during presentation?		x				x
5. Was there any mix of skill training with classroom presentation?	x				x	
6. Was the next Monthly Training planned or tentatively planned during this Monthly Training?	x				x	
7. Was there evidence of any determination of Field Extension Agent skill level prior to deciding what to teach and how to teach it?	x			x		
8. Was systematic procedure used to obtain farmer adoption percent as guide for selecting what to teach?	x			x		
9. Was any pre-assessment made during present Monthly Training to determine emphasis for next Monthly Training?	x			x		
10. Was there any evidence during lesson presentation to determine/manage the skill/interest level of individual participants and make appropriate adjustments?	x					x

Table 1 (continued)

Criteria	January			February		
	Low	Med	High	Low	Med	High
11. Did Subject Matter Specialist/District Extension Officer (Instructor) make (ask for student) conclusions, focus, summarizations, extension of subject matter (methods to reach farmers) and generalizations?	x				x	
12. Was a time schedule developed/followed?	x				x	
13. Was the subject matter broken down into small but meaningful increments to insure retention?	x				x	
14. Did presentation include Try-Out/Practice step?	x				x	
15. Was the Followup/Review/Evaluation step included?	x				x	
16. Did the Instructor "prepare" the participants at the beginning of the presentation?	x				x	
17. Is there any evidence that a team approach is being used to reach individual farmers (Subject Matter Specialist/District Extension Officer/Field Extension Agent/Farmer), i.e., what methods do we/should we use to extend information/practices to farmers?						
a. Need identification	x				x	
b. Sharing/extending information	x				x	
c. Evaluation	x				x	
d. Etc.						
18. Did sufficient first-time learning take place?	x				x	

The Next Step in Training

Farming Systems Research/Extension will be implemented through the leadership of the Farming Systems Economist during the remainder of the Project. It is recommended that a followup three-week intensive training program be conducted in January-February 1986 as follows:

Extension in Farming Systems Research/Extension

1. Review the meaning of teaching for transfer, decision making and problem solving. Make applications to the role of Extension Agents in the diagnostic or survey, design, testing and extension stages of Farming Systems Research/Extension.
2. Use case studies to teach the kind and level of cooperation needed to support the Researcher/Extension Agent/Farmer team effort needed to accurately survey, design, test, and extend Farming Systems Research/Extension.
3. Role play the team activity identified in the case studies of successful Field Extension Agent, Farmer, Researcher teams.
4. Develop survey techniques designed to obtain accurate information for the diagnosis stage of Farming Systems Research. Simulate interviews and survey techniques that combine observation with interviews to obtain accurate status information.
5. Use data collected to review Domains, Standard Farmers, and Target Farmers and test the usefulness of this categorization in effecting change.
6. Study and practice group-leading skills needed to teach Field Extension Agents how to identify and design, as a member of the Researcher/Extension Agent/Farmer team, a variety of enterprise combinations--annual crops, perennials, multiple cropping in its various forms, livestock as a part of the farming system, and non-farm labor demand activities as well as critical labor demand periods for all enterprises conducted by the farmer.
7. Use Possibilities/Factors problem-solving method and enterprise analysis to evaluate the results of comparison trials completed.
8. Review the appropriate Extension methods and strategies for extending recommendations derived.

Educational Implications

The educational implications of this experience are as follows:

1. There appears to be some lack of appreciation for training as an articulated part of research and extension in development projects. The experience reported in this paper provides support for the efficacy of training and teaching methods as a needed part of an articulated research and extension project.

2. Somalia and their world donor-supported agricultural projects can make good use of vocational agriculture education traditional teaching methods instruction to help prepare Extension personnel for a role in Farming Systems Research.

3. Personnel training can be successfully accomplished given appropriate commitment of trainee time and systematic application. The training deserves a priority emphasis but must be an articulated application to research and Extension for projects that use farming system research.

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Appendix

Evaluation of Monthly Training

January (+) and February (✓)
MonthMiddle Shebelli
Region

Instructor				Remarks/Suggestions/Recommendations
	I.	M	H	
1. Were team members used to teach?	+	✓		
2. Was content appropriately timed to enable communication to reach farmers prior to the activity trained for?		✓+		
3. Was participation problem solving used as a teaching approach?	+		✓	
4. Did discussion take place during presentation?		+		
5. Was there any mix of skill training with classroom presentation?	+	✓		
6. Was the next Monthly Training planned or tentatively planned during this Monthly Training?	+	✓		
7. Was there evidence of any determination of FEA skill level prior to deciding what to teach and method of preparation?	✓+			
8. Was systematic procedure used to obtain farmer adoption percent as guide for teaching?	✓+			
9. Was any preassessment made during present Monthly Training to determine emphasis for next Monthly Training?	✓+			

	I.	M	II	Remarks/Suggestions/Recommendations
10. Was there any evidence during lesson presentation to determine/manage the skill/interest level of individual participants and make appropriate adjustments?	+	✓		
11. Did SMS/DEO (Instructor) make (or have someone else) conclusions, focus, summarizations, extension of subject matter (methods to reach farmers) and generalizations?	+	✓		
12. Was a time schedule developed/followed?	+	✓		
13. Was the subject matter broken down into small increments for ease of teaching/understanding?	+	✓		
14. Did presentation include Try-Out/Practice step?	+	✓		
15. Was the Followup/Review/Evaluation step included?	+	✓		
16. Did the Instructor prepare the participants at the beginning of the presentation?	+	✓		
17. Is there any evidence that a team approach is being used to reach individual farmers (SMS/DEO/FEA/Farmer), i.e., what methods do we/should we use to extend information/practices to farmers?				
a. Need identification	✓ +			
b. Sharing/extending information	✓ +			
c. Evaluation	✓ +			
d. Etc.				
18. Sufficient first time learning depth takes place.	+	✓		

Evaluation of Monthly Training

January (+) and February (✓)
Month

Lower Sheballi
Region

Instructor				Remarks/Suggestions/Recommendations
I.	M	II		
1. Were team members used to teach?	+		✓	
2. Was content appropriately timed to enable communication to reach farmers prior to the activity trained for?	+	✓		
3. Was participation problem solving used as a teaching approach?	+		✓	
4. Did discussion take place during presentation?		+	✓	
5. Was there any mix of skill training with classroom presentation?		+	✓	
6. Was the next Monthly Training planned or tentatively planned during this Monthly Training?	+	✓		
7. Was there evidence of any determination of FEA skill level prior to deciding what to teach and method of preparation?	+	✓		
8. Was systematic procedure used to obtain farmer adoption percent as guide for teaching?	✓+			
9. Was any preassessment made during present Monthly Training to determine emphasis for next Monthly Training?	+	✓		

	I.	M	H	Remarks/Suggestions/Recommendations
10. Was there any evidence during lesson presentation to determine/manage the skill/interest level of individual participants and make appropriate adjustments?	+		✓	
11. Did SMS/DEO (Instructor) make (or have someone else) conclusions, focus, summarizations, extension of subject matter (methods to reach farmers) and generalizations?	+	✓		
12. Was a time schedule developed/followed?	+	✓		
13. Was the subject matter broken down into small increments for ease of teaching/understanding?	+		✓	
14. Did presentation include Try-Out/Practice step?		+	✓	
15. Was the Followup/Review/Evaluation step included?	+	✓		
16. Did the Instructor prepare the participants at the beginning of the presentation?	+		✓	
17. Is there any evidence that a team approach is being used to reach individual farmers (SMS/DEO/FEA/Farmer), i.e., what methods do we/should we use to extend information/practices to farmers? a. Need identification b. Sharing/extending information c. Evaluation d. Etc.	✓+			
18. Sufficient first time learning depth takes place.	+		✓	

The Effect of Colonization on Rural Women
In Africa and the Implications This Presents
For Agricultural Education

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Purpose

Colonization had a detrimental impact on the economic development of rural women in Africa. However, with colonization have come new challenges and opportunities for rural women. This paper will focus on those opportunities and present some factors that have prevented rural women from taking advantage of those opportunities. In addition, the paper will offer specific implications for the role of agricultural education in assisting rural women in Africa to better utilize the opportunities that do exist.

This paper will present a review of the literature related to this purpose and is not a report of a research study. However, because of the insight this presentation can offer, it is an appropriate place to begin to launch research efforts.

The Issue

Basically, the economic activities of the rural women in Africa during the pre-colonial era can be divided into three broad categories: farming and food processing, domestic chores and petty trading. The degree to which these activities were carried out depended on the kinship pattern (Patrilineal, matrilineal or bilateral) and the economic pattern of the community (agricultural, pastoral, gathering and hunting or fishing). The kinship pattern also determined a woman's access to certain types of resources usually; right to land (from husbands or natal or both), food from communal farms, labor and how income generated from her farm was utilized. Each member of a kinship had a defined role of what they were expected to do. For example, Hemmings and Gapihan (1977) who studied the Gulmatche found that the division of labor was based on sex and age.

Farming was shared by all members; the women grew millet and peanuts while men grew cotton and tobacco. In areas where Muslim seclusion was observed, women did not work much on farms (Guyer, 1984).

As a result of colonization, the traditional economy which was based mainly on the barter system was displaced by the introduction of a cash economy. Because men were forced to pay taxes, most of them had to abandon their communal effort of food production to take up cash crop production or go to work for wages. In certain parts of Africa like in South and East Africa, fertile lands were taken away from the people by the colonists and thus forced the men to migrate in search of a wage-earning job either on a plantation or in the mines, thus breaking down the traditional communal pattern of production and moving to an individualistic production pattern. Women no longer had access to male labor, they had to take over some of the activities which men were performing plus farming their land, caring and feeding the young and old and training to earn some income. All these activities increased women's work loads. To add to all these difficulties, the rural women were particularly vulnerable to being displaced from their land. The gap between

sexual division of labor was greatly increased because of the sexist attitude of the colonists. Females were forced to take up crop production basically to feed the family. They were already farming, they just had to do more. There was very little profit (money) in food cultivation at that time.

In areas such as South Africa where large acres of fertile land were taken from the indigenous people and the men were forced to migrate, colonization was disastrous to women. However, Guyer (1984) points out ". . . colonial intervention gradually weakened traditional patriarchal control over women, lessened the possibilities of torture and slavery." Today, in both matrilineal and patrilineal areas, the freedom of rural women to search for a market where they are able to get fair prices instead of "farm gate" prices has increased. Because of the income generated from selling their products in urban markets, some rural women are willing to increase their cultivation (Bryson, 1979). Women heads of households who had little opportunity during the pre-colonial era are now able to engage in economic activities from which they can generate enough income to see their children through school. If nothing else, colonization helped to stimulate the potential of rural women to be more productive, creative and to value education. The traditional spirit of cooperation and collective efforts have also increased greatly because rural women now recognize the importance of such a relationship for present day survival.

Educational Importance

As previously mentioned, migration of the active and skilled men from rural to urban areas has resulted in the increase of labor and responsibilities of women and children in rural areas. With continuous outward migration, the role of women in agricultural production and as providers of food for the family will become very crucial for family survival, thus making the integration of women in agricultural education, training and development a prerequisite for success in attaining self-sufficiency in food production for many African and other developing countries. Historically, it is clear from literature and experience that agricultural extension services have been provided for men. Women have, to a large extent, been excluded intentionally (when government and international development policies direct all extension efforts toward cash crop production) and unintentionally (when extension agents want to help the women but cannot because of their narrow and inadequate training in agriculture) from the educational program provided by this institution. The challenge to agricultural educators and institutions is how and what type of agricultural educational programs and training should be provided for rural women in Africa to make use of the stimulated productive and creative potentials, resulting from the changing socio-economic and political situations. Before planning educational programs and projects for women, educators must recognize the following factors and characteristics of rural women in Africa, especially as they affect the failure or success of any program:

1. Most women in rural areas who are engaged in food crop production in Africa are illiterate. According to the report by Niehoff and Neff (1978), there are "over 500 million illiterate women in the world who do not and will not have access to formal education for a variety of reasons, ranging from lack of facilities and services to high cost, and lack of child care."

2. There is a cultural and class-related variation in the sexual division of labor in agriculture for men and women. However, these variations in roles tend to be complementary in nature.

3. Women are recognized as important contributors to decision-making and farm management in traditional agriculture. Mintz (1978) found that women in West Africa had the right to use as they like, their own market profit and their own properties. These women (both Muslim and non-Muslim) can reinvest their profit in acquiring farm land for cultivation or educating their children. This sense of ownership helps to strengthen women's access to decision making and serve as a motivating factor.

4. Rural women in Africa possess three distinct learning characteristics--that is, they are goal, activity and learning oriented and are known to have individual goals and aspirations and want to engage in educational activities that will result in vocational improvement.

5. Certain educational programs for women (example, many home economics programs for women in Africa) perpetuate segregation between the sexes.

6. Orienting agricultural education programs to men diminishes agricultural productivity since this approach tends to neglect women who produce 47% of the food in Africa (F.A.O., 1984).

7. Women play critical roles in food production, processing, storage and preservation, and food preparation. However, they lack access to production resources such as land, extension services and training, appropriate labor saving technology and devices, credit and loans.

8. Due to the outward migration of men, the number of women heads of households and farm managers is on the increase, especially in southern Africa.

Implications

These factors point to the importance and crucial role of non-formal education as a suitable and highly recommended type of education for rural women. The fact that most women are illiterate limits their ability to participate in most training programs (provided by the agricultural extension service or other development agencies and training centers) since the programs usually require some literacy level.

Apart from this reason, non-formal education is the only cost effective means for women in developing countries by which a pragmatic type of education can be used to develop the vocational skills of women and others. Thus, there is the need to redesign the curriculum and teaching methods--requiring more use of effective communication and practical field demonstration.

The major issue of providing non-formal educational programs for rural women in Africa has been the lack of a suitable means to provide training in agriculture. It is generally recognized that third world countries can no longer continue with the colonial approach of home economics training for rural women. Thus, before home economics services can be useful as a means of providing agricultural and other educational training services for women, it is important that the home economics approach be broadened to integrate agriculture into its training program. This would help to avoid the possibility of restricting women to the stereotype of housewife.

Since there is a shortage of women agricultural extension agents, a short term solution to this problem would be for researchers in education to look into ways of using and training the large proportion of human resources that exist, the illiterate, functionally illiterate and mature women as recruits in extension services. In training and recruiting these women, it would appear that the problem of recruiting trained extension agents (such as the literate and young) will be reduced because these women are less likely to migrate to the urban areas. Though it is necessary to train and recruit more women extension agents, it is not advisable to restrict their clientele--that is female agents to work with women and male agents with men (except in situations where this behavior is regarded as the proper cultural norm). Efforts should be made to integrate both men and women in training programs.

It is also important that planners of educational programs for rural women develop a working philosophy of the aims of education for women. According to Sutton (1982) and Lewis (1981), these are some suggested questions that can guide educators and planners of rural women's programs:

- What does education aim to achieve in the short and long term?
- Who controls strategic resources?
- Who benefits from the new practices?
- Who actually implements new practices?
- Who is penalized by new practices?
- Should there be women's courses, and are they educationally and economically worthwhile?

Because of the diversity of the cultural backgrounds of African society, educational plans should be modified to suit the different interest, needs and competence of rural women. Programs should be built on their experiences and skills--such as the marketing skills of the West African women. Vocational training with little cost and time investment which does not require women to leave their families for days but includes demonstrations on women's farms or within their environment are more suitable. Training should aim at making rural women self sufficient and provide the possibility of transferring the skills learned with the ultimate goal of achieving some satisfaction. The women should be trained in acquiring problem solving skills to enable them to participate in identifying problems, solutions and evaluating their programs. Rural women require more functional and beneficial literacy classes and training rather than general reading skills. According to Mintz (1971), "West African market women display a firm grasp of economic principals having to do with capital as opposed to money . . . showing substantial economic independence but restricted opportunities for the enlargement of enterprises."

There are many vocational skills which can be taught to rural women which do not require literacy (or a high level of literacy) that can be profitable in generating income for these women. Carr (1984) identified the following income generating areas for rural women: fish smoking, processing of game, oil and spices, pickle making, baking, solar drying of coconut, preservation of fruits and vegetables, cloth and clothing fiber production and production of building materials.

Women should be taught farm bookkeeping, how to operate in a changing social structure, their civil rights and about legislation that affects their lives.

Finally, extension services and educators should make use of women's groups in providing training for rural women. These groups (cooperative, savings, social and farm work groups) are known in Africa for being important in mobilizing local support, disseminating information, legitimizing proposed changes and a means by which women raise production resources (for example, money, tools and labor).

Conclusion

Even though agricultural education cannot be regarded as a solution or cure for the problem of food crop production and rural women's problems, it would go a long way in improving the food situation in Africa as well as providing the means and opportunity for rural women to grow and realize some of their potential. Innovative changes in program structure and activities can give women greater access to non-formal training programs offered by the agricultural extension service. The challenge lies in developing new strategies in extension programming which are sensitive to the needs of women farmers; involving women in participating in the planning, execution and evaluation of projects meant for them and the way to encourage young girls to take up

agriculture as a career. However, short term solutions should be planned while new curriculum is being developed at higher educational levels in home economics as well as agriculture. The role of the United States institutions of higher education according to Nji, Firebaugh, Weidemann and Rojao (1984), is to "make it essential that educators do not perpetuate the dichotomy between agriculture and home economics" in the training of students from less developed countries and when planning developmental projects for rural women farmers in Africa.

To a large extent, the problems faced by rural women are tied to the value placed on their activities which are reflected in the national policies of most African countries. The development strategies historically used have only aggravated the problems resulting from colonization rather than alleviating them. The lack of access to information on farm and non-farm activities, land, credit, services, new methods for assessing women's economic activities, appropriate technology that could save time and reduce the workload of women and suitable socio-cultural norms and values are some of the obstacles to the development of African women.

Factors (as mentioned in this paper) that deter women from improving their agricultural production and standard of living should be considered when planning programs for women. If agricultural educators and planners of women's educational and training programs would take into consideration women's needs, this would make a significant impact on agricultural productivity.

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STRATEGIES FOR EFFECTIVE DISSEMINATION OF RESEARCH FINDINGS
FROM INTERNATIONAL AGRICULTURAL RESEARCH CENTERS AS
PERCEIVED BY CENTER STAFF AND BY INTERNATIONAL
STUDENTS AT OKLAHOMA STATE UNIVERSITY

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Introduction

The International Agricultural Research Centers (IARC's) are located in different parts of the world and especially in developing nations. Nations where IARC's are located include Colombia, Ethiopia, India, Italy, Kenya, Liberia, Mexico, Netherlands, Nigeria, Peru, Philippines, Syria and the United States.

Their main objective is to increase and improve the quantity and the quality of agricultural food production in the developing countries by use of new technologies and recommended practices. However, some countries which could greatly benefit from the use of these International Agricultural Research Centers have been quite limited in their ability to do so. The problem as to how the developing countries could best obtain and utilize research findings from the recently established centers would still seem to remain largely unanswered.

Purpose

The main purpose of this study was to obtain the perceptions of (a) the research scientists at the International Agricultural Research Centers (IARC's) and (b) the International Students studying Agriculture at Oklahoma State University (OSU) as to how the developing countries can best disseminate and utilize the information obtainable from IARC's. The study was also designed to identify additional elements of strategy which might enhance or make more effective the dissemination and utilization of research findings from IARC's to farmers and producers.

The following objectives were formulated in order to accomplish the purpose of this study.

1. To secure a listing of experimental work now being attempted at each of the Centers and further secure data relative to the nature and extent of work now being accomplished.

2. To secure the perceptions of research scientists serving at the International Agricultural Research Centers as to (a) the nature and extent of present utilization of the information obtainable from the Research Centers and (b) the relative effectiveness of strategies now being used to disseminate Center findings and the anticipated effectiveness if each was fully implemented.

3. To secure the perceptions of international students studying Agriculture at Oklahoma State University on (a) the nature and extent of present utilization of the information obtainable from the Research Centers and (b) the relative effectiveness of strategies now being used to disseminate Center findings and the anticipated effectiveness if each was fully implemented.

Rationale for the Study

Most commendable is the fact that 13 International Agricultural Research Centers have now been established in various parts of the world for the purpose of improving the quantity and the quality of production of

agricultural products in order to meet the demand of an ever growing population. Still, some needy countries seem to have been unable to make maximum needed utilization of services rendered by these Centers (1).

Some of the factors that keep the developing countries from benefitting from findings of these Research Centers are alleged to be: (a) lack of support by political and administrative leaders, (b) the higher educational institutions of agricultural lacking or not functioning effectively, (c) lack of continuity of planned programs, (d) lack of knowledge and appreciation of the true value of agricultural research by political and administrative leaders, (e) meager productive relationships between the experimental centers and (i) Institutions of Higher Education and (ii) Ministries of Agriculture and/or Agricultural Extension Programs, and (f) lack of long-term, continuous support for research (2,5).

Also, the absence of graduate training, lack of effective extension services, inadequate salary for the qualified scientists in the developing nations and the absence of up to date equipment and needed supplies are some of the reasons often given as to why developing countries have been unable to utilize findings and information available from the International Research Centers (2,3,4,6).

Design and Conducting of the Study

After a review of research and literature related to this study, the following tasks involved in the design and conduct of the study were: (a) selection and development of the questionnaire, (b) validation of the questionnaire, (c) establishment of the study population and administration of the questionnaire, (d) establishment of a procedure for collecting data, and (e) a method for analyzing and describing the collected data.

The population used in this study consisted of 1,550 individuals, including 1,136 persons in a total of 13 IARC's, 76 international undergraduates and 118 international graduate students studying agriculture at OSU in the spring of 1984. The sample size of the total population of IARC's was 295 individuals. This included 65 Trustees, 13 General Directors, 78 Research Scientists, 61 International Cooperation and Outreach Staff, 27 Visiting Scientists and Postdoctoral Fellows, and 51 Communication, Information and Library/Documentation Specialists.

A total of 489 survey instruments were mailed in the middle of April, 1984. The questionnaire was designed and validated through a pilot test with International and non-Agricultural students at OSU.

To provide for comparative treatments of data, a five point Likert-type scale was used to measure the relative degree of perception by respondents. Numerical values are assigned to the response categories as shown in Figure 1.

Findings of the Study

Of the 489 survey instruments, 135 (27.6%) valid responses were received by the end of December, 1984. Eighty-six questionnaires (29.2%) were returned from IARC's and 49 (25.3%) from the students.

When reviewing findings, it should be noted that not all statistical computations possible for each of the groups were utilized in this report. The complete dissertation included much more data manipulation. Total mean response and rank order were beneficial in summarizing in each selected strategy. With regard to the major concerns of the study, in this report,

Judging Degree	Numbers Offered for Response	Absolute Limits
Highly Effective (HE) or Fully Used (FU)	5	4.5 - 5.0
Readily Effective (RE) or Frequently Used (FQ)	4	3.5 - 4.49
Moderately Effective (ME) or Moderately Used (MU)	3	2.5 - 3.49
Slightly Effective (SE) or Only Slightly Used (SU)	2	1.5 - 2.49
Not Used (NU) or Not Effective (NE)	1	1.0 - 1.49

Figure 1. Absolute Limits for Use in Establishing Group Mean Scores for Questionnaires

findings were summarized under each of the fifteen selected strategies or practices.

1. Strategy: "Instruction Provided Through Workshops Held at the Center"

Among IARC respondents giving perceptions as to the extent of present usage in effective dissemination of agricultural research findings, this strategy received highest mean response ($\bar{x}=3.79$); this among the 15 selected strategies proffered. It thus was categorized in the "frequently used" classification shown on Table 1. However, international students at OSU ranked this strategy second ($\bar{x}=2.76$) which placed it in the "moderately used" category.

With regard to the effectiveness of present usage, IARC staff ranked this strategy highest ($\bar{x}=3.65$) which placed it in the "readily effective" category. However, students ranked this strategy as fourth ($\bar{x}=2.76$) and placed it in the "moderately effective" category.

Regarding anticipated effectiveness if fully implemented, IARC respondents judged this strategy of holding Center workshops as ranking second ($\bar{x}=4.19$) among the 15 selected strategies and placing it in the "readily effective" category. Students also perceived it to be in the "readily effective" category but ranked it fourth ($\bar{x}=4.00$).

2. Strategy: "Instruction and Experience Provided by an Internship at the Center"

In terms of the extent of present usage, IARC respondents judged this method to be in the "frequently used" category. This method was ranked second ($\bar{x}=3.51$) among the selected strategies. On the other hand, students judged it to be in the "moderately used" category and ranked it seventh ($\bar{x}=2.53$) among the selected strategies in terms of present usage.

With regard to the effectiveness of present usage, the method was ranked second ($\bar{x}=3.56$) by Center staff which placed in the "readily effective" category. However, students perceived the practice as

Table 1. Perceptions as to Usage and Effectiveness of Selected Strategies

Strategy or Practice	Extent of Present Usage						Effectiveness of Present Usage						Anticipated Effectiveness If Fully Implemented					
	IARC's			Students			IARC's			Students			IARC's			Students		
	M	V ¹	R	M	V	R	M	V	R	M	V	R	M	V	R	M	V	R
1. Workshops at the Centers	3.79	FQ	1	2.76	MU	2	3.65	RE	1	2.76	ME	4	4.19	RE	2	4.00	RE	4
2. Internship at the Centers	3.51	FQ	2	2.53	MU	.	3.56	RE	2	2.73	ME	7	4.01	RE	7	4.02	RE	3
3. Specialists to provide presentations and demonstrations	3.32	MU	3	2.62	MU	4	3.18	ME	5	2.67	ME	8	4.16	RE	3	3.47	ME	13
4. Informing research personnel other than IARC's	3.13	MU	4	2.59	MU	6	3.49	ME	3	3.09	ME	2	4.23	RE	1	4.00	RE	4
5. Trial plots at provincial level	2.97	MU	5	2.79	MU	1	3.28	ME	4	3.26	ME	1	4.13	RE	4	4.30	RE	1
6. Joint conferences and planning sessions	2.79	MU	6	2.43	SU	9	2.86	ME	9	2.74	ME	6	3.73	RE	10	3.92	RE	7
7. Extension personnel providing instruction to farmers	2.72	MU	7	2.36	SU	11	3.03	ME	8	2.87	ME	3	4.11	RE	5	4.23	RE	2
8. Textbooks by IARC staff for use in universities	2.67	MU	8	2.43	SU	9	3.06	ME	6	2.65	ME	9	3.95	RE	8	3.96	RE	6
9. Informing government officials about IARC's	2.45	SU	9	2.73	MU	3	3.04	ME	7	2.62	ME	10	3.79	RE	9	3.60	RE	11
10. Dispersion of research needs in developing nations	2.41	SU	10	2.24	SU	13	2.58	ME	11	2.49	SE	11	3.32	ME	13	3.66	RE	10
11. Course work at universities	2.40	SU	11	2.47	SU	8	2.49	SE	12	2.38	SE	12	3.33	ME	12	3.55	RE	12
12. Instruction provided by FAO and UNDP	2.17	SU	12	2.62	MU	4	2.61	ME	10	2.75	ME	5	4.08	RE	6	3.67	RE	9
13. Demonstrations provided by PVO's	1.85	SU	13	2.26	SU	12	2.37	SE	13	2.13	SE	14	3.19	ME	14	3.11	ME	14
14. Adult villagers in training at IARC's	1.80	SU	14	2.06	SU	14	2.15	SE	14	2.38	SE	12	3.48	ME	11	3.88	RE	6
15. Primary and secondary schools informed of IARC's work	1.61	SU	15	1.45	MU	15	1.63	SE	15	1.70	SE	15	2.94	ME	15	2.98	ME	15
Total (N = 489)	2.71	MU		2.44	SU		2.91	ME		2.62	ME		3.76	RE		3.76	RE	

¹ Interpretation of value figures are shown in Figure 1.

"moderately effective" and ranked it seventh ($\bar{x}=2.73$).

Regarding anticipated effectiveness if fully implemented, IARC staff thought the practice to be the "readily effective" category ranking the method seventh ($\bar{x}=4.01$). Students at OSU also agreed the practice to be in the "readily effective" when fully implemented. Students ranked it third ($\bar{x}=4.02$).

3. Strategy: "Knowledgeable and Competent Specialists Employed to Produce Media Presentations and Demonstrations"

Perceptions of IARC staff regarding the extent of present usage revealed that they recognized this strategy as "moderately used." Among the strategies proffered, the staff ranked it third ($\bar{x}=3.32$). Students also agreed, placing it at the "moderately used" level and ranking it fourth ($\bar{x}=2.62$).

In terms of the effectiveness of present usage, IARC staff perceived the method to be in the "moderately effective" ranking the practice fifth ($\bar{x}=3.18$). Students also judged the method to be at the "moderately effective" level, but ranked eighth ($\bar{x}=2.67$).

In terms of the anticipated effectiveness if fully implemented, IARC respondents ranked the method third ($\bar{x}=4.16$) and placed it in the "readily effective" level. Nevertheless, students perceived the method as the "moderately effective" category ranking thirteenth ($\bar{x}=3.47$).

4. Strategy: "Personnel Service in Experiment Station Other Than Those IARC's Become Knowledgeable about work performed at the Center and Attempt Closer Coordination of Experimental Work Throughout the Nation and/or Area"

In terms of the extent of present usage, IARC staff judged this method as "moderately used" giving it a fourth ranking ($\bar{x}=3.13$). Students also judged it as the "moderately used" level with a sixth ranking ($\bar{x}=2.59$).

With regard to the effectiveness of present usage, IARC staff perceived this practice to be "moderately effective," ranking third ($\bar{x}=3.49$). OSU students also perceived it to be "moderately effective" ranking it second ($\bar{x}=3.09$).

In terms of the anticipated effectiveness if fully implemented, IARC respondents highlighted the strategy with a first ranking ($\bar{x}=4.23$), placing it in the "readily effective" level. Students also anticipated that when fully used, the practice would be "readily effective". Contrasting with IARC personnel ranking, student's anticipations of effectiveness provided a fourth place ranking ($\bar{x}=4.00$).

5. Strategy: "Through the Ministry of Agriculture and/or Agricultural Extension, a Network of 'Trial Plots' at the Provincial or Village Promote Farmers Understanding and Adoption"

In terms of the extent of present usage, IARC staff assessed this strategy to be in the "moderately used" category giving a fifth ranking ($\bar{x}=2.97$). Nevertheless, in the perception of the students, the present usage of the strategy was ranked first ($\bar{x}=2.79$) which placed it in the "moderately used" level.

With regard to the effectiveness of present usage, the strategy was ranked fourth ($\bar{x}=3.28$) by staff and was felt to be "moderately effective." Students also judged present usage as "moderately effective"; however, students responded by ranking the method first among the selected strategies ($\bar{x}=3.26$).

Regarding anticipated effectiveness when fully implemented, IARC staff anticipated the strategy to be in the "readily effective" level, ranking it fourth ($\bar{x}=4.13$). Students highlighted the practice ranking it first among all selected strategies ($\bar{x}=4.30$). They placed it in the "readily effective" level.

6. Strategy: "Through Joint Conferences and Planning Sessions Including Center Personnel, Agricultural Extension Staff and University Professors, a Program for Dissemination of Center Findings is Developed"

Concerning the extent of present usage, this practice was categorized as the "moderately used" and ranking it sixth ($\bar{x}=2.79$) by IARC staff. However, students perceived it to be "only slightly used," ranking it ninth ($\bar{x}=2.43$).

IARC staff, relating to the effectiveness of present usage, categorized the practice as "moderately effective," ranking it ninth ($\bar{x}=2.86$). Similarly, the method was placed in the "moderately effective" category, ranking sixth ($\bar{x}=2.74$) by students.

In terms of the anticipated effectiveness if fully implemented, IARC respondents perceived the method would be "readily effective," ranking it tenth ($\bar{x}=3.73$). Similarly, students also viewed it as "readily effective" ranking it seventh ($\bar{x}=3.92$).

7. Strategy: "Agricultural Extension Personnel, Especially Specialists, Provide Instruction about IARC Findings to Farmers and/or Producers"

IARC staff when responding as to the extent of present usage, assessed this strategy as "moderately used" giving a seventh ranking ($\bar{x}=2.72$). However, OSU students felt this strategy was "only slightly used" and ranked it in eleventh place ($\bar{x}=2.36$).

With regard to the effectiveness of present usage, IARC staff noted that the strategy was "moderately effective" ranking it eighth ($\bar{x}=3.03$). Students also judged effectiveness of present usage to be "moderately effective" with third ranking ($\bar{x}=2.87$).

Regarding anticipated effectiveness if fully implemented, IARC respondents displayed the method to be in the "readily effective" level and ranked it fifth ($\bar{x}=4.11$). Students also judged that it would be "readily effective" giving the high ranking of second ($\bar{x}=4.23$).

8. Strategy: "Textbooks and Instructional Materials Developed by Staff in Each of the IARC's to be Used in Institutes, Colleges, and Universities"

With regard to the extent of present usage, this practice was recognized by IARC staff as "moderately used" ranking eighth ($\bar{x}=2.67$). On the other hand, students perceived it as belonging in the "only slightly used" category and ranking it ninth ($\bar{x}=2.43$).

In terms of the effectiveness of present usage, IARC staff viewed the method as being "moderately effective" ranking it sixth ($\bar{x}=3.06$). Students responded similarly, placing the practice in the "moderately effective" category and ranking it ninth ($\bar{x}=2.65$).

Concerning anticipated effectiveness when fully implemented, IARC staff placed the practice in the "readily effective" level ranking it eighth ($\bar{x}=3.95$). Students also classified it at the "readily effective" level ranking it sixth ($\bar{x}=3.96$).

9. Strategy: "Government Officials In Developing Countries Assisted to Become Fully Informed about Nature and Effectiveness of the IARC's"

Relating to the extent of present usage, IARC staff indicated that this strategy was the "only slightly used," ranking it ninth (\bar{x} =2.45). Conversely, students thought the strategy to be in the "moderately used" level ranking third (\bar{x} =2.73).

Concerning the effectiveness of present usage, the method was placed in the "moderately effective" category and ranked seventh (\bar{x} =3.04) by Center staff. Students also judged it as belonging in the "moderately effective" category ranking it tenth (\bar{x} =2.62).

When IARC staff gave expression regarding anticipated effectiveness if fully implemented, they said it would be "readily effective," and ranked it ninth (\bar{x} =3.79). In close agreement, the method was placed at the "readily effective" level and ranked eleventh (\bar{x} =3.60) by students.

10. Strategy: "In Developing Countries Dispersion of Information about Needs for Research and Education in Developing Countries"

With regard to the extent of present usage, this practice was judged as belonging in the "only slightly used" category and was ranked tenth (\bar{x} =2.41) by IARC staff. Students likewise perceived it as being "only slightly used" ranking thirteenth (\bar{x} =2.24).

In terms of effectiveness of present usage, IARC staff judged the practice to be in the "moderately effective" category ranking it eleventh (\bar{x} =2.58). Nevertheless, students perceived it only in the "slightly effective" level ranking them both eleventh (\bar{x} =2.49).

Regarding the anticipated effectiveness if fully implemented, the strategy was placed in the "moderately effective" level and ranked thirteenth (\bar{x} =3.33) by IARC staff. However, students anticipated it as belonging at the "readily effective" level ranking it tenth (\bar{x} =3.66).

11. Strategy: "Instruction Provided through Course Work at Universities and Colleges"

Relating to the extent of present usage, both IARC staff and students judged the method as "only slightly used" ranking eleventh (\bar{x} =2.40) and eighth (\bar{x} =2.47), respectively.

Concerning the effectiveness of present usage, both IARC staff and students considered the method as only "slightly effective." Both groups ranked the method twelve with means of 2.49 and 2.38 respectively.

Regarding anticipated effectiveness if fully implemented, this strategy was placed in the "moderately effective" category by IARC respondents and "readily effective" category by students. Both groups ranked strategy twelfth with 3.33 mean score and 3.55, respectively.

12. Strategy: "Instruction Provided Through FAO and UNDP"

With regard to the extent of present usage, IARC staff perceived this practice to be "only slightly used" and ranked it twelfth (\bar{x} =2.17). However, OSU students felt it might be "moderately used" ranking it fourth (\bar{x} =2.62).

In terms of the effectiveness of present usage, the strategy was viewed as the "moderately effective" by both groups. Rankings were tenth (\bar{x} =2.61) and fifth (\bar{x} =2.75) by Center staff and students at OSU, respectively.

Regarding anticipated effectiveness when fully implemented, both groups judged the practice belonging to the "readily effective" category, giving rankings of sixth (\bar{x} =4.08 and ninth (\bar{x} =3.67), respectively.

13. Strategy: "Instruction and Demonstration Provided Through Work by Private Voluntary Organizations (PVO's)"

In terms of present usage, this method was placed in the "only slightly used" category by both groups and rated thirteenth ($\bar{x}=1.85$) by Center staff and twelfth ($\bar{x}=2.26$) by students, respectively.

When considering effectiveness of present usage, both groups perceived the method as only "slightly effective," staff ranking it thirteenth ($\bar{x}=2.37$) while students ranked it fourteenth ($\bar{x}=2.13$).

Concerning anticipated effectiveness when fully implemented, the method was placed in the "moderately effective" category by both groups. Both groups also ranked the practice fourteenth among the 15 selected strategies. The mean response was 3.19 by staff and 3.11 by students, respectively.

14. Strategy: "Villagers in Developing Countries Select and Sponser Adult Members of the Villages to Participate in Extensive Training Sessions Provided by the IARC's"

In regard to the extent of present usage, both IARC staff and students perceived this strategy as "only slightly used." Likewise, both groups gave the strategy a ranking of fourteenth among the selected fifteen strategies. The mean response was 1.80 by staff and 2.06 by students, respectively.

With regard to the effectiveness of present usage, both the Center staff and international students at OSU agreed that the strategy was only "slightly effective." Center staff ranked it fourteenth ($\bar{x}=2.15$) while students ranked it twelfth ($\bar{x}=2.38$).

In terms of the anticipated effectiveness when fully implemented, IARC staff anticipated the strategy to be in the "moderately effective" category and ranked it eleventh ($\bar{x}=3.48$). However, students judged it to be in the "readily effective" level and as ranking eighth ($\bar{x}=3.88$).

15. Strategy: "In Developing Countries, the Work of IARC's Widely Taught in Primary and Secondary Schools"

Regarding the extent of present usage, IARC staff judged the strategy to be in "only slightly used" category and ranking last at fifteen ($\bar{x}=1.61$). On the other hand, students judged the practice to be "not used" and also ranked it fifteenth as lowest ($\bar{x}=1.45$).

Concerning the effectiveness of present usage, both groups perceived the practice as only "slightly effective." The lowest mean scores collected among the fifteen strategies was showed for the practice, rating as 1.63 by IARC staff and 1.70 by students.

Finally regarding anticipated effectiveness when fully implemented, both groups anticipated the strategy as belonging in the "moderately effective" category. Both mean scores, 2.94 by staff and 2.98 by students were recognized as the lowest response among the 15 selected strategies.

Conclusions of the Study

Interpretation of the findings of this study prompted the following conclusions:

1. In terms of perceptions of IARC respondents, strategies being used most frequently at the present time are "Instruction provided through workshops held at the Center" and "Instruction and experience provided by an internship at the Center."
2. In terms of perceptions of international students at OSU, strategies

being used most moderately at the present time are "through the Ministry of Agriculture and/or Agricultural Extension, a network of 'trial plots' at the provincial or village level to enhance village farmers understanding and adoption" and "Instruction provided through workshops held at the Center."

3. In terms of perceptions of IARC respondents, the most promising strategies for dissemination in the future are "Instruction provided through workshops held at the Center" and "personnel serving in experiment stations other than the IARC's become knowledgeable about work performed at the Center and attempt closer coordination of experimental work throughout the nation and/or area."
4. In terms of perceptions of students at OSU, the most promising strategies for dissemination in the future are "through the Ministry of Agriculture and/or Agricultural Extension, a network of trial plots at the provincial or village level to enhance village farmers understanding and adoption" and "Agricultural Extension personnel, particularly specialists, provide instruction about IARC findings to farmers and/or producers."
5. It is concluded that those strategies which are ranked low in terms of present usage by both groups: (a) "in developing countries, the work of IARC's widely taught in primary and secondary schools," (b) "villagers in developing countries, select and sponsor adult members of the villages to participate in extensive training sessions provided by the IARC's," and (c) "Instruction and demonstrations given through work by Private Volunteer Organizations (PVO's)" were, in general, those which were also ranked low in terms of the anticipated effectiveness when fully implemented.
6. It must be concluded that the IARC personnel had a positive and expectant attitude when assessing the anticipated effectiveness of strategies when they may become fully implemented. This feeling was evidenced by the fact that they rated ten of the fifteen strategies as being "readily effective" when fully implemented.
7. The conclusion is inescapable that while IARC personnel recognize that the practice of "informing government officials about the nature, scope and effectiveness of the Center's work" is presently only "slightly used;" they are acutely aware of the potential value of this strategy. This was evident in an expressed anticipation that the practice would be "readily effective" when and if it was fully implemented.
8. It is concluded that international students at OSU are quite lacking in knowledge about IARC's. A sizeable number of students did not complete the questionnaire and many only signed their names, with a written comment that "I have never heard of IARC's" or "I know little or nothing about them."
9. It is further concluded that IARC respondents tended to perceive anticipated future effectiveness largely as being closely related to their own work, specifically that which is carried out at the Center and seemed somewhat hesitant as to work with schools or other agencies.

Implications for Agricultural Education

It is of utmost importance that the research work of the IARC's not only continue, but also a major effort should be made to accelerate the dissemination of the research information more widely to the farmers/producers so that they can improve and increase crop yield more economically. Moreover, the governments, public schools, higher education institutions, as well as the public should be more fully informed so that adequate support will be received for this research/dissemination work.

It is evident from this study that international students at OSU did not know of the tremendously important agricultural research in furthering food production work being done by the IARC's. They also did not fully understand the potential impact of the research and dissemination results being accomplished by the IARC's. This seems incredible in view of the food deficit and the importance of feeding the worlds future population.

Likewise, however, it is evident that personnel in the IARC's were apparently somewhat hesitant to acknowledge the full potential for dissemination which most surely must exist in the resources of schools, Agricultural Extension, and other institutions such as Food Corps, Sarvodaya and Private Voluntary Organizations (PVO's).

It is important that the IARC's should cooperate more fully with educational institutions, research and extension programs, and through the development and implementation of workshops, seminars, conferences, and special internship programs in both the developed and developing nations so that these useful research results will be disseminated more effectively and rapidly.

Therefore, it is strongly recommended that: (a) The instructional segment in agriculture at colleges and universities definitely include studies as to the nature and scope of world-wide agricultural production, research and the educational functions in development, (b) Agricultural educators make every effort to communicate more fully with personnel of the International Agricultural Research Centers, and (c) Educators take the initiative, offering to jointly plan workshops in dissemination methods, to conduct research in dissemination and particularly to work with AID or other agencies to plan projects which will involve "change-agent" institutions such as Agricultural Institutes in a functional dissemination of IARC findings.

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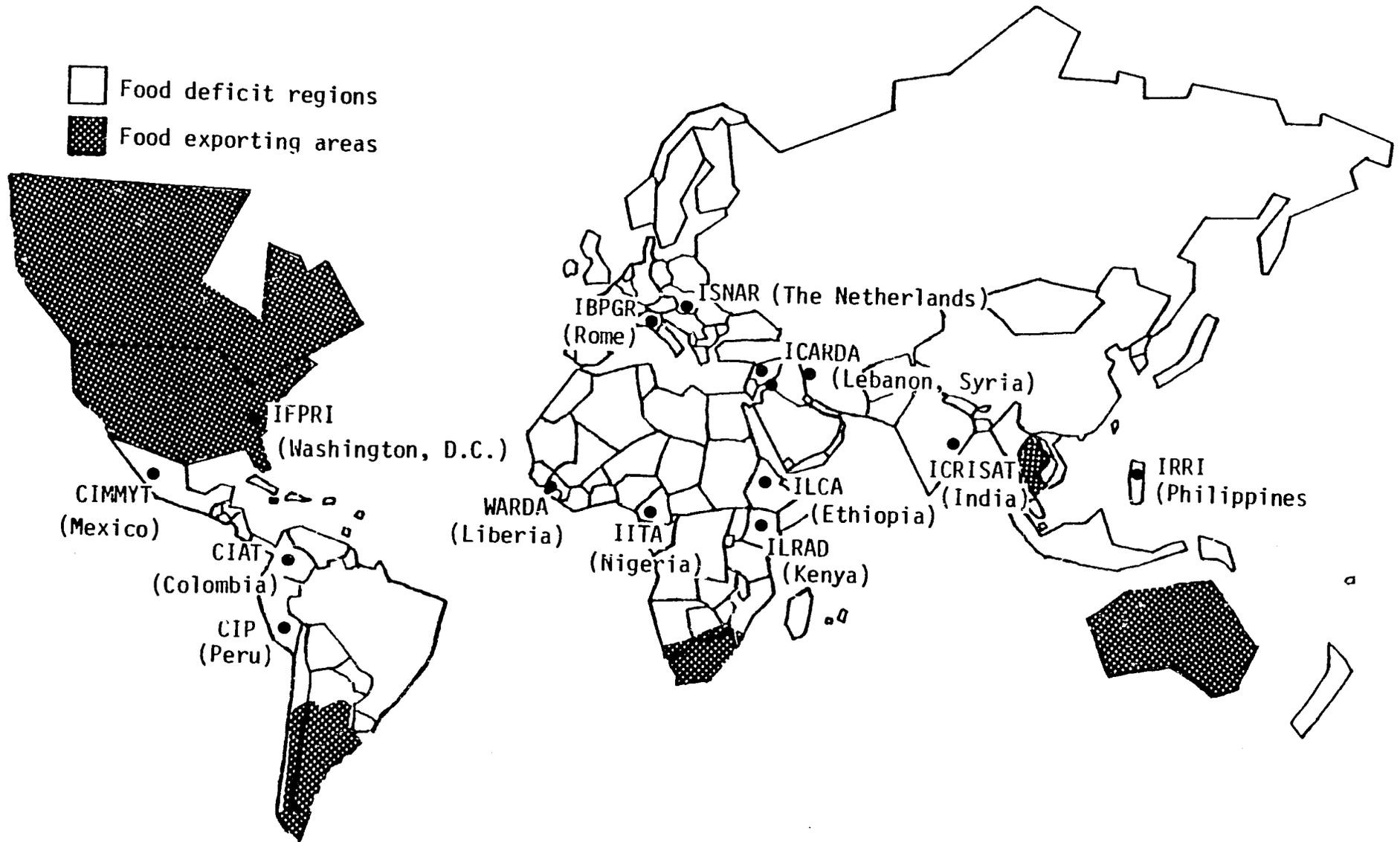
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Location and Area of Research of
International Agricultural Research Institutes (Bengtston, 1982)

Centre	Location	Research	Coverage	Date of initiation
IRRI (International Rice Research Institute)	Los Banos, Philippines	Rice under irrigation, multiple cropping systems and upland rice	Worldwide, special emphasis on Asia	1960
CIMMYT (International Centre for the Improvement of Maize and Wheat)	El Batan, Mexico	Wheat, triticale, barley and maize	Worldwide	1964
CIAT (International Centre for Tropical Agriculture)	Cali, Colombia	Cassava, field beans, rice and tropical pasture	Worldwide in low land tropics, special emphasis on Latin America	1968
IITA (International Institute of Tropical Agriculture)	Ibadan, Nigeria	Farming systems, cereals, cowpeas, soybeans, lima beans, pigeon peas, cassava, sweet potatoes and yams	Worldwide in lowland tropics, special emphasis on Africa	1965
CIP (International Potato Centre)	Lima, Peru	Potatoes (for both the tropics and temperate regions)	Worldwide, including linkages with developed countries	1972
ICRISAT (International Crops Research Institute for the Semi-Arid Tropics)	Hyderabad, India	Sorghum, pearl millet, pigeons peas, chick peas, farming systems and groundnuts	Worldwide, special emphasis on dry semi arid tropics, non irrigated farming	1972
ILRAD (International Laboratory for Research on Animal Diseases)	Nairobi, Kenya	Trypanosomiasis, theileriosis (mainly east coast fever)	Africa	1974
ILCA (International Livestock Centre for Africa)	Addis Ababa, Ethiopia	Livestock production systems	Major ecological regions in tropical zones of Africa	1974
IBPGR (International Board for Plant Genetic Resources)	FAO, Rome, Italy	Conservation of plant genetic resources	Worldwide	1973
WARDA (West African Rice Development Association)	Monrovia, Liberia	Regional cooperative effort in adaptive rice research among West African countries	West Africa	1971
ICARDA (International Centre for Agricultural Research in Dry Areas)	Aleppo, Syria	Barley, lentils, broad beans and farming systems including animal husbandry	Emphasis on dryland farming and arid areas in Near East and North Africa	1976
IFPRI (International Food Policy Research Institute)	Washington, USA	International food policy and food distribution	Worldwide	1975
ISNAR (International Service for National Agriculture Research)	The Hague, The Netherlands	International service organisation	Worldwide	1979

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THE INTERNATIONAL AGRICULTURAL RESEARCH NETWORK



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RURAL YOUTH —
KEY TO AGRICULTURAL TECHNOLOGY TRANSFER

by

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1985 ANNUAL MEETING
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INTERNATIONAL AGRICULTURAL EDUCATION

Rural Youth -- Key to Agricultural Technology Transfer

This is an appropriate topic to be exploring at this time for us. One of the reasons for this is that in 1979 the UN General Assembly voted to designate 1985 as the International Youth Year. We are now in 1985 and beginning the International Youth Year which is to be celebrated around the world. A second reason this topic is important is that "Countries that cannot feed themselves are a threat to world peace, to say nothing of the immense human suffering that is present today and growing more serious each day, particularly in Africa."¹ This is especially true as we think of the things we have seen recently in magazines, newspapers and on TV.

I think as we consider this topic we need to first clarify exactly what we mean by a number of the terms in the title, then we need to look at some of the reasons why agricultural technology transfer is important. What kind of a resource are we really talking about when we refer to rural youth? We will examine the success stories of some of the individual and program accomplishments that are occurring throughout the world. And then we should probably look to the future and what are the ways in which we can help rural youth be more effective as a key to agricultural technology transfer.

Clarifying Our Topic

You probably wonder as you think about a topic such as "Rural Youth - Key to Agricultural Technology Transfer," who are we talking about, what is really meant, and how does it relate to the world around us? Perhaps we might start with the concepts of technology and technology transfer. We have seen a lot of information in the newspapers and magazines these days dealing with the area of "hi-tech." We have also heard a lot of talk about technology or "hi-tech" and it has probably come to mean something in our minds associated with microcomputers, semiconductor chips, and things of this nature.

If we look at the topic of technology transfer, then we have even more interesting ideas to consider at our present time in history. All you have to do is pick up a number of recent magazines and look at the titles of some of the major articles such as, "Technology Transfer: Policy Nightmare," "Denying Visas to Stop Technology Exports," and "US Curbs on Technology Said to Hinder NATO Unity." Certainly when we think of technology transfer using this terminology most people immediately think of the high technology of the United States being taken to other parts of the world, and the illegal efforts on the part of other governments to secure restricted technology. The article, "Technology Transfer: Policy Nightmare,"² reveals much about this perception. This article in Business Week of April 1983 alludes to intrigue and covert activity -- a real life "Cloak and Dagger" operation. Here is the story of how the Soviet Union has taken our Tomahawk cruise missile -- allegedly the Soviets have taken the Tomahawk missile -- and has fabricated something very similar. It is so similar in fact that it is referred to in the trade as the "Tomahawkshi", with probable U.S. origin of the semiconductor microchips that are in the computer that controls its sophisticated radar guidance system. Certainly it is a policy nightmare regarding control.

This is certainly not the situation that we are generally looking at when we think about technology transfer related to rural youth. First of all, we are looking at the general area of agricultural technology. This does not necessarily mean "hi-tech" and your immediate image of microcomputers and semiconductor chips, but the very kinds of things that some of us would say are rather simple practices. However, they are practices that are necessary for producing more food and fiber, improving nutrition, and other aspects related to agriculture and the nutritional level of people in developing countries. I think that we would have to say that in this sense agricultural technology is a relative term and that if a country is not already using a particular practice, then this is technology that needs to be transferred.

Secondly, as far as agriculture technology transfer, it really is something that we have been trying to export or bring about in other countries for many years. There have been a number of AID, World Bank, and other types of assistance projects that have made efforts to export, if you will, agricultural technology. Basically the goals of these kinds of efforts have been to improve the agriculture production, raise the nutritional level, and improve health for people in other parts of the world through the use of technology that has not generally been a part of their practices as they raise food and feed their people.

The other part of the title that I think we need to explore is, What are we talking about when we refer to youth? Or even rural youth? The United Nations³ defines youth as young men and women from the age of 15 through 24. Using this UN definition of youth there are almost 700 million people, or 20% of the population of the developing world that are youth. In these developing countries there is an additional 40% of the population that are under 15 years of age. This is contrasted with the 23% under age 15 in the developed countries.⁴

However, in many studies and projects around the world today, people who are aware of what is happening in the rural areas insist that youth should include people from 10 through 24. It is probably unrealistic to discuss a comprehensive view of youth and the work that they accomplish in society without including the 10-14 year olds. The ILO (International Labor Organization) has estimated that 50 million children under the age of 15 are at work.⁵ Also that about 11% of the 10-14 year age group are economically active with nearly 98% of these child laborers found in the developing countries.

UNESCO has noted in a fairly recent report that in rural areas in general, children pass to adult life between 9 and 10 years of age.⁶

I think a brief exploration of these various terms gives us a better common idea of what we are talking about when we speak of rural youth being a key to agricultural technology transfer.

Why the Need For Agricultural Technology Transfer?

Certainly, as we look at the topics of population growth and food production alone, we can see that there is quite a need for doing a better job of transferring agricultural technology. One of the ways to look at this would be to look at our global interdependence. We as a society in the United States have an almost daily increasing awareness of the interdependence in this world. The United States, once considered as independent and self sufficient, is struggling to seek out its proper role in a world in which there must be accommodation in sharing. We are sharing with others around the world things that are in short supply such as food, energy, natural resources, and persons adequately trained and educated to face and resolve some of the pressing issues around us. There are four concepts that can be mentioned that would signal some of the global interdependency that we face.⁷

1. Certainly, no nation can anymore be isolated culturally, socially, economically or politically from the rest of the world. For the United States, as an example, we depend upon the developing countries for 45% of our oil, 85% of our bauxite, 93% of the zinc ore, and 36% of our iron ore.⁸

2. Developing countries around the world will have a direct influence on what happens to US agriculture job markets and prices. One out of every four American farm jobs depends on the sale of American goods overseas. It is also said that one in every three acres is exported.

3. We can communicate instantly via satellite to any point on the globe but at the same time we are still seeking better ways to listen to, understand, and develop effective communications with millions of people living in rural areas. We have the hardware for instant international response and retaliation, but we still have to realize our potential in developing the patience and skills for productive communication and negotiation.

4. Our individual responsibilities as private citizens become greater through global interdependence. These include the responsibility of awareness, information, understanding, concern, and appropriate action. As President Kennedy said in his inaugural address, "If a free society cannot help the many who are poor, it cannot save the few who are rich."

With the acceptance of the definition of youth being male or female, married or single, from the age of 10 through 24, we then need to look at the aspect of how many of them are in the rural area or would be classified as agriculturally or rural based. The South American continent as a whole would have on the average from 50 to 75% of its population living in rural areas.⁹ Table 1 shows the expected changes in the number of youth who are classified as rural youth, aged 10-24 between 1980 and the year 2000.¹⁰ In the area of Africa, by the year 2000 there will be an estimated 152 million rural youth from the ages of 10 through 24. In Southeast Asia, there will be a projected increase of 45 million more rural youth in the same 20 year period between 1980 and the year 2000. In Latin America the numbers of rural youth between 1980 and the year 2000 are expected to be somewhat constant, but that is due mainly to the expected continuing exodus of young people from the rural areas to the cities.

TABLE 1. THE RURAL/URBAN DISTRIBUTION OF YOUTH, AGED 10 THROUGH 24, IN AFRICA, LATIN AMERICA, AND SOUTHERN ASIA IN 1980 AND 2000*

Regional Areas	Rural Youth (000,000)		Urban Youth (000,000)		Total Youth (000,000)		
	1980	2000	1980	2000	1980	2000	% In- crease
Africa	101.3	152.3	45.2	122.7	146.5	275.00	69.2
Latin America	40.3	40.5	77.1	128.1	117.6	168.6	43.4
Southern Asia	334.6	380.1	123.0	252.8	457.6	632.9	38.3

* Data do not include China, Japan, Hong Kong, North or South Korea, and Mongolia.

In 1980, youth and children in less developed regions of the world made up nearly 60% of the total population. Even though this percentage will drop to about 52% by the year 2000, there will still be more than half the population of the developing areas under age 25 by the year 2000.

The center columns show that the expected increase in youth from the ages of 10 to 24 in urban areas is a different story than that of rural youth. In Africa there is a projected increase of from 45 million to over 122 million youth in the urban areas or a 171% increase in 20 years. In Southeast Asia the increase of urban youth is from 123 million to over 252 million. We saw previously that in Latin America the numbers of rural youth would remain essentially constant. Look what has happened to urban youth. From 77 million to 128 million, or a 66% increase. The right hand side of Table 1 shows us the total youth picture from 1980 to the year 2000. In Africa alone we have an increase of nearly 130 million youth or a 69% absolute increase. Latin America will have a 43% increase, going from 117 to 168 million youth, and in Southeast Asia we have 175 million more young people as an increase in the population. What does this mean in terms of need for agricultural technology transfer? Certainly, there are two very important things that we can look at. One is that there is an absolute increase in the number of youth in rural areas. But the other situation that is perhaps more crucial is that there are more people to feed, not only youth but older people as well. In Latin America with the increase of youth happening in the urban areas, what will we find? Urban dwellers will continue to apply pressure for low food prices; so certainly the farm producers are going to have to be more efficient than at present. Also, farm prices are going to be increasingly at the mercy of the political, powerful urban voice.

Apart from increase in population, and therefore increased need for

total food production for more mouths at the table, what are some of the other reasons that improved technology transfer is necessary? Certainly one reason that ties very closely with total food production would be nutritional level. In many countries there are already many people who are undernourished. It will take more food and a better job of agricultural production to improve the diet for the existing population, let alone consider increased numbers. Other factors that relate to the efficiency of technology transfer are the availability of both land and credit as well as the factor called access. Goods and services must be brought into the areas where food is produced and then the products must be moved out to the urban markets.

Lastly, as we consider the need for technology transfer, I think there are three very important aspects that are necessary conditions for any appropriate agricultural technology transfer to take place. One would be that the technology is biologically adapted; two, that it is economically viable; and three, that it is socially acceptable.

Youth as a Resource Need Education

Certainly as we look at the current situation we realize that youth are a resource not only for the future but today as well. We find that one of the conditions that we need to think about regarding youth and their ability to act as keys to agricultural technology transfer is that in many areas they have limited education. We must make sure that we recognize that lack of education does not mean lack of intelligence. I have found young people in most developing countries to be highly intelligent, though in many cases limited in terms of the amount of formal training or education that they have had. To give you some idea of the kind of limited opportunities for education and leadership training, I can cite the following examples. In the country of Colombia, South America, they have a total of 212 agricultural schools with a total of 34,000 students studying agriculture.¹¹ That sounds like a lot of students until we realize that figure represents approximately 1% of the 4 million rural youth of that country. Panama also has a number of farm or agricultural schools with sufficient land and facilities but they indicate they lack teachers and farm managers.

In Africa it has been indicated that food production is declining at about the same rate that the population is increasing. A number of people believe that production is declining because there is a lack of trained agricultural scientists generating new technology for the special conditions of Africa's agriculture. Certainly, this is part of the problem. In Africa, agriculture and natural resources still contribute somewhere between 60 to 90% of the gross national product of most countries. We don't dare think just in terms of the future but realize that today it is upon the shoulders of African youth that the level of agricultural productivity rests. They're not only tomorrow's farmers but they should be today's as well.

Dr. Solomon Gwei,¹² the Vice Minister of Agriculture of Cameroon states,

"The food question is the number one problem facing Africa today. It is a problem we must solve urgently in order to save the lives of millions of our sons and daughters. Hunger, malnutrition, and

consequent diseases stare us straight in the face. Food, food, food is the outcry in many corners of the continent. Food importation and gifts of food by benevolent organizations are only a temporary relief measure. Food self-sufficiency is the answer. The means to this end is agricultural development, and there can be no real and effective agricultural development except through agricultural education."

Applied education is required to make them more effective in their agricultural technology transfer responsibility.

Real Success Stories of Education in Action

Lest you think that nothing is happening, or that youth aren't doing things, let's look at some of the success stories in various countries of what youth are doing as they use their education to carry out technology transfer in agricultural areas.¹³

The community of Chimachoy is attended by Gregorio Cana who received special training last year on how to identify his community's needs and then develop a program to meet those needs. As a result of this programming he arranged for the agricultural soil conservation specialist to present a program and demonstration on the value of terraces and how to construct them. As a result of this demonstration, Gregorio worked in subsequent meetings with his group of farmers making what is called an "A"-frame level for making contour lines. Within a few months, 11 members of his group had constructed terraces on their own land. One young farmer of the group - with only minimal education, but highly intelligent - has become a volunteer leader regarding the construction of terraces. This young volunteer explained how he had demonstrated the construction and use of the simple "A"-frame level. Several groups of farmers from neighboring villages had visited his small plot of land to learn the practice of laying out contour terraces. He not only explained the value and procedure of terrace construction but very clearly outlined the economic (benefit/cost) aspects to his visitors. (In parts of his country contour terraces are necessary as crops are frequently raised on land that has from 50 to 80% slope.)

Carmen Chavez, who lives in the village of Parramos, has organized two groups of women and young girls. For one of the groups she has located a volunteer who teaches the group sewing and dressmaking. The second group is being taught knitting techniques by the promoter of a neighboring village. During 1978 the 15 members of her small knitting group made 22 sweaters, 22 vests, 31 pairs of slippers, and many other knitted items. Using \$1.25 worth of wool to make a sweater worth \$3.00, each group participant learned a new skill that could provide real economic benefit to their families.

Felipe Garcia has spent 10 years selecting seed from his crop of native corn. He selects ears based on size, height, stalk strength, etc. He estimates that over 80% of the stalks bear more than one ear - many have three nice sized ears of corn. This year his crop yield was over 100 bushels per acre. Now Felipe is working as a volunteer showing and explaining to others in surrounding villages that with proper seed selection, the native corn, grown for centuries in the Highlands of Guatemala, can produce high yields.

Credit Can Make a Difference

Rural youth are full of desire and ambition and are willing to try improved technology if only given the chance. One critical element is the necessary financing to allow them to put ideas into practice. Take the case of Johnny Aguilar. Johnny comes from a family with five brothers and sisters. His mother works as a cook in one of the agricultural schools. Until about a year and a half ago they lived on what their mother made as a cook and the additional income that they could secure during the banana harvest. At the end of 1981, Johnny, through the youth group at his school, voiced the desire to start a poultry project. He wanted to build a chicken house for some laying hens and produce eggs to sell in his community. If he could only get a loan to get started... He and two of his brothers were able to secure a low interest loan from FUNAC (the National 4-S Club Foundation) that allowed them to purchase 120 chickens. Today that initial investment has grown to a flock of 215 laying hens thanks to the income generated from the loan that helped them get started. Johnny and his family work like a cooperative with each member having an assigned responsibility around their small farm. He and his family are able to take care of the demand for eggs in their tiny community of Carambola. He has only two payments left to cancel the original loan to start his project. When this is paid off he will have gained two chicken houses, all of the chickens, and money to continue investing in his poultry operation. As a result of Johnny's efforts, the family has been able to improve their level of living.

Another story of success, as a result of youth initiative and available credit through FUNAC, is the story of the seven youth from Bijagua de Upala who are active in the 4-S club there. (4-S is the Spanish equivalent of 4-H in the US.) They decided that they needed to take the new technology that they had learned, coupled with their desire to work, and get their own farm to improve the production, using technology they were sure would work. In 1981 these boys, who had had 4-S projects of dairy cattle, tomatoes and sweet peppers, decided that if they could work together on a farm that they owned they would be able to do even more. They had decided that they were going to be farmers and they wanted to work in agriculture. They contacted various government agencies and soon realized that any land available through land reform projects would mean moving to another part of the country. Rather than move they approached FUNAC to see if they might secure some of the available credit to purchase 24 hectares of mountain land where they live.¹⁴ These seven youth, between the ages of 12 and 27, were able to secure the amount of C 50,000 for the first payment on a farm that had a value of C 480,000. Today the farm that they purchased is worth C 1,200,000 and they are successfully raising beans, corn, and yucca. They organized themselves into an agricultural business with clear and strict rules. The work is done equally and they fixed a salary that allowed them to save 20% over their costs of operation. As a result of the success of these young men there have been three other groups started who have organized themselves into similar agricultural businesses. They have organized, secured bank loans and purchased farms.

I wouldn't want you to think that only the young men are transferring agricultural technology. In the area of Golfito, two young students, studying home economics and foods in an area school decided to develop an agricultural industry type of project. Their idea was to use fruits and

vegetables available or gleaned from farms in their area to produce canned foods and jams. Using a ₡ 5,000 loan from FUNAC they were able to buy the jars, lids, and other supplies to make their idea a reality. As a result they have a thriving small business of canned and pickled food sold throughout their community. They have repaid the FUNAC loan and are helping their families. The technology that they are transferring in this case is a result of the studies in their school. Here we see young people with training available, full of enthusiasm and good ideas, able to secure credit to make a project work. They are transferring technology in the form of better nutrition and more efficient use of fruits and vegetables raised in the community.

FUNAC - Combining Education, Credit Availability and Leadership Training

What is this special activity that FUNAC, the National 4-S Club Foundation in Costa Rica, is accomplishing? The foundation, established in 1960, is about to celebrate its 25th anniversary. However, it wasn't until recent years, in 1978, that the foundation became a force in improving the lot of rural youth in the technology transfer that they were able to accomplish. At that time the foundation, through the representation of its executive director, Rafael Segovia, went to the Interamerican Development Bank (IDB) requesting a loan of one half million dollars to be used for providing supervised credit to young people who were active in 4-S club programs. The restrictions on that first loan were that the maximum loan per individual would be \$1,000 and that the loan must be paid within a three year period of time. That first loan, which became available in June 1979, was an agreement between the National 4-S Club Foundation, The Interamerican Development Bank and the Ministry of Agriculture. The money was used for loans to 4-S club members who were working in the traditional 4-S programs attended to by extension agents of the Ministry of Agriculture. After a period of four years that initial capital has been rotated two and a half times, and in the year of 1983 alone, 1,200 loans were made.

Two years later in July of 1981, a similar loan of a half million dollars was secured by FUNAC for using Interamerican Development Bank money through the Ministry of Public Education. In this case 4-S clubs were located in the agricultural schools, very similar to the programs of vocational agriculture and the Future Farmers of America in this country. The same success has been duplicated in the schools with a high rate of turnover of capital, a lot of small loans, and timely student repayments of the loans. The figures show that for the 4-S clubs located in the agricultural schools, the percentage of tardy or delinquent payments were less than .75% for the half million dollar project. In 1983, between the two projects, there were 2,036 loans with an amount of almost ₡ 32,000,000 loaned. To that ₡ 32,000,000 the members themselves added an input of their own money and effort of nearly ₡ 21,000,000, making a total investment of over ₡ 52,000,000. That ₡ 52,000,000 returned, in terms of value of production, over ₡ 137,000,000, giving a rate of return on the loan of ₡ 4.3 returned for each ₡ 1 loaned to the members.¹⁵

Mario Crawford is the instructor at the agricultural school at Guacimo where Johnny and others are learning by doing with their projects. He believes firmly that youth are "change agents" at the family level and a possible solution to the national economic crisis in Costa Rica.¹⁶ This potential as a change agent, must be given the opportunity to succeed through

their involvement in a 4-S Club programs in their schools. Mario feels that the 4-S program and support through the supervised credit made available through the National 4-S Club Foundation (FUNAC) completes the missing link that is needed to make many of the youth not just potential change agents but actual functioning keys to agricultural technology transfer. The assistance of credit available for the youth to carry out, in a business-like manner, their desire in practicing the new educational technology that they have been taught means they can help solve family problems and function for the benefit of the entire country. In this sense youth are true change agents, for the results that they obtain for themselves make them feel important and supported. Youth are innovators, who implant or seed new ideas that their parents recognize as valuable and helpful in their lives.

In Costa Rica the agricultural schools are requiring that students have true hands-on experience. This means that a student, whether from the farm or from the city, who is studying in one of the agricultural schools, must have a project using supervised credit. This will insure that they understand the procedures necessary to secure a loan, how to keep appropriate records, how to calculate the return on their investment, and the steps necessary to repay the loan. They will also build a good credit rating. This means that they will have both the loan experience and the educational experience from running the project as a part of their program of study.

The success of FUNAC is not limited to Costa Ricans as Rafael Segovia, their Executive Director, has begun to provide training on "How To Write Proposals" and "How to Run a Credit Program" to a number of other Latin American countries as well as the government of Taiwan. FUNAC also has more ideas for the future. They currently have under consideration by the Interamerican Development Bank a loan request for 6.6 million dollars.¹⁷ Within this project they will continue small supervised loans as was done for the Projects with the Ministries of Agriculture and Education. But in addition, they are including some innovative ideas that will make youth more effective in their role as keys to agricultural technology transfer. They are strengthening the abilities of the schools to be financially independent, maintain well trained staffs, and provide high quality education. The loan request includes the possibility of a feed mixing center that would be a quantity buyer and producer of feed for the different livestock projects run by agriculture students at schools around the country. They also have contemplated the possibility of being a central supply warehouse for materials needed at the agricultural schools, ranging from paper to uniforms. By the same token, this central buying warehouse will be able to purchase those crops produced by the students as a result of their loan projects. Not only will materials be provided at a reduced rate to the students, but they will have a solid market for the goods that they produce.

FUNAC also recognizes the need for leadership training. In this area, the Costa Ricans are considering the need and the possibility for a national rural youth training center. This center would provide specialized leadership training for those people who would become the instructors and leaders of youth organizations and encourage and motivate youth to do an even better job in transferring technology. The national center includes such innovative ideas as raising a good share of the resources necessary for building the

center. The center would provide training in leadership, nutrition, educational practices, etc. The other idea that is contemplated is that such a center/school would be self supporting. The center would not have to be dependent on a continuing handout from some international agency; but rather it would become self supporting by producing income through student projects, rental of its facilities, and other cost recovery services.

In Panama a group of young businessmen, recognizing the importance of agriculture and the need to improve the agricultural schools, have formed a foundation that provides agribusiness support to the schools and insures that leadership training opportunities are available. This will make their youth more effective in technology transfer and as future leaders. They recognize those students who perform well in various leadership areas through contests, awards, and other incentives.

The experience and training that young people have received through their youth organizations work is helpful in many ways. When the Jamaicans began to expand their cooperative extension programs and started searching for extension agents, they first went to those people who had been 4-H club members and volunteer leaders. The type of leadership training available through 4-H or 4-S makes them valuable in agricultural technology transfer.

Summary and Conclusions

We have seen that youth comprise a very large percentage of the population of this world. Also, when we think of youth we have to go beyond the UN definition of 15-24 year olds and include all those from approximately 10 through 24. There are a lot of youth, and there are going to be many more.

Secondly, there is much technology that needs to be transferred. It's not a case of guarding national security by keeping the technology to ourselves. It is the opposite idea, that of sharing the best of what we have to help other people to help themselves and reducing the danger that illiterate and hungry people pose to world peace. Youth in many countries around the world are a resource. These young people have and can continue to provide a number of the answers in the transfer of agricultural technology which will improve the agricultural production, the economic stability, and the nutritional level of the people in their own countries.

Last, we see that these youth are successful in accomplishing much now but can be more successful through efforts - such as those of FUNAC - to provide the kinds of conditions that make them more effective as keys to agricultural technology transfer; namely, providing them with education about agricultural technology --technology that is biologically adapted, economically viable, and socially acceptable. In addition to this appropriate technology, they need the leadership training and the opportunities to both develop and use that leadership. Youth are already leaders today, but will become more influential leaders in the future as they advance through levels of decision making and direction within their own countries. Finally, their enthusiasm and their education alone will not guarantee success. They must be given the opportunity to succeed by providing the necessary financing through credit that is appropriately administered and supervised. If rural youth have the education, the leadership training,

and the financial opportunities, they can become an even more effective key to the agricultural technology transfer that is so desperately needed by this world. What can you do or who can you influence to see that these three conditions are better provided for the rural youth of our world?

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DEVELOPMENT STRATEGIES AND TECHNOLOGY TRANSFER:
A CRITIQUE*

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Development Strategies and Technology Transfer:
A Critique*

The papers discussed herein include the following: "Agricultural Development for Whom?" by Martin B. McMillion of Virginia Polytechnic Institute and State University, "A Training Program for Extension Agent Participation in Farming Systems Research" by Gilbert A. Long and Gordon L. Beckstrand of Utah State University, "The Effect of Colonization on Rural Women in Africa and the Implications This Presents for Agricultural Education" by Joyce Endeley and James Knight of Ohio State University, "Strategies for Effective Dissemination of Research Findings from International Agricultural Research Centers as Perceived by Center Staff and by International Students" by Young Joo Kim of Oklahoma State University, and "Rural Youth--Key to Agricultural Technology Transfer" by Richard W. Tenney of Cornell University.

It goes without saying that the topic of development strategies and technology transfer is of extreme importance currently. On the one hand, domestic critics question the intent and method of development strategies and on the other scores of human beings are dying due to food and nutrition shortages. The papers discussed here address both motive and procedure of technology transfer. As a vehicle for discussing the papers, the focus will be on major points presented and questions raised.

Agricultural Development for Whom?

As we look at this series of papers, this is a good one to begin with since it questions our motives. It is easy to admit that errors have been made in development efforts, but a somewhat more difficult task is to identify specific problems and take corrective action. McMillion in this philosophical paper points out that agricultural development projects have often had a negative effect on subsistence farm families in lesser developed countries (LDCs) primarily because many of the development efforts were designed toward commercial agriculture. This problem has been recognized for several years and strategies have been designed to try to correct it. One example of a strategy which is directed toward subsistence farm families is the Farming Systems Research and Extension (FSRE) approach.

Claims in this paper of "new colonialism" cannot be denied, yet the examples given relate to the private sector rather than donor agencies. If donor agencies and personnel of public educational institutions haven't considered and, in many cases, redirected international development motives, now is the time.

* Presented by Ronald A. Brown, Professor of Agricultural and Extension Education and Coordinator for Education, International Programs, Mississippi State University, at the 1985 Annual Meeting, Association for International Agricultural Education, April 24-26, 1985, Chevy Chase, MD

Another problem identified in LDCs is the exploitation by urban dwellers of rural farmers by demanding, and usually getting, cheap food. Too often government policies discriminate against development in rural areas. Additionally development projects have too often paid too little attention to policies governing inputs needed by farmers, such as credit, and access to fair markets. Subsidized interest rates or grants for inputs are suggested as possible solutions.

This paper also deals with the need to consider socio-cultural factors and how they are related to techno-economic changes. The suggestions of requiring a social impact statement and an economic impact statement for all LDC development projects (similar to environmental impact statements required in the US) may be going too far, but the idea has some virtue. Though the procedure is not a panacea, FSRE may serve as a potential and partial solution to the problem by involving more people including the clientele in planning development efforts. The needs and desires of subsistence farm families should be a major focus of development efforts.

Suggestions are made regarding the type of change agents needed and the kind of education to offer. Local extension agents should be generalists with adequate backup support from specialists. Agents should be educators, not regulators or enforcers. Education should be both formal and non-formal, with the assertion that reserving part of the education for the adult level will prevent people from leaving the rural communities.

In spite of a review of problems and some good suggestions, a major question remains: What are the incentives to keep rural farmers in rural areas? What will entice a well trained agriculturalist to work as an extension agent in a rural village rather than as an agricultural loan officer in the national bank? Until development projects take such disincentives into account, problems will remain.

A Training Program for Extension Agent Participation in Farming Systems Research

In this paper, a Farming Systems Research and Extension (FSRE) approach is recommended, with the local farmer as the focal point and the extension agent as the key team member responsible for liaison functions of diagnosis, design, testing and recommendation. No doubt the FS approach is of value in considering social, cultural, and educational factors previously overlooked. The idea of involving researchers, extensionists, and clientele in the total process of planning, implementing, and evaluating development efforts is based on sound programming principles.

This particular paper focuses on training extension agents to fulfill their roles in this process. One aspect is for agents to utilize the problem-solving approach to teaching. Probably no other instructional approach is more defensible from a philosophical and a psychological standpoint. Yet, the major question which arises is can an extension agent, though proficient in the problem solving approach to teaching, effectively

handle the role assigned in a FSRE project? When one considers the assigned role of carrying out the "liaison function of diagnosis, design, testing, and recommendation" and realizing that cultural, social, economic, and educational factors must be considered, the answer is probably no-- unless a lot of help is provided from other members of the team.

The effect of Colonization on Rural Women in Africa
and the Implications this Presents for Agricultural Education

The authors of this paper review the status of rural African women from pre-colonial to current times and suggest implications for agricultural education. In the pre-colonial era women in Africa had basically three economic activities: farming and food processing, domestic chores, and trading. As a result of colonization, their roles were expanded in some cases to include what the men had been doing. With colonization men had to pay taxes, even though in some cases their land was taken. To pay taxes, they had to abandon production of food crops and grow cash crops or work on plantations or in mines. As a result, women in Africa currently produce almost half of the food, yet in most cases the traditional education program is home economics. The emphasis in this paper is that women must be included in the agricultural education system if the goal is food self-sufficiency.

When planning agricultural education programs for women, the following factors should be considered: most rural women farmers in Africa are illiterate, yet they are recognized as important contributors to decision-making and farm management, and they are goal, activity, and learning oriented. Since most are illiterate, non-formal education should be used and should include agriculture and home economics. Consideration should be given to utilizing women as trainers and women's groups as vehicles for training. (The US Extension EFNEP approach may be useful).

In the long run, institution building projects should also take these factors into account in designing educational programs geared to solving long-term needs.

Dissemination of Research from IARCs

This paper reports a survey research project designed to measure the perceptions of personnel in the 13 International Agricultural Research Centers (IARCs) and of Oklahoma State University international students toward procedures used in disseminating research findings from the centers.

All international students at OSU and a sample of IARC personnel were mailed survey instruments. Major questions were what were the most frequently used dissemination strategies, which strategies were most effective, which were most promising, and if fully used, which would be most effective?

According to IARC respondents, the most frequently used strategies are presently "workshops at IARCs" and "internships at IARCs." The most promising strategies are "IARC workshops" and "other research personnel becoming more knowledgeable about IARC work and attempting closer coordination of research efforts."

International students perceived the most promising strategies as "a network of trial plots, through the Ministry of Agriculture or Department of Extension, and the provision of instruction about IARC findings by extension personnel, especially specialists."

Questions that should be asked about this research include: How valid are responses which are based on a 27 % return rate? Did the pilot test not warn of a low return rate? How valid are student responses, especially undergraduates, when some of them responded that they didn't know anything about the IARCs?

Rural Youth--Key to Agricultural Technology Transfer

This paper reviews the definition and scope of youth as those people ages 10-24 which make up a significant, and increasing, proportion of the population of LDCs. Using these figures as a base, technology transfer is described as being increasingly important. The focus here is more of a long-range one dealing with youth, while some of the other papers have focused more on short-term efforts.

A rationale for involvement in technology transfer efforts is offered and includes our moral obligation (people are hungry), the fact that we live in an interdependent global society, that we depend on international trade, and that we hope for world peace, which cannot be achieved when parts of the world are hungry.

Next, the paper points out policy decisions which hinder food production in LDCs. These include low prices and poor markets, lack of credit and other inputs, and lack of transportation and other parts of the needed infrastructure.

This is followed by several examples of successful projects involving young people in Costa Rica and Panama. The inferred keys to success include access to credit and a solidly based vocational agriculture/FFA/4H educational system.

Summary and Implications

When any topic is discussed and is as complex as international development strategies and technology transfer, many gaps will appear. However, there are some common areas in the papers included. For example, most of the papers spoke to the question of Who? The consensus seems to be that our focal point should be subsistence farmers who are oriented to producing food for themselves and their families as opposed to cash crop/export crop production. In some cases these clientele may be rural African women, in others youth age 10-24. In the first case the emphasis is on a short-range solution, in the second the solution is more long-term. Both are needed.

All of the papers included suggestions to the question of How? A summary of this area would indicate that programs should be based on sound teaching-learning principles. For example, FSRE involves all the actors and considers the total picture rather than one abstract section, utilizing rural African females to teach other females is based on the principle

that a change agent must be credible to the clientele, and using non-formal strategies for adults and more formal ones for youth mean that programs are being geared to fit the characteristics of the audience and the situation. Suggestions are also offered about the training and role of change agents, including the idea that they be generalists, that they be proficient in the problem solving approach to teaching, and that they not be enforcers or regulators.

Problems or hindrances to development activities mentioned were lack of inputs, e.g., credit, rural flight, brain drain, poor markets, and others. It seems that government policies often fail to supply necessary incentives. Development projects have not been able to provide such incentives.

The 1971 "Guide to Institution Building," with which most of you are familiar, reminds us that "...the transfer of new technology from one society to another seldom persists unless there is an institution present in the new society which supports, strengthens and perpetuates the technological innovation" (p.3). Some of the things we attempt fail to keep this in mind. Our work is often too restricted and we focus on doing one thing well--not considering how it fits the total context. We do this in research. We do this in technology transfer. A coordinated effort is essential to progress in development efforts.

New Partnerships between U.S. Universities,
International Agricultural Research Centers and
National Institutions in Less Developed Countries:
A Research and Training Model

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New Partnerships between U.S. Universities,
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COOK COLLEGE

Rutgers, The State University of New Jersey

New Partnerships between U.S. Universities, International Agricultural Research Centers and National Institutions in Less Developed Countries: A Research and Training Model

I. Introduction

Described in this proposal are three phases of a comprehensive model which will improve and expand collaborative efforts involving U.S. universities, International Agricultural Research Centers (IARCs) and National Programs of less developed countries (LDCs). A major goal over the longer term is the establishment of a collaborative research network that will more rapidly solve some of the major food problems in developing countries. Shorter term objectives are 1) to improve agricultural research and training programs for LDC students in U.S. universities and 2) to facilitate their reintegration upon graduation through participation in the design and conduct of collaborative research projects in their home country. Funding is being requested to implement Phase I of the Model. Phase I includes a two-week workshop scheduled for May 19 - May 30, 1986 and a second workshop for another cycle of participants to be held about 12 months thereafter. LDC students who are about to return to their jobs in national institutions as they conclude their graduate studies in the U.S., U.S. faculty who serve as their major professors, and scientists from LDC national programs and IARCs will participate in this initial phase. A modest program is proposed, requiring just over \$0.1 million in each of the first two years. This presumes that additional resources can be identified to enable expansion if the program is successful.

The Phase I workshop, divided into three parts, will orient U.S. faculty and reorient returning graduates to the current and emerging research priorities in the graduates' home countries. More specifically, Unit I of the workshop will 1) provide an update on cassava and potato research being conducted by the Centro Internacional de Agricultura Triopical (CIAT), the Centro Internacional de la Papa (CIP), and National Program scientists and 2) review the institutional objectives that are being addressed through those research efforts. Unit II will focus on research management, including the design and conduct of applied research which is so important in solving priority problems in LDCs. Unit III, the major portion of the workshop, will engage all participants -- U.S. faculty, LDC students who are concluding their degree training, IARC and National Program scientists -- in the identification and design of research proposals on key commodities (i.e., cassava/potatoes). Upon approval by the students' national institution, these projects will then be initiated by the graduates under the auspices of IARC/National

Program scientists upon return to their home countries. All participants, including U.S. faculty will subsequently participate in site evaluations and follow through as projects are completed, with some funding from the budget requested here.

The Cook College International Agricultural and Food Program professional staff will manage the project.

Assisting Rutgers in the planning and implementation of this initial demonstration of the model (Phase I) are scientists and training staff from CIAT and CIP. CIAT and CIP have been selected as the IARCs to be involved in Phase I for several reasons: 1) they are already working collaboratively in a major United Nations Development Programme project (Technology Transfer on Root and Tuber Crops); 2) they assist many of the same countries, particularly in Latin America, in solving the commodity problems (roots and tubers) with which they deal; and, 3) it is deemed important that we begin with a somewhat homogeneous focus in order to demonstrate immediately the viability of the model.

Representatives of the Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT) will be invited observers of the first workshop and participate in a similar workshop for different students during the second year. Refinements may be made in the format of the first workshop and the second will be expanded to include corn and perhaps beans.

Phase II of the project involves extension of the model to additional IARCs. It is anticipated that additional funding will be secured by the end of the second year, thus permitting all interested IARCs to participate in similar programs. Phase III will be reached as the network expands and the mutual understanding of interests, needs and capabilities grows to the point that the interventions and collaborative efforts described in the following sections can occur in the most logical and functional sequence.

The long-range goals for the Collaborative Research and Training Network Model (Phases I-II-III) are as follows:

To strengthen national programs research capabilities;

To expand further the potential for and the occurrence of collaborative research among national programs, IARCs and U.S. universities.

To facilitate the interinstitutional transfer of new technologies and research methodologies; and

To increase the output of food and improve nutrition in developing countries.

The more immediate objectives of Phase I -- objectives that will contribute to the achievement of the long term goals just cited -- are as follows:

To optimize the pre-training, training, and post-training career development cycle for LDC students;

To increase the frequency with which LDC students' thesis projects are relevant to home country needs;

To broaden the motivation and capacity of U.S. university faculty to backstop IARC research initiatives through collaborative research;

To promote understanding and exchange among U.S. universities, IARCs and national programs.

Detailed in the following sections are the project rationale, a description of the model, the plan of action and schedule for Phase I, Rutgers University's capacity to manage the project, the resources which are available, and a budget.

II. The Problem and Project Rationale

A. Background

A basic objective of the IARCs, most of which are supported through CGIAR, is to improve the quantity and quality of food production in developing countries. Their focus is on the critical aspects of food production and farming systems research that are not addressed by other research programs. In addition to technological components, centers are expected to provide training for people who in turn are expected to help increase agricultural productivity in their home countries.

With the help of CGIAR and donors from around the world, the centers have greatly expanded their capacities to conduct research on a wide range of agricultural problems confronting LDCs. Nevertheless, IARCs alone cannot carry out complete multidisciplinary research and training programs on all aspects of problems related to their mission. Their research facilities and budgets are tailored to their specific objectives and they are limited in the number of scientists available, especially in any one discipline.

The September 15, 1980, CGIAR report¹ called attention to a number of concerns that are equally problematic a half decade later. The report enumerates a number of gaps in IARC research programs; indicates that developing countries and IARCs rely a

¹ Consultative Group on International Research, 1980 Report on the Consultative Group and the International Agricultural Research System--an Integrative Report, September 15, 1980.

great deal on the developed countries for the generation of scientific knowledge and ideas; and stresses the need for backstopping in basic research and research methodology. Indeed, most centers have formed linkages with developed countries. Among those countries are Australia, Belgium, Canada, Denmark, France, Germany, The Netherlands, Sweden, the United Kingdom and the United States of America. Several centers have had contractual or other linkages with U.S. universities, research institutes and the USDA. Examples include cooperation between Oregon State University and CIMMYT on spring-winter wheat breeding and screening; University of Minnesota's work with CIP on cold hardiness in potatoes; and Cornell's linkages with CIMMYT, CIP and IRRI.

Most linkages have been worked out on the initiatives of center directors and scientists. However, to date they have tapped only a small percentage of the capabilities available in U.S. universities.

Another resource and linkage for IARCs are the national institutions and scientists in the developing countries with whom they work. Many examples of such linkages can be found in CIAT, CIP and CIMMYT as well as in the other centers. While these ties are both necessary and productive in many cases, achievements could be greatly expanded if more and better trained scientists were available in those national institutions. This brings us to the crux of the concern to be addressed in the proposal.

3. An Immediate Problem

A major concern raised by National Programs and IARC staff is that most LDC students in U.S. universities are engaged in research that is of questionable relevance to the priority needs of the home country. In other cases, where the subject matter is relevant, the research findings are not necessarily transferable because the U.S. soil, climate and other conditions are often unlike those found in LDCs. These concerns have been echoed in recent conferences such as the March 1985 International Science and Education Council (ISEC) meeting and the 1984 regional conferences of the Board for International Food and Agricultural Development (BIFAD).

One frequently proposed solution is that LDC students should be permitted to conduct all or some portion of their thesis research in their home countries. This is occurring in a small number of cases, and primarily in those U.S. Universities with long-standing commitments in international development. In order to make this practice acceptable to more university faculty, it is necessary to address their concerns about the value of applied research for thesis credit, the absence of direct supervision and guidance of the student's research (even if it is basic research), limited or unavailable resources for off-campus research, and a lack of knowledge about LDCs and the research needs that exist.

The problems described above are exacerbated where LDC students, once graduated, are unable to initiate research immediately upon return to their home countries. The reasons are many and among them are the following:

Time is required for readaptation to the home country;

Funding is limited or not readily available;

Changes have occurred in governments, national priorities, directors and supervisory personnel;

Broader administrative (managerial and supervisory) responsibilities are thrust upon them;

Mentors are not available to help them translate newly acquired skills into applied research projects that are appropriate to national program objectives.

The lack of capability to perform research is seldom the reason for delay!

As affirmed earlier, many IARCs (and perhaps CIAT, CIP and CIMMYT in particular) have assisted LDC students and National Programs to overcome problems related to non-relevancy of thesis. CIP's Regional Research and Training Program (see p.23, Table 1) provides one positive example. However, more can be done, especially with regard to the establishment of systematic, tripartite efforts involving IARCs, national programs and U.S. universities.

Just as AID, BIFAD and U.S. universities have taken the initiative to learn more about each other's interests, needs and capabilities (through Title XII and related activities), so must IARC, National Program and U.S. university scientists more actively pursue relationships that will facilitate their participation in mutually beneficial endeavors such as collaborative and contracted research projects.

The need for these relationships is already acknowledged. CIP, for example, has contracted Cornell, Wisconsin, North Carolina State and other U.S. universities to conduct basic research which can be done more efficiently and economically at these institutions. These contracts are within the scope of IARC and U.S. university mandates and priorities. Furthermore, they provide the opportunity for faculty to be involved in front-line research while gaining a better understanding of the research priorities in LDCs.

What is needed, and conspicuous by its absence at present, is a clearly articulated, comprehensive, transferable model that can effectively and systematically address the issues and problems described above. More to the point, there is a need for a program that will 1) optimize the pre-training, training, and post-training career development cycle for LDC students: 2) increase

the frequency with which LDC students' thesis projects are relevant to home country needs; 3) broaden the motivation and capacity of U.S. university faculty to backstop IARC research initiatives; and, 4) promote understanding and exchange among U.S. universities and IARCs and perhaps between IARCs as well. The model and workshops described herein are designed to meet those objectives, thus filling the present void.

It is also noteworthy that the model and workshops may serve as a partial but significant response to recommendations that are contained in the February 1984 official report entitled **Budget Recommendations of the Board for International Food and Agricultural Development (BIFAD) on the AID Program and Budget for FY1985 in Agriculture, Rural Development, and Nutrition**. Specifically, BIFAD recommends that (pp. 59-62, unedited excerpts):

3. the Agency modify its proposed FY 85 ARDN program to deemphasize activities likely to have relatively low-level impact on agricultural development and concentrate its resources on fewer, potentially high payoff interventions. With appropriate consideration of country-specific conditions, this will mean:
 - a. increased investment in the strengthening of indigenous institutions most fundamental to agriculture;
 - b. increased investment in LDC human capital formation including an expansion in agricultural sector "blanket" education and training programs to serve LDC organizations and agencies where trained manpower requirements are high and which do not have access to AID-funded educational opportunities under the participant training components of AID contract projects or other donor programs;
 - c. accentuation of the trend to phase down investments in short-term agricultural production and development projects and the real location of these budgetary resources to activities holding potential for greater multiplier effects on the rate of agricultural development; and
 - d. seeking additional means of effectively linking research and technology development efforts of the centrally-funded IARC, CRSP and contract research programs to agricultural research, extension and development programs in the LDCs.

7. additional funds allocated to the Office of Agriculture be used to:
 - b. expand contractual research in priority problem areas where this approach is indicated.

9. the Agency re-assess its policies vis-a-vis budgetary support of the IARCs and to place such new policies and budgetary guidelines as might evolve from this exercise in practice prior to the initiation of the FY 1986 budget cycle.
12. the Agency make a quantum increase in its investment in the academic degree training of LDC participants to the M.S. and Ph.D. levels in U.S. universities or third-country institutions as the case may warrant.

As stated above, it is believed that the model and workshops described herein will greatly assist AID in meeting these important recommendations. Moreover, the model and workshops proposed provide a creative response to a number of the recommendations which appear in the CGIAR Technical Advisory Committee Study Team Report, Study of Training in the CGIAR System - 1984 (February, 1984). For example, one key recommendation is as follows:

ii. The Centers which assist a particular country in training should work together, in association with the appropriate national agencies, to ensure that their collective contribution is in accordance with national needs for development. For example, the Centers should devise appropriate means of collective collaboration with the universities and other institutions for agricultural research, education and training in the nations; if they are invited to do so, they should contribute to curriculum development; and where it is advantageous to do so, a resident representative of one of the Centers should be enabled to promote their collective actions, and to inform national authorities of the activities and developments in the CGIAR System, (P.14).

III. Description of the Collaborative Research and Training Network Model

A. Three Stages of the Model

The Collaborative Research and Training Network Model shown in Figure 1 (p. 21) depicts three stages in the career development of many LDC scientists: 1) the PRE-TRAINING stage (the time in home country prior to degree training in the U.S.); 2) the TRAINING stage (typically two-to-three years); and, 3) the POST-TRAINING stage (the period following the return to the home country).

A recognized objective of graduate degree training in the agricultural sciences for many LDC participants is the development of research skills which will enable them to make substantive contributions to national program needs through research upon return to their home countries. Ideally,

candidates for degree training are:

carefully screened and pre-selected;

placed in colleges or universities with established eminence in their chosen fields of study;

supervised by major professors whose research interests are compatible with the students' educational and career goals; and

adequately prepared, prior to their return home, to design and conduct basic and applied research that is appropriate to the needs of LDCs.

Unfortunately, the ideal occurs all too infrequently! Moreover, collaboration during any of the three stages (pre-training, training, post-training) that involves all parties -- national program, IARC and university scientists and the students -- is virtually non-existent (see Figure 2, p. 22). Thus, there is limited opportunity for each to learn in a direct manner about the needs, interests and capabilities of the others. The model proposed here provides those linkages, through the workshops and follow up activities planned for years one and two of the project.

As illustrated in Figure 1, p. 21, interventions may be made at various points in the career development of LDC students. Those interventions (A, B, C, D) that are referenced throughout the current proposal are discussed below.

B. Interventions and their Relationship to the Stages

Intervention A. For purposes of this proposal, Intervention A is defined as the **pre-training stage** of perhaps up to two years during which candidates are screened, selected, and prepared for placement in an appropriate graduate program in a U.S. university. Ideally, a well-defined manpower development plan guides the process and a cadre of individuals will eventually receive degree training. Also, as shown in Table 1 (p.23), the training is often a part of a larger developmental strategy which includes research, technology transfer and institutional building. Although selection of the candidates rests with the National Programs, input from U.S.A.I.D. mission personnel, IARC scientists and faculty of the receiving institution may vastly strengthen the manpower development program. Interventions of this nature do occur within the context of specific AID projects, but in other instances they occur at best on an ad hoc basis.

Intervention B. Intervention B is defined as that point in the **training stage** where a major advisor is assigned to assist the student in planning a course of study and select the thesis project. Unlike domestic students who may take most of their course work before identifying their thesis work, international students frequently make their selection in the first term of

study. Ideally, students will be guided by informed faculty who will help them acquire knowledge and skills that are transferrable to developing country settings. In some instances, it may be most appropriate for the thesis research to be conducted in the student's home country, perhaps under the supervision of IARC or National Program (e.g., National University) scientists in collaboration with U.S. faculty. This option is more likely to be exercised where the faculty and scientists have an established relationship and positive regard for the other and each other's institution.

Intervention C. Intervention C is that point just before or after the completion of the training stage where the graduating student is about to resume employment with a national institution in the home country. Since the ideal processes and linkages alluded to under Interventions A and B are not operative universally in most national programs and universities, **Intervention C represents the logical and necessary starting point for the project described in this proposal (Phase I).** That is, through the workshops, scientists of LDC National Programs, IARCs and U.S. universities will learn about each others' interests and capabilities and interact with selected graduates to design research proposals. Upon approval by the appropriate National Institution, the graduate will engage in the research under the supervision of National Program scientists and collaborating IARC scientists once they return to their home countries. The U.S. faculty will serve as backstops. As these U.S. scientists continue their campus-based research, 1) they will have a greater understanding and sensitivity about its relationship to the research that is now being conducted (perhaps by their former students) in developing country settings; 2) they will be in a better position to design and participate in collaborative research projects with IARCs and/or National Programs; and, 3) they will be more receptive and helpful to future LDC students as the opportunity for Intervention B arises.

Intervention D. Intervention D. constitutes a period of further evaluation of the activities begun during Intervention C and the research which has since been conducted. At this juncture in the **post-training stage** the graduate, U.S. faculty, National Program scientists and IARC scientists meet to evaluate the research findings and the process. Recommendations for future action will be made this time. Modifications in the process can be made before the workshop is conducted again with different students in year two of the project.

IV. Plan of Action, Work Schedule and Implementation of Phase I

A. Overview of the Plan

Ideally, interventions begin with A and progress through D. However, as noted above, since the ideal processes and linkages described in Intervention A and B are not operative universally, **networks** must be established. Intervention C is seen as the **logical and necessary first strategy** leading ultimately to

productive, collaborative tripartite linkages among IARCs, LDC National Programs and U.S. universities. The major component in Intervention C is a two-week workshop to be conducted May 19 - May 30, 1986.

During the Fall of 1985 (October-November), an intensive institutional survey will be made of the agricultural colleges and universities throughout the United States, utilizing among others, USDA and IIE data. The survey will identify institutions, faculty, and LDC students whose research has relevance to those commodities that are the concern of CIAT (particularly beans, cassava, and rice) and CIP (the solanum potato). The survey will be updated in the second year to include CIMMYT commodities (principally corn and wheat). The survey will, among other things, result in a resource directory that will be available to IARC and National Program scientists, AID and U.S. universities.

The survey will also be used to identify potential participants for the workshop (i.e., LDC students who will be completing their graduate programs during the spring term, 1986, and the professors who are directing their thesis research). With input from CIAT, CIP and National Programs, candidates will be selected in January-February 1985 and invited in teams (students, their National Program Directors, and their major professor or an appropriate thesis/dissertation committee member) to participate in the workshop. It should be noted that only those students who have jobs awaiting them will be selected (at least in this initial program). IARC and National Program representatives will collaborate in the selection of the students.

Scholarships will be made available to 12 LDC students and their National Program Directors to enable them to participate in the workshop (travel, room and board). Room and board will also be provided for faculty, but their universities will be asked to cover the cost of transportation to and from the workshop. Travel and per diem for faculty will be provided for the site visits referenced under Intervention D. CIAT, CIP and CIMMYT participants will cover their own room, board and transportation costs. Also budgeted in the current proposal are basic expenses for the research projects (supplies, local travel, etc.) at an average of \$2,000 for the 12 proposals that may be funded in each of the two workshops slated herein. It is anticipated that projects will complement existing IARC/National Program goals, thus justifying IARC participation in the project. It is unlikely that these will be discrete, short-term endeavors. Initial expenses, replications and extensions of the projects may require more support; therefore, IARC and National Program representatives will work to identify additional funds as needed. Once the projects are fully integrated into the national effort, National Programs will assume the costs for their continuation.

LDC students selected for the workshop must complete their degree training and return to their home countries within three months. The research projects must be initiated as soon as

conditions permit. U.S. faculty will conduct site visits as described in Intervention D during the first three-to-six months of the project.

Evaluations of the workshops will be made at the end of the two week program and again during the site visits. Evaluation of the research projects will be built into the design. The evaluations that occur during the site visit (involving the graduates, U.S. faculty, National Program and IARC scientist) will be used to improve the second workshop which will be held approximately 12 months after the initial one. As noted earlier, CIMMYT will join CIAT and CIP in the second workshop for new students and faculty, and the commodity focus will expand to include corn and perhaps beans. Site visits to the new projects will be made and summative evaluation and report will be made at the end of the second year (July, 1987).

Additional funds will be sought so that the networking model can be extended to other IARCs as early as 1988. By 1988, it is anticipated that the initial IARCs (CIAT, CIP and CIMMYT) will have established linkages and networks beyond those which they have already that will enable Interventions A, B, C and D to unfold in their logical sequence. In fact, as Interventions A and B begin to occur on a more regular basis, Interventions C and D will not be required because students will be involved in country-relevant thesis research from the start of their programs and will, therefore, be better prepared to design, conduct and manage projects which address National Program priorities once they return to their respective LDCs.

B. Workshop Outline

Subject	Days Allocated
Unit I	
Update on Cassava/Potato Research Being Conducted by CIAT, CIP and National Program Scientists	1 1/2 days
Review of Current National Program/IARC Objectives	1 day
Unit II	
Discussion of Research Management, Including Design and Conduct of Applied Research Relevant to LDC Priorities	1 1/2 days
Unit III	
Identification and Design of	4 1/2 days

Research Proposals on Key
Commodities (Cassava/Potatoes)

Presentation of Research
Proposals and Evaluation of
the Workshop 1 1/2 days

Total 10 days

C. Participants in the Initial Workshop

<u>LDC Students</u> Nearing Completion of Degree Training (approximately equally divided between cassava and potatoes)	12
*Major Professors from U.S. Universities (who directed the thesis work of the LDC students)	12
* <u>National Program Directors/Scientists</u> (with whom the graduates will be employed upon return to home countries)	12
* <u>IARC Staff/Scientists</u> (2 to 4 each representing CIAT, CIP and CIMMYT)	6-12
Total	42-48 **

*Presenters and group leaders will be
drawn from among these participants;
thus, additional consultants will not
be required.

**Additional U.S. University faculty may
attend as participant observers at their
own expense. AID and BIFAD will be
encouraged to send representatives as well.

D. Projected Dates for the Workshop

The projected dates for the initial workshop are
May 19 to May 30, 1986. Participants should arrive in New
Brunswick, Sunday, May 18 and depart Saturday, May 31, 1986. A
get-acquainted reception will be held Sunday, May 18, and a
banquet will be provided Friday evening, May 30, 1985. Optional
weekend and social/cultural excursions to New York and
Philadelphia will be planned for the weekend of May 24, 1986.

E. Workshop Site

The Workshop will be held in New Brunswick, New Jersey at Rutgers University, Cook College. Although laboratories and other facilities on campus will be available if needed, the workshop will be conducted at the Rutgers University Continuing Education Center adjacent to Cook College. This attractive and spacious center has been especially designed for intensive resident adult instruction. The facility offers comfortable, air conditioned accommodations in addition to functional seminar and conference rooms, administrative and instructional services and library resources. The campus is within 30-90 minutes of three international airports; thus, the most competitive, economical airfares will be available to all participants.

F. Plan of Evaluation and Final Report

All participants, including the leaders, will be asked to evaluate the workshop on a unit basis and to complete a summative evaluation at the end of the workshop. Their feedback will enable the workshop's leadership to be responsive immediately and provide guidance and follow-up services to the participants (e.g., additional resource materials, training and technical assistance). The evaluations may also lead to refinements for the workshop that is scheduled for year two. A report to be prepared after completion of each workshop will also contain copies of the research proposals that have been designed. Reports will be made available to AID, BIFAD, all IARCs, participating National Programs and participating U.S. universities.

G. Organization, Administration and Leadership

The organization and administration of the workshop will be the responsibility of the Cook College International Agricultural and Food Program and the Non-Degree and Short Course Program. Promotional efforts, special events, housing, local transportation and other logistics will be coordinated as well. Leaders of the workshop units (Parts I, II, and III) will be identified from among the participants--IARC, National Program and U.S. University representatives. Thus, there will be no expenses for additional "consultants."

V. Institutional Resources and Capability to Manage the Project

A. Institutional Background

Rutgers, the State University of New Jersey, was established in 1766, as one of the original Colonial Colleges. In 1864, it was designated the Land Grant College of New Jersey, and it became the State University in 1945. As such, it is the only institution in the U.S. which has been a Colonial College, A State University, and a Land Grant College. Today it ranks 19th in size in the U.S., with over 50,000 students in three major locations -- Camden, Newark, and New Brunswick -- and with 24

different colleges, 16 research units, and over 2,000 faculty members. Rutgers has a total foreign student population of 1,100, with about 30 percent coming from Latin American and the Caribbean. A recent survey has identified 340 with faculty overseas experience and 172 as having had experience in the Latin American region--the region in which CIAT, CIP and CIMMYT are located.

The agricultural unit of the University is George H. Cook College, named for the first director of The New Jersey Agricultural Experiment Station who was responsible for bringing soybeans into the U.S. from China. It currently enrolls 3,000 undergraduates and 600 graduate students; about 100 graduate students are international students. Another 7,000 persons participate annually in an especially active Short Course Program, with over 60 individual offerings every year.

Cook College was recently rated among the top 15 schools in the U.S. by reason of its outstanding teaching programs. One of its former faculty members, Dr. Selman Waksman, received a Nobel Prize for his development of the term "antibiotic" and the antibiotics terramycin and spectromycin. It has also been distinguished as having the oldest and largest environmental science program in the U.S., as well as for its research on biomass and ethanol production, its work on solar heating, and other recent efforts to develop alternative energy sources. J.B. Smith, the first State Entomologist and Cook's first internationalist, was primarily responsible for reducing mosquito infestations and malaria in the Panama Canal at the turn of the century.

Perhaps Cook College's most distinctive feature is its organization around multidisciplinary, problem-solving programs of teaching, research, and technology transfer which integrate the agricultural, environmental, and social sciences. Its faculty of 400 (which makes it second in size only to Cornell's College of Agriculture in the Northeast region) are drawn from the biophysical sciences sociology, political science, anthropology, and economics, as well as law, medicine, and communications.

The College has four main divisions, supporting 22 problem-oriented multidisciplinary departments. The Agricultural Experiment Station is a separately budgeted unit with off-campus sites in five locations throughout the state. The Cooperative Extension Service is a second main division, composed of about 150 faculty members, 60 of whom are subject matter specialists fully integrated into Cook's department as voting members, with comparable faculty ranks and teaching, research, and public service assignments. A third division of Resident Instruction has responsibility for all degree and non-degree teaching programs of the College.

B. International Expertise

The International Agricultural and Food Program (IAFP) has emerged recently as the fourth major unit of Cook College. The IAFP supports and complements the teaching, research, and extension divisions, and is strengthened by the expertise and resources in those units. Over 80 Cook College faculty have engaged in overseas assignments and participated in international program activities, with most departments of the college being represented in this group. About a dozen of these people took on specific assignments of long or short duration overseas in 1982-1985, and another four spent sabbatic leaves in developing areas of the world. Twelve were invited to present papers in international conference, workshops, and symposia. In turn, fully 26 foreign professionals from 15 different countries chose to take leaves from their base institutions to spend extended periods of research and study at Cook, and 90 students (graduate and undergraduate) participated in regular degree programs, while another 50 from developing countries attended workshops on vegetable production and marketing and human welfare implications of irrigation development. Further, almost 50 faculty members reported doing research of international significance, with funding from a variety of sources, including the Experiment Station. This is research which can make significant contributions to problems faced by foreign countries and, in turn, benefit from collaboration with professionals outside the United States.

Presently, Cook College is under contract with USAID and the Government of Panama. Cook College is providing technical assistance to the Government of Panama to enhance its capability in applied agricultural research. The major purpose of this project is to assist Panama to establish an agricultural research capability that will help operators of small farms increase their land and labor productivity and ultimately their incomes and employment opportunities. Another short-term technical assistance project was supported by AID during 1983 which permitted five faculty to assist Panama's Ministry of Agriculture with the design of a new agricultural extension service.

In addition to these overseas activities, Cook College has relevant campus-based experience with participants from LDC's including the provision of degree and short-term training special conferences. In June of 1984, for example, Cook College faculty hosted the Third International Conference on Avian Endocrinology. Some 200 scientists from 16 countries participated. Over 90 international students are currently enrolled in agricultural and environmental science graduate degree programs at Cook College. Also, in May and June 1984 Cook College faculty, through a grant from the Ford Foundation, hosted and conducted an international workshop on the Human Welfare Implications of Water Irrigation. The workshop is scheduled again for the same time period in 1985.

Cook College conducted the fourth annual Vegetable Production and Marketing Workshop, July 9 - August 20, 1984.

Seventeen participants from 12 countries of Africa, Asia, Latin American and the Caribbean attended the all-day sessions. Some 20 Cook College faculty who specialize in various aspects of vegetable production and marketing provided instructional support. As a result of the lectures, field trips and productive exchanges between participants and faculty, several participants have taken steps to return for graduate degree programs, three stayed on for specialized in-service study and training, and other participants expressed interest in arranging for Cook faculty to provide technical assistance for their countries. The success of the course led to its expansion from six weeks in former years to eight weeks in 1984.

The International Agricultural and Food Program is directed on a full-time basis by Dr. Reed Hertford, a Ph.D. economist. He has ten years of resident experience in Latin America (Mexico and Colombia). Before joining the College in 1982, he directed in New York the Ford Foundation's agricultural program for Latin America and the Caribbean for three years and its Asia and Pacific agricultural program for two years. His present position as Chair of the Board for CIAT will insure open communications as the project develops.

The IAFP also has an Assistant Director, Dr. Judith Lyman Snow. Dr. Snow, who has a Ph.D. in Plant Breeding from Cornell University, was a research scientist at CIAT (1978-1980) prior to her employment with the Ford Foundation (1980-1984). She joined the IAFP staff in September of 1984. Dr. Snow will serve as co-manager of the project proposed herein with the former Associate Director of the IAFP, Dr. Maurice P. Hartley. Dr. Maurice P. Hartley, currently serves Cook College as Associate Dean for Special Programs. He is an Associate Professor in the Department of Education and former Director of Cooperative Education. He has overseas consultive experience, especially in organizational training and development. IAFP has a full support staff, including a program specialist/administrative assistant, two secretaries, and a bookkeeper. This complement of professional and support personnel makes the IAFP capable of providing high quality management and oversight for its international activities.

With generous financing from the University and AID through a Title XII Strengthening Grant, IAFP has developed a small grants program to support activities (research, travel and study, workshops and symposia, and short course) which can build bridges of collaboration between the overseas commitments of the University and Rutgers's vast faculty, student, and service resources. This makes it possible to provide to the projects far more than is contractually agreed on.

C. Qualifications of the Faculty

In addition to the IAFP Director, Associate Director and support staff, faculty members, located in departments related to this proposal, devote full-time or provide release-time for

international development efforts. They are in the Departments of Entomology, Horticulture, Soils and Crops, and Agricultural Economics. Experiment Station and departmental-based research projects involve such areas as plant nutrition, irrigation systems, crop protection, integrated pest management, soil conservation, plant growing, harvesting, post-harvest physiology, packaging and marketing. With reference to roots and tubers, faculty research includes work in such areas as yield improvement, high specific gravity, varietal development, and disease and insect resistance.

Further, these faculty hosted in 1980 an international potato pest management conference, which resulted in an internationally recognized book. A related conference organized by faculty was held in Germany in 1984. The program emphasized new insect control strategies.

D. Suitability of Location

Although New Jersey is the most urbanized state in the nation with some 7.5 million residents, over 60 percent of the state is in forest and farms. New Jersey farmers grow some 80 different vegetable crops; half a million acres of grains such as corn and soybeans; and peaches, apples, blueberries and cranberries. Potato production is in excess of 1.5 million cwt. New Jersey is blessed with a number of soil types, as well as variations in climate. These led to New Jersey's identification as the Garden State. Production and marketing innovations, many applicable elsewhere, make vegetable production in New Jersey a \$100 million dollar industry.

New Jersey is within a few hours drive of one fourth of the nation's consumers. Major national markets are nearby and, because of the availability of good seaport facilities the markets of the world are here as well.

In addition to the above, it is important to call attention to the accessibility of Rutgers University. Located at the hub of the northeast corridor, New Brunswick is mid-way between Washington, D.C. and Boston and within an hour drive of the cultural centers of New York and Philadelphia. Three international airports serve the area, and all are within 30-90 minutes of the campus.

E. Additional Resources: CIAT and CIP

CIAT and CIP, having already assisted Rutgers University, Cook College in the development and planning of the Collaborative Research and Training Network Model, will make additional resources available to the degree that budgetary and personal limitations will permit. Among the immediate resources are the following:

- . A collaborative research, technology transfer, and institutional building system which has evolved

through close association with LDC National Programs (see Table 1, p. 23).

- . Improved germplasm with disease and insect resistance that has been developed in the centers' breeding and genetics programs or other sources.
- . Research results and technologies aimed at solving priority problems affecting potato and cassava productions including
 - Techniques for virus and viroid identification and control:
 - Rapid multiplication methods related to accelerated seed production;
 - Biological control of nematodes;
 - Integrated pest management control practices.
- . Opportunities for further training within the IARC training programs.
- . Consultancy and technical assistance, including supplemental resources such as research literature and IARC publications.
- . Identification of funding sources for collaborative research projects of mutual interests to IARCs, National Programs and U.S. universities.
- . Participation of IARCs' scientists and training staffs at the workshops in years one, two and subsequent years.

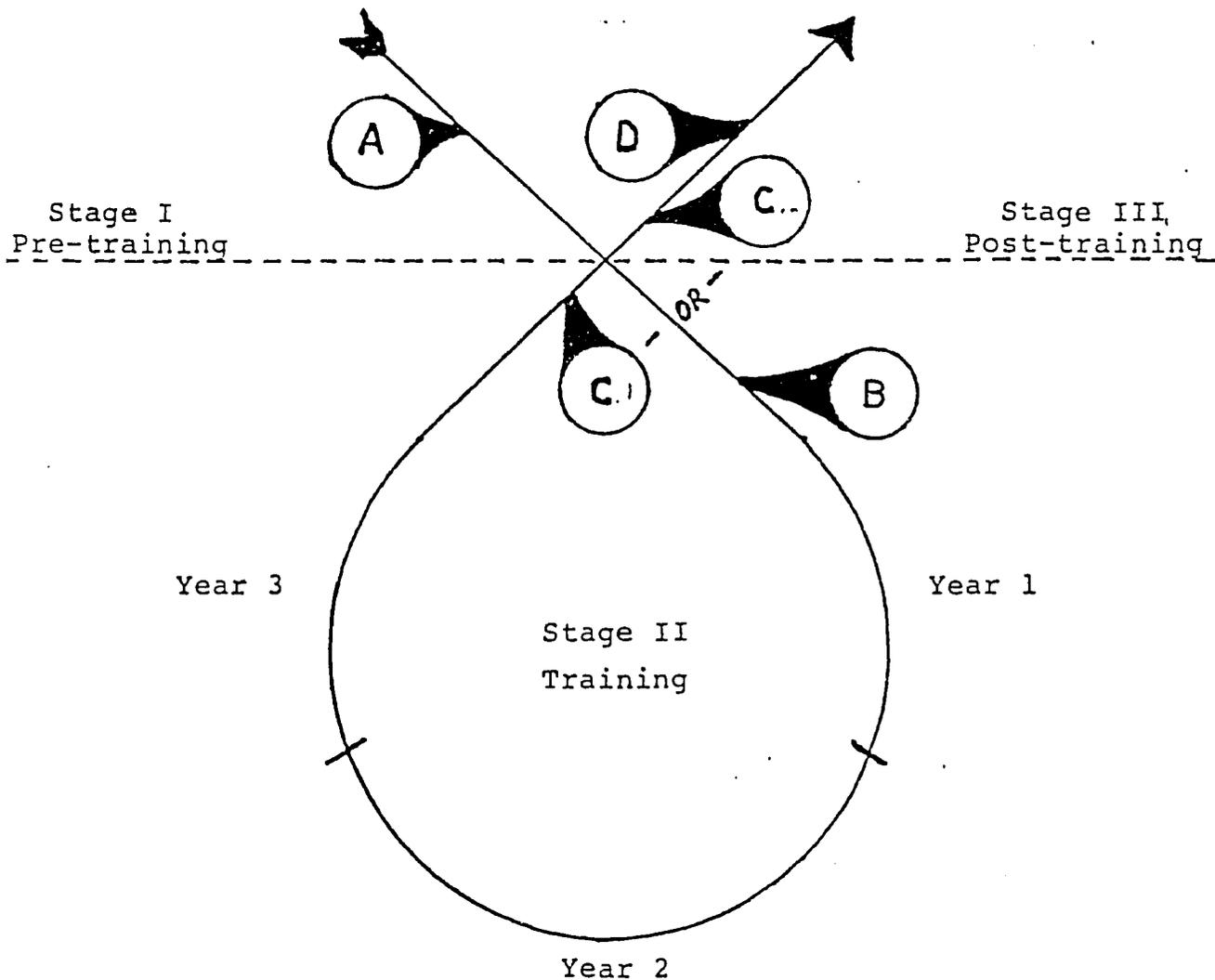
It is anticipated that additional IARCs, as they become involved in the project, will provide similar resources and support as the network expands.

VI. Budget

Rough budget estimates for Phase I of the Collaborative Research and Training Network Model are presented below. Funding is requested to begin August 1985, with the design and conduct of the first institutional survey, and conclude July, 1988, after the last site visit for the second workshop has been made. A final evaluation and budget report will be submitted within 90 days thereafter. These are five major categories of expenses: Workshops, Research Implementation, Follow-up, Management Fee, University Overhead.

FIGURE 1

Collaborative Research and Training Network Model

(Interventions in the Career
Development of LDC Students)INTERVENTIONS

- A. Pre-training stage: candidates for degree training are screened, selected and prepared for placement in an appropriate graduate program in a U.S. university.
- B. Training stage: a major advisor is assigned to assist participant in planning course of study and selection of thesis project.
- C. Training/Post-training stage: point just before or after graduation prior to re-entry into the work force where graduates attend workshop with scientists of LDC National Programs, IARC's and U.S. universities to design research projects to be initiated by graduates in LDC context.
- D. Post-training stage: point where research project findings (and workshop outcomes) are evaluated on site by graduates, National Program/IARC scientists and U.S. faculty.

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FIGURE 2
Collaborative Interactions
Among National Program, IARC and
University Scientists and LDC Students

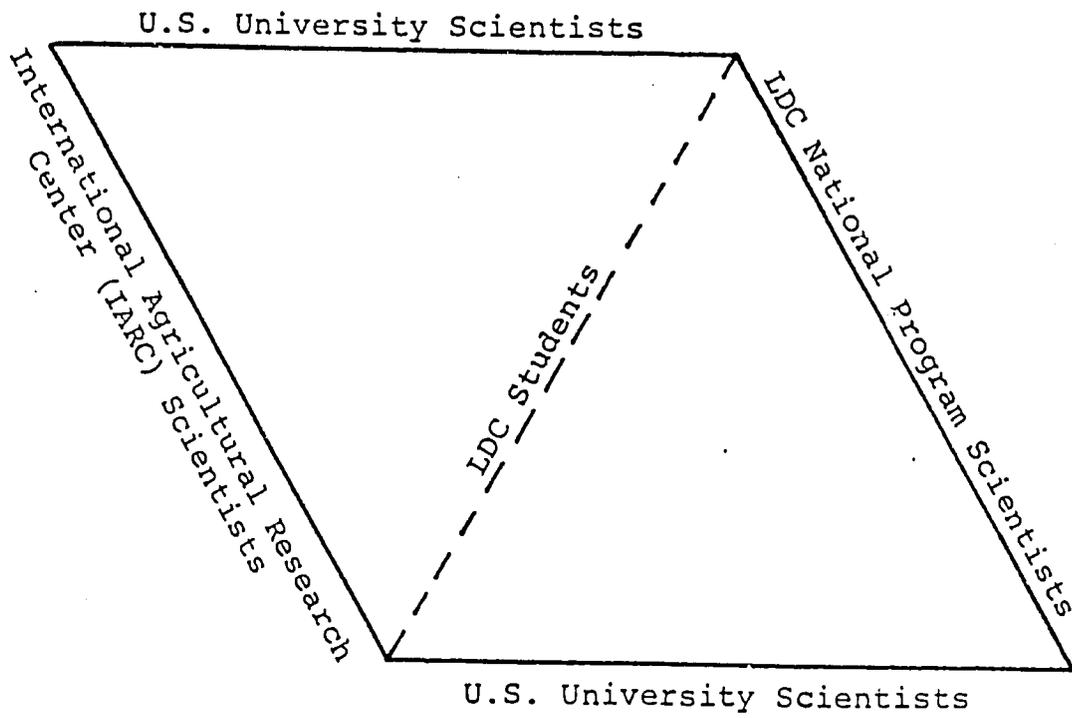


TABLE 1. - CIP'S REGIONAL RESEARCH AND TRAINING PROGRAM
DEVELOPMENT OF THE RESEARCH AND TECHNOLOGY TRANSFER SYSTEM

	1972 - 74	1975 - 77	1977 - 80	1981 - 84
COLLABORATIVE RESEARCH	Assessment of Country needs Potential	<ul style="list-style-type: none"> - Seed Production - Evaluation of varieties and clones - Disease and insect control - Seed storage - Establishment of research contracts with few LDC where major facilities and expertise was available 	<ul style="list-style-type: none"> - Evaluation of varieties and clones and initial improved Germplasm - Seed Potato storage - Virus Identification - On-farm research - Initial evaluation of true potato seed 	<ul style="list-style-type: none"> - Establishment of collaborative and contracts research projects with each country according to its needs and potentials; - Evaluation of improved germplasm with disease resistance and adaptation - Rapid multiplication techniques for seed production - Evaluation of true potato seed technology - Storage of seed and consumption potatoes - Antisera preparation for virus identification - Integrated control of potato tuber moth - Biological control of Nematodes - Adaptation of the potato to warm climates
TRAINING	<p>In CIP Lima Production and Seed Courses</p> <hr/> <p>In CIP regions In-country courses</p>	<ul style="list-style-type: none"> - Production and seed Courses - Individual, in-service Training. <hr/> <ul style="list-style-type: none"> - Regional and In-country production and seed courses - Regional Workshops 	<ul style="list-style-type: none"> - Production and seed Courses - Specialized Courses (Pathology, Germplasm management, etc.) - Training of mid-career scientists - Individual training <hr/> <ul style="list-style-type: none"> - Regional and In-country production, seed, storage, etc. courses - Regional Workshops 	<ul style="list-style-type: none"> - Individual training - Training of Mid-Career Scientists - MSc Thesis research at CIP for foreign Universities students. <hr/> <ul style="list-style-type: none"> - In-country production courses (UNDP) - Specialized Courses (Pathology, Germplasm management, Storage, True Potato Seed) - MSc thesis research with CIP staff/countries univ.
INSTITUTIONAL BUILDING	Initial contacts with scientists and research managers	<ul style="list-style-type: none"> - Identification of National Scientists and Leaders to develop national programs - Identification of scientists for graduate training - Interaction and cooperation with Institute leadership and policy makers 	<ul style="list-style-type: none"> - Conduction of surveys to assist countries research and production planning efforts - Development of Regional Country Networks for research and horizontal transfer of technology (PRECODEPA) - Continue strengthening national capabilities for research and training - Participation of nat'l scientists in CIP 	<ul style="list-style-type: none"> - Conduction of surveys to assist countries research and production planning efforts - Development of Regional Country Networks for research and horizontal transfer of technology (SAPPRAD, PRAPAC, PRACIPA, PROCIPA) - Assistance in projects preparation and implementation - Funding from international agencies and banks - Participation of National Scientists in CIP Planning

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RANGE SCIENCE EDUCATION FOR INTERNATIONAL STUDENTS:
A HISTORY OF OUR RECOMMENDATIONS

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Summary

For over two decades range science educators have been concerned about, or have been made aware of, the shortcomings in our training programs for foreign students. Since the late sixties no less than 45 papers have been published in proceedings of international rangeland and grassland congresses, in proceedings of range/livestock workshops, in technical journals, or in special reports concerning training of foreign students in range management. Location, level, and type of training as well as numbers trained, have been addressed and recommendations have been made to allow our U.S. training to be better suited to the needs of the non-U.S. student. This paper recounts these recommendations and asks if these suggestions are still relevant, have we followed our own recommendations, and if we have not, asks why.

Introduction

Africa is in the middle of another famine crisis. Ironically, as Mayer (1984) points out, each new famine is dealt with as if it were a completely new phenomenon. In fact, in most cases, we could prevent these famines if we could separate our role as a country that sells very large stocks of commodities and services from the role we should be playing--the teacher of modern-but-appropriate agriculture in the developing nations.

We have been urged for years to fully exploit the opportunities universities have to strengthen on-campus international programs (Rural Development Research Project, 1968). Although universities have expanded their teaching programs in all aspects of international affairs, the educational process for international students has not improved as it should have, given that educational needs of international students vary greatly from those of their U.S. counterparts. Both U.S. and host country personnel agree that education is the single most important assistance that we can provide the developing world (Rural Development Research Project, 1968; USAID, 1982a; Smith and Dwyer, 1981; Thomas, 1981; Dye, 1981; O'Rourke et al., 1981; Lele, 1981; Dwyer, 1981; Fuenzalida, 1981; USAID, 1982b; Henson and Noel, 1983; Dickie and O'Rourke 1984).

Although A.I.D. has provided considerable assistance in past decades for the development of agricultural education at the college and university level in LDCs, its activities were very limited. Since that time U.S. agricultural colleges and universities have been encouraged to expand their participation in international agricultural

development activities through passage of the Title XII Famine Prevention and Freedom from Hunger Amendment to the Foreign Assistance Act of 1975. Particular emphasis has been placed on strengthening U.S. universities' capabilities and involvement in training foreign professionals in the U.S. and overseas. Even though thousands of students from LDCs have been trained in agriculture in the U.S., most colleges of agriculture in low-income countries are in need of modernization and/or expansion (USAID, 1978; Beck, 1980; Rural Development Research Project, 1968; Fienup, 1981).

We need to review the voluminous literature we have produced over the past two decades wherein we have told ourselves how to improve our U.S. educational programs for foreign students and ask ourselves three questions as we go:

1. Are these suggestions still relevant and valid?
2. Have our programs in range science developed appropriate training for the international students we graduate?
3. If we have not developed appropriate training, why not and when will we?

Location of Training

Higher priority should be given to the building of educational institutions within the countries themselves. The burden of the future leadership must eventually rest on people trained in their own environment, by their own people, and with locally designed curricula (Thomas, 1981; Strange, 1978; Calembert and Strange, 1978; Wagner 1981).

Some development assistance agencies insist that all training take place in the host country, or at least in a developing country. Degree and non-degree programs organized by personnel from developing countries and conducted in a developing world setting is the ultimate goal as Kenya has done (Karr and Metto, 1984).

The principle of in-country training is laudable as it forces presentation of applicable material, and it gives the trainee immediate tools that do not need reshaping for home use. It does not, however, adequately prepare him to adapt findings from other countries as the science develops in his country.

The lack of available, qualified professors of range science who can lecture in a language other than English is a critical limitation. In addition, until foreign educators are provided with some sense of job security, they will rarely be attracted to the short-term sporadic opportunities that now exist. Even when qualified foreign educators occasionally are available, they often have not had time to prepare for their assignments. The result is that their presentations may be

little different from those presented in classrooms in their home country.

The difficulties that arise from the lack of trained personnel are compounded by the lack of adequate training sites in developing countries. In order to teach principles of optimum management, areas managed at an optimum must be present. These field facilities are presently much more limiting than adequate classroom and laboratory facilities.

Extension, formal education, and research organizations must develop side by side supporting one another. Until the country has developed a self-reliant educational system in range management, training will be essential in outside institutions to provide the depth of personnel needed to generate dynamic extension, education, and research programs. However, it is desirable that the student should go abroad with some knowledge of the range environment of his own country and of the problems arising in it. That is why departments of range management should be created as quickly as possible.

Those who advocate training of LDC personnel in established U.S. range science schools do so primarily because of the successful history of the U.S. model in agriculture. The critics, however, point out, and rightfully so, that the U.S. system of education is aimed at a different audience, with different cultural backgrounds, perhaps with different motives, with differing incentives, and in an economical structure dissimilar to many parts of the developing world (Calembert, 1978; Pratt, 1978; O'Rourke, 1982; O'Rourke and Coebel, 1984; Child et al. 1984; Smith and Dwyer, 1981).

Selection of a U.S. university should be done with care. It is important that the university have a program appropriate to the candidate. Choosing a school with an environment somewhat similar to that of the home country is also a consideration for two reasons: 1) Research conducted in a similar environment may be more relevant than that conducted in a dissimilar environment; and 2) it may be easier for the student to adjust to an area with a similar climate (Child, et al., 1984).

One school of thought concerning where and how training might be accomplished is on-the-job training (OJT) in the trainee's own country where the trainee is attached as a counterpart to a foreign 'expert'. Supporters of this method have grown out of dissatisfaction with U.S. classroom training in range science for foreign students. Proponents of this method of training, however, must recognize that a sound background in the basic sciences is necessary for a person to appreciate the principles of range science, and that a thorough understanding of range science principles is essential before a person should attempt to manage arid or semi-arid ecosystems.

The reliance upon on-the-job training for counterparts has proven to be inadequate. The average foreign 'expert', on the production-

oriented projects which dominate foreign assistance, has seldom had teaching experience. The amount of time spent on training in basic principles is nearly nonexistent. Most of the effort is aimed at achieving a certain goal -- a fence built or a stock pond dug. Why and how these jobs are done is seldom explained in detail and, if at all, only to accomplish the immediate task. The underlying principles of plant physiology or animal nutrition, or other options open to accomplish the objective, are seldom thoroughly explained. OJT is normally limited to one trainer per trainee, as opposed to an entire faculty from whom one could receive these explanations in a formal training setting. This is an expensive approach. A one-on-one training experience is very demanding, requiring long hours and patience. Both the trainer and the trainee are prone to take advantage of distractions. These distractions too often result in the trainer and trainee spending little time together, the trainee being expected to have gained more than was possible (O'Rourke and Goebel 1984; Child et al., 1984).

After years of training overseas, however, it can be difficult for newly returned technicians to put expertise to work in the field. This is partly the result of long-term cultural isolation. In addition, trained nationals are often not from the traditional society with which they are working, and also have cultural barriers to bridge. Those who have received formal training would now likely benefit more from short expatriate consultancy visits than to be assigned a "full-time" expatriate counterpart (Child et al. 1984; Dickie and O'Rourke, 1984).

No topic regarding location of training is more publicized yet less utilized than a modification to graduate training in which the student completes all or part of the academic portion of his program at a U.S. university and his research in his home country. The degree issued is either a Ph.D. from the U.S. or a doctorate degree from the home country. Such a program can require more time and be more costly than the traditional pattern of university research. Benefits include the development of a research base in the home country that can help solve local problems, experience is gained in working in local environments and under local constraints, funding and personnel linkages are established, the U.S. university advisor will gain experience in the LDC that will benefit other foreign students, broaden the perspective of the courses taught, and make more useful the contribution that the professor might make to his future efforts in other LDCs. Some feel, however, that in the initial stages of developing institutions it may be unnecessary or even undesirable to do research training in the home country. The approach requires adequate supervision of the research conducted in the home country either by host-country scientists or the advisor from the out-of-country university. USAID feels the costs are justified. Though the conduct of research in the home country required for the graduate degree has been tried, the record of success is meager. AID should work with universities to provide the necessary funding and logistical support to accomplish the program without relying heavily on the LDC government (Perez, 1980; Billingsly, 1968; Turk, 1980; Univ. of Minnesota, 1977;

Smith and Dwyer, 1981; O'Rourke, et al., 1981; Dwyer, 1981; Thomas, 1981; Henson and Noel, 1983; USAID, 1982a; USAID 1982b; O'Rourke and Goebel, 1984, Child, et al., 1984; Wagner, 1981; Fienup, 1981; Omtvedt, 1980).

In the absence of a university-to-university development program, it is more difficult to work out satisfactory arrangements for international graduate students to return to their home country for thesis research. Proper supervision of the graduate student at his home institution is the key ingredient. It is essential for the major advisor of the student to have knowledge of the country and its agricultural problems, if the research is to be relevant to the country's need. Therefore, the advisor needs to spend as much time as possible through repeated assignments with the student in his home country and environment. The major advisor might develop a personal relationship with a mature scientist in the developing country who can assist in the supervision of the graduate student. With the gradual increase in the number of graduate schools in developing countries, such a procedure may become easier to establish (Turk, 1980).

The development in recent years of international research and training centers has provided programs that emphasize resource-management problems in its own locale. Each visiting student should then be encouraged to attend a center with bioclimatic and natural-resource conditions similar to those in the home country, (Turk, 1980; Wagner, 1981).

A growing number of U.S. students are expressing an interest in conducting research for their theses in an LDC. By providing this kind of opportunity to American students, we can build a cadre of young, well-trained, vigorous professionals with language capabilities that would be available to subsequent international projects (Turk, 1974; Billingsly, 1968; Henson and Noel, 1983).

Level of Training

If projects are to have long-lasting effects, educational efforts must be directed at herders, farmers, administrators, and technicians alike. This calls for substantially broadening education and supporting not just primary but middle- and high-level training of nationals in technical fields to develop a science-based peasant agriculture. This will not only help to create national policy, planning, and implementing capacity but will support a diverse network of institutions required in addition to those operated by governments (USAID, 1978; Gall, 1982; Lele, 1981; O'Rourke and Goebel, 1984; Raun, 1978; McDowell, 1978).

Some people believe that graduate and post-graduate degree programs best use available funds, not only because the long-term potential of reaching more people is greater, but because this is the training most developing countries need and want (GAO, 1984; Thomas, 1981).

Self-sufficiency requires that people from the developing country trained to the Ph.D. level establish research and formal training capabilities within their home countries. The demands for these trained people are numerous and are rapidly increasing. There are many situations, however, where Ph.D. level training is not necessary. The majority of the administrative positions would be best filled with M.S. or B.S. level personnel trained in administration, personnel management, extension technologies, or cultural anthropology, in addition to basic principles of range science (Smith and Dwyer, 1981; Childs et al., 1984).

In another view, the common practice of placing scarce, highly trained scientists in administrative positions befitting their level of education rather than in technical positions which require their skills is due, in part, to an institutional incentive structure that favors administration and discourages application, teaching, and research. Excessive formal training in relation to the needs of the job often inhibits the supply of lower level technical personnel. For such manpower, a shorter period of practical training would often be a more effective and less costly way of meeting required skill levels. Field-level technicians will always have the most frequent contact with producers. If this level of trained personnel does not exist, the means by which research findings can be transmitted to the producer, and subsequently applied, are greatly limited. At the same time we must realize that it is difficult to convince the developing country leadership of the value of vocational-technical training because such training does not carry the prestige of the traditional degree programs.

While directing more technical training opportunities to lower socio-economic levels would necessitate some provision for local language instructors or English language training, these additional costs would be warranted (USAID, 1982b; Pratt, 1978; Thomas, 1981; USAID, 1978; GAO, 1984; Schacht et al., 1984; Horowitz, 1979).

USAID encourages and supports short-term training for research managers and directors to teach the fundamentals of range management to people who are unable to find the time required for formal courses in an academic program. The shortcourse is needed for two kinds of participants: first, administrators and government officials responsible for introducing, implementing, and evaluating range management programs in less developed pastoral areas; second, professional staff in consulting companies who are engaged in range/livestock development projects (USAID, 1982a; Pratt, 1978; Schacht et al., 1984).

Number of Students Trained

Virtually no developing country has a sufficient number of range management technicians or scientists, and the poor rate of success of many range livestock projects can be attributed to this fact. Students

in natural sciences, life sciences, and in agriculture made up only 10% of the total foreign student enrollment in the U.S. in 1981 (Pratt, 1978; Dye, 1981; O'Rourke et al., 1981; Lele, 1981).

It is estimated that to achieve satisfactory results in grassland management, there should be one professional for every 10,000 square miles of grassland and one technician for every 4,000 square miles (El Moursi, 1978). Perez (1980) reports a satisfactory size for an animal science faculty in the Philippines to be composed of 15 Ph.D., 15 M.S., and 5 B.S. or DVM degree holders.

In order to establish sufficient numbers of high caliber persons in key positions of research, training, extension, and development, effective training requires a mutual long-term commitment which anticipates high attrition rates. The common experience is: 1) Counterparts do not return from the United States training until the project is finished, and thus they never have the opportunity to work in the field with the specialist; 2) These trained developing country nationals may be assigned to other projects which lack their own training program. This reliance on other projects to supply trained manpower results in a self-defeating cycle of training deficiency. 3) Counterparts, once trained, often leave the project and range management for a more lucrative career in private business.

Training of host country counterparts must be in numbers far in excess of current project needs. Whether the overflow is to other projects, to private industry, or to administrative governmental positions, rangelands will benefit from these persons. A project should not depend on a single staff member. (Maner, 1980; Perez, 1980; Thomas, 1981; O'Rourke, 1982).

Training adequate numbers of students will help solve the problem of professional isolation that many students feel when they return home by building up a cadre of peers who interact among themselves (Wagner, 1981). We can solve the problem of technicians being assigned to work with an ethnic group that is not their own by training sufficient numbers from various ethnic groups and thus allowing more compatible assignments (Hoben, 1979).

Efforts should be made by the project design team to determine selection criteria for candidates, the procedure for evaluating applicants, and imaginative ways of providing language training well before project implementation so as to insure the return of trainees while the expatriate personnel are available for on-the-job training, keeping in mind that the shortage of people with the necessary educational qualifications is so great that funds provided for training frequently go unused (Rural Development Research Project, 1968; Pratt, 1978; Henson and Noel, 1983; Lele, 1981).

Content of Training

Suggestions made to improve the content of our training programs, I'm sure, are more numerous than the implementation of those suggestions. Trail et al. (1983) provides a convenient outline from which we can review the possibilities and to which we can add others' ideas.

1. Preparation for the U.S. Academic Experience (orientation seminars for students prior to departure for U.S.; faculty provide assistance to students in learning how cultural adaptation relates to academic performance; role of advisor and other campus support facilities explained; on-the-job training in the home country provided in advance of formal classroom work -- Trail et al., 1983; Horowitz, 1979).
2. Academic Planning (students share in planning degree program; insure that student, donor, advisor, and university administrators understand donor contract, goal of the academic program, and future job responsibilities of the student; open channels of communication between student, advisor, and other students; early appointment of advisor; thoroughly understand, or blend, the European and American systems of higher education; sound preparation in English which might include: providing experience in lectures and examinations from the U.S. classroom, developing a first term seminar in which the foreign student gains confidence in himself and his English proficiency by presenting a seminar about his home country, cassette tapes made available in all classes for follow-up review, and encouraging students to visit instructors early and frequently in each academic term -- Trail et al. 1983; Thomas, 1981; Templin, 1982; Dwyer, 1981; Gall, 1982).
3. Program Relevancy (advisors use international examples in classes; students be provided the opportunity to practice concepts learned in the classroom; develop research projects relevant to the host country; substitute courses required of U.S. students with courses more relevant to the student's home country environment, culture, tradition, social institutions, and future job responsibilities; include interdisciplinary courses; make adjustments in format of examinations; develop seminars dealing with international development issues; donor provide literature from home country appropriate to student's field of study; provide support to attend off-campus professional meetings; training provided to prepare student to introduce change in the student's home country; provide leadership role training; provide course in teaching and teaching methods; participation in departmental student organizations; students present relevant seminars on their home countries; take course in technical writing; develop an annual 4-week summer shortcourse on range livestock production in developing nations; develop a 1-year, non-degree program in range livestock production utilizing numerous existing programs, institutions, and organizations; provide courses in project planning and

implementation; develop an idealized curriculum in range livestock production within a foreign option; students attend another university for one or two terms for special programs not offered at the institution in which they are enrolled; develop courses which deal with nomadic and transhumant pastoralism, non-market values, communal grazing lands, a great variety of ruminant species, and special social, political, economic, and cultural conditions; to the regular U.S. style courses (i.e. range improvements, range livestock production, etc.) add a tag-along course which would put the scientific management and production principles of the main course into the LDC context; provide training in extension principles and in planning of extension programs; focus on needs of low-income farmers in the curricula; provide a firm grasp of principles which can be recognized in particular situations and then solutions devised; provide an internship of one semester living and working on ranches; gain experience in organizing, budgeting, and conducting research in imaginative ways in a country with limited resources; reverse the attitude that herdsmen are ignorant and follow inefficient practices because of blind tradition; training in the social sciences to include survey techniques; develop skills in agricultural planning, policy analysis, monitoring, data collection and analysis, project management, public administration, and organization coordination; utilize the non-thesis approach to graduate training when research is not the future role of the student; integrate range management training with existing Africa, Asia, etc. study programs; incorporate farming systems research methods into the curriculum; provide courses in agriculture, ecology, geography, practical experience in agricultural development, and interdisciplinary internship programs for social science students; provide coursework in historical roots of underdevelopment, the structural characteristics of developing countries, and their role in the international division of labor; curricula should be developed for each of the major development-related disciplines and for each major region of the developing world -- Trail et al., 1983; Witt, 1959; Blackmore, 1963; Lewis, 1967; Guither and Thomson, 1968; Fienup, 1981; IRRI/UNDP, 1982; USAID, 1982a; Gall, 1982; Pratt, 1978; Henson and Noel, 1983; USAID, 1980; Fuenzalida, 1981; Thomas, 1981; USAID, 1978; Horowitz, 1979; Child et al., 1984; Hoben, 1979; Smith and Dwyer, 1981; Rural Development Research Project, 1968; Wagner, 1981; Dickie and O'Rourke, 1984; Dwyer, 1981; Raun, 1978; Moore, 1975; O'Rourke and Goebel, 1984; Schacht et al., 1984; O'Rourke, 1982).

4. Resource Allocation and Support (adequate financial support be provided advisor to insure allocation of time to participants and for all components of the student's program of study from USAID, FAO, World Bank, etc., and to permit the tailoring of programs to the specific needs of the individuals and countries involved -- Trail et al., 1983; Omtvedt, 1980; Dwyer, 1981).

5. Updating Training (Current and future range scientists must maintain links with the world bodies of range science through membership and attendance in meetings of the Society for Range Management, Australian Rangeland Society, etc. They must exchange their knowledge and new findings with each other by forming their own range management organization, by conducting regular technical symposia, and by becoming active in publishing range science information, either in existing technical journals or in a journal that they create. Libraries with access to world-wide periodical literature must be established. Most LDC professionals desire support in continuing collaborative relationships with U.S. scientists. There is also a continuing need to increase competence through postgraduate programs, short courses, and seminar activities -- USAID, 1982a; Fienup, 1981; Dickie and O'Rourke, 1984; Child, et al., 1984, Wagner, 1981).
6. General (students interact with U.S. students in off-campus life; host family program developed; conduct workshop on the role of education in international development; tutorial programs developed for participants; project design teams be represented by academic advisors who have worked with international students and who have overseas experience -- Trail et al., 1983).

Two additional, but related, topics deserve to be addressed in more detail. First, most agricultural college faculty members have not sensed the opportunity for professional growth for themselves, their colleagues, or their students through participation in international contract projects. Successful participation requires competence and goal orientation on the part of faculty, blended with experience and knowledge of developing countries. Not only must teachers and scientists be technically competent in their respective fields, but they must also have an appreciation of the problems and constraints that occur in other countries. They must understand the social and cultural relationships among the people of the developing countries and what motivates them to accept new ideas and information. They need to understand the complex processes of change and their application in different cultures. There is no substitute for the actual experience of living and working in a less developed country (Turk et al., 1979; Turk, 1980; Fienup, 1981; Conrad, 1978; Omtvedt, 1980; Maner, 1980; Pratt, 1978; Wagner, 1981; Henson and Noel, 1983).

Secondly, but first and foremost in allowing any of the recommendations made in this paper to come to fruition, are university policies which prevent tenured and non-tenured faculty from spending lengthy periods away from campus. The academic setting should be restructured to better reward international development activity. It must be acknowledged that few faculty members are paid to teach foreign students, or are promoted or tenured for developing programs uniquely applicable for them. However, administrators at all levels (university, college, department) are asking faculty members to accept long-term overseas assignments, a responsibility the administrators

themselves would not be willing to accept (USAID, 1982a; Henson and Noel, 1983; Wagner, 1981; Dwyer, 1981; Turk, 1980; Conrad, 1978).

Conclusions

This paper says nothing new. In the words of A. J. Dye (1981) this paper, and the papers and sessions that generated it, will have accomplished its objectives if individuals active in international development take time to reflect on future directions and those improvements that can be made in designing training programs which will better prepare developing country professionals to meet the challenge of agricultural development.

Ask yourself:

1. Are these suggestions still relevant and valid?
2. Have our range science programs developed appropriate training for the international students we graduate?
3. Whatever your role, have you used your position to develop appropriate training? Why not? When will you?

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AN ASSESSMENT OF MOTIVATIONAL FACTORS AFFECTING
COLLEGE OF AGRICULTURE FACULTY INVOLVEMENT IN
INTERNATIONAL DEVELOPMENT ACTIVITIES

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INTRODUCTION

Land grant college of agriculture involvement in and commitment to international agriculture development activities rests on 1) a financial incentive, 2) a moral and ethical obligation in providing assistance to all people, 3) effective utilization of the scientific and technological talent available at these institutions, and 4) a means by which the quality of faculty and the educational programs of the institutions can be improved (Thomas, 1983). Understanding development's dominant focus on agricultural and rural development, there is general agreement among AID personnel, developing country officials, and land grant university administrators that college of agriculture international programs should be improved, continued, and expanded (Whitaker, 1980; CIC-AID, 1968).

However, several recent studies (Management Analysis Center, 1982; Kiehl, 1980; Van Buren, 1984) have raised warning flags concerning future college of agriculture involvement in and commitment to international development activities. The warnings indicate a declining faculty involvement in these activities at a time when the need for faculty assistance exists and is projected to grow.

One reason for declining faculty involvement is a perception that there is a great deal of risk and uncertainty for an individual faculty member to accept an international assignment (Whitaker, 1980). The reasons for this perception range from fear that an international assignment will not enhance their professional career to the fear that such an experience will not be considered favorably regarding appointments, tenure, and promotion to salary policies and organizational structures (CIC-AID, 1968; Management Analysis Center, 1982; Perez and Rogers, 1984). Even if approval was given from a dean or department head, an international assignment still represents a detour "...fraught with unknowns and diversions from professional activities that have required a relatively long gestation period" (Whitaker, 1980, p. 20).

The perception represents a significant problem for college of agriculture international contracts in that they will not be able to fill personnel needs on the contracts from within their faculty ranks. As a

result, such contracts become little more than professional recruiting and consulting services impacting only on the financial base of college of agriculture involvement in and commitment to international development activities. Such a practice satisfies neither AID's nor the university's requirements in providing technical assistance to the developing countries.

PURPOSE AND OBJECTIVES

Can the perception be changed? Many factors affect a faculty member's decision to become involved in international projects. One factor which has received very little research attention has been the basic "why" questions of faculty involvement. It was the purpose of this study to probe beneath the favorable attitudes which a select group of college of agriculture faculty have toward international development activities and attempt to assess their motivation for such involvement. By concentrating this study on the motivational factors, information will result which can provide a better understanding of faculty's background, personal characteristics, sources of original motivation for involvement, and strategies which can sustain that motivation. Such information can then be used to help maximize the contribution college of agriculture faculty can make to themselves, their university, and to the developing countries (Byrnes, 1965).

The specific objectives of the study were to:

- 1) Develop a profile of personal characteristics possessed by the select group of faculty.
- 2) Determine sources of their original motivation for involvement in development activities.
- 3) Develop strategies that can be used to stimulate and sustain faculty involvement in international assignments.

THEORETICAL FRAMEWORK

Motivation provided the theoretical base for this research "...because it aids in the understanding of why people behave the ways they do..." (West and Foster, 1976, p. 91). The specific theoretical framework used in the study was developed from the humanistic perspective of motivational psychology. As advocated by Carl Rogers and Abraham Maslow, the humanists emphasize that the goal of every person is to reach his/her full potential. Rogers uses self-actualization as the single, ultimate motive for behavior, while Maslow uses a system of multiple motives that are arranged in order of their strength for influencing behavior. As shown in Figure 1, the lower needs tend to have the stronger motivational strength and are more physiologically based. The higher order needs are weaker and are more psychologically based.

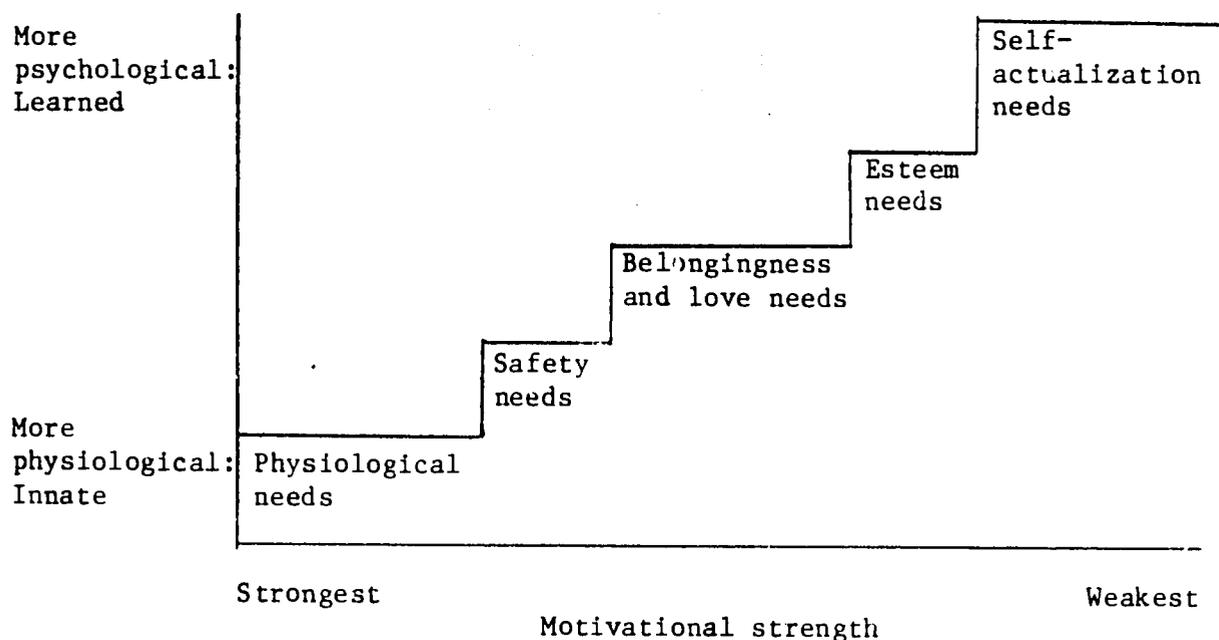


Figure 1. Maslow's need hierarchy strength (Arkes and Garske, 1982, p. 126)

Humans are aware of themselves and their environment and do make continual choices about what to do. These choices are based on the person's perception of what will be the outcome of certain behavior. The critical point for the humanists is to strive toward self-actualization through a cognitive process (Arkes and Garske, 1982).

Relationship of study's objectives to a theoretical framework

The theoretical framework has been directly applied to the objectives in the research study. In terms of personal characteristics, the humanists argue that behavior tends to be determined, partially, by one or more of the person's personal characteristic traits. Maslow (1954) and Hamilton (1983) argue that personal characteristic traits and motivation are inherently intertwined and cannot be separated. Each individual has particular personal characteristic traits which direct goal-seeking strategies to meet basic needs. Personal characteristic traits desired by individuals involved in international development activities have been identified (Moran and Harris, 1979; Byrnes, 1965). By having faculty indicate how they identify with these desired characteristics, it is possible to develop a personal characteristics profile of faculty and to determine if those traits do affect motivation for involvement in international development activities.

The second objective of the study was to determine sources of original motivation for faculty involvement in development activities. By studying the conscious experience of individuals, humanists believe that

it is possible to assess the origin of motivational factors which influence behavior (Arkes and Garske, 1977). The importance of studying conscious experiences follows from the assumption of free will. People do make choices concerning motivational behavior through a cognitive process based on their goals. The choice, made from the perception of the individual, will then lead toward the attainment of that goal (Deci, 1975).

Deci (1975) goes on to argue that most behavior is motivated by both intrinsic and extrinsic factors. As illustrated in Figure 2, people decide what to do based on their perception of what the outcomes of that behavior will be, i.e., an intrinsic reward, an extrinsic reward, or a combination of both. Behavior which is motivated intrinsically, however, is the most desirable form of motivation (Davis, 1983).

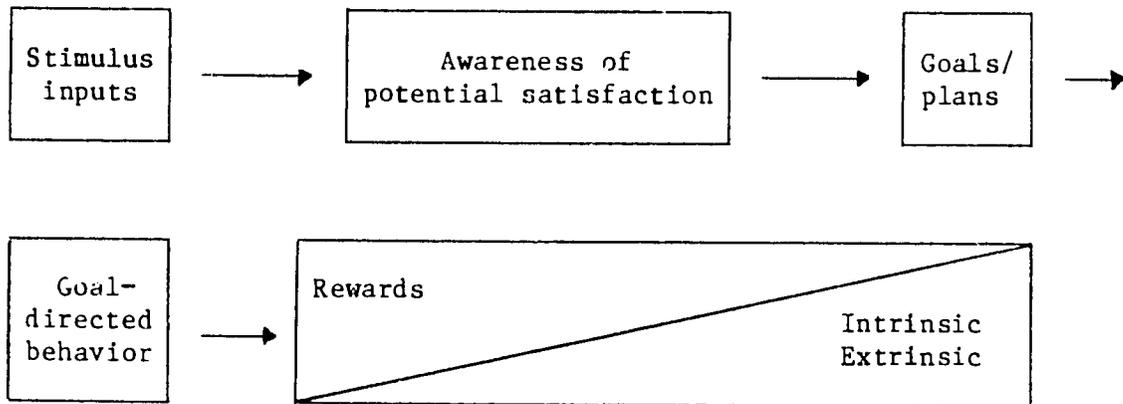


Figure 2. Motivation process (Deci, 1975, p. 98)

The instrument used in the study provided a means by which faculty could assess sources of original motivation for involvement in international development activities. These sources were identified on a basis of their intrinsic origin, extrinsic origin, or a combination of both. The results have implications for understanding why faculty initially become motivated for involvement in international activities.

The third objective of the study was to develop strategies that can be used to stimulate and sustain faculty involvement in international assignments. Maslow (1954) explains that motivational forces wax and wane as a result of attempting to satisfy different need categories. However, as supported by the Hackman-Oldham model shown in Figure 3, it is possible to enhance motivational strength by using strategies which influence the motivational factors affecting behavior.

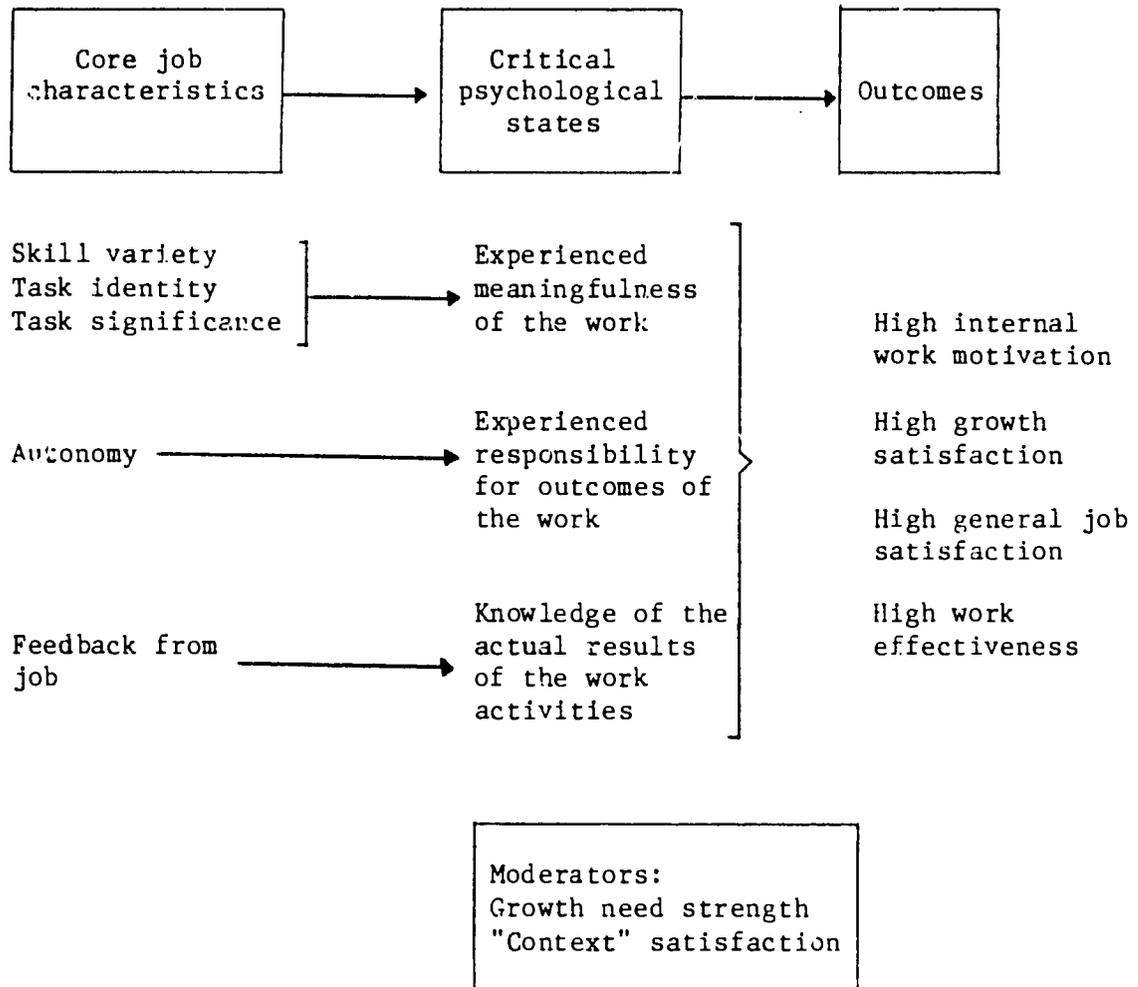


Figure 3. Hackman-Oldham model (Hackman and Oldham, 1980, p. 90)

Prior to implementing strategies to sustain faculty involvement, policy makers require a basis for making decisions on which strategies to use. The instrument used in this study provided a means by which faculty could indicate the level of importance various strategies had in influencing their motivation for involvement in international activities. Such information can then be used to better make decisions regarding strategies to sustain faculty motivation for involvement in development activities.

METHODS

A population of 195 college of agriculture faculty members from five Midwest land grant institutions (Iowa State University, the University of Missouri, Kansas State University, the University of Nebraska, and

PREPARING PARAPROFESSIONALS FOR
INTERNATIONAL AGRICULTURAL HOME ECONOMICS

By

Maxine L. Stutler and Nancy M. O'Rourke

Malnutrition and hunger can be found everywhere. In the world population of 4.762 billion there are an estimated 500 million people who suffer from severe malnutrition and another 500 million people who are hungry--which means nearly 1 in 4 people in the world suffers from hunger.

In the developing world, food and family are closely related. Women and children in rural areas are agriculture workers, although not often counted by the official census. In the food production cycle women cultivate, harvest, process, and prepare food. Women also perform the storage tasks as part of their household maintenance duties as well as marketing some food to earn cash incomes (Tinker, 1979). In some countries, women in addition to their nurturing and household management roles are primarily responsible for feeding and educating their families. The 1974 United Nation's World Food Conference,

Recognizing that rural women in the developing world account for at least 50 percent of food production, called on all governments to include in their plans provision for education and training for women on an equal basis with men in food production and agricultural technology, in marketing and distribution techniques, as well as in consumer and nutrition information...in order that the energy, the talent, and the ability of women can be fully utilized, in partnership with men, in the battle against world hunger.

Utah State University is a land grant university with a tradition of concern for improving agricultural production and family life. Since 1951 University personnel have served on international projects to help developing countries improve their agriculture in an endeavor to alleviate world hunger. Increasing numbers of international students have come to Utah State University for academic training in disciplines which will be of benefit to them and to their home countries when they return.

On the Utah State University campus, there are wives of international graduate and undergraduate students who want to take classes for academic credit because they wish to obtain knowledge and skills which will enable them to participate in the development of their country. They would like a two-year degree because a degree carries great importance

in their country. There are also some domestic students whose goals include assistance work in developing nations. Studies substantiate the importance of educating women, regardless of whether they ultimately enter paid employment or hold official positions, a philosophy which Utah State University has held from its inception in 1888.

The College of Family Life at Utah State University has recently been given approval by the Utah Board of Regents to offer a one-of-a-kind academic program. Food and Family in International Development is an undergraduate Associate of Applied Science degree. The curriculum is being developed as an interdisciplinary program and provides para-professional training in the following areas:

Agricultural Development

- Small-scale agriculture
- Raising small animals and food
- Home gardening
- Food storage, preservation, and processing
- Family roles in farm household management
- Appropriate teaching and extension methodology

Human Resources and Institutional Development

- Population
- Mother's and children's health and nutrition
- Natural resource conservation
- Potable water
- Education of special family needs

The College of Family Life with the aid of Title XII Strengthening Grant Funds surveyed Utah State University international student wives, and offered six pilot courses for the academic years 1982-83 and 1983-84. In this study 56 percent of the 201 respondents indicated a strong interest in a two-year program in food and family. Students were enthusiastic about the potential of an Associate of Applied Science degree program in which the educational emphasis is on food and family. Thirty-nine students from 19 countries have taken classes in the pilot program.

The overall design of this interdisciplinary two-year program includes two components. One is a core of required courses drawing from the three departments in the College and from other departments across campus which include agriculture, health, nutrition, anthropology, natural resources, family resource management, and teaching and extension methodology.

The other component provides the student with a choice from three optional areas of emphases. One area available to students is the Family and Human Development emphasis. Students that choose this area focus on skills in prenatal and early childhood development and parenting.

The second area of emphasis is Home Economics and Consumer Education. This option prepares an individual as a generalist that stresses all areas of home economics, i.e. nutrition, housing and management, clothing techniques and production, and child care.

Nutrition and Food Sciences is the third area of emphasis available to students. The Department of Nutrition and Food Sciences is a shared department with the College of Family Life and the College of Agriculture. Over half of the students in the program are in this option. Four special classes have been developed specifically in the nutrition and agricultural component. These include a class on the nutritional needs in pregnancy and lactation as well as the nutritional needs of infants. Another class is oriented towards preservation methods of fruits, vegetables and meats for lesser developed countries. Types and composition of milk, dairy products, and cereals are studied as well as home cheese production. The third class stresses the various techniques and methodologies in nutrition assessment; world-wide food consumption patterns; and the roles of men and women in less developed countries in production, acquisition, and preparation of food. A special class developed in the Department of Agricultural Education is Occupational Experiences in Agriculture, which emphasizes planting and harvesting a garden, caring for plants and weeding, and raising and caring for small animals. Other agriculture courses which have strengthened the program include:

- Animal, Dairy and Poultry Production
- World Crops
- Economics of World Food Problems

To promote agricultural development and to improve family resource use in developing areas of the world requires the education and training of people. The World Bank says that better educated women and girls are one of the best investments a country can make in future growth and welfare because 1) children are more likely to succeed in school if mothers are educated; 2) educated women have fewer children, and infant mortality rates drop; and 3) children are better nourished and healthier. Although training opportunities are increasing for women,

"Higher rates of illiteracy as well as higher dropout rates after the first few years of school form the major obstacles to the integration of village women into professional occupations at the local or district level. Yet the expansion of institutional infrastructures in rural areas creates new jobs in education, health services, agricultural extension, legal service, cooperative management, and other fields for which women need advanced training." (Dixon, 1979)

Our new degree program, Food and Family in International Development, responds to an urgent need for a new kind of specialist in food and family, an international integrationist whose university education provides a broader range of knowledge and skills than traditional disciplines offer. This new specialist needs expertise, pertinent to cross-cultural settings, in agricultural production, household production and resource management, and family health and nutrition.

Upon completion of this degree, these individuals will be paraprofessionals in the field of home economics which include food production, processing, and preservation; household resource management; and nutrition and well-being of families. The paraprofessional training concept is now relatively accepted in all developing countries. Paraprofessionals are fairly common in areas of health, nutrition, agricultural extension, instruction education and home economics. (Kahler and Droegkamp, 1980) Even though graduates of the program may not work directly with rural people, they can become trainers of trainers who go to the rural areas. They may find employment in the following areas:

- Teachers in public schools
- Teachers in extension institutes
- Extension agents
- Assistant supervisory positions in governmental ministries
 - e.g. Extension, Education, Health
- Managers and technicians in industry
- Entrepreneurs in private enterprise

This new academic program at Utah State University, to our knowledge, is unique among U.S. colleges and universities. The program supports the mission of relieving hunger and developing the productive potential of natural and human resources in other countries. Currently, sixteen students are enrolled in the program. These students will be able to contribute to the development process in their countries, helping to alleviate world hunger.

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April 26, 1985

PERCEPTION OF THE BENEFITS OF VARIOUS LEARNING
EXPERIENCES AT OKLAHOMA STATE UNIVERSITY BY
AGRICULTURAL GRADUATES FROM LESS
DEVELOPED COUNTRIES

Purpose

Post-secondary education of agricultural students from the developing world at U.S. universities is a process that is both expensive to all those involved as well as a key element in continued development of the students' nations. The central problem with which the study was concerned was the extent of relevancy to career preparation of selected educational experiences received by international students in the College of Agriculture during their sojourn at Oklahoma State University. It was seen as important that the career preparation value of the selected educational experiences would relate to the relevant needs of the developing world. This study was an attempt to provide answers which might be used for relevant curriculum planning and implementation of optimally effective teaching methods and strategies in the College of Agriculture at Oklahoma State University.

The major purpose of this study was to assess the appropriateness and the effectiveness of selected educational experiences in terms of the career preparation in developing countries for international agricultural alumni of Oklahoma State University. A concomitant purpose was to analyze secured data to provide a basis for recommendations directed toward enhancing learning experiences in agriculture provided to international students at Oklahoma State University.

Specific objectives established for attaining the above purpose were:

1. After location of as many Oklahoma State University Agriculture College alumni from developing countries as possible determine the following:
 - a. Initial job after completion of schooling
 - b. Present occupation
 - c. Initial and present demographic data (socio-economic, geographic)
 - d. College of Agriculture department and degree level of graduates

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2. Secure and analyze perceptions and judgments as to the extent to which selected learning experiences at Oklahoma State University were found to relate to the career of each student. In particular, to obtain self-perceptions as to the nature and extent of benefits from learning experiences.
3. From an analysis of the data gathered, develop recommendations directed towards attainment of possible improvements in learning experiences as these relate to success in future careers.

Methods and Data Sources

Following a review of literature, the study was designed to satisfy the purpose and objectives listed above. The population consisted of alumni of the College of Agriculture at OSU who came from, and returned to, the developing world. The purposive sample of 412 consisted of those alumni for which reasonably accurate and current addresses could be obtained. A total of 130 valid responses were received by the end of December, 1984, and data from these responses were used to satisfy the study objectives.

The data for the study was collected using a questionnaire. Part One of the survey instrument consisted of demographic information which was used to (1) describe the respondent group, (2) make comparisons between sub-groups, and (3) meet the first listed objective. Part Two included the respondents' perceptions of the extent of helpfulness in career preparation of selected educational experiences at OSU. The specific educational experiences selected for inclusion and the final form of the questionnaire was arrived at after repeated input from faculty and staff of several departments in various college of the University, all of whom had had close contacts with international students and experiences in the developing world. In addition to this "jury" the questionnaire was tested and retested with international students at OSU.

The survey was mailed overseas in June and July of 1984. Responses received through the end of December, 1984, were included in the study. From the data collected, descriptive statistics, including means, were computed to indicate the extent of helpfulness in career preparation of the selected educational experiences as perceived by the respondents. Obtaining and analyzing these means and frequency distributions fulfilled the second objective listed above.

Two main problems were encountered in the attempt to identify and contact the population involved in this study. (1) No records existed which would identify and locate the entire population and (2) the international mail seemed to be slow and unreliable at best. Because no complete records existed which would identify and locate the entire population, it was not possible to randomly sample and infer any results of this study to that population. A purposive sample of 412 alumni was selected based on reasonably current addresses being obtainable for

that number. Concerning the problem of international mail, it was noted that a mailing of over 4,000 letters to OSU alumni unrelated to this study was sent from Stillwater, Oklahoma by surface mail in January, 1984. Six months later responses from only four percent had been received and seven percent of the mailing had been returned as undeliverable. The survey instruments for this study were mailed by air in June/July, 1984 and 130 (31.5 percent) valid responses had been received by the end of December, 1984. Forty-three (10.4 percent) had been returned as undeliverable by that date. In the case of both mailings, responses and returns for invalid addresses continued to be received through the middle of March, 1985.

Results

The major findings of this study were divided into three sections. They were as follows:

1. Demographics of the Respondent Group
2. Extent of Helpfulness of Selected Educational Experiences
3. Recommendations for Educational Improvements

Demographics of the Respondent Group

The respondents represented 42 countries in the developing world. Of the four world areas categorized for this study 52 respondents came from Asia, 38 from Latin America, 21 from Subsaharan Africa and 19 from North Africa/Middle East. The modal age of the respondents was 36-45 years with 46.2 percent of the group in that category. Thirty percent were 46 and older which meant that three out of four of the respondents were older than 35 years. Only 25 BS degrees were represented in the respondent group while 82 MS and 43 PhD degrees had been earned by the respondents. Twenty of the respondents had earned more than one degree in the College of Agriculture at OSU. Agricultural Education had the most graduates in the respondent group with 44 while Agricultural Economics had 33, Agronomy 27, Plant Pathology 16, Animal Science 15, Agricultural Engineering 10, and the departments of Entomology, Forestry and Horticulture had one each.

It was found that 49 respondents came from cities of 150,000 or larger and 61 returned to work in cities of that size. Forty-one came from towns of 5,000 persons or less and only 21 returned to work in areas of similar size. Concerning the economic category of the parents of the respondents, 82 indicated their parents had an economic status in the middle one-third. Twenty-nine respondents indicated they had come from a background in the lower one-third while 19 reported coming from what they perceived as the upper one-third of the economic category in their country. International Development Agencies provided the major source of funds for 44 of the respondents' studies at OSU while the students' home government funded 33 and 30 paid for their studies with personal or family funds. Of particular interest was the number from each economic category which were funded by International Development

Agencies. Thirty came from the middle one-third while five came from the upper one-third and nine from the lower one-third.

Teaching was the job of 29 respondents before coming to OSU. Thirty-three returned home to teaching positions and only 21 listed teaching for their present positions. Research involved 19 respondents before OSU studies, 20 returned to research and 11 were currently doing research. Extension work was listed as the job before OSU studies for 13 respondents while 11 returned to Extension and 10 were presently working in Extension. A combination of Teaching/Research/Administration involved 18 respondents before OSU studies and 29 listed this combination for both their first job after OSU and their present job.

Extent of Helpfulness of Selected Educational Experiences

The second major objective of this study was to secure and analyze perceptions and judgments as to the extent to which selected learning experiences at OSU were found to relate to the career of each student. These perceptions were obtained for 13 selected educational experiences in Part Two of the questionnaire. Numerical values of the Likert-type response categories and the range of numerical limits for these categories are provided in Table I.

Table I

CATEGORIES DETERMINED BY MEAN SCORE VALUES

Response Categories	Scale Numerical Value	Range of Numerical Limits for Categories
Not Helpful for Job	0	0.00 - 0.49
Slightly Helpful	1	0.50 - 1.49
Moderately Helpful	2	1.50 - 2.49
Very Helpful	3	2.50 - 3.49
Essential	4	3.50 - 4.00

The highest mean across all degree levels and academic departments occurred for the two items concerning coursework in the major subject area and research. The range of combined group means for the two items were 2.53 and 3.41. All means fell into the category of "Very Helpful." Means for the Agricultural Economist's first job were consistently higher for coursework in their major subject area than were the means for their present job. It could be assumed that, at least for this question, the Agricultural Economists possibly felt that they were being better prepared for entry level jobs than for those jobs they had held later in their career. It was of interest to note that the

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Agricultural Educators showed just the opposite result with the means appreciably higher for present job than for first. A comparison between means of jobs at the BS level showed 2.83 for first job and 3.50 for present, MS was 3.00 for first and 3.31 for present job, and for PhDs the first job mean was 2.60 and present job was 3.20. In general, it was possible to continue across all degree levels and departments and observe similar, if sometimes less striking, examples which could possibly be of some interest to educational administrators.

Instances of a variance of means within certain academic departments by degree level were also noted. For example, on the item concerning interaction with faculty Agronomists with the MS degree had means of 3.11 and 3.00 for their first and present job compared to means of 2.00 and 2.00 for those with the BS and 2.75 and 1.83 for the PhDs. The means for Animal Scientists, on the other hand, showed those with the MS to be 2.00 for both jobs while those with the BS had means of 3.00 and 3.50 and PhDs had means of 3.33 and 3.00.

A general review of the response categories for all selected educational experiences reveals two major findings of interest. Those items ranked "Essential" which were based on returns from three or more respondents reflect some degree of consensus as to the high level of helpfulness for those particular respondents. For the first position, "Essential" response categories were noted for Agricultural Economists PhDs on Item 4 and Plant Pathologists PhDs on Items 1 and 4. It was noted that these response categories were limited to the PhD level and items concerning coursework and research. For the present job, "Essential" responses were noted for Agricultural Educators on Items 1, 3, 7, and 8, while Plant Pathologists had "Essential" on Items 3, 4, 6, and 10, and Agricultural Economists rated Item 4 as "Essential" in their present position. Only three "Essentials" resulted from the value of items to first position while nine came from their present position. In general, respondents seemed satisfied with their educational experiences at OSU but the higher response categories resulted from the value to the respondents' present position.

The respondents were grouped into four world areas and a comparison of mean values across the four groups was made. The Subsaharan Africans and those from North Africa/Middle East tended to value the experiences listed in Items 5 through 9 on Part Two of the questionnaire, higher than did those graduates from Asia or Latin America. These items concerned how higher education works in the U.S., how they could adopt U.S. educational principles to their home country, extension courses, courses in administration/management and visits to agricultural activities. In every case the means from Asia and Latin America were as low or lower on each item than were those from Subsaharan Africa and North Africa/Middle East.

A second finding of interest when comparing mean values across items involved, once again, 1 and 4, coursework and research. The combined group mean for all respondents on Item 1 for their first job was 3.14 and for Item 4 the mean was 2.97. An exact reversal of means occurred for the same two items on present job with a mean of 2.97 for coursework and 3.14 for research. The increased importance of research

for those considering their present job may imply that research is not as common an element in entry level positions for those returning to the developing world.

Item 13 related to the value of learning English at the English Language Institute. The mean values across the four world areas for the first position ranged from a low of 1.60 to a high of 2.88. The combined group means for the present position ranged from a low of 1.83 to a high of 3.00 which occurred in two of the four world areas. The perceived value of formal English training at OSU appears to increase as the graduates progress in their careers in their home country.

The respondents were given an opportunity to check a column titled "Did Not Experience at OSU" which applied to all 13 selected educational experiences. Two of the items concerning home stays with American families and learning English at the English Language Institute had 60 or more respondents indicate they had not encountered this educational experience at OSU. Fewer valid responses occurred for the item pertaining to research with five respondents indicating no experience in this endeavor. This finding could be compared to the fact that research was consistently rated one of the most valuable experiences throughout the study. The respondents, for the most part, did encounter at OSU that learning experience that they would later perceive to be of great value to their careers.

In general, the perceived value to respondents of all selected educational experiences at OSU seemed to increase from the BS level to the PhD level. This could be seen when comparing the mean responses for first and present job for the BS degree, 2.43 and 2.54; the MS degree, 2.59 and 2.64; and the PhD degree, 2.71 and 2.70. A final finding of interest concerned the means for first and present job by world area. In both cases the Subsaharan Africans had the highest mean of the four world areas studied. Although it appears that the Subsaharan Africans valued their experiences at OSU most highly, this finding should be contrasted with the next finding in which respondents from this world area also had the greatest number of recommended improvements.

Recommendations for Educational Improvements

The respondents were given the opportunity to provide their own input for recommended educational improvements at OSU in Part Two of the questionnaire. Although frequencies and percentage distribution was made for six categories of comments, the most striking finding did not involve the numbers but the rather emphatic recommendations made for more relevancy and practical experiences. The Subsaharan Africans most often recommended items related to the need for more relevancy and they also had the highest percentage of comments concerning more practical experiences for respondents from the four world areas studied. Of particular interest were the 12 comments made in which the respondents had only positive things to say. Although only recommendations for improvements were asked for, almost one in 10 of the total respondents took the opportunity to express complete satisfaction with their educational experience at OSU. A final finding of interest was that

the category of recommended improvements which received the least number of comments concerned the need for better advising by the faculty with only nine respondents suggesting improvements in this area. Interestingly, the Subsaharan Africans had no comments about better advising even though they had the highest percentage of comments in other categories among the four world areas studied. Only one respondent from Agricultural Education commented on a need for better advising out of the 44 respondents with degrees from that department. This finding of rather low frequency of recommendations for better advising was particularly noteworthy considering the fact that 105 of the respondents had graduate degrees which take far more of the faculty's time for advising individual students than does the undergraduate degree.

Conclusions

After a thorough study and analysis of the data the following conclusions were made:

1. Overall, graduates of the College of Agriculture at Oklahoma State University were very satisfied with the value of their education at OSU in preparing them for careers in the developing world.
2. Coursework in the major subject area and research were consistently perceived as having the most value to careers among the 13 selected educational experiences.
3. A large proportion of respondents came from, and even more return to, large cities over 150,000.
4. International Development Agencies are selecting students for study in the U.S. based on need in that 88.6 percent of those receiving this type of funding came from the middle and lower one-third of the economic categories in their country.
5. Many respondents came from, and even more return to, teaching and research jobs. The combination of Teaching/Research/Administration jobs ultimately involve the largest number of graduates. Fewer graduates return to extension jobs than come from work involving extension.
6. There were discernible differences in the perceived extent of helpfulness to careers between several subgroups of the respondents. The more notable and consistent differences in means occurred between:
 - a. Degree level. When the mean responses were combined across the three degree levels, those with MS degrees scored higher than those with the BS and those with the PhD/EdD scored highest of all.

- b. For the most part, the perceived value of all selected educational experience was rated more highly for the present job than for the first job.
 - c. The respondents from Subsaharan Africa rated the value of all selected educational experiences the highest of any respondent group from the four world areas.
7. The perceived value of learning English in the formal setting of the English Language Institute at OSU increased for those graduates more advanced in their careers.
 8. Research was the selected learning experience perceived as most helpful by several indicators and it was also encountered by the highest percentage of graduates.
 9. The frequent and occasionally emphatic requests by alumni for more relevancy and for practical experiences, especially by Subsaharan Africans, confirmed for the respondent group the findings of other studies discussed in the review of literature.
 10. A final conclusion from the findings of this study was that respondents were satisfied, for the most part, with their education at OSU as reflected in the fact that almost one in 10 volunteered all positive comments when asked for improvements only. It was also concluded that advisement by faculty in the College of Agriculture definitely functions as a strength, this indicated by the fact that the need for better advising was mentioned least often by respondents from the developing world.

Implications and Recommendations

As a result of the conclusions drawn from the analysis and interpretation of the data, the following recommendations were made:

1. Establishment and continued maintenance of complete and current records for alumni would aid greatly the pursuit of similar follow-up studies in the future. It is recommended that the information from this study be incorporated into the files of each academic department within the College of Agriculture at OSU. Further, another office within the university could be tasked to maintain appropriate address lists. Possibilities would include the Office of International Programs or the Assistant Dean of Agriculture for International Programs.
2. It is recommended that follow up studies of international graduates of the College of Agriculture be conducted, perhaps by EdD candidates in Agricultural Education, on a regular basis with the recommended interval to be no more than five years.

3. In view of the finding of discernable differences in the perceived extent of helpfulness to careers between several discriminators, it is recommended that faculty and administrators within the College of Agriculture examine their curriculum and educational offerings to insure the needs of the various categories of students from the developing world continue to be satisfied. Particular attention needs to be paid to incorporate practical experiences and relevancy to home country situation in the plan of study.
4. Further study is recommended in determining what happens to graduates from the developing world when they return home. Considering the importance of extension work in the developing world, it may be of concern that for the respondent group in this study fewer returned to work in extension than came from that area of endeavor. If, however, consideration is given to the implication that many returned to teach and administer extension programs, that would most certainly impact on educational planning for their U.S. studies.
5. Almost one-half of the purposive sample for this study returned to work in cities of 150,000 or more. Again, further study is recommended to determine the possible nature and extent of impact these agricultural graduates are having on increasing the production of food and fiber for their countries.
6. In view of the fact that an increased appreciation of the value of formal language training at the English Language Institute seems to occur later in the graduates' careers, it is recommended that administrators encourage students in residence to avail themselves of this opportunity.
7. Finally, the relatively high level of satisfaction with the education received by students from the developing world which was reflected in the results of this study should be a source of satisfaction to the faculty and administration of the College of Agriculture at Oklahoma State University. It is recommended that in each department of the College of Agriculture the Department Head and/or the individual designated as having major responsibility for planning and coordinating studies of international students consider carefully the strengths and weaknesses as may be implied in the results of this study. Further, that they attempt to maintain the areas of implied strengths such as coursework, research, and advisement as well as seek ways to bring about more effectiveness in other areas of the learning experience.

USING STUDENT IDENTIFICATION PROCESSES TO IMPROVE
INTERNATIONAL AGRICULTURAL EDUCATION

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USING STUDENT IDENTIFICATION PROCESSES TO IMPROVE INTERNATIONAL AGRICULTURAL EDUCATION

ISSUE

The issue is whether or not improved student identification processes are cost effective methods that can be employed to increase the recruitment and retention of an effective labor force in agriculture.

Situation

In many parts of the world investment in formal education in agriculture has not always resulted in the type and quantity of labor force needed to address the real life problems of agriculture. In some countries where the economy is relatively good and there are multiple opportunities most of the trained agriculturists take jobs in non agricultural occupations. In other countries where the economy or other circumstances may not provide many opportunities outside of agriculture the trained agriculturalists often become reluctant employees in agricultural occupations. In either case the result is the less than optimum availability of an effective, trained labor force for agricultural development.

Why have the results of formal training in agricultural education so often not met the expectation of those who developed the programs? Many explanations have been voiced over the years including quality of teachers, quality of facilities, finances, syllabus, quality of students and many other variables. Many of the explanations have been a result of an isolated experience of an individual who has evaluated the situation based on his/her experiences in a more developed system. Obviously the lack of any of the variables that have just been mentioned can cause difficulty in preparing an individual for employment in agriculture. All of these variables and more must be addressed to develop and sustain a quality agricultural education program. The thesis I would like to explore in this paper is that the manipulation of the traditional variables in agricultural education will not yield the desired results until one key area has been addressed. The area I am concerned with is the student.

The quality that I'm interested in is not the capability of the student but the interest of the student at the very beginning of training in attaining a career in agriculture. The circumstances vary in different countries but in many places the competition for a seat to further their education

is keen. There are less places available in the education system than there are capable applicants who want an education. In many of the countries the educational system is dominated by the concept of the external exam. The students after attending school for the prescribed number of years sits for an exam that has been developed at some outside institution. The success or failure of a student to pass will to a large extent determine the future of the individual.

Generally, in many countries with a British colonial heritage the student must pass five O level (Ordinary level) subjects to attain an entrance into higher education or to go into the ranks of the white collar work force. Of course, what subjects are passed at the O level are important, but the attainment of the five O level passes normally is enough to get one a white collar job. Conversely, the lack of sufficient passes at the O level can forever keep an individual from gaining employment in the much sought after white collar occupations.

Trinidad and Tobago is one country where the external examination system is employed. Trinidad and Tobago has been plagued by the problems in developing a trained agricultural work force through agricultural education. They have invested heavily in buildings and teachers for the agricultural science program. However, after several years of operation less than ten percent of those who successfully complete their O levels in agriculture are employed in agricultural occupations. After several years of training in agriculture in some very good facilities, taught by some very capable teachers and in a relatively well financed program the results are very disappointing given the agricultural labor force needs of Trinidad and Tobago. The supply of workers in agricultural occupations still do not meet the need because the agricultural graduates take non-agricultural employment.

The reason that so few elect to enter occupations in agriculture after school is that very few wanted an occupation in agriculture before they entered the program. Agricultural science is just a vehicle that many students use to get the five passes at the O level so they can become employed in white collar jobs. In Trinidad and Tobago the course in agricultural science is an intensive course and as a result it is rated two O level passes for the successful completer. Thus if a student can combine a O level pass in agricultural science and three other areas such as math, english and chemistry he/she will attain the coveted five O level passes. The result of this system is that the majority of the students in the agriculture science course are there to get the two O level passes and have only a passing interest in agriculture. This system leads to the development of some well informed citizens on agriculture

but does little to augment the ranks of a skilled labor force in agricultural occupations.

The situation is a little different in countries that are further behind in the development process. Typically, in the more underdeveloped countries there is both a lack of educational opportunity and a lack of job opportunity upon completing one's education. This also leads to a situation where classes in agriculture science are filled with individuals who have little or no interest in agriculture. In fact, many of the students may actively dislike agriculture as a possible future occupation. Why are these students studying agriculture, if they are not interested in the subject? The answer is that there is no alternative to studying agriculture. Admission to a course in agriculture is often the last chance the individual has for further education. Admission to all education programs is very competitive and to a large extent based upon the results of the external tests. Generally, students apply for seats in the courses and list their number one preference then their second preference and their third preferences. The Ministry of Education then goes through the process of placing individuals in the various courses based on the results of the examinations and the preferences of the applicants. Because of the lack of space in the courses only a small percent of those who apply are successful in winning a seat. Those that are successful are placed according to their capabilities and their interests. Those that have the best scores being the first selected into the courses of their preferences. Others with lower test scores are placed in second or third preferences if the slots have already been filled by those with better test scores. The possibility exists that if the potential student doesn't wisely select courses that are likely to be open when his/her ability level is being selected he/she may not have a slot at all.

The wise applicant, to protect himself, after selecting the programs in which he/she is truly interested as his/her number one or number two choices will select a program that is not so popular to ensure a spot for further education if they are not selected in the popular courses of their preferences. Agriculture in many developing countries is not one of the "popular" courses. This fact is well known by students and parents who often use this fact to further the education opportunities they have available to them by identifying agricultural education as the lowest preference program. The competitive admissions criteria often ensure that the majority of the class will have a very low or no interest in agriculture because aspiring students use agriculture as a safety valve.

There are individuals in all countries that are interested in studying and working in agriculture, however, for a variety of reasons they are not in the agriculture

classrooms. The reason may be social pressure or other fields may appear to be more rewarding or have more prestige. On the other hand, they may come from rural regions where the academic preparation may not be of such quality that will enable them to compete successfully against better prepared urban youth for the seats that are available. In either, case youth with an interest in agriculture often are not in agricultural classrooms while the classrooms are filled with students who have little or no interest in the subject

Unfortunately, the intake of students who have little or no interest in agriculture and in fact who are unfamiliar with farming and the way of life of the farm family affects the effectiveness of the graduates after completing their studies and becoming employed in agricultural occupations. In the more underdeveloped countries the occupational opportunities are often very limited. In these countries there is little or no problem in the number of completers who seek employment in an agricultural occupation because it may be the only opportunity that is available. However, these are the same students who were trained in a course they considered as their last chance for education. Many of them did not significantly increase their interest in agriculture during the training process and thus completed the training and began employment with a very low level of interest in agriculture. As might be expected, the results achieved by individuals who are really not interested in agriculture and are not familiar with rural life often is less than their employers feel is satisfactory. As a result, the employers condemn the school system for inadequate training of its students.

Conclusions

There are many variables that are involved in providing an effective work force in agricultural occupations but the manipulation of the traditional variables will not yield the required results unless steps are taken to insure that students studying agriculture are really interested in the subject. The agricultural training program itself must be involved in creating and developing the interest of its students, however, given the exceptional circumstances of developing countries it is often very hard to accomplish this with the very low initial interest of the students.

Some method must be found to help both the student and the individuals who are doing the selecting to determine the students real interest in an occupation in agriculture. Educators have realized for a long time that the problem exists and have tried to develop alternative techniques to overcome the problem. Usually, this has taken the form of an interview with the prospective student before admission.

Certainly this has proven to be a positive step, however, it has not solved the problem.

The students are very keen and just as they know to put agriculture as one of their preferences to insure selection for some kind of education, they are also able to provide the appropriate answers during the interview that will insure their selection into the agricultural education program. There is a real need for procedures that identify the actual interests of the student to better insure that the students studying agriculture have interests in agriculture and future employment in agriculture.

Solution

One effective method used to determine interest has been the use of Interest Inventories that have been normalized on the population for which they are intended. I believe that in locations where these instruments have been used that they have contributed in a major way in improving the quality of the agricultural education programs. They provide two great benefits to those who are involved with them. They help the student analyze his/her own interests and to eliminate much of the dead end attempts to find his/her niche in society. The instruments help the selecting agency to identify students who have an interest in the agricultural programs at the entry point and who are more likely to eagerly seek employment in agricultural occupations.

At present a review of the latest editions of Tests In Print led me to conclude that there are no instruments that have been developed for use in identifying interests in agriculture that have been normalized on the populations in developing countries. The need exists to begin this effort and to work with the countries where the problem exists to implement this as a part of the student selection process. The development and use of an effective Interest Inventory would be one of the best steps that can be taken to improve the image of formal education in agriculture. It would be a relatively low cost project and certainly one in which the cost/benefits ratio should be very favorable.

ON BECOMING A SUCCESSFUL INTERNATIONAL AGRICULTURAL EDUCATOR

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On Becoming a Successful International Agricultural Educator

"My highest frustration levels and highest fulfillment levels were reached while in Indonesia. I'm ready to go back."
Dick Yencer, a U.S. vo-ag teacher (1979).

For over three decades many professional agriculturalists from the United States have served as international agricultural educators, particularly in the Third World. Many of them including Mr. Yencer (quoted above) had success stories to share. Others have not been as positive about their international assignments. Even though there are some disappointments and frustrations, there is still a growing number of agriculturalists in U.S. colleges who express deep interest in international assignments (bin Yahya and Moore, 1984; Meaders, 1982; Perez and Rogers, 1983; Thuemmel and Welton, 1983).

In view of the possible disappointments and frustrations that could stem from international assignments and the increasing numbers of professionals from the various agricultural disciplines with interest in international activities, it becomes important to identify some of the basic "agreed-upon" thoughts and behaviors necessary to enhance success in foreign assignments. Many agriculturalists who accept international assignments seem to have three fundamental goals in view: (a) personal growth, (b) professional improvement, and (c) achievement of project/program objectives in the context of overall improvement in the well-being of the people. In order to achieve all goals, professional agriculturalists who opt to undertake foreign assignments need be fully aware of some very basic DOs and DON'Ts as they relate to international assignments. In this paper, the reader is presented with some TIPS for success offered by a group of professionals who have been involved in international development activities. The suggestions appear to be appropriate for "first-timers" and may be helpful for "old-timers" who might have had disappointments in their first assignment abroad.

Background Information

In 1984 the researchers conducted a census survey of all agricultural teacher educators in the U.S. who had experience in international agricultural and rural development activities at foreign locations (N=98). The purpose of the project was two-fold: (1) to assess the past and (2) to determine the future role of the U.S. agricultural teacher education profession in international agriculture and rural development. A mailed questionnaire consisting of 19 questions was used. Teacher educators were asked to record their responses to the questions on blank cassette tapes. Responses were transcribed and then synthesized by the researchers. For the purpose of this paper, only responses to Question 17 of the research instrument are presented. The question was:

"If you were giving advice to other teacher educators with expressed interest in international assignments or actually preparing to leave on international assignment for the first time, what would you say?"

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Findings

Responses to the above question were grouped into two main categories: 1) pre-departure advice and 2) on-location advice. First, there were suggestions (refer to Table 1) deemed worthwhile prior to departure on a foreign assignment. Secondly, "first-timers" were advised to shoulder certain responsibilities (refer to Table 2) once they were at the foreign location. Most statements in the tables are direct quotes from one or more university professors of agricultural education. Other statements (marked with an *) are combinations of two or more similar statements.

What Should You Do Before You Leave On Assignment?

It was advised that those with expressed interest in foreign assignments first resolve some basic personal and family issues before any decisions are made. Refer to Table 1. These issues included the "real" reasons they would want to leave their position in the U.S.; whether the family relationships would be adversely affected by such action; and age and education of children. If the first set of issues are successfully resolved, then the next step is to go "scavenger hunting." Information-gathering is important. "First-timers" in particular need to learn as much about the country of interest as possible. It is also crucial to learn the "working language" of the country (if it is not English). It was strongly suggested that one expect the unexpected and that culture-shock is normal.

What Should You Do While In the Host Country?

Four broad categories of suggestions (reported in Table 2) constituted the in-country responsibilities. The first of these categories was the technical-professional dimension. First-timers were cautioned to demonstrate competence and objectivity during situation analyses and decision-making. They were also to try and refrain from prescribing quick-fix solutions to seemingly perennial problems. The overall tone of the suggestions was that of caution. Refer to items 1-23 in Table 2 to see the exact statements suggested by teacher educators in the technical-professional dimension.

Secondly, "first-time" international educators should make a genuine effort to understand the cultures of the peoples (refer to Table 2-II). Concerted efforts should also be made by these educators to understand the "real" problems the local peoples encounter. They were advised to refrain from imposing their values and lifestyle on the natives of the other country.

A third category of responsibilities relates to communications and the concept and use of time (refer to Table 2-III). Time, according to the experienced international agricultural teacher educators, is not of great importance in most Third World nations. Therefore, there appears to be no need for becoming overly concerned with deadlines, timelines, or bottomlines. Besides, change or development is a slow process. First-timers were also advised, thus: "Don't hesitate to ask questions."

Finally, international agricultural educators should consider their personal traits. Desirable traits are reported in Table 2-IV. Some of the traits are being flexible, adaptable, curious, patient, committed, persistent, persevering, and a good listener. Also, first-timers were advised to try to mingle and interact with the local peoples; to respect the customs and habits of the natives; and to "keep an overall personal goal in view."

Summary and Implication

Agricultural educators with international experience were of the opinion that acquiring such experience is worthwhile. They were also agreed on the issue that certain pre-departure activities were crucial and important for first-timers. Furthermore, they believed that, upon arrival at a foreign location, an international educator has to assume a new set of responsibilities. While on assignment the first-timer, albeit even the old-timer too, needs to assume and fulfill responsibilities in the following dimensions: (1) technical/professional competencies and skills, (2) perceptions and values of the other culture, (3) time and communication, and (4) personal and other relationships.

The suggestions gathered in this research appear to be applicable to the professional groups involved in Third World agricultural and rural development process. Granting that the above statement is valid, there is an important implication for administrators of international agricultural programs in U.S. colleges. These findings could serve as a basis for planning, organizing and conducting seminars and workshops to prepare agriculturalists for international assignments.

Agriculturalists with expressed interest in international assignments need to be well informed of the ABC's of successful involvement in foreign activities. Without such knowledge, their experiences could be everything else but success stories. Every "first-timer" dreams of becoming a successful international agricultural educator and deserves to be one too.

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Table 1

Advice From Agricultural Educators to Their Colleagues With
Expressed Interest in International Development Activities:
Pre-Departure Responsibilities

1. Ask yourself whether or not your wife and family are going to be happy?
- *2. Consider the age and education of your children.
3. Reflect very critically on the question, How did I get interested?
- *4. Ask yourself whether or not you are committed, dedicated, and motivated enough?
5. Ask yourself whether or not you are running away from your Head of Department?
6. Be sure you are not going for the wrong reason.
7. Think through very carefully if that is what they really want to do.
8. They must have a true missionary spirit to be effective.
9. Learn the language.
10. Learn a foreign language.
- *11. Study the country extensively: its climate, geography, cultures, educational system.
- *12. Visit with and learn from your international students.
13. Seek out all travel information about the country or countries.
14. Visit with those who completed assignments in the country you plan to visit.
15. Get a passport.
16. Get a visa.
17. Get yourself inoculated.
18. Secure medical advice from your physicians.
19. Get a health check.
- *20. Decide whether or not to take your family.
- *21. Become very clear of your exact responsibilities while on assignments.
- *22. Be sure you have a secured position in the United States upon your return.
- *23. Avail yourself with suitable reference materials and resources.
24. Think of the contribution of vocational agriculture to U.S. agriculture and how much it could help developing countries.
25. Don't build hopes too high.
26. Be prepared for setbacks in the cultural, social, and political situations in these countries.
27. Be prepared for the unexpected.
28. Be prepared for cultural shock.
29. Be prepared for frustrations.
30. Be prepared for the worst.
31. It is an unprecedented opportunity to get to know other people.
32. It is entirely normal to face culture-shock.
33. It takes more time to be accustomed to mores, customs, etc.
34. Expect the unexpected, which becomes the normal.
35. Three qualifications are (1) must like people, (2) must be able to get along with all kinds of people, and (3) must want to do it.
36. Three virtues (1) be patient, (2) must have persistence and (3) must have perseverance.
37. Read broadly on the field of international development.

Note: All statements are direct quotes except those with * marks.

Table 2

Advice From Agricultural Educators to Their Colleagues
With Expressed Interest in International Development:
Responsibilities While in Host Country

- I. The Professional - Technical
- *1. Be familiar with subject-matter and be technically competent.
 2. Use workable principles.
 3. Be down-to-earth.
 - *4. Be prepared to introduce technology appropriate to the specific context of development.
 - *5. Make concerted efforts to consider the implications of the programs you helped develop for the given culture.
 6. Be objective in your analysis and decision-making.
 7. Refrain from quick answers.
 8. Don't prescribe solutions.
 9. Don't force an agenda on yourself.
 10. Don't make groundless assumptions.
 11. Be a consultant.
 - *12. Cooperate with other experts involved in the project or program.
 13. Take with you professional books, magazines, and journals.
 14. Keep in mind you are first, a reservoir of knowledge, then a fountain.
 - *15. Establish and help maintain a library for the people.
 - *16. Don't expect the U.S. land-grant concept to have immediate success.
 - *17. Try and attend the Annual National Agricultural Education Research Meeting.
 18. Find out why they do things the way they do before deciding on a course of action.
 19. You are there to give advice not to take over... be cautious with how you do so.
 20. Become a part of the team... don't think the people are not smart.
 21. Assure yourself that sufficient on-site opportunities are provided... negotiate for them.
 22. Use the farming systems approach. Work with what's available and adjust to their situation.
 23. Don't become another 'ugly American.' You are there as a consultant to help their leaders. And if you can initiate the idea with their educational and agricultural leaders and let them receive the credit, then the project would probably continue and become very worthwhile. If you are the one who wants to grab the glory and do everything in your name, as soon as you leave the project will be forgotten.
- II. Perceptions and Values of the Other Culture
1. Make a concerted effort to understand and feel the culture.
 - *2. Try and understand the problems of the people.
 3. Be prepared to learn more than you offer.

(table continued)

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Table 2 (continued)

4. Get to the grassroots and apply yourself.
5. Don't impose your values and lifestyle on the people.
6. Avoid the provincial and parochial attitude of most agricultural teacher educators.
7. Study and understand the local customs and agriculture of that country.
- *8. Mingle and interact freely with the people.
- *9. Visit homes of the local people while in the country.
- *10. Use Maslow's hierarchy of needs.
- *11. Find out what the host government's position is on the project.
- *12. Don't attempt to uncritically translocate the success stories of the United States into these other countries.
13. You must enjoy being with people to enjoy in cross-cultural environment.
14. Learn to be friends with all levels of the people.
15. Attend social and cultural events.
16. Learn from the people.

III. The Time Dimension and Communications

1. First of all leave your wrist-watch and calendar in the United States. In most countries time is not of the essence as it is in the United States.
- *2. Don't be overly concerned with timelines, deadlines, bottom-lines, and logistics. Be prepared to go at a slower pace.
3. Remember that change is a slow process.
- *4. Accept a relatively short-term assignment; first familiarize yourself with the culture.
5. Plan to stay at least four years. I think a 2-year assignment (is to) get your feet wet. And by the time the two years (are) up, you are just then preparing to get effective. I think you have to stay longer to make a real impact.
- *6. Take time and review the social and economic policies and actual direction of the national government to help you communicate more effectively.
- *7. Study the existing obvious limitations to development in the country of interest.
- *8. Be sure you create a free, uninterrupted channel of communication with the U.S. while on foreign assignment.
- *9. Don't hesitate to ask questions.

IV. Personal and Other Relationships

1. Be flexible.
2. Be prepared to do a lot of things by yourself.
3. Be patient.
4. Be ready to adapt to the new environment.
5. Keep an overall personal goal in view.
6. Keep your enthusiasm up.

(table continued)

Table 2 (continued)

7. Check into the cost of housing.
8. Be committed.
9. Don't become over glamorous.
10. Be curious.
11. Give yourself benefits to look forward to by mingling and interacting with the people.
12. Be a good listener.
13. Establish good relationships.
14. Don't prescribe.
15. Be adaptable.
16. Must have persistence.
17. Must have perseverance.
18. Be yourself.
19. Don't try to dress like 'the foreigner'.
20. Should remember you are a visitor. Respect the customs, habits, etc. of the people.

Note: All statements are direct quotes except those with * marks.

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