

# DIGEST

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## Editor's Corner

We are pleased to send you this first issue of INTERPAKS DIGEST. We hope that you will agree that it continues the INTERPAKS INTERCHANGE tradition of publishing thought-provoking articles about issues important to extension. Long-term readers will note that we have changed our format. And all should note that we are making a particular effort to identify and give credit to authors of DIGEST articles. Thus, in essence there now is a new avenue for communications in the form of what amounts to "executive summaries" of research and scholarship within the profession. These communications will deal specifically with the world-wide concerns of agricultural development and how extension can better serve the needs of people and the development process. We in INTERPAKS believe that readers will find this publication fits an unmet need. Our goal is to have it fall into the *must read* category of busy extension professionals. We hope that you find this to be so and that you will share your copy with others as appropriate.

DIGEST is supported in part by subscription income. It also is supported by a grant from the Cooperative Extension Service of the University of Illinois at Urbana-Champaign. These combined resources make it possible to produce DIGEST and also to provide an emerging "bundle" of electronic services for the profession. Reminders about these electronic services will appear from time to time in DIGEST, particularly when they are first introduced or when services are modified. Readers are advised that an annual subscription (described more fully elsewhere in this issue) provides at least two benefits: it guarantees delivery of three issues of DIGEST and it makes possible free delivery of DIGEST to professionals in developing countries. Consequently, part of the fee can be considered an indirect contribution to economic development in developing countries. INTERPAKS electronic services are free.

We hope that you will contact us regarding DIGEST-related concerns. We hope that you will consider sending us material for possible inclusion in DIGEST. We hope that you will enjoy reading DIGEST. ○

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## From Agricultural Extension to Rural Information Management

### Introduction

Information is an essential production factor in agriculture. Farmers need information to improve or adapt their farming. Farmers need extension only to the extent that it can provide them with relevant and timely information.

Five common factors have been identified with extension which in a way defines it: (a) it is an intervention, (b) it uses communication for change, (c) change must be voluntary, (d) it works through planned processes and outcomes, and (e) it is institutionalized.

### Background

Investment in extension has recently increased: about half of the present extension services in the world were established in the last ten years. Most of those organizations are publicly funded. About 60 percent of extension's resources are directed toward

larger commercial farmers, while the vast majority of small, marginal farmers receive support based on about a third of all extension resources. In terms of methods used, individuals and groups each receive about 40 percent of extension efforts, with less than a fifth allocated to mass media activities.

### *Investments in Extension*

Global annual expenditure for extension rose from \$3.4 billion in 1980 to over \$6 billion in 1990, about 85 percent of which is public expenditure. About 0.5 percent of Agricultural Domestic Product (AGDP) is spent on extension worldwide, with ranges depending on country size and priority given to extension. There are an estimated 600,000 people employed in extension services worldwide—more than 90 percent by governments. Four out of every five staff members work away from central headquarters. About 13 percent of field workers are women.

The World Bank has been the largest donor for agricultural extension in developing countries. It has lent more than \$2 billion since 1964 to about 80 countries. The Bank plans to invest some \$150 million per year through 1994 for extension in about 30 countries.

### *Knowledge About Extension*

Extension is a relatively new phenomenon with one of its roots in Ireland in the 1840s. Serious research on extension only started after the second World War. The focus of extension science has shifted, but the various phases extension has gone through were all necessary at the time and essential to getting us where we are now.

In the sixties, the main focus was on interpersonal communication. It was the time of the diffusion of innovation theory, with attempts to categorize farmers on the basis of the speed with which they adopted new technology. However, being good communicators did not solve all of extension's problems. The seventies were the time of constraint identification. Farming Systems Research emerged because traditional research did not produce results farmers could use. The eighties concentrated on

the management side of extension services, with the Training and Visit system of extension as the major example. The nineties are likely to show an interest in a more systemic approach to agricultural information. Demand and supply of information need to be identified, and the most effective and efficient ways to match them need to be applied. Policies that provide a level playing field to all information suppliers need to be formulated. Many governments are reconsidering the role of the public sector with respect to agriculture.

### *Technology for Extension*

The past 40 years have shown striking increases in yields, particularly in the major cereals: World wheat yields increased from 770 kg/ha in 1950 to 2160 kg/ha in 1986. Globally, the better use of information is a key element in improving yields, particularly information on better uses of water and capital. Biotechnology is expected to drive yield increases of the future. New technology in the field of animal production is expected to come from increased productivity per head. A greater use of improved technology will again be the key factor to achieve that goal, with extension playing an essential role in getting that technology to farmers. And as was noted in a recent article, we could feed four billion more people today if the Third World fully adopted the latest high-yield farm technologies.

In the field of communication technology, changes have been dramatic. Over the last 100 years, advances have come at an ever-increasing pace. Particularly important for rural development is the digitization of information.

A lot of money has been invested to generate and transfer new technology. Farm productivity increased considerably, but it is difficult to prove that part of those yield increases might be attributed to extension. Indeed, a major reason for underfunding of extension is the difficulty of demonstrating its benefits.

### *Questions About Extension*

Companies like Coca Cola know their five Ps (People, Product, Price, Place, and Promotion). Their challenge

is in achieving a cost-effective balance. Governments need to open debate on these questions with respect to extension:

People: who are the future clientele?

Product: what kind of information is needed?

Price: who is going to pay to cover extension's costs?

Place: how is information to be transferred?

Promotion: who are to be the suppliers of information, public or private?

### *Issues*

There appear to be five major issues facing extension: (a) lack of common purpose, (b) a lack of accountability, (c) changes in information needs, (d) a widening clientele seeking information, and (e) a lack of consistency of agricultural information policies.

#### *Lack of common purpose*

Symptoms of a lack of common purpose include: (i) insufficient knowledge about farmers; (ii) a lot of different, overlapping extension structures; (iii) unclear objectives, with few objectives aiming for a bottom-up approach; (iv) little coordination between different extension media, like farm visits and radio programs; (v) unfocused monitoring and habitual reporting; and (vi) in-service staff training that offers what is available, not what is needed.

#### *Lack of accountability*

Symptoms include: (i) a lack-of-fit between what (small) farmers want and what extension supplies; (ii) demonstrations that interest only a few farmers; (iii) contact farmers are often not representative of the farming community; (iv) extension concentrates on irrigated crops and much less on rainfed farming, livestock production, or natural resource management; (v) bad extension management that can go on for long periods.

#### *Changing information needs*

There are two reasons that farmers' needs for information are changing. One is the success of the past twenty years of extension, and another is that extension has learned to listen better to farmers.

Two major shifts in farmers' information needs include: (i) from production recommendations to advice that increases income; and (ii) from on-farm messages to counseling on off-farm and non-farm activities.

*Expanding audience*

Agricultural information is generated, transferred, and utilized not just by farmers but also by researchers and policy makers. The focus in many extension services has been on farmers only. But extension often lacks the diagnostic and editorial skills to tell the farmers' story in such a way that policy makers listen.

*Recommendations*

Four possible ways are suggested in which the efficiency and effectiveness of agricultural information management might be improved: (a) shared objectives, (b) stronger accountability, (c) a systemic approach to information, and (d) comprehensive policies.

*Shared Objectives*

A common feature of America's best-run companies is that there are company-wide shared objectives. Extension organizations, like well-run companies, need commonly shared objectives. Staff need to know their clients better. Then they can do effective program planning. And once extension activities have been agreed upon, the most cost-effective communication channel may be chosen to achieve the specific objective. The last step then is to have staff do the job—staff who have the necessary experience, skills, and attitudes to do it well.

*Stronger Accountability*

Accountability often boils down to the extent of control farmers have over the extension service. One of the easiest ways to measure control is the percentage of the budget for extension that is under direct control of farmers. To make the generation and transfer of information more accountable to end users: (a)

ensure farmers' direct control over part of the public extension budget and (b) privatize part of the extension service.

In the United States, county constituents vote on extension budgets, thereby influencing extension planning. In Burkina Faso, farmers provide housing for "their" extension agent. End users in these kinds of situations can influence agent performance. Privatized extension activities emerge as agriculture becomes sophisticated and commercialized. The

greater the need to respond to market demand, the higher the information needs. Advanced commercial farmers are ready to pay for information.

*A Systemic*

*Approach to Information*

It is just as silly to build separate roads for doctors, teachers, and farmers as it is to design separate information systems for health, education, and agriculture.

Production increases are only one way of improving farmers' income. A systemic approach is needed to satisfy present needs for more technical efficiency, for better integration of farming activities, and to enable suppliers to get in the market. Secondly, development does not happen automatically just because farmers are fully informed. Others need information too: policy makers, researchers, and private entrepreneurs. Thirdly, the Bank's areas of special interest are systemic: women, poverty, participation, or the environment.

*Comprehensive Policies*

A policy sets the rules of the game for a variety of players. Comprehensive policies for agricultural information are needed to respond to expanded and different information needs from a

widening audience. Public extension and research are no more than policy instruments of the government. If there is no policy, the instruments can easily be misused. Expectations are sometimes unrealistic. Too often extension managers and policy makers have skipped some of the more difficult questions. It is not uncommon to see staff being trained, for instance, without agreement on what that staff are supposed to do nor on whether staff visits to farmers are the most efficient way to achieve a given objective.

*Where Could the Bank Invest?*

The Bank plans to invest some \$150 million annually for extension over the coming three years. A considerable proportion will go towards funding the same type of activities that have been supported so far. However, in addition to these more routine investments, the Bank could shift some of its investments. The Bank might consider investing in people and in communication technology:

*People*

Diagnosis of farmer problems remains a weak area in many extension services. The employment of people for training in rapid rural appraisal and skillgap analyses has shown positive results. Also, support for enhancing farmer associations and for promoting private sector investment is needed.

*Communication Technology*

Some Bank investments could be shifted to the area of communication technology. Keywords for future lending might include a) digitization, b) localization of information, c) linking, d) educational science, e) private sector, f) language training—especially English, g) multiple uses of rural information centers. ○

By Willem Zijp, Extension Specialist, The World Bank. Excerpts from a presentation at the 12th World Bank Agricultural Symposium, Washington D. C., January 8-10, 1992.

**Quote Dejour**  
 George Bernard Shaw wrote, "You see things and say why? But I dream things that never were, and I say, why not?"  
 Reference: Presentation by Dr. K.V. Ramon at 1992 Symposium for Research in Agricultural and Extension Education, Columbus, Ohio, USA



## A New Interdependence Model— Implications for Extension Education

Recent legislation, public policy, budget limitations, and international competition require closer coordination and cooperation within and between the public and private sectors. Conceptual models may serve to strengthen or inhibit linkages—i.e., help or hinder coordination and collaboration—between Extension and other public sector agencies and private sector organizations.

Two dominant types of conceptual models representing Extension—i.e., research-transfer models and adult education models—may limit coordination and cooperation between Extension and other public sector agencies as well as the private sector. Extension may best strengthen its linkages with other public agencies and the private sector through using a third type of model, i.e., *interdependence models*.

Research-transfer models first consider research agency/industry roles, processes, and outputs and then consider Extension roles, processes, and outputs. Adult education models first consider Extension roles and processes, then cite research contributions to the subject matter content of Extension programs. Interdependence models describe (1) the concurrent roles, actions, and outputs of Extension and related elements of the public and private sector; and (2) the continuous, mutual dependencies of these elements in resolving public issues and clientele needs.

### Roles and Relationships

A new interdependence model identifies 15 *generic roles* performed by the public sector/private sector complex which includes Extension. The five elements in the complex, *Extension, Research, Industry, Intermediate Users, and End Users*, share a majority of the generic roles. *Together, these roles lead to and include the generation and adoption (use) of practices and technologies.* (Technologies are product oriented while practices are process or management oriented. End Users put information and skill of *technologies* into operation

primarily by acquiring and using specific materials, devices, or products. End Users put the information of *practices* into operation primarily by exercising specific observations, judgments, and complex skills).

Extension roles must *complement* those of the other elements in the public/private sector complex so as to maximize the overall effectiveness of the complex. The new interdependence model promotes such complementarity by identifying Extension's distinctive capabilities—its *comparative advantages*.

The 15 generic roles in the public/private sector complex, and Extension's distinctive performance of eight of them, are described next.

- *Network*—The five elements listed above each assess needs and availability of resources. The elements network in order to obtain information on economic, social, political, and environmental conditions and trends. Each entity tends to network in a distinctive way. Extension tends to network with a relatively high proportion and wide range of Intermediate and End Users.

- *Discover, Invent, and Develop*—Industry tends to conduct most of the research to invent and develop new technologies. Public sector agencies conduct much of the research to develop new practices (especially practices that have low marketing potential for Industry). Extension may co-develop technologies with Research in a task force setting.

- *Assess*—Research and Industry assess the performance characteristics of technologies and practices they develop. Intermediate Users orchestrate technology and practice assessments. End Users make adaptations and assess their own use of technologies and practices. And Extension may independently assess selected technologies and practices, but often enlists End Users to participate.

- *Commercialize*—This involves the use of patents, licenses, and copyrights to prepare to market technologies and information.

- *Adapt and Systemize* (Adjust and Integrate)—Industry increasingly integrates its technological products (e.g. seeds and fertilizers) with recommended practices. End Users and Intermediate Users also adapt practices and technologies. Extension is concerned mainly with adapting practices to varied, localized conditions. *Systemizing* combines selected technologies and practices into user-oriented groupings and then assesses their use under site-specific conditions. Research generally devises generic systems of technologies and practices. Extension adapts these generic systems to varied, localized conditions.

- *Transfer and Market*—Transferring conveys (free or for a non-profit user fee) information and advice regarding the adoption of technologies and practices. Marketing involves delivering technological products and information to Users—normally for a profit. Practices can be spread by information transfer alone, since no purchase of product is necessarily required. Extension generally transfers practices and systems rather than technologies.

- *Assist*—This is technical problem-solving for End Users. Intermediate Users in the private sector plus public sector agencies provide assistance.

- *Finance*—End Users may seek financing to acquire and use technologies. Both public and private sector Intermediate Users are involved in providing financing.

- *Educate*—Education enables people to cope with existing and changing conditions by increasing their ability to solve problems. It empowers people by helping them understand and apply principles and processes so as to select specific practices, technologies, and systems that are correct for them. Extension educates Users in a non-formal manner as they consider how to meet their needs and those of the public.

- *Use*—This is the adoption of technologies and practices to improve personal living, homemaking, and farming. Use of technologies and

practices occurs as End Users take initiative to retrieve information and/or apply information they receive.

- *Evaluate*—Assess use and impacts of alternative practices and technologies. Extension evaluation tends to focus on *extent of use* of alternative practices and technologies.

*Educational Implications*

Extension should re-examine its programs to determine whether each places sufficiently high priority on *education* beyond transferring specific practices and systems. Rationale for this re-examination is based on current trends: a large and growing number of private sector organizations are increasingly transferring and/or marketing information and adoption advice on specific technologies and practices. Extension's comparative advantage increasingly will lie in performing the role of education *beyond* transferring

information and adoption advice regarding specific practices and systems of practices and technologies.

*Recommendation*

Extension should focus more on education. In doing so, Extension should continue to integrate education with the transfer of information and advice regarding selected practices and systems.

*Further Observations*

Clientele increasingly need *education*, i.e., to learn principles and bodies of knowledge, not just to have their immediate problems addressed. For example, farmers are told too little about the ecological, biological, and economic relationships associated with the use of agricultural chemicals.

It is increasingly more important for Extension to educate people to make their own informed decisions than to

recommend the adoption of specific practices. Prescriptive advice and information transfer will continue to be important roles for Extension. But Extension generally has little or no comparative advantage in this role. Extension should hesitate to transfer practices/systems apart from presenting them in an educational context. ○

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By Claude F. Bennett, Program Evaluation Leader, Extension Service, United States Department of Agriculture, Washington, D.C. 20250. Adapted from a presentation at the Symposium for Research in Agricultural and Extension Education, Columbus, Ohio, May 1992. The Symposium presentation was based on the author's USDA publication, *Cooperative Extension Roles and Relationships for A New Era: A New Interdependence Model and Evaluation Synthesis To Foster Work with Other Agencies and Organizations* (Springfield, VA: National Technical Information Service, 1990).

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## *Bridging the Research-Farmer Gap: Examining the Role of Nongovernmental Organizations*

One-way paradigms of extension have been thoroughly criticized in recent years. A major weakness is the inadequate linkage between research and extension. Over the past three decades, nongovernmental organizations (NGOs) have been recognized by development experts as having a legitimate role in agricultural development. Arising perhaps because of chronic development needs that have remained unmet through existing organizations, NGOs are filling a critical niche in agricultural development.

Due to the far-reaching linkages that NGOs typically possess with resource-poor farmers and grass-roots organizations, these flexible organizations offer considerable advantages in the area of agricultural development. The NGO community also presents some refreshing alternative programmatic approaches that, when contrasted with the dominant agricultural technology transfer/extension paradigm, can be instructive.

*Problem Statement*

The predominant linear view of technology transfer is insufficient for addressing complex agricultural problems that exist, especially in limited-resource regions of the world. The continued ingrained belief that agricultural technology is best developed by the researcher, then delivered by an extension agent, and finally adopted by a farmer is a hindrance to poverty alleviation. The agricultural extension literature is infected with language that reflects the one-way paradigm. Even though most informed writers are making a well-intentioned attempt to incorporate more feedback mechanisms into their technology transfer model, they are unable to move away from their top-down thought processes.

*Purpose and Method*

This paper documents the strategic role that NGOs are playing in extension and participatory research. It is an

exploratory analysis of approaches and emerging models of extension used by many NGOs. The paper reports on a comparative analysis of the organizational characteristics of selected NGOs in Malawi and Zimbabwe. Data were gathered from personal interviews, site visits, and documents from selected NGOs in April-August 1991.

The NGOs in Zimbabwe and Malawi, selected for examination in this study, were found to be involved in a variety of agricultural activities. Ventures include food production, processing, storage; utilization, germ plasm conservation and utilization, produce marketing, horticulture, oil extraction, cash crop production, poultry, aquaculture, dairy production, credit, water program, off-farm income generation, and training in areas of leadership, facilitation, and management. Few NGOs are involved in all of these activities, and most have a subset that fits their individual mandate and program objectives.



### *Participatory Features*

The participatory approach to agricultural development modeled by the selected NGOs is significantly different from the predominant technology transfer paradigm. The farmer is not viewed by NGOs as the "end recipient" of a top-down technology delivery process. Likewise, the NGO agricultural development worker is not characterized as a "conduit" for conveying information generated by institution-based scientists down to farmers.

Rather than formulating a pre-packaged prescription for farmer problems, the more effective NGOs are embracing a collaborative and jointly diagnostic process. Farmers are regarded as valued partners with NGOs in the development process at all levels of intervention: needs assessment, program planning, experimentation, technology development, program implementation, and evaluation. The partnership model entails giving considerable decision-making control over to the farmers, including the ability to influence the allocation of available resources.

### *Grassroots Networks and Linkages*

Effective NGOs perform their work through a web of local organizations, commonly referred to as networks. Networks may reach only a selected geographic region or may be so expansive that they extend throughout an entire country. Most networks involve linkages with and between local organizations. Often formation of new local organizations is necessary. For example, local agricultural cooperatives, self help groups, village committees, or irrigation associations may be born out of the activity of an NGO. It is linkage with, and between, local organizations that is the fundamental characteristic allowing effective NGOs to make a difference in the lives of resource-poor farmers. NGOs also link with government research and extension organizations, universities, and other organiza-

tions that are not easily accessible to members of local organizations.

### *Proactive Features*

Unlike public sector extension establishments, the NGOs' efforts were more proactive in initiating interactions with farmers. Instead of just promoting adoption of new technologies delivered by the research establishment, NGOs functioned more as intermediaries and advocates for farmers. Rather than visualizing the farmer as an end-user, NGOs treated farmers as collaborators in the development learning process.

### *Conclusions*

An innovative model of agricultural development is steadily evolving and maturing among NGOs in Zimbabwe and Malawi. The NGO model is complex but has at least two definable characteristics. It is participatory at the grassroots level and proactive at the institutional level. And the NGO development model is clearly different from the dominant agricultural extension, or technology-transfer, model.

The approach of a change agent, acting as an intermediary, can be radically different depending on an organization's structure and philosophy. If an organization is predominantly oriented to a technology transfer paradigm, a change agent's role will be reactive. If, on the other hand, an organization's paradigm is oriented toward service of farmer needs and participation in the working of local organizations, the change agent's role will be more interactive. Efforts of the change agent will be focused on cultivation of a co-learning partnership with farmers. In the process of facilitating collaboration with farmers, a change agent will assist local organizations with research and assessments. The change agent will support farmers' learning by enhancing their capabilities to identify and acquire knowledge and technologies that address locally identified needs.

### *Greater Collaboration Needed*

Governments stand to benefit tremendously by allowing private and voluntary efforts to take root in society and thereby provide effective entry points for public sector inputs. Collaboration combines the enhanced program flexibility and responsiveness of the NGO community with expertise of public sector institutions.

The important contribution of NGOs in agricultural research and extension is not well documented. As a result, many public sector extension practitioners underestimate the capability and capacity of NGOs in agricultural development. Unfortunately, the existing literature fails to adequately demonstrate the potential of NGOs for proactive development, participatory research, and networking.

It is commonly known that NGOs contribute to organizational capacity by stimulating action at the local level. They are effective mobilizers of people. In contrast to the predominant technology-transfer paradigm of development, NGOs do not overly focus on supplying technological, informational, and financial inducements to development. Rather, NGOs seek to partner with people, create a co-learning capacity, and cultivate a local environment that might stimulate development. Among Zimbabwe's Shona-speaking NGO community, the phenomenon of self-development is called "zenzele" or self-reliance. ○

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Source: By D. M. Mattocks and R. E. Steel, Winrock International Institute for Agricultural Development, Morrilton, Arkansas, U.S.A. 72110. Adapted from a presentation entitled "Bridging the Research-Farmer Gap: Examining the Role of Nongovernmental Organizations in Agricultural Extension" contained in Conference Proceedings, 1992 Symposium for Research in Agricultural and Extension Education, May 1992, Columbus, Ohio, USA.

## *New Strains of Maize in Zimbabwe*

Zimbabwe is a fertile country that can produce as much maize per acre as elsewhere in the world. However, a drought has resulted in the need for a government appeal to the international community for grain. People wait for hours in long lines to purchase food in the capital city.

The drought also killed millions of tiny leafhoppers. But when the rains return, so too will the leafhoppers. They are likely to bring with them a "streak virus" that wipes out maize plants. A severe epidemic struck West Africa in 1983 and 1984. Central Kenya was hit in 1988.

The International Maize and Wheat Improvement Center, headquartered in

Mexico and better known as CIMMYT, has produced new strains of maize that are resistant to streak virus. These strains were developed in an intensive breeding program begun in the early 1980s. Streak-resistant genes were inserted into high-yielding varieties that also were resistant to other diseases such as leaf blight and common rust. Streak resistance is only the second improvement in maize breeding that has been passed on to Africa's maize growers. The first came in the mid 1970s, when the first high-yielding, disease-resistant maize varieties were brought in from Mexico. The goal is to provide subsistence farmers stability of production. Small-scale

producers tend to get 15 to 30 bushels per acre. Streak-resistant varieties of maize should enable them to increase productivity by 50 percent.

Breeders at CIMMYT now are working to produce varieties of maize that are resistant to corn borers, are more drought tolerant, and use nitrogen more efficiently. ○

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Source: Science for International Agriculture, Reports on Frontline Research to Improve African Agriculture authored by science writer Jane Stevens. For more information contact Dr. Kent Short or Dr. Hiep Pham, CIMMYT, P.O. Box 163 MP, Mt. Pleasant, Harare, Zimbabwe, FAX +263 (4) 35559

## *A Fair Exchange*

A 40-pound box of soybean seeds arrived at the University of Illinois in the spring of 1992, the culmination of a decade of negotiations between scientists and government agencies in China and the United States. The soybeans, 500 varieties common to central China, hold genetic material new to American scientists. Breeders hope some of the varieties have genes that can be used to solve disease and insect problems or make other improvements in commercially important varieties of U.S. soybeans.

The exchange marks the first time the Chinese government has released a large quantity of soybean seed. In return, U.S. researchers will host a Chinese soybean breeder for a year and provide analytical equipment. A team from the Illinois and Iowa Agricultural Experiment Stations, USDA-Agricultural Research Service, Illinois Soybean Program Operating Board, and Iowa Soybean Promotion Board negotiated the exchange.

The USDA Soybean Germplasm Collection, housed at the U of I, has more than 14,000 accessions of soybean germplasm. ○

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Source: Illinois Agricultural Experiment Station, University of Illinois at Urbana Champaign, College of Agriculture, Research Notes, Vol. 1, No. 2, 1992

## *Mapping the Genes of African Cattle*

Trypanosomiasis, a disease spread by the stinging bite of the tsetse fly, every year causes sleeping sickness in tens of thousands of people and debilitates and kills millions of cattle, causing enormous food and economic losses. An international group of scientists has launched a project to develop a breed of cattle resistant to the disease for farmers in sub-Saharan Africa.

Trypanosomiasis cripples the potential of farmers in this region to produce food sufficient for a growing population. The tsetse fly has virtually sealed off 10 million square kilometers of land—one third of Africa that is otherwise suitable for grazing and mixed farming. In the tsetse belt, farmers for the most part must cultivate by hand and carry water and goods.

Two methods are widely used to control trypanosomiasis: drugs to treat and prevent the disease, and insecticides and traps to kill tsetse flies. Both have drawbacks. Parasites develop resistance to the few drugs available; insecticides damage the environment; and traps work only in some areas and only for some species of tsetse.

A third method, breeding cattle that resist the disease, is the most permanent way to control trypanosomiasis.

Scientists are racing against time. In just 32 years, Africa will be home to 1.3 billion people, nearly four times today's 500 million. A 1992 study estimates that to feed Africa's growing population, the 45 million head of cattle now raised in the tsetse belt must be increased to 102 million (by the year 2025). The cattle raised must also be more productive. And to do this, trypanosomiasis must be brought under control.

A degree of resistance to trypanosomiasis evolved over thousands of years in a few cattle breeds that are able to survive in tsetse-infested areas. These cattle came to Africa five to seven thousand years ago. Today, they account for about five percent of the cattle in the 37 countries where tsetse flies occur.

African farmers need many more disease-resistant animals. And they cannot wait another 7,000 years for them to evolve. But breeding more of the N'Dama cattle that are disease resistant is not the answer. It would take 15 years merely to double the number of N'Dama cattle. That rate of growth is not adequate to serve the human population anticipated in 2025.

Scientists have been working on the problem since 1983. Their first task is to find the one or two genetic "markers"

that always show up in the DNA of trypanotolerant cattle. Breeders would then use those markers in a simple genetic test to select the animals that are likely to be carrying the genes for resistance to trypanosomiasis.

The breakthrough technology that will enable scientists to identify genetic markers rapidly and inexpensively was reported only this year in research related to identifying disease-resistant plant genes.

The original core herd of 10 disease-

resistant animals which was established in 1983 near Nairobi will have been increased to 160 animals by 1993 through artificial insemination and embryo implants. The DNA of all 160 animals in that herd will have been tested by November of 1993. The only thing that will keep the project from working is if trypanotolerance is controlled by a large number of genes instead of the expected two or three.

The tsetse fly and the disease-causing parasites it carries make 10 million

square kilometers of Africa—an area as large as the continental U.S.A.—inhospitable for farming. This tsetse belt occurs in Africa's humid and subhumid regions, the very ecological regions that have the greatest potential for farming and beef ranching on the continent. ○

Source: Science for International Agriculture, Reports on Frontline Research to Improve African Agriculture. For more information contact Dr. Alan Teale, ILRAD, P.O. Box 30709 Nairobi, Kenya, FAX +254 (2) 631-499, E-mail:(BT Tymnet) CGI017

## *New Paradigms for Technology Transfer*

At tremendous financial and human resource cost, we have moved away from a traditional means of technology development and dissemination practiced for several thousand years. Under traditional or indigenous knowledge systems, agriculturalists modified, tested, and utilized technologies which were sometimes borrowed and sometimes ignored by their neighbors. Over time, with advancements in the application of science to agriculture and the concomitant process of specialization, the traditional technology-sharing process was transformed from one involving a single individual to one involving a wide range of specialists scattered along the technology transfer continuum. But there are two fundamental problems associated with the specialized approach to technology development: the lack of effective linkages among specialized functions and the lack of relevance of the technologies developed under systems based on a predominantly one-way flow of information from scientist to farmer.

The vocabulary we have adopted even serves to reinforce and sustain the largely inefficient paradigm—the specialized approach. In this paper, the term “technology transfer” is used when referring to the traditional paradigm. New approaches to the overall process of technology improvement will be referred to as “technology development.”

The impetus for paradigm shifts frequently comes from outside a given

field. Therefore, this research focuses on sources outside of the usual range of agricultural sources.

If cooperative relationships are established among research, extension, and rural communities, all partners in the technology development process, there will be improvement in the level and rate of development. Through teamwork encouraged by “quality circles” and participatory management, cooperation between specializations is enhanced. Productivity is increased, and product excellence is the common goal.

### *Findings*

Technology transfer in agriculture has reached a state of highly developed inefficiency due in part to specialization of disciplines and personnel compartmentalization in the various stages of the process. There are communication breakdowns among participants in the process.

### *Teamwork*

A number of technology development models exist which seek to avoid these pitfalls. One from the high-tech world of Japanese industry is described in a Harvard Business Review article (1986) entitled “The New New Product Development Game.” In this efficient flexible approach, groups of specialists pass a product down the line from group to group much as a baton is passed in a relay race. The functions of each group are specialized.

An alternative approach described by the authors of the same article is

characterized by teams of people with all of the required specializations working together. This approach allows cross fertilization of ideas among team members and promotes product quality and frequent interactions. Fuji-Xerox uses this approach and calls it the “Sashimi” system after the way raw fish are arrayed on a platter in an overlapping pattern. Phases are overlapped and linked to insure continuity. One can imagine the pieces of fish represent a basic research team, an adaptive research team, a dissemination team, and a diffusion team.

### *Quality Circles*

Another process management concept with potential use for agricultural technology development is “quality circles.” Quality circles are described as a structure within an organization composed of employees with similar job functions. It is intended that they be fully engaged in problem identification, development of solutions, implementation, and evaluation. An advantage of quality circles is that they are flexible, with membership changing in response to changing circumstances. In agricultural technology development, quality circles could bring together farm families, researchers, extensionists, input suppliers, and policy makers to solve problems.

### *Theory Z*

“Theory Z” is founded on trust, subtlety, and intimacy. A 13-step

process outlined by W. G. Ouchi in 1981 emphasizes relationships, understanding, reward, communication, and coordination among team players. Team members using this approach feel a high degree of "ownership." Organizational pride is increased, which leads to greater productivity and efficiency.

#### Total Quality Management

Ford Motor Company uses a concept known as total quality management (originated by Deming in the 1950s). The approach utilizes a "plan-do-check-act" cycle. The program is based on several guiding principles: quality is the #1 priority, customers are the focus of everything, continuous improvement is essential to success, employee involvement is a way of life, suppliers and dealers

are partners, and integrity is never compromised.

#### Conclusions

The efficiency of the traditional specialized approach to the technology transfer process can be improved. Improvements in the process will draw on lessons from diverse disciplines and settings. New systems for technology development in agriculture are likely to incorporate end-user participation, feelings of ownership, teamwork, continuity, relevance, incentives, and improved impacts.

One approach would be to have teams composed of farmers, researchers, and extension staff (and others as needed), moving through the technology development process. Teams may need

to loop back to an earlier stage or to remain at a single stage for a period to gain more in-depth understanding. Team members move through the process, constantly exchanging roles, viewpoints, and ideas. Team dynamics are likely to be governed by the principles of successful management found in TQM, quality circles, and Theory Z. ○

Source: Adapted from a presentation entitled "New Paradigms for Technology Transfer" by D. G. Acker (Oregon State University), J.L. Marcey (Oregon State University), W. T. Bunderson (Ministry of Agriculture-Malawi) contained in Conference Proceedings, 1992 Symposium for Research in Agricultural and Extension Education, Columbus, Ohio, USA., May 1992.

## Indian Agricultural Practices and Related Environmental Concerns

Indian agriculture has undergone tremendous changes in the post green revolution period (post 1966). Most notable is: Self sufficiency in food grains with 80 percent of Indian households getting at least two meals a day since the 1980s. Efforts of agricultural extension boosted the percent of production where high-yielding varieties are used and increased the use of new agricultural technologies. At present, high-yielding varieties are used on 83 percent of the land in wheat and 57 percent of the land in paddy rice. Chemical fertilizer use went from 7.4 kgs per hectare in 1966 to 57 kgs per hectare in 1986.

This study examines the continued relevance of conventional extension teaching in the context of rapid strides being made in Indian agriculture. The hypothesis was that extension needs a thorough reorientation due to a changed agricultural scenario.

New agricultural technology brought both economic growth and externalities. Indiscriminate use of chemical fertilizers, plant protection chemicals, bad soil, and forest practices, etc.—all have added to environmental hazards. Consequently, there is need to educate clients regarding the externalities in order to cope with the imminent problems brought about in part by the use of modern technology.

Indian farmers at first hand were hard

to convince of the "benefits" of new agricultural technologies. But now, promotion of these technologies does not require great effort.

Extension has two new roles, and new instruments in extension education may be required. Extension needs to help farmers **unlearn** some of the new agricultural practices which pose imminent environmental problems. And extension needs to help farmers understand their responsibilities with respect to pure water, clean air, and other environmental amenities.

#### Selected case studies demonstrated the extent of the problems:

Farmers in the Cauvery Basin grow paddy rice and sugarcane with intensive use of fertilizers and chemicals. Extension is emphasizing increased use of these inputs but is not providing farmers sufficient information on the health hazards, residual effects, or salinity problems associated with poor drainage.

Reference was made to chemical residues on the great majority of vegetables delivered to metropolitan areas such as Delhi. More than half of milk samples tested had residues of DDT where the milk was obtained from cows that grazed on grasses where chemicals had been applied. The continued use of DDT itself as opposed to safer chemicals

was noted as a serious concern.

Individual contact was emphasized by extension as the major teaching method in the 1960s and 1970s. During the 1980s, extension made heavy use of method demonstrations, result demonstrations, field trips, trials, and tours. Extension appears to be emphasizing print media, radio, and television as the methods of choice in the 1990s. However, extension continues to emphasize profit maximizing while neglecting sustainability. And imperfect extension efforts tend to have harmful impacts with the concurrent requirement that effort must be exerted to re-educate clientele to correct past errors.

Extension needs to gear up with new approaches (methods and messages) that will instill confidence among farmers and better serve them and the long-term interests of the country. ○

Source: Adapted from a presentation entitled "New Instruments in Extension Education for Imminent Environmental Problems of Indian Agriculture" by N. Narasimha, M. Ranganath (University of Agricultural Sciences, Bangalore), L. Miller (Ohio State University), and M. Chandrakanth (University of Agricultural Sciences, Bangalore). Contained in Conference Proceedings, 1992 Symposium for Research in Agricultural and Extension Education, May 1992, Columbus, Ohio, USA.

## VIEWPOINT *Passive Accommodation Only?*

Experts tell us in great detail what constrains agricultural and economic development in the poor countries, but they often neglect the largest constraints of all—those as large as the country and as pervasive as the weather. Greatest among them are instability, even civil war, and corruption. These are not agricultural but contextual, creating an all-shaping ambience in which all lesser constraints are made irrelevant and development is submerged. Methods of intervention and resolution are exceedingly complex, and responsibility defies identification. The words of experts and the books of scholars evoke neither advocates nor action.

Political instability, often to the point of civil war, may be beyond all resolution except by outside intervention. A dramatic current case is Somalia, torn, ravaged, immobilized.

There, the ills are compounded: not just tribal clashes but also sub-tribal clashes, and not just uncivil armies but also armed civilians. A high Somalia official is quoted in the *Christian Science Monitor*, February 12, 1992 as saying in regard to the need for United Nations intervention: "Each clan has its own army and its own military wing. There is no clan that can disarm the other clan. So...the peacekeeping force is very important... to disarm the civilians." Far beyond Somalia, insidious traffic in arms produces armies pointed inward rather than outward or, worse yet, civilians armed to fight other civilians, ending in utter chaos, as in Ethiopia.

Corruption is often too powerful and high up to be exposed or discussed, from petty bribes to sale of offices (not for the salary but for the graft it guarantees), plundered treasuries, contract kickbacks,

diversion of aid funds, and the prostitution of justice. What could be more destructive of those human relations, whether personal, political, or business, that depend on trust and predictability? Unlike instability, corruption calls for internal intervention. The trouble is that the expected solution may be the real problem—government. Without government action, citizens, businesses, and overseas traders and donors lapse into passive acceptance and silent accommodation.

There are certainly no quick fixes but also certainly no remedy if the least attention is given to the greatest problems. ○

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By Eldon L. Johnson, INTERPAKS Associate, University of Illinois, Urbana, Illinois — written prior to U.S./U.N. intervention.

## How to: *Start a Producer Organization*

Successful extension organizations often work with and through producer organizations. Producer organizations are useful because they enable farmers to accomplish things that they cannot do on their own. Having separate organizations to provide economical farm inputs, for processing and marketing of farm produce, or to lobby governments for certain causes, etc. is important since these kinds of activities often go beyond what is possible for farmers acting alone. And such activities may be inappropriate to the missions of publicly supported extension organizations. Such activities tend to weaken extension's posture as an unbiased organization concerned primarily with practical education and problem solving. If producer organizations do not exist to carry out needed functions, extension can serve an important role in helping to create them.

A summary of the steps involved in the process of organizing a new producer group can be listed as follows:

- (1) Determine the perceived needs for an association by surveying potential members and analyzing the results of the survey.
- (2) Hold an initial steering committee meeting. If enough interest appears to exist, help the group to continue the process.
- (3) Carry out discussions with people who have had experience in starting similar organizations. Obtain guidelines from such groups to use as a starting point on how best to organize the proposed association or organization.
- (4) Help the steering committee to develop guidelines for the proposed organization.
- (5) Plan and hold an initial organizational meeting for producers who likely

would be interested in becoming members of the proposed producer organization. Assist participants in determining what to consider as they make a decision whether to proceed in forming the new organization.

(6) Assist the leaders of the new organization as they get started, particularly in the first year.

It is likely that this six-step process can be adapted to a variety of different situations and cultures faced by Extension professionals throughout the world. Use of this approach may cause such efforts to be more successful than would otherwise be the case. ○

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Source: Adapted from an article entitled "Starting New Producer Organizations" by Frank R. Lichtkoppler and Gregory R. Pasewitz, Ohio State University, *Journal of Extension*, Spring 1992, 432 North Lake Street, Madison, Wisconsin 53706, USA.

## Extension and Sustainable Agricultural Development: Issues and Priorities

Sustainable agricultural development (SAD) is now very much in focus, both in rich highly industrialized countries of the world as well as poorer nations. Although some may claim SAD is merely "old wine in new bottles," there are several problems that are undoubtedly the consequences of modern day agricultural practices. Extensionists, therefore, should develop clear perspectives on what needs to be done.

### *Critical Role of Extension*

As the entity closest to farmers, extension must play a critical role in SAD efforts. The farmers, of course, will bear the brunt of SAD in the final analysis, since they will be called upon to practice sustainable agriculture. Extension, on the other hand, will be responsible for convincing farmers of the need for SAD and for encouraging them to use recommended technologies. Given this scenario, it behooves the technologists to involve extension at the beginning—that is, in the development of the technologies—rather than at the end, when technologies are already developed and are "ready for transfer."

### *Holistic approaches needed*

Given the position extension occupies as the link closest to farmers, the tendency has been to blame extension when recommended technologies are not widely adopted. However, it must be recognized that SAD is a multifaceted endeavor that, in many instances, would involve action on several fronts. For example, the situation where people cultivate on marginal lands and hillsides prone to erosion has its roots in deep underlying issues, such as poverty, unemployment, or landlessness. The search for appropriate SAD strategies should, therefore, rely on holistic approaches for delineating the dimensions of the problem and developing feasible solutions.

Due cognizance should be given to rapid reconnaissance surveys, sondeos, and similar methodologies, which grew

mainly out of Farming Systems Research. Although initially regarded as a "quick and dirty" method, our experience in the Caribbean has found the sondeo to be superior in certain situations.

Some of its features that should commend itself to SAD studies are:

- (a) it is completed in a short period of time, usually less than six weeks;
- (b) it aims at a holistic and systemic view of the situation;
- (c) it uses multi-disciplinary teams;
- (d) it views problems and solutions from the perspective of the farmers;
- (e) it involves all the major actors in the agricultural development scenario, i.e., it is a community-based approach.

Who should take the lead in organizing and conducting such studies? This is a role that extension is best placed to fulfill.

### *The Problem of Diminishing Resources for Extension*

Public extension services worldwide are being called upon to operate with less and less resources. This drive toward economic sustainability has resulted in the use of cost-recovery approaches, usually involving fees for services. A likely outcome is that people will only pay for services that they see will result in direct and, perhaps, immediate economic benefits. Whatever system is adopted, care will have to be exercised so that extension's capacity is not compromised.

### *Increased Capacity for Working With Groups*

Some of the recommended measures to prevent environmental degradation will involve collective action—for example, integrated pest management (IPM) and soil and water conservation. Indeed, the audience or clientele for some SAD programs may extend beyond those directly involved in agriculture and could include the wider community. Extension will, therefore, need to develop a greater capacity for group extension approaches with a concomi-

tant increase in "hardware," such as various types of audio visuals that will facilitate group teaching.

### *Promoting Sustainable Agriculture*

Extensionists, obviously, would need to be clear about what they are promoting and the implications. They must be prepared to answer questions. What are the short-term and long-term benefits of SAD? How is it going to affect farmers' incomes? How would lower profits or other hardships resulting from the practice of sustainable agriculture be offset? Alternatives should not, therefore, put farmers at a serious disadvantage.

The messages should not appear inconsistent with what has gone before. One area that could appear so, depending on how it is promoted, is Low Input Sustainable Agriculture (LISA). For a long time, the use of inputs such as fertilizers and pesticides have been promoted as necessary elements in modern agriculture. Farmers the world over seem to be sold on the value of such inputs. Care must therefore be exercised in how low-input systems are advocated, so that the message does not appear to contradict what has long been promoted.

Undoubtedly, much could be achieved with intensified research and development work in certain areas. Regarding agricultural inputs, messages could emphasize correct amounts, placement, and timing so that excessive amounts do not remain in the ecosystem. Of course, there is also the added benefit of big savings in cost. These areas could possibly constitute good starting points for extension programs. ○

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Source: By J. Seepersad, Lecturer, Department of Agricultural Extension, The University of the West Indies St. Augustine, Trinidad & Tobago. Adapted from a paper presented at the 21st West Indies Agricultural Economics Conference in Belize, July 1992.

## Interesting Facts and Trends

### A. Population Trends

World population in 1991 was estimated at 5.4 billion. This compares to 4.4 billion in 1980. World population in 2000 (8 years from now) is projected to reach 6.2 billion.

Source: World Development Report 1992, Development and the Environment, World Bank: Washington D.C.

### B. A Country's Economy Defined

Low-income economies are defined as those countries with a GNP (gross national product) per capita of \$610 or less in 1990

Middle-income economies are those with a GNP per capita between \$611 and \$7,619 in 1990.

High-income economies are those with a GNP per capita of \$7,620 or more in 1990.

The 24 member nations of the Organization for Economic Cooperation and Development (OECD) had a 1990 GNP per capita of \$21,170. South Asian countries averaged \$330. The world average was \$4,200.

Source: World Development Report 1992, Development and the Environment, World Bank: Washington D.C.

### C. Some Comparisons of Statistics for Low and High Income Countries

	Low Income Countries	High Income Countries
Annual Average Rate of Inflation		
1965-1980 (%)	8.0	7.7
1980-1990 (%)	9.6	4.5
Life Expectancy (Years)	62.0	77.0
Adult Illiteracy (%)	40.0	4.0
Annual Population Growth		
1965-1980 (%)	2.3	0.9
1980-1990 (%)	2.0	0.6
Infant Mortality Rate		
1965 (No. deaths/1000 live births)	124.0	24.0
1990 live births)	69.0	8.0
Daily Calorie Supply		
1965 (per capita)	1975.0	3091.0
1989 (per capita)	2406.0	3409.0

Source: World Development Report 1992, Development and the Environment, World Bank, Washington D.C.

### Editorial Comment:

Without speaking to the issue of "causation," it is apparent from the above data that there is a rather consistent pattern that can be seen in the numbers recorded for "low-income" countries as compared to "high-income" countries. The data also suggest that "progress" is being made over time in both the "low-income" and "high-income" countries with respect to these major indices. ○

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Authors are encouraged to submit unpublished manuscripts at any time for inclusion in a subsequent issue of DIGEST. It is highly desirable that manuscripts be no longer than 4 double-spaced pages. Submissions that are too long for available space will be reduced in length (if they are used) by the DIGEST Editor. Books, other published material, speeches, etc. may be excerpted for inclusion in DIGEST (with permission when appropriate of authors and/or publishers).

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# DIGEST

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## Editor's Corner

### In This Issue

#### Editor's Corner

#### Feature Articles

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Development Project

Changes in Indian Agrarian Sector:  
Implications for Extension

We have received many excellent comments regarding the first issue of the DIGEST which was mailed to approximately 3,700 people. And we have received a number of checks in payment for subscriptions to DIGEST. We hope those checks will continue to come in so that we may continue making this publication available without charge to people in third world countries who are concerned with technology transfer.

DIGEST is supported in part by subscription income. It also is supported by a grant from the Cooperative Extension Service of the University of Illinois at Urbana-Champaign. These combined resources make it possible to produce DIGEST and also to provide selected electronic services of interest to the profession. Readers are advised that an annual subscription provides at least two benefits: it guarantees delivery of three issues of DIGEST and it makes possible free delivery of DIGEST to selected professionals in developing countries. Consequently, part of the fee can be considered an indirect contribution to economic development in developing countries. INTERPAKS electronic services are free.

We hope you will consider sending us material for possible inclusion in DIGEST or in our electronic services. And we hope that you will benefit from reading the excellent articles in this issue. ○

## Development and the Environment

The protection of the environment is an essential part of development. Without adequate environmental protection, development is undetermined; without development, resources will be inadequate for needed investments, and environmental protection will fail.

The coming generation presents unprecedented challenges and opportunities. Between 1990 and 2030, as the world's population grows by 3.7 billion, food production will need to double, and industrial output and energy use will probably triple worldwide and increase fivefold in developing countries. This growth brings with it the risk of appalling environmental damage. Alternatively, it could bring with it better environmental protection, cleaner air and water, and the virtual elimination of acute poverty. Policy choices will make the difference.

### Priorities for action

Inadequate attention has been given to the environmental problems that damage the health and productivity of the largest number of people, especially the poor.

Priority should be given to:

- The one-third of the world's population that has inadequate sanitation and the 1 billion without safe water;
- The 1.3 billion people who are exposed to unsafe conditions caused by soot and smoke;
- The 300 million to 700 million women and children who suffer from severe indoor air pollution from cooking fires;
- The hundreds of millions of farmers, forest dwellers, and indigenous people who rely on the land and whose livelihoods depend on good environmental stewardship.

Addressing the environmental problems faced by these people will require better progress in reducing poverty and raising productivity. It is imperative that the current moment of opportunity be seized to bring about an acceleration of human and economic development that is sustained and equitable.

*Policies for sustained development*

Two types of policies are required: those that build on the positive links between development and the environment, and those that break the negative links.

*Building on the positive links*

The scope for actions that promote income growth, poverty alleviation, and environmental improvement is very large, especially in developing countries. Such "win-win" policies include:

- Removing subsidies that encourage excessive use of fossil fuel, irrigation-water, and pesticides and excessive logging;
- Clarifying rights to manage and own land, forests, and fisheries;
- Accelerating provision of sanitation and clean water, education (especially for girls), family planning services, and agricultural extension, credit, and research;
- Taking measures to empower, educate, and involve farmers, local communities, indigenous people, and women so that they can make decisions and investments in their own long-term interests.

*Targeted environmental policies*

But these "win-win" policies will not be enough. Also essential are strong policies and institutions targeted at specific environmental problems. Lessons for effective policy making include the following:

- Tradeoffs between income and

environmental quality need to be carefully assessed, taking long-term, uncertain, and irreversible impacts into account. Carefully balancing costs and benefits is especially important for developing countries, where resources are scarce and where basic needs still must be met.

*Quote Dejour*

*"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things."*

*Machiavelli*

- Standards and policies need to be realistic and consistent with the monitoring and enforcement capacity and the administrative traditions of the country.

- Blunter and more self-enforcing policies are likely to be attractive in developing countries. Policies need to work with the grain of the market rather than against it, using incentives rather than regulations where possible.
- Governments need to build constituencies for change—to curb the power of vested interests, to hold institutions accountable, and to increase willingness to pay the costs of protection. Local participation in setting and implementing environmental policies and investments will yield high returns.

*The costs of a better environment*

The costs of protecting and improving the environment are high in absolute terms, but they are modest in comparison with their benefits and with the potential gains from economic growth. Improving the environment for development may make it necessary to raise investment rates in developing countries by 2 to 3 percent of GDP by the end of this decade. This would enable stabilization of soil conditions, increased protection of forests and natural habitats, improved air and water quality, a doubling of family planning expenditures, sharply improved school

enrollment rates for girls, and universal access to sanitation and clean water by 2030. The costs of addressing global atmospheric issues would be additional.

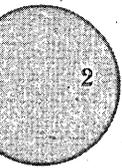
*Partnership for solutions*

Finding, implementing, and financing solutions will require a partnership of effort among nations. Specifically:

- Improved know-how, new technologies, and increased investment are essential. Open trade and capital markets, the restoration of credit worthiness through policy reform and selective debt relief, and robust, environmentally responsible growth in the world economy will all be needed.
- The close link between poverty and environmental problems makes a compelling case for increasing assistance to reduce poverty and slow population growth and for addressing environmental damage that hurts the poor.
- High-income countries must play a major role in financing the protection of natural habitats in developing countries from which the whole world benefits. They must also assume the primary responsibility for addressing worldwide problems of which they are the primary cause (greenhouse warming and depletion of stratospheric ozone). ○

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Key messages of World Bank Report entitled "World Development Report 1992—Development and the Environment" prepared by a team led by Andrew Steer under the general direction of Lawrence H. Summers. 308 pp. Published by Oxford University Press, 1992. Reprinted with permission.



## Sustainable Growth in Agricultural Production: Poetry, Policy, and Science

*"Contemplation of the world's disappearing supplies of minerals, forests, and other exhaustible assets has led to demands for regulation of their exploitation. The feeling that these products are now too cheap for the good of future generations, that they are being selfishly exploited at too rapid a rate, and that in consequence of their excessive cheapness they are being produced and consumed wastefully has given rise to the conservation movement."*

Harold Hotelling, 1936

### Definitions of sustainability

In spite of the advantages of avoiding defining a term which has apparently been adopted precisely because of its ambiguity, it is useful to trace the evolution of the concept. The term was first advanced in 1980. Prior to that, proponents had traveled under a number of rhetorical vehicles such as biodynamic agriculture, organic agriculture, farming systems, appropriate technology, and more recently, regenerative and low-input agriculture.

Writing in the early 1980s, Gordon K. Douglass identified three alternative conceptual approaches to the definition of agricultural sustainability. One group defined sustainability primarily in terms of the capacity to supply the expanding demand for agricultural commodities on increasingly favorable terms. For primarily mainstream agricultural and resource economists, the long-term decline in real prices of agricultural commodities is evidence that the growth of agricultural production has been following a sustainable path. In contrast a sustained rise in real prices of agricultural commodities would raise serious concern about sustainability.

Douglass identified a second group that regards agricultural sustainability primarily as an ecological question. Among those advancing the ecological sustainability agenda there is a pervasive view that present population levels are already too large to be sustained at present levels of per capita consumption:

A third group, traveling under the

banner of "alternative agriculture," places its primary emphasis on sustaining not just the physical resource base but a broad set of community values. This third group draws substantial inspiration from the agro-ecological perspective. But it often views conventional science-based agriculture as an assault, not only on the environment, but on rural people and rural communities.

By the mid-1980s the sustainability concept was diffusing rapidly from the confines of its agro-ecological origins to include the entire development process. The term had been appropriated by the broader development community. The definition that has achieved the widest currency was that adopted by the Bruntland Commission: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The Bruntland Commission definition raises the possibility that it may be necessary for those of us who are alive today, particularly those of us living in the more affluent societies, to curb our level of material consumption in order to avoid an even more drastic decline in the consumption levels of future generations. This is not a welcome message to societies that have found it difficult to support the transfer of resources between rich and poor nations or rich and poor people. Our historical experience, at least in the West, often causes us to be skeptical about our obligations to future generations. It was less than a generation ago that Robert Solow, one of our leading growth theorists, noted: "We have actually done quite well at the hands of our ancestors. Given how poor they were and how rich we are, they might properly have saved less and consumed more." In most of the world, ancestors have not been so kind!

### The technological challenge

One might ask why concern about the sustainability of modern agricultural systems has emerged with such force toward the end of the 20th century. The

first reason is the unprecedented demands that growth of population and income are imposing on agricultural systems. We are in the process of completing one of the most remarkable transitions in the history of agriculture. Prior to the beginning of this century almost all increases in food production were obtained by bringing new land into production. This process of growth in agricultural production within the framework of what has been termed the "resource exploitation" model clearly is no longer sustainable. By the first decades of the next century almost all increases in food production must come from higher yields—from increased output per hectare. In a few countries this transition began in the 19th century. Most of the countries of the developing world have been caught up in this transition only since mid-century. Among developing countries this transition has proceeded further in South and Southeast Asia than in Latin America or Africa.

World wheat prices have declined since the middle of the last century. Rice prices have declined since the middle of this century. These trends suggest that productivity growth has been able to more than compensate for the rapid growth in demand arising out of growth in population and income, particularly during the decades since World War II. But the past may not be an effective guide to the future. The demands that the developing countries will place on their agricultural producers arising out of population growth and the growth in per capita consumption will, until well into the middle of the next century, be exceedingly high.

A second reason for concern about sustainability is that the sources of future productivity growth are not as apparent as they were a quarter century ago. It seems apparent that the gains in agricultural production required over the next quarter century will be achieved with much greater difficulty than in the immediate past. The incremental responses

to the increases in fertilizer use has declined. Expansion of irrigated areas has become more costly. Maintenance research required to prevent yields from declining is rising as a share of research effort. The institutional capacity to respond to these concerns is limited, even in the countries with the most effective national agricultural research and extension systems. And during the 1980s there had been considerable difficulty in many developing countries in maintaining the agricultural research capacity that had been established in the 1960s and 1970s.

It is possible that within another decade advances in basic knowledge will create new opportunities for advancing agricultural technology that will reverse the urgency of some of the above concerns. Institutionalization of private sector agricultural research capacity in some developing countries is beginning to complement public sector capacity. Advances in molecular biology and genetic engineering are occurring rapidly. But the date when these promising advances will be translated into productive technology appears to be receding.

It is only a slight overstatement to note that advances in crop yields have come about primarily by increasing plant populations per hectare and the ratio of grain to straw.

Advances in animal feed efficiency have come about primarily by decreasing the proportion of feed consumed that is devoted to animal maintenance and by increasing the proportions devoted to the production of usable animal products. There are severe physiological constraints to continued improvement along these conventional paths. These constraints are most severe in the areas with the highest levels of productivity as in Western Europe, North America, and parts of East Asia. Advances in conventional technology will be inadequate to sustain the demands that will be placed on agriculture beyond the second decade of the next century.

It seems reasonable to anticipate, however, that advances in molecular biology and genetic engineering will release the constraints on productivity growth in the major food and feed grains. But advances in agricultural technology

will not be able to eliminate what some critics tend to view as a "subsidy" from outside the agricultural sector. Transfers of energy in the form of mineral fuels, pathogen and pest control chemicals, and mineral nutrients from outside the agricultural sector will continue to be needed to sustain growth in agricultural production—and in much larger quantities—until well into the middle of the next century. Until population and total demand growth rates fall below one percent per year, energy transfers can be expected to continue to expand. Over the very long run scarcity, reflected in rising real prices, of phosphate fertilizer and fossil fuels are likely to become the primary resource constraints on sustainable growth in agricultural production.

This leads to what appears, in my reading of the evidence, to what ought to be the primary concern about the sustainability of growth in agricultural production. This third set of concerns is with the environmental spillover from agricultural and industrial intensification. The spillover effects from agricultural intensification include

- the loss of soil resources due to erosion;
- water-logging and salinization;
- surface and ground water contamination from plant nutrients and pesticides;
- resistance of insects, weeds and pathogens to present methods of control;
- and the loss of landraces and natural habitats.

If agriculture is forced to continue to expand into more fragile environments because of lack of technical progress in more robust soil resource areas, problems such as soil erosion and desertification can be expected to become more severe.

The sustainability of agricultural production will also be influenced by the impact of continued intensification of industrial and transportation systems. There can no longer be much doubt that the accumulation of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases—principally methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and chlorofluorocarbons (CFCs)—has set in motion a process that will result in a rise in global average surface temperature over the next 30 to

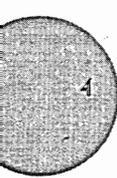
60 years. There continues to be great uncertainty about the temperature and rainfall changes that can be expected to occur at any particular date or location. But these changes can be expected to impose substantial adaptation demands on agricultural systems. The least capacity to adapt will be in countries with the weakest agricultural research and natural resource management capacity—principally in the humid and semi-arid tropics. The effects of industrial intensification can also be expected to impose substantial health burdens on agricultural producers and consumers. The effects of heavy metal contamination have already affected the quality of crops and of animal and human health in a number of areas.

### *Sustainability is not enough*

It should be apparent that a major issue over the next half-century for most developing countries, including the formerly centrally planned economies, will be how to generate and sustain the advances in agricultural technology that will be needed to meet the demands that these societies will place on these agricultural sectors. This objective appears to be in direct conflict with the world view of many of the leading advocates of sustainable development.

"Sustainable development" is a concept that implies limits, both to the assimilative capacity of the environment and to the capability of technology to enhance human welfare. To the sustainable development community the capacity of the environment to assimilate pollution from human production and consumption activity is the ultimate limit to economic growth. But this is not a problem that has emerged only during the second half of the 20th century.

It is important that the sustainability community embrace an agenda that includes: both (a) enhancing the capacity for improvement in the natural components of sustenance, particularly in low income countries, and (b) the capacity to reduce the environmental stress associated with the production of residuals generated by agricultural and industrial intensification. Three unresolved issues must be confronted.



The issue of substitutability

One area where our knowledge is inadequate is with respect to the role of technology in widening the substitutability among natural resources and between natural resources and reproducible capital. Economists and technologists have traditionally viewed technical change as widening the possibility of substitution among resources—of fertilizer for land, for example. The sustainability community rejects the “age of substitutability” argument: The loss of plant genetic resources is viewed as a permanent loss of capacity. The elasticity of substitution among natural factors and between natural and man-made factors is viewed as exceedingly low. This is an argument, in economists’ language, over the form of the production function. While the argument is often cast in philosophical terms, empirical research should lead toward a convergence. If a combination of capital investment and technical change widens the opportunity for substitution, imposing constraints on present resource use could leave subsequent generations less well off. If on the other hand, real output per unit of natural resource input is narrowly bounded—cannot exceed some upper limit which is not too far from where we are now—then catastrophe is unavoidable.

*Obligations toward the future*

The second issue is one that has divided traditional resource economists and the sustainability community. That is the issue of how to deal analytically with the obligations of the present generation toward future generations. The issue of intergenerational equity is at the center of the sustainability debate. Environmentalists have been particularly critical of the approach used by resource and other economists in valuing future benefit and cost streams. The conventional approach involves the calculation of the “present value” of a resource development or protection project by discounting the cost and benefit stream by some “real” rate of interest—an interest rate adjusted to reflect the costs of inflation. It is World Bank policy (but not always practice) to require a 10

to 15 percent rate of return on projects. These higher rates are set well above long-term real rates of interest (historically less than 4 percent) in order to reflect the effect of unanticipated inflation and other risks. Critics insist that this approach results in a “dictatorship of the present” over the future. At conventional rates of interest the present value of a dollar of benefits 50 years into the future approaches zero. “Discounting can make molehills out of even the biggest mountain.” Solow has made the same point in more formal terms. He notes that if the marginal profit to resource owners rises slower than the rate of interest, production is pushed nearer in time and the resource would be exhausted quickly.

A question that has not been adequately answered is if, as a result of the adoption of a widely held sustainability “ethic,” the market-determined discount rates would decline toward the rate preferred by those advancing the sustainability agenda. Or will it be necessary to impose sumptuary regulations in an effort to induce society to shift the income distribution more strongly toward future generations? It is clear, at least to me, that in most countries efforts to achieve sustainable growth in agricultural production must involve some combination of (a) higher contemporary rates of saving—that is deferring present in favor of future consumption—and (b) more rapid technical change—particularly the technical changes that will enhance productivity and widen the range of substitutability among resources.

*Incentive-compatible institutional design*

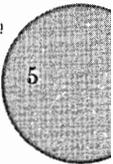
A third area where knowledge needs to be advanced is on the design of institutions that are capable of internalizing—within individual households, private firm, and public organization—the costs of actions that generate the negative spillover effects—the residuals—that are the source of environmental stress. Under present institutional arrangements important elements of the physical and social environment continue to be undervalued for purposes

of both market and non-market transactions. Traditional production theory implies that if the price to a user of an important resource is undervalued it will be overused. If the price of a factor, the capacity of groundwater to absorb pollutants for example, is zero, it will be used until the value of its marginal product approaches zero, even though it may be imposing large social costs on society.

*An uncertain future*

In closing I would like to emphasize how far we are either from being able to design an adequate technological or institutional response to the issue of how to achieve sustainable growth in agricultural production or in the sustainable growth of both the sustenance and the amenity components of consumption. At present there is no package of technology to transfer to producers to assure the sustainability of growth at a rate that will enable agricultural producers, particularly in the developing countries, to meet the demands that are being placed on them. Sustainability is appropriately viewed as a guide to future research rather than as a guide to practice. As a guide to research it seems useful to adhere to a definition that would include: (a) the development of technology and practices that maintain and/or advance the quality of land and water resources and (b) the improvement in the performance of plants and animals and advances in production practices that will facilitate the substitution of biological technology for chemical technology. The research agenda on sustainable agriculture needs to explore what is biologically feasible without being excessively limited by present economic constraints.

At present the sustainability community has not been able to advance a program of institutional innovation or reform that can provide a credible guide to the organization of sustainable societies. We have yet to design institutions that can assure intergenerational equity. Few would challenge the assertion that future generations have rights to levels of sustenance and amenities that are at least equal to those



enjoyed (or suffered) by the present generation. They also should expect to inherit improvements in institutional capital—including scientific and cultural knowledge—needed to design more productive and healthy environments.

My conclusion with respect to institutional design is similar to that which I have advanced in the case of technology. Economists and other social scientists have made a good deal of progress in contributing the analysis

needed for “course correction.” But capacity to contribute to institutional design remains limited. The fact that the problem of designing incentive-compatible institutions—institutions capable of achieving compatibility between individual, organizational, and social objectives—has not been solved at even the most abstract theoretical level means that institutional design proceeds in an ad hoc trial-and-error basis—and that the errors continue to be expensive. Institu-

tional innovation and reform should represent a high priority research agenda. ○

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By Vernon Ruttan, Regents Professor in the Department of Agricultural and Applied Economics, University of Minnesota, St. Paul, Minnesota. Excerpts from a paper published by the Department of Agricultural and Applied Economics, Staff Paper P 91-47, November 1991.

## *The Realities of Globalization: Implications for Extension*

An overwhelming majority of the faculty and staff in our institutions of higher education, as well as our leaders in government and industry, received their formal education and developed their fundamental beliefs and attitudes in an era of U.S. dominance of the world economy (“The American Century”). Against a backdrop of superpower struggles, growing affluence, and trade among sovereign nations, they developed an expectation that the next generation of Americans, their children, would be better off than their parents.

The world and the U.S. position in it changed decidedly and dramatically. We became aware of the dimensions of this change in the 1980s. Some of it was in the making long before we realized that new rules were emerging. Our initial reaction was denial. We failed to believe that the world’s mightiest economy could have problems. We equated military might with economic might. We took credit for and pride in the collapse of communist regimes and the eagerness of millions of people who had erstwhile lived in centrally planned economies to embrace the basic tenets of capitalism. We allowed the adversarial relationship between government, industry, and labor to develop. We neglected our infrastructure and human capital, and confused growth in financial transactions with wealth created through production. Our inertia carried us further and further from the corrective measures which needed to be taken.

Lester Thurow, in his new book *Head to Head*, suggests that while different national systems followed different paths to get to where they are today, they now face off in the same global economy. He suggests replacing military metaphors with the language of football. “Despite its competitive element—the desire to win—football also has a cooperative element. Everyone has to agree on the rules of the game, the referees, and how to split the proceeds. One can want to win yet still remain friends, both during and after the game.” However, what the rest of the world knows as football is known in America as soccer. What Americans like about American football—frequent time-outs, lots of huddles, and unlimited substitutions—is not found in world football. It has no time-outs, no huddles, and very limited substitutions. It is a faster game; so, too, is the economic game ahead. All sides will call themselves capitalists, but participants will be playing two very different games. It is time for us to think about new rules for playing this new game.

Globalization is the driving force of the U.S. and world economy and community. The global village has shrunk. Information, technology, labor, capital, pollution, and culture won’t recognize artificial national boundaries. Globalization has reduced the independence of nations. It has struck at the heart of national sovereignty.

In a global economy where capital is

free to move and where exchange rates fluctuate freely, income and employment in any nation are affected almost immediately by the decisions of investors and policy makers in other nations. In a world where information flows freely, political systems and cultures blend quickly.

There is also the realization that excessive burning of coal at one end of the world changes weather patterns at the other end. More and more people understand that if the earth boat is leaking, it no longer matters which end of the boat sinks first, because we are all in it together.

Let me explore several important dimensions of globalization:

### *The global marketplace*

The U.S. is part of a global assembly line which produces international composites of products. It is hard to find a totally American or European product. Most are cooperative products. The Boeing 767, which most of us will readily identify as an American product and major export item, gets its nose from Italy, fuselage from Japan, and various other components from 27 other countries. Counting the U.S., the Boeing 767 is a cooperative product of 30 countries.

The combined effects of the spread of technology, the information revolution, the growth of sophisticated transportation modes, and improved skill levels of the work force in many countries have

fragmented the production process. As a result, product components are produced where labor, capital, resources, and technology can be combined at the lowest cost, then shipped somewhere else for assembly. "Made in the U.S.A." increasingly means some parts are probably made in the U.S. and "assembled in the U.S.A." In this type of a marketplace, slogans such as "buy American" completely lose their meaning until one attaches qualifying conditions to what "made in the U.S.A." means.

In the global marketplace, all inputs (resources) are footloose. In the past, skills, capital, natural resources, and technology created comparative advantage by virtue of their relative abundance in specific countries. Since capital, technology, and resources are footloose, the education and skills of the work force, the least mobile of inputs, can create comparative advantage in some products. Today, any country that systematically invests in its people attracts investors by the virtue of the quality work force it provides. It also lays the foundation to be the home base of global enterprises which are held together by information management skills.

In the global marketplace, new ideas and new product technologies still create wealth for their owners. This, however, no longer necessarily translates into wealth for the nation. New process technologies are the primary impetus to high-paying jobs and an increasing standard of living. The U.S. invests 80 percent of its R&D funds into new product technologies. The Japanese invest 80 percent of their R&D funds into new process technologies. Improving the process by which it applies someone else's invention gives Japan the economic edge.

Following along the new product vs. new process technology dichotomy, the competitive status of businesses, even entire industries, changes quickly. In 1970, virtually all color televisions sold in the U.S. were made in the U.S. In 1992, the U.S. is not a manufacturer of color televisions. The examples also include VCRs, walkmans, and an uncomfortably long list of other consumer electronics.

The global marketplace is not dominated by a single leading economy. It

offers a more level playing field allowing at least three leading economies and, depending on the product in question, a whole assortment of Asian or other "tigers" to compete and win. As a consequence, the real per capita income of most countries has improved dramatically over the last few decades. America's share of world GNP fell from over 50 percent in the 1940s to about 25 percent in the late 1980s. Today, the U.S. is only one of a number of wealthy countries.

### *Employment and wages*

In the face of increased competition, companies search for labor where wage rates are lower. Simultaneously, workers from densely populated regions search for jobs across borders. Immigration can bring with it dynamism into slow-growing labor markets, such as the United States and some European countries, but introduces social and cultural fissures as well. The United States, which has assimilated waves of immigrants successfully in its short history, is challenged to cope with ensuring social and economic stability in a mosaic society. In other industrial nations, particularly Germany, the social strife associated with cultural diversity is alarmingly evident as well.

On the wage front, wage differentials between countries are ultimately based on productivity differentials of labor. Since goods can be sourced anywhere in the world, the supply of unskilled labor is effectively increased. If productivity differences between unskilled labor in developed and developing countries are minimal, wages of unskilled labor will fall in the United States and other industrial countries. If unskilled labor in rich countries will not work for the low wages of unskilled labor in Third World countries, jobs will move to the low-wage areas.

Lester Thurow offers evidence that rising per capita GNP does not ensure rising incomes for the unskilled in a nation. "Between 1973 and 1990, America's real per capita income rose 28 percent, yet the real hourly wages for nonsupervisory workers (about two-thirds of the total work force) fell 12 percent and real weekly wages fell 18 percent...." In the late 1980s and early 1990s, real hourly

wages were declining at one percent per year. The lower the educational level, the bigger the decline in real earnings.

This decline in real wages of nonsupervisory workers is not evident in countries like Germany and Japan. The critical difference in these countries is the higher education and skill level of the bottom half of the work force. Higher education and skill levels of the German and Japanese work forces have led to higher productivity, which enables these societies to cushion the fall of real incomes of the relatively lower skilled workers in their nations.

In the global marketplace, the relative skill level and productivity of the labor force have become the deciding factor in creating national competitive advantage. There is no shortcut to achieving higher per capita income. Countries must invest in improving the level of literacy of the bottom 50 percent of the work force and put resources into building specific skills.

### *Globalization of finance*

Satellites, computer networks, and other technologies link the world's financial institutions and investors. The stock market is always open somewhere in the world. Money and financial shocks move in an instant. As a result, access and opportunity and, possibly, instability are greater.

In the 1980s, many of the boundaries between national financial markets dissolved and a global capital market emerged. This change is probably the most important economic event of the second half of the 20th century. It was driven everywhere by the same forces: innovation, technology, and deregulation. The change came so quickly that the world community has not yet caught up with the regulatory safeguards that must be built into the functioning of global finance.

Large capital flows across national boundaries introduce a new element into macroeconomic management. There needs to be a highly coordinated monetary policy among the industrial countries of the world in order for most of them to realize their domestic income and employment goals as well as ensure stability in world exchange markets. The

instability of exchange markets in 1992 is partly a result of the divergence of interest rate policies between Germany and most other industrial economies. It is no longer possible to take unilateral economic action in the interest of domestic concerns without creating economic and political tension elsewhere.

Another important dimension of the global capital market is the opportunity it affords to people and businesses in need of finance. Relative abundance of capital in a given country used to provide easy access to funds to its citizens, which gave them an advantage. This advantage is much less in a world where you can access the savings of other nations with great ease. During the 1980s, U.S. companies and the U.S. government financed their growing debt with European and Japanese funds.

#### *Consumption and culture*

Travel and immigration are growing. Entertainment, sporting events, and consumer products are shared worldwide. As a result, cultures and tastes are becoming homogenized, and global markets for consumer products—from Mickey Mouse T-shirts to video games—are created.

In the last 40 years, the number of people who travel internationally has increased from 25 million to 400 million per year. Tourism ranks among the world's three major exports, the other two being oil and motor vehicles. Including domestic travel expenditures, tourism accounts for about 10 percent of world gross domestic product. Travel also plays an important role in bringing international cultures and consumption patterns into synch.

#### *Environmental concerns*

Better communication, more education, and wider travel make people aware of global concerns and the need to plan for future generations. Decisions made by individuals and nations have long-term costs and risks for everyone. When rain forests are depleted and oceans overfished, when chlorofluorocarbons threaten the ozone layer, when there are nuclear accidents and oil spills,

we risk our collective health, our food supply, and the planet itself. We must learn how to balance our local interests with those of the "global commons," to ensure ecologically sustainable behaviors.

#### *Implications for extension professionals*

The realities of globalization I have briefly discussed above have implications for every sector of our society. Let me focus only on the implications for extension professionals. The broader economic, political, social environment was always critically important as a backdrop to quality extension work. The backdrop has now become more fluid, dynamic, and much more complex.

Diminishing national sovereignty makes it imperative that the primary focus of the environmental scan shifts from the nation-state to the global arena. Whether we are offering career related programs to youth, or lecturing on family financial management, or working with a farmer or small-business person on profit enhancement, or assisting a community group to pull together a strategic plan to create jobs and income, we must build the global realities into our educational content. We must make the global realities the center of some programs and part of the context for all programs. Our faculty and staff need more than superficial understanding of the forces of globalization to be effective, to have credibility, and to command greater respect.

My hypothesis is that supporting our faculty and staff to develop an international perspective will strengthen our leadership position in the educational marketplace. We can't do it alone. We need to keep pushing our colleagues in universities to broaden the campus curriculum and deepen the international content of the undergraduate and graduate training offered. There has been positive change in this direction over the last two decades, but there is still a long way to go.

We have to acknowledge that international content and understanding is a "core competency" in extension work. If those we have and those we hire do not possess this competency, we must see to it

that they get it. As a part of our commitment, we should support first-hand international experiences for our faculty and staff. There is no substitute for direct cross-cultural personal experiences in another country. We can ask our professionals to share financially in their own development. Most of them can and will.

Further, we should encourage and support independent study, formal course work, in-service offerings, faculty conferences, and the hosting of foreign academics and others by our faculty and staff. Small grants may be another approach to encouraging comparative study. If extension administrators clearly communicate their support for "internationalizing" the faculty and staff, I am convinced that they will tap a new reservoir of creativity in our colleagues.

Maintaining our leadership as educators in the 1990s and beyond requires that we bring the knowledge and skill sets demanded by this era. It is not possible to get by with the educational currency of the 1960s and 1970s. The boundaries of the village have changed from local to global. The key objective of internationalizing our faculty is to help them "think global and act local." When they can do this, they can help clients do the same. In the quest for excellence in our extension professionals and programs, we must strive for nothing less. ●

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By Ayse Somersan, Dean, Wisconsin Cooperative Extension, and Professor of Agricultural Economics, University of Wisconsin-Madison. 1992 McDowell Lecture, The Pennsylvania State University, November 1992. Reprinted with permission.

## Lessons Learned and the TIPAN Development Project

There is an old adage that goes something like this: If one doesn't read or heed history, one is destined to repeat it—mistakes and all. There is much wisdom in this saying for all of us involved in creating new educational institutions or revamping (modernizing) already established ones. Fortunately, the planners of the NWFP-AU (Northwestern Frontier Province Agricultural University) and the TIPAN program (Transformation and Integration of the Provincial Agricultural Network) drew heavily on prior experiences in institution building. Nevertheless, each project encounters new and challenging problems and opportunities to be reckoned with when implementing even the best laid plans. The leadership for USAID/NWFP AU and TIPAN is to be complimented for scheduling a meeting of the TIPAN partners for the purpose of reviewing the progress to date and to set program priorities for the successful completion of this exciting 10-year project. As programmatic options are being considered, it might be useful to draw on past experiences again, as a "checklist" for points to be considered.

I have been asked to recall, with the benefit of hindsight, some "lessons learned" through the University of Illinois' participation with five other land-grant universities and USAID, in providing technical support for India's development of nine new agricultural universities some 35 years ago. A few general background comments to set the stage for some more specific observations are apropos.

The program had a firm foundation developed through an early planning process that conceptualized a role for education in helping the new nation (India) improve its agriculture as a means of coping with chronic food shortages and as a strategy for improving the economies and social status of farmers and rural people. This "vision" came from the prestigious University Education Commission, which, in a 1949 report, recommended that India must "embark on a bold new program for making the benefits of our scientific and

industrial progress available for improvement and growth of underdeveloped people. . . . We recommend special attention to higher education in rural areas." The commission stressed the essential role of training and the development of human resources (expertise), which should be coupled with a dedication of such trained people in service to their "fellow men." This latter statement was a subtle reminder that if higher agricultural education was to serve farmers and rural people, it would require a change in the then traditional "academic culture" of the colleges of agriculture. These early actions, which set a conceptual stage for planning and development, not only made the Commission's "vision" a driving force for development strategies but also laid the foundation for a sustained long-term evolutionary process that changed higher agricultural education in India.

The GOI (Government of India) commitment policy-wise, coupled with promise of financial and administrative support, led to the long-term relationship with USAID, the Rockefeller Foundation, the Ford Foundation, and American land-grant universities. Professor Hadley Read, in a history of the technical assistance role of these U.S. universities, called the relationship a "dynamic partnership."

I now want to discuss some specific issues that appear, in retrospect, to have been key elements in the success or failure of the nine original new agricultural universities in India, and I must add, to the roles of the technical assistance providers as well.

1. At the national level, a new administrative and program planning, coordination, and evaluation entity, called the Indian Council for Agricultural Research (ICAR), was created within the Ministry of Agriculture. Its mission was to provide administrative and programmatic leadership at the national level. ICAR also represented GOI in negotiations and in the utilization of foreign technical assistance; thus,

it became the focal point for long and extensive interactions with USAID, American universities, and other governmental agencies and organizations on behalf of GOI. Another important function for this quasi-independent agency (ICAR) was to articulate and defend the academic roles of the agricultural universities, thus giving them a degree of protection from unneeded political intrusions into the operations of their programs. And, finally, ICAR developed and aggressively presented budget requests on behalf of the universities to GOI.

2. The importance of developing operating academic procedures, coupled with an efficient and functional physical plant management system, was an urgent need in the early establishment of new universities, e.g., Pant Nager and Ludhiana.

Academically, student services, student records, admission and retention policies, grading and examination policies, needed early attention. Especially sensitive was the evaluation of satisfactory academic progress as related to not only admission but student retention. Class attendance and examinations, in addition to the "final exam," were also made factors in evaluating student academic progress.

3. Major efforts were made in introducing an integrated system of course offerings with prerequisite course requirements. This required faculty to prepare course outlines and the institution to publish lists of course offerings by colleges and departments with timetables. These concepts, largely foreign to traditional universities, promoted the integration of teaching and research. Also promoted was the concept of interdisciplinary education and its scientific and technical linkage to agriculture, veterinary medicine, engineering, and the social sciences. Leadership from campus administration was often hard pressed to introduce such concepts but, with time, achieved success. The American land-grant model helped in designing the concept, but the essential elements were relevant.

and adapted to the environment and needs of the people served and the resources available in India.

4. The development of a new teaching culture enabled the universities not only to stress the importance of knowledge-linkages but also to appreciate class and student-based learning experiences. This concept was clearly demonstrated in the strict requirements and stress on the student practicum. At Pant Nager, for example, students were assigned farm plots to work and manage, with faculty supervision, for a crop growing production cycle. Further, they were "banked" with money to purchase farm inputs, and as a means of teaching the economics of farming, they could keep any "profit" from their teaching-learning enterprise. Perhaps this practicum, linked as it was to regular classroom instruction, did much to sensitize students to the work ethic required in farming, the management aspects of farming systems, the relevance of science and technology to food and fiber production systems, and the marketing, processing, and distribution processes related thereto. Such experiences introduced students to the potential for private-sector careers in agribusiness.

5. Assigning research and extension education program responsibilities had a major impact on the "culture" of these new universities. One aspect was that faculty involvement in research would enhance scholarly advancement with positive spin-off effects on the quality of their teaching activities. Research and extension educational experiences also provided a link to the practical aspects of agriculture and technological innovation. Multiple function university programs challenged established dogma—it was a foreign idea that seemingly threatened the role of existing research and extension institutions and their staff's job security. But, again, the vision and the urgency for mobilizing academic and scientific expertise prevailed, and new concepts for internalizing the integration of teaching with research and extension came to the fore.

An Indian journalist, in a review of the development of the agricultural

universities in 1973, cited the integrated programming of teaching, research, and extension education, noting that "the strict observance of the three-point principle lies at the root of whatever success the universities of Ludhiana and Pant Nager have achieved." Further, on the part played by extension education, he stated that "it involves the use of a group of distinctive teaching methods, including: visits to the homes, fields of farmers, the organization of demonstration plots, collective meetings, block level farms, towns, exhibitions, and fairs." An excellent example of the lasting benefits of instructional cooperation is the current planning for All-India commodity-based research programs involving scientists from Indian Agricultural Research Institute (IARI) and the agricultural universities.

6. Through decentralization of administrative responsibilities, ICAR encouraged programmatic flexibility and local initiatives in operational decision-making. This management system placed considerable responsibility, along with authority, on the universities themselves. Thus, it was not surprising that the effectiveness of the vice-chancellor and other academic leaders, i.e., deans and department heads, came to have important roles in the development of their university. The communication task called for interagency interactions and developing an understanding of the holistic implication of the new educational programs the agricultural universities were introducing, e.g., comparability of degrees to those traditionally recognized by the civil service. As a result, the universities and their faculties were able to introduce new farm technologies leading to changes in strongly held, traditional, ingrained cultural and social patterns that had guided farming for years. Fortunately, the availability of ready-to-apply technologies, such as dwarf wheat varieties, mineral fertilizers, pest control chemicals, and tube well irrigation and the availability of small-scale, locally built farm machines coincided in time with the establishment of the agricultural universities.

7. Commitment by all parties to the

development partnership was a critical factor in sustaining the Indian university development program. True planning and idealism initially led to the emergence of this extensive undertaking, but the key to long-term sustainability of the project was the strong commitment to the vision for benefits that would flow from the new and exciting roles for agricultural education.

TIPAN has a broadly conceived development plan, built on a partnership concept for mobilizing resources to achieve a shared goal: developing a "new vision" for NWFP AU's programs and the services it can bring to students and the people of NWFP and Pakistan. In such a multi-faceted long-range undertaking, it is imperative that the resolve of the "partnership in development commitment" be reinforced from time to time. Program priorities need reassessment; and problems, however vexing, need to be resolved so as to avoid time-consuming delays. But, the underlying guiding principles and goals of TIPAN must not be compromised nor the initial vision for NWFP AU be dimmed by problems in program implementation and finances. Societies rightly look to their institutions to solve development-oriented problems and to be leaders for change; this is especially true for institutions of higher agricultural education. NWFP AU is well along in creating a new and exciting chapter for itself—it needs a reaffirmation of the broad-based support required to make its new charter a reality.

Commitment and dedication are powerful influences to motivate action. Sustaining motivation and commitment requires action oriented candid discussion and communication among stakeholders in a development venture. NWFP AU has an exciting and challenging role in helping a new vision to become a reality for agriculture and rural people. ○

By Orville G. Bentley, INTERPAKS Associate and Dean Emeritus, College of Agriculture, University of Illinois. Excerpts from a presentation in Islamabad, Pakistan, December 7, 1992.

## Changes in Indian Agrarian Sector: Implications for Extension

India has made tremendous strides in agricultural development which led the country to self-sufficiency in food production. Despite the success achieved in agricultural development, certain problems predominate the Indian agrarian scene. One such problem is the structural changes that have occurred. These include shifts in land ownership, number and size of holdings, number of fragments, average size of holdings, and productivity of land through technological and institutional innovations. Three dimensions of this structural change deserve special identification: 1) examination of census data indicate that the percentage of small and marginal holdings has increased; 2) decline in land-man ratio due to increasing population pressure; and 3) excessive land fragmentation.

The Indian agrarian structure is characterized by an incidence of tenancy, landlessness, a high degree of fragmentation, and a skewed distribution of land ownership resulting in lower yields and higher costs per unit of output. In areas where soils are traditionally poor and the average yields are low, this problem is further aggravated. The factors associated with these changes include: 1) laws of inheritance and succession; 2) the break-up of joint family system; 3) high pressure of population on land; 4) lack of off-farm employment opportunities; and 5) governmental sponsored land reform measures.

The alternative to fragmentation is consolidation. Consolidation of holdings is of major interest in many developing countries engaged in efforts to improve their agrarian structure. Consolidation refers to the grouping of land plots in order to make holdings more compact. Several studies have indicated that the operational efficiency of the farm increases as a result of consolidation. Many states in India have enacted legislation to implement and facilitate the consolidation of holdings. The implementation has been extremely patchy and sporadic. Only a

few states have made some progress in this effort. It appears that there is a lack of awareness among farmers and the general public about the legislation promoting the consolidation of holdings. In a survey of 2,640 Indian farmers in a southern state, only 29 percent of the farmers were even aware of the legislation. In the same study, farmers were asked to indicate the most favored method of pooling the land. The most favored methods found were the sale to the owner of an adjacent plot (72 percent), sale to the farmer of their choice (33 percent), exchange of plots between farmers (74 percent), exchange of plots between farmers and government (31 percent), and joint cultivation of land fragments (24 percent).

In this paper, we examined the trends in agricultural holdings for the last three decades and made projections for the year 2001. Implications of these trends to extension program development and changes in the nature of extension programming are also discussed. It is important that we recognize that India is not alone in experiencing changes in the agrarian sector. The structural changes that have taken place in India reflect similar trends that are occurring in almost all old peasant communities of Africa and Asia.

Examination of census data for the three decades (1970-71, 80-81, and 90-91) revealed that the number of holdings increased by 61 percent (up from 71 million in 1970-71 to 114 million in 1990-91). Operational land area increased marginally by 4.8 percent (up from 162 million hectares in 1970-71 to 170 million hectares in 1990-91). When examined across different land size classes, marginal and small holdings (under two hectares) showed the largest increase (79 percent) (up from 49.63 million in 1970-71 to 89.97 million in 1990-91). Similar trends have occurred relative to semi-medium (36 percent) and medium (4 percent) size holdings. The number of large-size holdings (over 10 hectares), however, decreased by 39 percent. These findings highlight the

numerical predominance of marginal and small holdings in the Indian agrarian scene. This is likely to continue by the turn of the century. The projected figures for 2000-01 indicate that there will be 147 million holdings operating in 183 million hectares with an average size of 1.2 hectares. Of this, 82 percent (122 million) of the holdings will be in the marginal and small size category, operating in about 37 percent (69 million hectares) of the area.

### *Extension's role*

The results of the data analysis provide a basis for identification of several implications for extension, especially as related to program planning and development. Farm sizes will theoretically continue to decrease and become less economically viable, potentially resulting in limited improvement and investment in land. In addition, a greater number of farm families operating smaller holdings will need to be reached by extension.

From an extension programming perspective, there appear to be three areas where extension can play an important role. First, Indian farmers need to have more information in an understandable form about existing legislation and implementation plans related to land subdivision, fragmentation, and consolidation. Such informational extension programming should involve local farmers and community leaders in discussing how such governmental policy and implementation guidelines affect the farmer currently and the future generation of farmers in light of the Indian cultural expectations, values, and norms. Such informational extension programs must also include an emphasis on how the governmental policies will influence the economic well-being of farmers.

Secondly, extension personnel have an opportunity to develop programs which directly address the needs of those with limited land. Especially needed are educational initiatives which suggest alternative approaches to operating

individual, fragmented small holdings. It is important for extension to assume a leadership role in facilitating the establishment of demonstration projects. Extension should also develop initiatives for farmers to examine alternatives to traditional agriculture. However, such alternative agriculture considerations must also include an assessment of the availability of required supporting infrastructures. Without the availability of the required infrastructure, alternative agricultural production options would most likely result in farmers with increased expectations and increasingly higher frustrations and disillusion.

A third role for extension relates to helping people examine alternatives to earning a living in agriculture. It is unlikely that farmers will continue to be able to survive economically, based on future projections of land fragmentation. Extension personnel should examine potential program efforts which may assist those who desire to leave farming to find alternative ways to earn a living. Such an effort would obviously require a multidisciplinary approach which is based on the needs of people, rather than governmental imposed programs which may be viewed as disrupting the norms of a society and specifically the lives of individuals. ○

By Rama B. Radhakrishna and Edgar P. Yoder, Pennsylvania State University. Adapted from a presentation at the 1993 Conference of the Association for International Agricultural and Extension Education, March 1993, Arlington, Virginia.

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Authors are encouraged to submit unpublished manuscripts at any time for inclusion in a subsequent issue of DIGEST. It is highly desirable that manuscripts be no longer than four double-spaced pages. Submissions that are too long for available space will be reduced in length by the DIGEST Editor. Books, other published material, speeches, etc. may be excerpted for inclusion in DIGEST (with permission when appropriate of authors and/or publishers).

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# DIGEST

# INTERPAKS

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## *Editor's Corner*

Readers are encouraged to submit manuscripts for possible inclusion in future issues of DIGEST. And those with access to computers are encouraged to make use of INTERPAKS electronic services and to help us make these services more useful. We are open to receiving materials to be added to the INTERPAKS electronic data bases. Material in electronic format will be identified as to its source.

## *Netherlands—A Case Study*

In the Netherlands, agricultural productivity has increased rapidly over the last 25 years. Fifty-six percent of agricultural holdings have disappeared, leading to shifts in employment to other sectors. The extension system has responded to changes in the agricultural sector by becoming increasingly privatized and farmer responsive—combining public and private services. Agricultural information is supplied by three types of service: the government, the farmers, and the commercial sector.

"Both the government extension service and the private extension service have their own tasks, priorities, and goals, but nevertheless they supplement each other very well" (Netherlands MOA, 1988).

The government extension services focus on the whole farm whereas private extension emphasizes information that applies only to certain parts of the farm. In addition, government services focus on teaching farmers to help themselves.

"It is necessary to have excellent cooperation between the extension services of trade and industry and those of the government and agricultural organizations, because the problems of a technical and economic as well as of a social nature are often extensive" (Ibid).

Government extension was fully subsidized until 1990, providing both technical advice and explanation of government policies. Beginning in 1993, farmers will gradually take on a greater proportion of the cost. Initially, the system will be 95 percent government subsidized, but the farmer contribution will grow from 5 percent in 1993 by an additional 5 percent per year until the shares are equalized. The government maintains 11 regional offices (10 to 12 specialists each) and 160 staff in Information and Knowledge Centers

(IKCs). The IKCs are open to all and train privatized extension staff and provide a link between extension and research.

Budgetary pressure has led government to reduce administrative responsibilities. Thus, the daily work of public-sector extension is no longer controlled by civil servants but by farmers' associations. The government's involvement is through the provision of subsidies. In the late 1980s, 550 government extension officers were incorporated in new regional extension offices controlled at the regional level by farmers' associations and funded jointly by government subsidies and farmers. A sliding scale of payment has been set up which will, by 2000, result in farmers paying for 50 percent of the total cost of extension services. The government has maintained national research-extension liaison offices in order to be able to continue providing various extension agencies with new research results (Netherlands Ministry of Agriculture, 1988, p. 13). The farmers through their own organizations employ about 200 extension staff, whose main task is socio-economic extension. They assist farmers in such tasks as estate planning, alternative employment, or legal matters. This service is subsidized 50 percent by government while 50 percent comes from farmers' membership fees of their organizations.

In addition to organizational changes, there is also a change in the focus of the advice of government extension agents now working through the farmers' associations. Semi-public extension staff, approximately 800, continue to provide advice to farmers and increasingly help farmers put advice from different commercial operators into perspective. Emphasis is placed on farm

management as a whole. For example, the semi-public-sector extension agent can provide a dairy farmer with objective information to complement a construction firm's advice on the profitability of a new cowshed. Another key job of semi-public-sector agents is to inform farmers about changes in government regulations relating to the farmers' operations. This has become an increasingly important task since the Agricultural Structure Memorandum was put into place in the 1990s, involving a plethora of new guidelines and regulations on pesticide, fertilizer, and herbicide use, soil and water management, sustainable production systems, the role of organic farming, new crop rotation systems, and winding up arable farming operations with poor prospects.

The production of some commodities involves very complex technology, and continual advances in quality are required to remain competitive. This is the case with greenhouse floriculture and vegetable production. "Suppliers from other countries compete for sales on the same market. Operators must increasingly work to improve the quality of products and, in particular, the quality of the production process" (Ag Structure Memo, no date, p.35-38). In addition to the pressures of competition there are consumer pressures to limit chemical residue on vegetable products.

"The implementation of the above arrangements will depend on technical developments, economic viability, standard of knowledge, and an awareness on the part of producers that measures are necessary on environmental grounds, even though they may give rise to initial losses. A clean production process can, however, give an extra mark of quality to products and can even strengthen the producers' comparative position. Research, extension, and education will assist the development and introduction of the necessary arrangements" (Ag Structure Memo. No date. D.35-38).

Private extension is active in work on these issues. There are private consultants working on designing greenhouses as well as those who design computer programs for greenhouse climate control, water mixing, and so on. The skills and

### Two Major Block Grants Received

We have received two major block grants or bulk purchase orders for 1995 issues of DIGEST. The Food and Agriculture Organization of the United Nations and the Illinois Cooperative Extension Service each have made financial commitments for 1995. And while these commitments do not cover all costs beyond those provided for by subscription income, the grants should enable us to continue publishing until additional resources are identified.

Other organizations are urged to consider making a grant or a bulk purchase for their offices and staff. Bulk rates are available upon request.

information required in such systems are very specialized and are also an essential part of the production process. Farmers have a strong incentive to pay for the information.

The commercial sector employs 2,500 extension staff, whose main task is to provide highly specialized, technical advice.

"Increasing specialization makes it increasingly difficult for extension officers to keep up with all details, while the demands of farmers are continually increasing. Officers from the commercial sector can visit the farm more often, and farmers are prepared to pay for this kind of highly specialized service" (Netherlands MOA, 1988).

Information is provided by suppliers of seeds, plants, pesticides, herbicides, artificial fertilizers, animal feeds, fuels, machinery, implements, buildings, and so on. Half of the Dutch input supply is handled by CEBECO, one of the world's largest cooperatives, which provides information to its members. Other inputs are provided by private companies which may also provide information.

A lot of information is disseminated through contracted operations such as pig and calf fattening, production of poultry, grass seed, vegetables, etc. There are also extension officers working in the agricultural credit banks, milk production extension officers from the dairy factories, and stable and cattle feed inspectors. Private extension may offer information on a single product or total farm management, on the use of equipment and inputs and their adaptation to specific farm operations, on the production process itself, and on marketing.

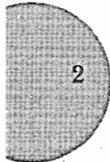
Farmers pay for advice from commercial extension staff, either directly (for veterinary or accounting services for example) or in the price of the product (feedstuffs, chemicals, etc.). Farmers are willing to pay a relatively higher price for a product, for example livestock feed, that comes with technical advice.

As the roles of the public and private sectors evolve, the public sector takes less and less responsibility for delivering technical information and more for explaining policy, not a popular task for extension agents. As surpluses and environmental problems have increased, government is forced to take measures which are unpopular with farmers. It remains to be seen how this issue will be resolved under the new system where farmers' associations manage the subsidized extension staff. A clear lesson from the Netherlands for developing countries is the degree of government intervention. "The government stimulates the role of farmers' organizations in extension, and where trade and industry take over tasks, the government withdraws" (Netherlands Ministry of Agriculture, 1988, p. 14). In some cases, the government intervenes strongly. For example, the difficult government decision has been made to accelerate the reduction in the active farming population while simultaneously working to reorient rural people toward different activities in rural areas.

"The Netherlands example has shown how useful it can be when government and farmers' organizations allow each other room to play their particular roles and agree on the rules of the game according to which commercial companies can [carry out] their activities" (OECD, 1989).

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By Lisa A. Schwartz, Department of Agricultural Economics, Cornell University, Ithaca, NY 14853-5901, USA. A case study contained in Network Paper 48, Overseas Development Institute, Regent's College, London, UK, July 1994, "The Role of the Private Sector in Agricultural Extension: Economic Analysis and Case Studies."



## The Frustrating Thing About IPM

The frustrating thing about integrated pest management is that it usually takes a disaster to get farmers interested. In Colombia, for example, cotton growers didn't seriously consider the alternatives to frequent pesticide use until the bollworm had developed resistance to all the available products. By then, cotton was receiving as many as 28 applications each season. Production was down and even abandoned in some places. A lot of farmers went broke and lost their land.

That was in the early 1970s. By the end of the decade, biological control and other measures had led to a drastic reduction in pesticide use. So, the crisis ended with a success story. But it need not have happened at all. In the 1950s, Peruvian farmers went through exactly the same thing. Why didn't Colombia learn from their experience? For that matter, why haven't Colombian farmers learned from their own experience? In the mid-1980s, cotton growers got hooked again—this time on pyrethroids, a new generation of more-efficient pesticides. Pretty soon, they'll be in the same mess they were in before.

Most of these are large-scale, commercial growers. What worries me

even more are the small-scale farmers throughout the Andean region who are falling into the same trap. Fifteen years ago they hardly ever used pesticides. Now, they apply them 10, 11 times a season on beans, potatoes, vegetables, anything that's green. So, the problem is not just a commodity issue—it's a farming systems and resource management issue.

Here in Colombia, farmers who are going to apply pesticides say, *Voy a banar el cultivo* (I'm going to bathe the crop). And if you ask them why, they're likely to answer, *porque es martes* (because it's Tuesday). The target of these applications is *lo que pueda venir* (whatever comes up). Farmers have become convinced that if they don't spray regularly, on a calendar basis, they'll be in trouble. Pesticides are their crop insurance.

Maybe this approach has contributed to increased production but at a high cost in terms of environmental pollution, human and animal health hazards, rising production costs, and increased risk of production failure. Ironically, indiscriminate pesticide use can also make insect problems worse. In 1978, when

we published the first edition of our book on bean production problems, the leaf-miner deserved two lines. In the 1989 edition, it got two pages. Why? Because irrational pesticide use, partly by destroying beneficial species, prepared the way for a drastic increase in leaf-miner populations. It's a man-made pest.

The irresistible attraction of pesticide use on a calendar basis is its simplicity. IPM demands more from researchers, extensionists, and farmers. As entomologists, our job is to know the pests—their biology and behavior. We also have to know the enemies of our enemy and understand the way all these species interact with crops in particular farming systems. That's what we call pest ecology. Then, we have to figure out how farmers can act on this knowledge to achieve effective economical pest control.

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By Cesar Cardona, Entomologist, Bean Program, "CIAT at the Threshold of Sustainable Development, 1992-93," International Center for Tropical Agriculture, Cali, Colombia, Annual Report.

## Israel Report—Israel: A Growing Success

Yitzhak Kiriati explains the success story that is Israeli agriculture and highlights the directions in which current research and innovation trends are leading.

Israel holds a special place in the world of agriculture. The country is a major force as a grower, manufacturer of agricultural machinery, research center, and center of know-how. But the depth and level of leadership that Israel maintains in these areas of activity confound traditional explanations and growth patterns. The question is, how has Israeli agriculture reached the stage whereby its home-developed technologies are in use across the world?

One answer lies in a paradox. The history of Israeli agriculture is a very short one, spanning no more than 100

years. The country's first cultivators bore the same personality traits and characteristics as those who are involved in the agricultural industry today—a young, idealistic and highly educated group who saw agricultural development as a national priority.

For the pioneers of a century ago, there existed no tradition of farming, no accumulated wisdom, and no methodology passed from father to son. However, without conservative tradition to hold back progress, the new farmers had the freedom to find innovative solutions to farming problems. Thus Israel's agronomists learned early on how to make the country agriculturally self-sufficient while overcoming such hurdles as low rainfall, lack of fertile soil, hot

summer seasons, and a scarcity of investment capital.

Other reasons exist. Israeli farmers have for many years been backed by a network of research stations, academic establishments, and an agricultural extension service that turned this small country into one large experimental station. As the local market is extremely small (Israel having a population of five million), exports are essential. Thus research was directed early on to international market demand. Equally, company, organization, and governmental strategies were directed abroad. For instance, the Israel Export Institute, an organization created by the export community and the government to expand and promote Israel's overseas

commerce, has been a significant factor in Israel's agricultural export drive.

The Israeli economy supported the drive towards agricultural development. It is a mixed economy that is capable of broad vision, and it tends to work according to flexible guidelines rather than fixed plans. In addition, fluent interaction between farmers, industry, and extension services provides a basis for the flow of information that leads to positive action and development.

Government support has also been a critical factor. Israeli governments have historically viewed the country's agricultural industry as vital to the health of the national economy, as well as seeing the renewal of the land as an ideological plank. This has led governments to invest in the development of an agricultural infrastructure, including a national water carrier and other water resources. Governments have also supported farmers, farming cooperatives, and farming collectives, which have needed to invest in agricultural ventures.

Israeli agriculture has been forced to cope with three major disadvantages: lack of fertile soil, scarce water resources, and high manpower costs. These serious impediments to the development of an agricultural industry were solved in innovative ways. An overall look at available soil was taken, and high-yield crops were cultivated to offset the shortage of good soil. In order to make the best use of the limited quantities of water, highly sophisticated irrigation methods were developed. These methods included drip irrigation, which feeds the plant the correct amount of water without waste. And high manpower costs were combated by the existing manpower attaining high productivity levels.

Ironically, however, the fertile soil that exists in this small country is scattered among various soil types, climates, and topologies, ranging from sub-tropical and temperate to desert. This has given Israel the advantage of producing a wide variety of crops and being able to respond quickly to export demands.

Innovation and resource sharing extend beyond production to marketing and sales. Much agricultural produce has

historically been exported through marketing boards and cooperatives. The reduced competition between agricultural producers has led to information sharing, further contributing to technological development. While the marketing boards have become less central over recent years, information sharing is still very much the norm.

Finally, the kibbutz or collective farm is a major contributing factor to the development of Israeli agriculture. As the kibbutz settlement system developed, it provided from within its ranks qualified layers of professional agronomists and agricultural economists whose natural inclination when addressing and solving farming problems was to relate the individual issue to all elements of the farming community, thus placing problems within their greater context.

In addition, many industrial plants are located on kibbutzim, contributing to an overall trend towards modernization. The fact that the kibbutz collective includes farm and factory, and the owners are one and the same, means that the vertical integration between factory and field is extremely efficient.

The results of these policies have been spectacular in comparison to farming communities worldwide. Results have included a fall in agricultural fresh water needs over the last 20 years. Crop sales have registered high profits, and yields from one cubic meter of water rose from US\$0.46 in 1950 to US\$2.04 in 1990. Today, Israel exports about US\$600 million of fresh foods, US\$600 million of processed foods, and US\$1.2 billion in agricultural inputs.

Two trends have developed in Israel regarding agricultural produce: one is to concentrate less on conventional crops and more on specialty fruit such as kiwis and litchis. The other is to improve strains using chromosomal engineering, resulting in new high-yield and high-protein strains of wheat; long shelf-life lettuce; tomatoes that grow successfully—with a high sugar content and enhanced shelf life—in natural brackish water; and completely seedless full-size and cherry tomatoes.

Intensive breeding programs, based on cross-breeding and genetic engineering techniques, have been combined

with management methods such as the maintenance of a computerized pedigree database for the entire national dairy herd. They produce new types and breeds of livestock that have very high yields and value relative to their inputs. For example, Israeli-developed computerized technology in the dairy allows for immediate identification of disease. The use of the dairy herd database has made it possible to optimize the breeding of Israel's Holstein cattle herd to the point that it has the highest milk output in the world, averaging 9,000 liters per cow per year.

Poultry breeds have been improved, resulting in such strains as a low-fat, high-meat-content chicken, more-productive layers, and a chicken without neck feathers that is especially suitable for hot climates. The drive towards high yields and high economic value has also resulted in successes such as

- an average of 300 tons of tomatoes per hectare being harvested from Israeli greenhouses;
- the cotton yield standing at six tons per hectare;
- cotton production requiring only five working days per year per hectare.

Although several Israeli companies have developed both mobile and fixed sprinkler systems for large-scale irrigation, one of the most important techniques has been drip irrigation using small-bore, plastic piping. Apart from the most obvious advantage of being able to deliver minimal quantities of water very precisely to plant root systems with little evaporation loss, the fact that the water is absorbed directly by the plant root system has meant that drip systems can be used for irrigation with non-potable, treated waste-water. Several Israeli companies have become major exporters in this field.

New trends in irrigation include higher-performance, blockage-resistant drippers that can be used in brackish water and underground irrigation lines that will save water. Apart from direct exports and turnkey projects, Israeli companies have embarked on joint ventures in countries such as Kazakhstan and India.

Agricultural plastics continues to be a major field in Israel. Usages include

packaging and transportation of agricultural produce, plastic sheeting in greenhouses, mulching, and baling. Today, Israel remains a leader in the use of agricultural plastics. Recent innovations include a photo-degradable plastic sheeting for solar sterilization of agricultural land and a portable silo system developed by the Volcani Institute and a major kibbutz company that radically reduces the loss of food grains to insect pests and fungi.

Agricultural machinery produced in Israel includes chemical sprayers, pickers, harvesters, automatic planters, graders and sorters, and irrigation machines. This equipment has begun to incorporate the newest computer technology and automatic optical recognition. Production management systems for dairy and livestock have been successfully exported worldwide.

Israel's most important mineral reserves (sodium chloride, potassium, and bromine) are found in the Dead Sea and the surrounding desert. These are

used in the production of potash fertilizers and feedstock bromine as well as for additives in agricultural and other plastics. Innovations in the branch include slow-release fertilizers.

Intensive research continues to be conducted in agroecology and the application of closed or semi-closed agricultural systems. Two important areas include plant protection and natural fertilization. Improved natural resistance to insect pests has been bred into plants, both through engineering of the *bacillus thuringiensis* gene into plant genomes and through selection of varieties with greater natural resistance.

The use of natural predators has been successfully commercialized, and the technique of solar soil sterilization instead of fumigation with methyl bromide was invented and perfected in Israel. Israel has begun to export recycled sterilized manure as fertilizer pellets and to export the know-how and equipment for recycling factories.

Produce and equipment aside, Israel's

horticultural know-how itself is becoming one of Israel's most valuable resources and is in great demand worldwide. Specialties include the exploitation of sub-standard water resource and the implementation of turnkey projects, agricultural development programs, and irrigation programs.

The need constantly to innovate is crucial to Israel's continuing strength in agro-industry. To maintain and increase its existing international market share, the cooperation between researchers, industry, and the farmer must be sustained. For Israel's agro-industry, the motto for the foreseeable future is "export or perish."

By Yitzhak Kiriati, Director of the Agriculture & Chemicals Department, Israel Export Institute. Reprinted from the November/December 1993 issue "Far Eastern Agriculture," with permission of Alain Charles Publishing of London, England.

## Village Extension Workers Preferences

Village extension workers (VEWs) in the Indian Extension System are functionaries. Yet the entire extension system is dependent upon them. They are only moderately educated. Over time, the government has used different approaches in trying to accelerate the process of information transfer. The goal has been to improve socio-economic conditions for small and marginal farmers whose main livelihood is farming.

### Three major approaches

Three technology transfer approaches have been followed over time. A Community Development (CD) approach was begun in 1952, an Intensive Agricultural District Program (IADP) followed in the 1960s, and the Training and Visit (T&V) system was initiated in 1974-75.

In CD the VEW was considered to be a multipurpose worker. Each had several

superiors and was responsible for handling a number of agricultural concerns as well as rural development issues. The VEW was unable to shoulder the multitude of activities placed on him/her. In IADP the VEW was asked to focus specifically on agriculture, but targets and expectations were not realistic. And finally, in T&V the VEW was considered to be a professional. The VEW had a single reporting line. VEWs worked with selected contact farmers.

It is worthwhile to review these three approaches from the VEWs' standpoint. And while it is not possible to bring these approaches back in their original form, it is interesting to note the preferences shown for each by VEWs. Their preferences need to be taken into consideration as modifications in technology transfer approaches are developed for future use.

### Location and sample

A study was conducted in the Maharashtra State of the Indian Union. A sample of 74 VEWs was drawn

### Adult Literacy

Adult literacy has increased from 56 percent of the population in 1950 to about 74 percent today, or by about 1.8 billion people worldwide—a net growth of 120,000 people per day. But discrepancies persist between industrial and developing nations and between men and women. In 1970, some 94 percent of adults over age 15 in industrial countries were considered literate compared with only 45 percent in the Third World. Since then, literacy rates in the developing countries have climbed to 65 percent. But that still leaves 1.4 billion illiterate adults worldwide. Population has grown even faster than literacy over most of the past three decades, thus, the absolute number of people who cannot read is greater now than it was in the early sixties.

Source: "International Dateline," February 1994, Population Communications International, New York, NY USA.

randomly from four subdivisions of two districts. The sample was considered to be representative in regard to age, educational background, and service experience.

VEWs ranked the three approaches as follows: T&V first, IADP second, and CD third.

With regard to the CD approach, the VEWs were worried about the multitude of activities they were supposed to carry out. The program provided a positive link between agricultural extension and other aspects of rural development. But the result was that specific agricultural extension responsibilities were lost in a long list of tasks. The VEWs' attention and accountability were dispersed among many different and unfocused activities.

The VEWs liked the IADP approach because it had a built-in provision for supplying production inputs. Targeted farmers received recommended production inputs along with a package of recommended practices. However, the VEWs were unhappy with the approach because of unrealistically high targets and expectations. Pressure built up and the program operated in a climate of tension.

About 69 percent of the VEWs preferred the T&V approach to technology transfer over the other approaches. However, some 28 percent of the group gave T&V a second ranking.

#### *Implications for the future*

T&V is supposed to be a farmer-focused approach that puts farmers and their constraints at the center. As a management system for extension organizations, it tries to overcome problems of other approaches by promoting regularity of farmer visits combined with regular training and good supervision. The approach focuses on selected contact farmers who supposedly are representative of the farm population. VEWs do not like the rigidity of T&V. They want to accommodate differing educational and socioeconomic circumstances. They offered some suggestions for improving T&V:

- Work with groups of contact farmers rather than individuals.
- Provide for flexibility in the schedule of farm visits.
- Make the program client oriented as well as technology driven.

- Integrate mass media activities with T&V in a suitable way.
- Provide for linkages between department and the village level.
- Give AEOs and SMSs freedom to take independent actions.
- Program from the bottom up instead of top down.
- Employ women extension workers.
- Operate within a committed policy framework.
- Direct attention to broadly based agricultural problems.

With the incorporation of the above suggestions, T&V was seen by VEWs as an acceptable means for transferring technology. Of the three approaches, it was seen by VEWs as the only one where professionalism was practiced.

By A. U. Gadewar and Y. P. Singh, Associate Professor, Agricultural Extension, National Academy of Agricultural Research Management, Hyderabad—500 030, A.P. India, and Head of the Division of Agricultural Extension, Indian Agricultural Research Institute, New Delhi—110 012, India.

## Women in Agriculture

### *Perspective*

Some historians believe that it was women who domesticated crop plants and thereby initiated the art and science of farming. While men went hunting in search of food, women gathered seeds from the native plants and began cultivating those of interest for food, fiber, and fuel. Today, 44 percent of the world's food is produced by women. Women are engaged in a wide range of activities yet that continue to be systematically marginalized, undervalued, and unrecognized. There has been a tendency among administrators and policy makers to see "men as farmers" and "women as farmers' wives."

Women not only handle a substantial share of farming activities, but they also are responsible for the whole range of domestic work. In India, women's involvement in farming is shown in the

following statistics. As of the 1991 census, 38 percent of all agricultural laborers, 20 percent of all cultivators, and 29 percent of all livestock and forestry workers were women. Furthermore, recent studies show that from 50 to 90 percent of all agricultural activities in India are carried out exclusively by women.

### *Some questions*

Women have a predominant role in agriculture and related activities in India. This raises the question as to how their conditions might be uplifted. How can their contributions be better recognized?

Other issues include:

- How can appropriate technology for women farmers be generated and transferred?
- What kind of developmental interventions would prove useful in

bringing about accelerated growth for women?

- How can policy makers and administrators be made more sensitive to the concerns of women?
- What can be done to overcome the adverse effects of customs, ignorance, and traditional values on the status of women?
- How can women's legal rights be protected and enhanced (including the right of land ownership)?

### *Women extension workers*

A major avenue for reaching rural women is through the employment of more women agricultural extension workers. They provide a means for extension to reach rural women. Women extension workers are often seen as a more credible source of information than male extension workers by rural women. Farm women

are likely to accept and act upon their recommendations.

Typically, extension workers have been male, and they have mainly approached men. Out of 88,000 village extension workers, only about 10 percent (9,000) are women. This suggests that inadequate attention has been paid to recruiting female extension workers.

Recommended technology has often entailed commercial inputs and irrigation. Larger-sized land holdings and access to cash resources are usually required. Now that India is reaching its peak with respect to access to irrigation, there has been a gradual shift by research institutions to an emphasis on new techniques in dryland farming to achieve production increases. The substantial involvement of women in this kind of farming emphasized the need to use women extension workers.

#### *Academic inputs*

Two national-level seminars were conducted in 1993 at the National Institute of Rural Development (NIRD) and at the National Academy of Agricultural Research Management (NAARM). Issues relating to women's participation

in agriculture were discussed at great length. Both seminars identified the following issues:

- The need for appropriate technology to reduce drudgery and health hazards of work for farm women;
- Women's need for skill development training and access to resources and provisions;
- Lack of facilities at the village level focused on development activities for women;
- A need for sensitized policymakers and administrators combined with appropriate legal provisions that protect the rights of farm women.

The following suggestions are based on deliberations conducted at the two seminars:

- Professionals and other stakeholders should become more aware of the role of women in agriculture and of their needs and problems. Men and women should be viewed as equal partners on the farm and in the home.
- There is need to evolve relevant technologies that are suited to

women-specific farm activities. This research should focus on ways to reduce drudgery, provide for labor diversification, and improve energy conservation while providing for higher and more-stable farm incomes.

- Since women are involved in both the farm and the home, scientists should be concerned with generating technology in both areas. Women should be involved in every aspect of research, decision making, and technology development.
- How knowledge and skills are transferred to rural women should be tailored to their socio-economic condition and literacy status.

And finally, it is noted that extension workers in India tend to be almost exclusively male. Their advice is aimed toward men at men's activities. Increased employment of women in the delivery system is strongly encouraged.

By R. K. Samanta, Faculty Member & Head, TOT Systems & Policies Unit, NAARM, Rajendranagar, Hyderabad—500 030, India.

## *Agricultural Extension in the Hills of Nepal*

### *Introduction*

Pakhribas Agricultural Center (PAC) was established in 1973 as an agricultural training center for ex-Gurka soldiers. Since 1975 the center has served the farmers in the PAC command area through the main disciplinary sections that have been created—agronomy, seed technology, livestock, veterinary investigation, horticulture, forestry, and socioeconomic.

The center extension responsibilities have been:

- A local target area (LTA) of seven panchayats in Dhankuta district with a land area 8,068 hectares and 4,163 farming families;
- A northern target area (NTA) of eight panchayats in Terathum and Tapiejung districts with a land area of 10,000 hectares and 4,900 farming families.

This paper discusses the form and functions of extension from ten years' experience in the eastern hills of Nepal. The experience indicates that hill farmers are as receptive to innovative ideas and new technologies as any other farmers in Nepal. Indeed, they are often ahead of researchers in their willingness to try out alternative methods and crops on their limited land areas.

### *The PAC approach to extension*

PAC has developed extension sections within a multi-disciplinary agricultural research, production, and services center. In view of the complexity of the physical, biological, and sociological environment, it was initially decided that the extension sections should concentrate their efforts on the local and northern target areas. Both sections developed similar programs which included:

- New crop, crop variety, crop husbandry, storage, composting, and kitchen garden demonstrations;
- Mini-kits (small packages of seed and fertilizer designed to popularize recommended technologies);
- Farmer training on a variety of techniques in the field;
- Nurseries development;
- The supply of inputs;
- The supervision of farmers' field experiments.

All this work has involved a small core staff supported by field staff drawn from the villages and panchayats of the target areas. The work has involved a huge investment in time in the early development of the program—sitting, talking, explaining, listening, suggesting, arguing, agreeing and disagreeing, and planning with farming households. A similar amount of time is invested on a

continuous basis in monitoring and feedback activities as the program has developed. Staff of the extension sections agree that this investment of time is essential for any part of the program to succeed.

*The extension message—learning from farmers*

In conventional research, extension, and production programs, it has often been assumed that research generates the extension message, banks provide the credit, and inputs are supplied through cooperatives or quasi-governmental institutions. When production programs fail, blame is attached to lack of inputs, credit, or inappropriate technology. These problems can be very real for a significant proportion of PAC's target farming families. Consequently, a large part of PAC's approach has been to ease the problems of poor technologies and inadequate input supply. Nonetheless, PAC's experience also has shown that with the minimum of external inputs, extensionists can achieve a substantial impact—but only if they work closely with farmers.

Farmer-to-farmer seed exchange has been vitally important in the spread of improved varieties in the local target area. The best-documented case of this informal seed exchange system occurred in Terhatum District with Pokhrell Masino rice. In 1973 the agricultural development officer (ADO) of Terhatum obtained seed of Pokhrell Masino, a local variety very popular in the Kathmandu valley. In the mid-hills of the Koshi Zone, on-farm trials had shown that this variety yielded around 13 percent more than the local variety in reasonably well-irrigated (khet) land. PAC traced three farmers to whom the ADO had provided mini-kits. Thereafter, no further formal extension of this variety took place, because it had not been passed by the National Varietal Release Committee and therefore could not be included in any official seed multiplication program.

The lessons from this example are threefold:

1. If the technology is acceptable to farmers, it will be extended successfully with minimal additional input from extension.

2. Small inputs can result in significant impact.
3. Extensionists and researchers can learn from and experiment with farmers on effective methods of disseminating technologies.

In a second example of learning from farmers, innovations in cropping sequences led to significant modifications and improvements in extension recommendations. Capturing and developing these ideas came from mutual respect between extensionists and farmers.

Lentils were initially recommended as a broadcast-sown crop relayed into a standing crop of rice about 10 days before the harvest of the rice. The objective of this was to intensify the rice-fallow cropping pattern by replacing the fallow. However, the experience of the extension staff and the farmers examining this technology led to a sequence of steps in the adoption process. First a PAC field assistant sowed lentils on his small millet nursery bed after the millet had been removed for transplanting in maize. This succeeded and was adopted by neighboring farmers both on their own millet nurseries and on their other barl lands. PAC therefore modified their recommendations to include barl land cultivation. Later some farmers began experimenting with sequential sowing into cultivated khet lands after the rice had been harvested because their lands were too wet for good relay sowing. This again was successful and led to further modification of the recommendation. Sowing lentil in sequence on khet land is now the most common lentil planting system in the local target area.

*Close linkages with research*

In PAC experience the stimulus for improved research has often come from extension staff. Extensionists in conventional systems are frequently frustrated by being given inappropriate recommendations of technologies that have had inadequate testing in the environment in which they are supposed to work. In PAC the existence of both extension and research functions in the same institution and under the same management has forged close linkages, and the center has been able to respond to the needs of farmers more effectively.

In this situation, the question of responsibility for feedback from farmers is irrelevant as both extension and agronomic research staffs are in regular contact with farmers. Interaction between the two sections occurs regularly. The extension section may conduct on-farm trials for the special conditions of its target area, while the agronomy section on-farm teams may assist the ADOs in their regular extension programs. All the work that these sections carry out contributes to a better appreciation of the farmers' situation and therefore to the achievement of agricultural development objectives.

Examples of feedback from extension to research

- Farmers rejected high-yielding rice varieties on the grounds of insufficient straw (for fodder), poor taste, and poor cooking quality. Extensionists requested that PAC agronomists find varieties that were more acceptable to farmers using these criteria. Researchers in turn have fed this information back to national rice breeding programs.
- Improved pea varieties tended to lodge in the field. Extension reports on this problem led to the testing of alternative spacings and support systems. The closer-spaced, self-supporting crop was less prone to lodge, and this resulted in greater adoption of the improved pea varieties.
- PAC extension felt that they had reasonable recommendations for fertilizer use in maize and wheat. However, they were not satisfied with recommendations for rice and finger millet. More research on alternative methods of fertilizer application on rice led to more-cost-effective recommendations.
- PAC extension staff have identified the need to examine the potential for soybean varieties that will perform well under intercropped conditions with maize at higher altitudes. These investigations are part of the agronomy research program.

*Extension/research relations outside the target areas*

Extensionists in the Koshi Hills Rural Development Program (KHARDEP) found that the extension messages in the

four Koshi Hills districts had no research basis and there was no structured research and extension system to develop and test alternative technologies. Official recommendations were merely the extrapolation of results from teral areas or from the Kathmandu valley and were not based on any trial or verification system. As a result of discussions between the KHARDEP extension staff and PAC scientists, PAC research strategy was redesigned and its command area broadened to include the four Koshi Hill districts.

Despite the clear evidence of the benefits of a close working relationship between extension and research workers, there are still many difficult institutional and personal status problems to overcome. Research and extension may be in different ministries or they may be major divisions within the same ministry with all the consequent problems of different staffing, management, and budgeting, making effective cooperation difficult. The problem of the perceived value of each other's contribution to development needs to be tackled. Researchers rarely invite extension staff to attend national research seminars or six monthly review meetings. Even when they are invited, extensionists' contributions may not get a very sympathetic hearing. For instance, at a summer crops research conference in Jansput in 1986, the comments of an extensionist on the reasons for the low acceptance by poor farmers of an improved rice variety were ridiculed. *Flexibility in setting the extension message—Fear of failure*

The thing that extensionists fear most is to demonstrate a variety or husbandry practice that produces a result that is poorer than that of the surrounding farmers. Yet this is a frequent experience in extension work throughout the world as a consequence of:

- The requirement to fulfill targets;
- Technical messages that do not take account of the different agro-climatological conditions or the socioeconomic circumstances of the farming family.

*Insufficient decentralization of extension design*

Failures are bound to occur for many

other reasons, and it is therefore essential that as many farmers as possible are involved in the design, implementation, and evaluation of trials and demonstrations. In this way a failure may be used as part of the learning experience and the basis for redesign. In Nepal, these problems are exacerbated because of the problems of access and the tendency, in some of our earlier work, to rely on inputs of uncertain availability. In our more recent work we have tried to develop a more flexible approach to experimentation and to move away from excessive reliance on external inputs.

*Maize/wheat relay*

These approaches are illustrated by the recommendation to relay wheat after maize on certain barl lands. This practice was first noted by staff during visits to farms in the west near Lumie Agricultural Center and were tried out initially on the lands of the PAC field staff. Following a promising result, extensive testing is under way. However, it would appear that the adoption of this practice may be highly dependent on the preference for food or alcohol between different ethnic groups. Relative wealth may also be important. Among some groups, millet is the preferred crop after maize, as it is brewed for cash sale, to drink, and as a socially important product. The grain of millet stores well and the straw is highly valued as fodder for animals. In contrast, Brahmin and Chetri people do not normally drink alcohol and prefer a grain crop such as wheat. Wheat is also considered to require fertilizer whereas millet grows well on poor soils and is never given fertilizer.

*Recommendation domains for the hills*

In relatively homogeneous environments and among relatively homogenous ethnic groups, it may be possible to develop and define distinct recommendation domains into which general recommendations may fit. In the hills, however, the nature of variability is such that any attempt to design technologies for large numbers of farmers will usually fail. This may be either because the technology itself is inappropriate for most farmers or because suitable technologies that accommodate the high

degree of flexibility found in hill farming systems have yet to be developed.

*Communication*

Poor communication messages may also have negative results: bad technology. For many years blanket recommendations for fertilizer rates were made throughout Nepal and throughout the hills. Such recommendations took no account of the different cropping patterns, different cash resources of rich and poor farmers, whether they were land owners or sharecroppers, whether they were able to get cheap institutional credit or borrowed from money lenders, the differences in the real price of fertilizer, and differential access to the right kind of fertilizer at the right time. Fertilizer rates recommended are usually at an unrealistically high level for the majority of hill farmers, and research trial and extension recommendation need to take account of these realities.

The rejection of short-strawed, high-yielding, japonica-type rice has already been mentioned. The ADO in one Koshi hill district cut all rice mini-kits from his extension demonstration targets following several years in which the same unacceptable teral variety was sent from the national program to his district. At that time there were no appropriate alternative varieties available.

Similarly, a mini-kit demonstration of a finger millet variety recommended for the teral was sent to the Koshi Hills. *Conclusions and implications—Investing in agricultural extension*

The experience of PAC in the LTA area clearly illustrates that an investment in hill agricultural development is worthwhile. Hill farmers are primarily subsistence operators and are poor. They are, however, sensitive to new opportunities and willing to adopt new ideas and technologies if they see short term benefit.

There appears to be considerable scope for the development of new varieties of crops that perform well in local farming systems without significantly modifying current cultural techniques.

Recent changes in the extension program have greatly expanded the scope of operations to cover the range of disciplines found at the center. This will open up a much greater range of



possibilities for improvement than in the past. The linkages and interdependencies with farming systems in the hills make it essential for both research and extension staff to appreciate the points of entry for key potential interventions that may trigger positive change in these systems. *Commitment to farming households as clients and colleagues*

An important lesson has been the payoff from the investment in time by all staff in listening, learning, and working alongside farmers. Most staff now appreciate the value of this investment in the knowledge that they have gained from this way of operating. Yet another has been the development of a sensitivity to farmer circumstances that allows scope for modifying initial recommendations and adopting a more iterative approach than previously.

The recognition that women are a most important group has been a major advance in the approach. The focus initially on topics that were women-specific has resulted in many dramatic lessons for the future.

*Status and reward systems*

The experience has clearly illustrated the importance of the close extension linkages with farming communities, not only for developing and spreading messages but also for learning quickly what changes are occurring in farming systems. This makes the extension operation just as important as any part of the research activities at the center. At PAC the contribution of extension is appreciated, but within the national program, extension does not have such a high status nor are extensionists regarded as key people in the development and dissemination of new ideas and techniques.

Rewards for the approach that has been developed remain a problem as most of the formal government extension is target-oriented. The translation of these methods elsewhere (as we move to a wider mandate in the eastern hills) presents a major problem. PAC has placed a high value on the quality of extension work achieved through the development of effective personal relationships and confidence.

*Appropriate extension messages*

It is obvious that the messages must be appropriate to a wide range of

circumstances or that they are presented in such a manner that they may be easily adapted to many different circumstances. In order to apply this principle throughout the hills, future research and extension systems need to have a greater degree of local autonomy, and a much greater allocation of resources has to be made to on-farm, interactive, applied research and extension activities.

It is encouraging to note that the new NARSC outreach plan calls for a more decentralized approach based on regional research centers and more outreach activities carried out jointly between research and extension staff. It remains to be seen whether the kinds of close working relationships that have been developed in the PAC institution can be mirrored in the many hill districts and also be supported by the action of the relevant Ministry of Agriculture departments in Kathmandu.

*Management and leadership*

The PAC experience has also shown the importance of program planning and management in order to achieve results. The extension section has developed a particular style of management that has been effective. It has involved a great degree of regular interaction and participation in planning and implementation of all staff and constant interaction with farmers, groups, and community leaders.

The section staff have taken great care to avoid the "technical expert"

image that is evident in some parts of the national extension program. This has involved many "reversals" and the fostering of motivation as a powerful stimulus, not only among staff but also among farmer innovators. It has been made possible by a much less hierarchical structure within the section than is the norm.

The lessons from this experience are perhaps obvious but will be difficult to spread within the national system. A major task lies ahead in attempting to disseminate an approach within the wider eastern hills extension network that gives a high priority to farmers' needs, knowledge, and ideas. It will take courage, will, and resources to implement such a program, and it probably will need some imaginative leadership within involved ministries and line agencies.

Kallash Pyakural, dean of the Faculty of Agriculture, Tribhuvan University, has said, "The agricultural sector needs charismatic leadership which could instill the spirit of dedication amongst scientists and technicians. And it also needs a sincere agricultural policy which protects the interest of poor farmers."

By Hem B. Thapa, Terry Green, and David Gibbon. Excerpts from a paper entitled "Agricultural Extension in the Hills of Nepal: Ten Years of Experience from Pakhribas Agricultural Center." Overseas Development Institute, London, December 1988.

*The world is experiencing a slowdown in the growth of food production*

The Worldwatch Institute in its State of the World 1994 report indicates that the output from oceanic fisheries has stopped growing. The yield of land-based food systems has fallen behind population growth.

Since the 1950s, growth-yielding technologies enabled food yields from both land and sea sources to balloon. But growth from such technologies seems to have peaked and in many cases appears to be unsustainable. In the United States, corn yields—which account for one-eighth of world grain output—have stayed at the same level for 10 years after more than tripling in the 30 years before that. Wheat yields in Western Europe show a similar trend. The Worldwatch Institute says the recent slowdown in yield per hectare is occurring in both industrial and developing countries alike because farmers everywhere now draw on the same international pool of yield-raising technologies.

Excerpt from "International Dateline," Population Communications International, 777 United Nations Plaza, New York, NY 10017, April 1994.

## Introducing a new discussion group

There appears to have been very little use of the INTERPAKS electronic bulletin board over the past two years. We believe this was due primarily to the fact that bulletin boards are not very convenient to use. People must first find the bulletin board in a cyberspace sea and then remember how they got there each time they want to check the postings. Consequently, we decided to discontinue our bulletin board and to, replace it with a "Discussion Group." The difference between the two is that messages are sent via e-mail automatically to all who wish to participate in discussion groups. Our discussion group will focus its attention on extension-related concerns—extension methods and technology transfer in an international setting.

Persons interested in participating in the group (either as passive listeners or as active participants) will need to formally join (or subscribe). There is no charge. And when a person no longer wants to receive the mail being created by the group, all that is necessary is to "unsubscribe." Both actions are accomplished by sending a message to our "list processor."

You may find the following excerpt from another service useful. It was written by David Riggins. He gives some tips on how to avoid problems when participating in a computerized discussion group.

### *Listserv manager gives user tips*

List managers are aware that many subscribers don't fully understand, or practice, proper list service procedures. However, many of the incorrect subscription/unsubscription requests come from new users—and there are lots of those coming online every day.

### *Subscribing and unsubscribing*

List service managers are not in place to subscribe and unsubscribe users on a case-by-case basis. The individual sends commands to the list processor via e-mail messages, rather than requesting changes directly to the list manager. Some lists have thousands of subscribers, making it impractical, if not impossible, for the manager to directly assist with

subscribe and unsubscribe requests.

New subscribers to most listservs receive a return message that explains how to unsubscribe or change addresses and, in some cases, gives a list of other useful commands. These "welcome" documents should always be filed—preferably in a special e-mail folder—for future use. Having this file will also help you keep track of exactly what lists you have joined.

If you know your e-mail address is going to change, unsubscribe from *all* lists that you belong to *before* the address changes; then re-subscribe your new address. Old addresses on listservs cause "bounces" when system managers remove old addresses from their e-mail. List managers spend untold hours conversing with system "postmasters," trying to ascertain why certain addresses invariably bounce and removing those addresses from their managed lists. In cases where circumstances make unsubscribing ahead of time impossible, send an e-mail message to the list manager explaining what happened and asking him/her to unsubscribe you. Explaining circumstances may keep you from getting an e-mail lecture from the list manager about subscription protocol!

If you are interested in subscribing to a list but don't have the instructions, send a message to the list manager requesting the subscribe instructions. (Try to note list managers' names in announcements of new listservs.) *Do not* ask the manager to do it for you: In many cases the manager will just add you to the list, but you should always ask for instructions and let the manager make that choice.

Asking list managers to do these relatively simple functions defeats the purpose of listservs, which is to allow you to manage your own account. A list manager should only be asked to step in when nothing you've tried works.

### *Posting and replying*

Remember that everything you post to the list goes to every subscriber on the list and that the list may have thousands of members. There are times when you probably want to reply only to the

individual who posted a particular message. Make sure you address your message to that individual's e-mail address—not to the whole group (which is what happens if you use the "reply" function of most e-mail packages).

*Remember: a reply option will send your message back to all members of the list.*

### *Quoting within a reply*

If your e-mail package allows your reply to quote the original message, take advantage of that function. You don't need to quote the whole message, just enough to jog the memory of the person to whom you are replying. Many list members get and send large amounts of mail. They may need to be reminded of the point to which you are replying. If you don't have a quote feature, add a reminder as part of your reply.

### *Be brief*

Message length is a matter of personal judgment. But generally, the easiest-to-read posts are short and to the point. Most subscribers are looking for brief discussions—not ten-page "books." If you have more to say, send a message to the list announcing a long message (or "book") and how other subscribers can request it. It is bad form to drop a huge message into 2,000 mail boxes, which can cause enormous management problems. The best rule for considering the size of a message is the same one you should consider as to the content of your message. *Think before you send.*

Instructions for subscribing to INTERAG, the INTERPAKS discussion group, are shown on page 12 under the heading "Electronic Services."

By Robert P. Bentz, Editor

*DIGEST Editorial Policy:*

The DIGEST is published by INTERPAKS to serve extension professionals and applied research scientists worldwide. The information provided is intended to help readers become more effective in their work and to have greater impact on clientele served. The focus of DIGEST is on research on extension methods, on ways to more effectively and efficiently organize to bring about technology transfer, on important trends affecting the potential for human and economic development, and on current and emerging policy concerns in the areas of agricultural and human development.

Authors are encouraged to submit unpublished manuscripts at any time for inclusion in a subsequent issue of DIGEST. It is highly desirable that manuscripts be no longer than four double-spaced pages. Submissions that are too long for available space will be reduced in length by the DIGEST Editor. Books, other published material, speeches, etc. also may be excerpted for inclusion in DIGEST (with permission of authors and/or publishers).

Communications concerning submissions should be sent to: R. P. Bentz, DIGEST Editor, INTERPAKS, 110 Mumford Hall, University of Illinois, 1301 W. Gregory Drive, Urbana, IL 61801. The voice telephone number is (217) 333-5831 or FAX (217) 333-5835. Internet address is r-bentz@uiuc.edu

## INTERPAKS Electronic Services

INTERPAKS databases can be reached electronically. There is no fee for this service. To access these services, the reader may use one of three alternatives:

**1. Dial into IDEA (Illinois Dial-up Extension Access)**

Phone: (217) 244-5158  
 Speed: 1200, 2400, 9600, or 14400 BAUD  
 Parity: None  
 Stop Bits: 1  
 Data Bits: 8  
 User Name: interag

**2. Telnet into IDEA**

IP Name: idea.ag.uiuc.edu  
 IP Address: 128.174.134.152 or 128.174.134.153  
 Username: interag

**3. Gopher connection**

Host: cesgopher.ag.uiuc.edu  
 Port: 70  
 Select: "International-Agriculture-INTERPAKS"  
 or  
 Host: esusda.gov  
 Port: 70  
 Select: "Information Servers Cooperative Extension Service (CES)"  
 "University of Illinois"  
 "International-Agriculture-INTERPAKS"

Username: interag

On-line "help" services are available to users by selecting the option "INTERPAKS-Help-Information" on the initial screen when you access INTERPAKS data bases. Users are prompted in how to navigate among the several menus, in searching the data bases, and in how to download or electronically mail material to themselves.

**4. Discussion Group**

InterNet Address: interag-mg  
 Group Mail Address: interag-mg@ilces.ag.uiuc.edu  
 List Server Address: almanac@ilces.ag.uiuc.edu

**To subscribe to the list:** Send an e-mail message to the List Server (almanac@ilces.ag.uiuc.edu) and type "subscribe interag-mg First name Last name"

**To unsubscribe:** Send an e-mail message to the List Server any type "unsubscribe interag-mg First name Last name"

**To see who is a member of the list:** Send an e-mail message to the List Server and type "list alias interag-mg"

**To send e-mail to the members of the list:** Send an e-mail message to the group mail address (interag-mg@ilces.ag.uiuc.edu)

The discussion group is intended for public discussions of topics related to technology transfer in an international context. Individuals are invited to join the group and participate freely.

Anyone needing additional assistance should contact the IDEA Network Manager at (217)333-9519 or contact the editor via his InterNet address: r-bentz@uiuc.edu

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# DIGEST

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*New journal is begun*

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## *Editor's corner*

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Readers are encouraged to submit manuscripts for possible inclusion in future issues of DIGEST. And those with access to computers are encouraged to make use of INTERPAKS electronic services and to help us make these services more useful. We are open to receiving materials to be added to the INTERPAKS electronic data bases. Material in electronic format will be identified as to its source.

The first issue of the *European Journal of Agricultural Education and Extension* was published recently. The journal will be published four times a year. It is to be an international journal on changes in agricultural knowledge systems.

Persons interested in receiving the journal may obtain details about subscribing from the following address:

European Journal of Agricultural Education and Extension  
Editorial Office, dr. R. van Haarlem  
P.O. Box 194, 6700 AD  
Wageningen, Netherlands

## *Seven extension organization models identified*

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Research has identified seven different ways to organize to carry out extension work.

The seven models are:

- Conventional agricultural extension system
- Training and visit system
- University-based agricultural extension system
- Commodity development and production system
- Integrated agricultural development system
- Integrated rural development system
- Farming systems research and development system

Source: "Developing and Field Testing Design Parameters for Customizing Agricultural Extension Education Systems in Developing Countries" by Brian Sager. Presentation at Eleventh Annual Conference, Association for International Agricultural and Extension Education, 23-25 March, 1995, Little Rock, Arkansas.

## *Budgeting & administrative reform in Eastern Europe*

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Part of the blame for the demise of Communist regimes in the corridor from Poland to Bulgaria from the 1980s to the early 1990s can be attributed to inflexible and unresponsive public sector institutions. The legitimacy and authority of Communist regimes have been waning since the 1970s as governments became less capable of responding to the demand for better goods and services and less willing to lift authoritarian controls over individual behavior. In the face of severe economic and political security crises, Eastern Europe is now attempting to rebuild its public administration capacities. This will require administrative processes and technical skills that can weigh the market costs and consequences of alternative public actions.

The principal mechanism governments use to make allocations is the budgeting process. Public budgeting cannot, by itself, reform government, make public policy, or change public administration. But budgeting processes are the foundation for all such

reforms: the budgeting process determines expenditure allocations and guides program implementation during a fiscal year.

### *Chaotic public management*

Under central planning, public administration was characterized by chaos and lack of accountability. Command structures were rigid with many layers of bureaucracy. Most decisions were made only at the top of the pyramid.

The public budgeting process was based on a physical planning model that was expressed in budget norms. In this model, allocated hospital bed days or meals per student were financed with resources at prices set by the planning ministry. The budgeting process did not question the cost or sufficiency of norms. The norm system is, to a large degree, still in operation in Eastern Europe. But under current conditions of resource scarcity, the system is failing and has not been replaced with an alternative budget system.

### *Western-style budgeting*

A Western-style budgeting process is an active arena for the clash of views and information, revealing to policy makers and managers alike when resource allocations and administrative practices are appropriate or inappropriate. Ideally, a budgeting process is part of a larger financial management system that encourages post-expenditure cost accountability. The budget system is integrated into other financial management systems such as payroll, procurement, accounting, and debt management. The system encourages managers to analyze the costs and consequences of alternative fiscal choices.

A good budgeting process encourages management efficiency within the framework of cost control. Western

public managers are discouraged from malfeasance by post-audit examination of balances and internal controls over revenue and expenditure transaction entries. Control is designed to encourage spending that is consistent with known, legal, and transparent post-expenditure restraints. This encourages an active public management cadre intent on

taking risks in the service of the public.

### *The need for reform*

The relation between budgeting and administrative reform in Eastern Europe is circular, with improvements in one system generating demand for improvements in the other. In

many cases, the exact sequence of reform is determined in the field by some combination of needs assessment and trial and error. The dilemma is that improvements in administrative, management, and information systems without reform of the underlying budgeting process are unlikely to improve the effectiveness of service delivery. Improved skills in personnel recruitment and job classification, for example, will not be used if wage budgets continue to be determined by political criteria instead of by objective job programming based on a review of the tasks that need to be performed by the civil service.

An annual budget review can reveal where operational responsibilities and revenue mobilization can be taken off the state budget or out of government altogether. This implies a shift of authority and responsibilities within ministries to line personnel and from finance ministries to spending ministries to use resources as they see fit. Administrative reform thus depends upon decentralization of fiscal management,

both within ministries and to sub-national levels of government. The latter is actually happening by default as central governments run short of cash and control abilities.

### *Skills and systems development*

Given the interdependence of public administration and budgeting processes, reform efforts must target systemic weaknesses while crafting programs to upgrade skills. Skills development will require a tripartite strategy of pre-service, in-service, and on-the-job training. One problem that must be overcome is that, under communism, training was associated negatively with ideological guidance. In addition, few training materials existed because basic skills in report writing, accounting, and budgeting were not developed. But interdisciplinary courses with locally developed materials can overcome these constraints.

Short-term technical assistance combined with on-the-job training is occurring in key sectoral areas. The assistance and training cover such areas as pricing, operations and maintenance budgeting, demand-responsive scheduling, and contracting-out routes. Training in personnel budgeting and administrative systems development is taking place in Latvia and Lithuania; the emphasis is on development of manual systems rather than computerization.

### *The outlook*

To the extent that improved budgeting is institutionalized in Eastern Europe, it can generate an analytic competition between ministry spenders and treasury guardians each year. This should increase demand for information to counter competing claims, which will in turn affect spending plans and encourage expansion of a professional civil service that seeks responsibility and can deliver services with accountability.

*The dilemma is that improvements in administrative, management, and information systems without reform of the underlying budgeting process are unlikely to improve the effectiveness of service delivery.*

## *Using past and present U.S. experiences for averting an uncertain future in agricultural extension in developing countries*

The agricultural extension systems in developed and developing countries were severely attacked during the 1980s for their ineffectiveness and lack of relevance. Since then, shortage of funds has continued to cause attention to be directed toward the effectiveness of such systems. The extension systems in the U.S., Europe, Australia, and New Zealand have taken corrective measures to improve the effectiveness of their programs. The U.S. system has examined its mission, structure, and program priorities. Extension systems in Holland, Denmark, and France have begun managerial and financial changes designed to secure real involvement of farmers and their associations and to improve their performance.

Extension systems in developing countries have been under increasing pressure to improve their performance. These organizations have been characterized as having a centralized top-down structure, weak linkages with research, a lack of resources, and poor participation in program development by farmers. These characteristics have resulted in inappropriate planning and evaluation, inefficient management, inadequately qualified staff, and deficiencies in facilities. Developing countries typically have not addressed these problems. Rather, with the cooperation of donor agencies, they have searched for alternatives to public extension systems.

### *Establishing the U.S. Cooperative Extension System (CES)*

The notion of extending agricultural information to farmers was practiced in Europe during the seventeenth century. During the early 1900s Americans utilized extension methods to make rural life more profitable, comfortable, and attractive. Three main forces helped to bring extension into reality in 1914: A progressive movement in American society, farmer initiatives through organized groups, and an emerging

network of agricultural education and research institutions (land-grant universities).

During the 1940s and 1950s, American agriculture was very successful and achieved huge surpluses, and at least part of this success was attributed to extension efforts. The CES approach appealed to many newly independent countries during the 1950s. Many of these countries established some kind of extension system, and the most prevalent type came to be referred to as a "conventional model." The creation of this model was facilitated by U.S. technical assistance, but it was by no means a carbon copy of the CES system.

From the beginning, developing countries viewed agricultural extension as the implementing arm of government. It was the means to get farmers to meet national objectives as articulated by the government. Educating farmers and improving rural conditions received very little attention even though the majority of farmers were illiterate and operated on a very small scale. Farmer organizations were too weak to define and articulate the educational needs of farmers and their families. Agricultural universities and research institutions were weak or nonexistent. Farmers themselves knew little about and therefore were not supportive of the creation of extension systems. In many developing countries, the only force behind the establishment of an agricultural extension system was the government.

### *Special characteristics of U.S. CES*

Differing needs of clientele in the United States have been met successfully by CES through the years. This success has been due to characteristics that distinguish it from other systems.

- First, CES has been responsive and flexible in providing educational programs to meet local needs and priorities. This has been true both for

traditional clientele (farmers and their families) and for new nontraditional audiences.

- Second, CES concerned itself with a multi-dimensional educational program. From the beginning in 1914, CES had a broad charge—to improve quality of life by extending information about agriculture and related subjects to all people.
- Third, CES was focused on the local setting. The basic programming unit was the county level, and these county programming units were integrated by the land-grant university. Being part of the land-grant university gave extension the linkage it needed to research.
- Fourth, extension had a special funding arrangement which facilitated cooperation between three levels of government—federal, state, and local.

### *Common characteristics of extension systems in developing countries*

Mission, functions, and structure of extension organizations differ among developing countries. The predominant system currently is called T & V (training and visit). This is due largely to the influence of the World Bank, a major international donor agency. Integrated rural development systems with an extension component also are widespread and are supported by international donors. And there is the so-called conventional system operated through ministries of agriculture. Developing-country extension systems tend to share the following characteristics:

- The extension system is considered to be an implementing arm of government. Extension programs are designed to help farmers to meet some national goal. Extension policy and activities are designed to serve governmental objectives.

- Extension activities concentrate mainly on disseminating bits and pieces of information and technology in the form of recommended production practices. The needs of different groups tend not to be dealt with. Little attention is given to economic concerns, logistic matters like farm planning and management, the use of credit, or marketing.
- Most of the systems are top-down oriented with centralized control having weak linkages to research. Planning is done at the national or provincial level without taking into consideration farmer needs in different agro-ecological zones. Many systems actually have very little technology to disseminate to farmers.
- Extension systems suffer from a shortage of resources and facilities. These shortages severely affect activity levels and impact.

### *Changes in the U.S. CES*

In spite of more than 75 years of success, the U.S. CES faces increasing pressure to continue demonstrating its worth to American society. The environment in which extension operates has changed drastically over the years—most notably the decline in the number and percentage of Americans engaged in farming. CES has reacted by making changes in its mission (emphasizing the philosophy of helping people to help themselves) and by basing programs on issues unbounded by discipline, audience, or geography.

CES has modified its structure. It has

maintained a local presence and local involvement in planning, for the most part, but has achieved economies through staff reductions and the “clustering” of staff to serve larger geographic areas.

CES seeks viable alternative methods of program delivery that are appropriate to and tailored for the needs of targeted audiences. CES has become a provider of information and educational resources to other organizations, agencies, and localities. It is emphasizing “issue-related” programming, and it utilizes the latest technologies, especially electronic technologies, to disseminate information and to reach its clientele.

### *Recommendations for having effective extension systems in developing countries*

There are several fundamental lessons to be learned from past and present successes of CES. These are all “essential” ingredients.

1. Public support. The extension system must be viewed by rural people as a valued educational resource rather than as an agency enforcing government policies and priorities.
2. Real involvement of rural population in extension programs. Rural people should be encouraged to play an active role in program planning, program delivery, and program evaluation.
3. Focus extension on education. New knowledge and practices should be packaged in the form of educational

programs designed to meet the needs of different groups—not just bits and pieces of information. The function of technology transfer should complement the human development function.

4. Offer multi-dimensional programs that are relevant and flexible. Extension programs must be planned and carried out at the local level. They need to be based on relevant needs and problems. Methods of delivery that are appropriate for the clientele served and the situation should be utilized. Program delivery must be both efficient and cost effective.
5. Place extension in an educational context. This needs to be reflected in staff assignments, qualifications, administration, and linkages with research. Extension should service the needs and interests of the rural community with local staff backstopped by specialists. The staff should not have responsibilities beyond educational responsibilities, and they should understand that they are to try to deliver services to the satisfaction of clientele.

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*Excerpted from a paper by Dr. Mohamed M. Samy, Faculty of Agricultural Sciences, United Arab Emirates University, Eleventh Annual Conference, Association for International Agricultural and Extension Education, March 23-25, 1995, Little Rock, Arkansas.*

## *A comparative study of management effectiveness under the training & visit and general extension systems in Ghana*

An effective means of transforming Africa's potential agricultural resources into sustained agricultural development is through an effective extension system. African governments and international aid agencies have promoted and supported new extension approaches to help small-scale farmers increase food

production. The training-and-visit (T & V) system has been the latest extension method to be promoted.

The T & V system provides a sound institutional framework for reaching large numbers of farmers, and it has elements that can be adapted to a number of different environments. As of

1988, more than US\$2 billion had been channeled into T & V extension programs in developing countries.

### *General extension approach*

The general extension approach is practiced mainly by agricultural ministries of developing countries. Its

main goal is to increase agricultural production of subsistence farmers. And since subsistence farmers grow many different crops, extension agents are expected to have knowledge about all of them. In addition, since the extension agent is often the only government representative in a village, he/she is often asked to perform other functions such as input distribution or tax collection. The general extension approach has suffered from serious deficiencies, including poorly trained staff, lack of farmer participation in planning, poor extension/research linkages, lack of facilities, and poor management.

#### *Training-and-visit system*

The T & V system was intended to eliminate the deficiencies of the general extension system model. It is promoted mainly by the World Bank although other international donor agencies have used aspects of the T & V approach as well. T & V seeks to benefit small farmers by urging them to adopt technological innovations. However, in this case the innovations are selected by the funding agency. But unlike general extension, T & V focuses on specific crops and specific practices. It emphasizes frequent in-service training for extension personnel, regular visits to farms, the promotion of research-extension linkages, and improved extension management.

#### *T & V in Ghana*

Ghana is one of over 60 countries now using the T & V system. The Upper Region was the first area of Ghana to adopt T & V. This was in 1978. The Volta Region adopted T & V in 1981. And there are ongoing attempts to replicate the T & V system in the remaining seven regions of the country.

The purpose of this research was to determine if the T & V system was

better than the general extension system. Data were collected in the Central and Western regions of the country and compared to data collected in the Upper and Volta regions. Some 52 extension officers were surveyed. A panel of

experts was used to determine the suitability of the questionnaire and to check the validity of its content. Response to the questionnaire was almost 100 percent.

#### *Results of the study*

##### *Service conditions*

Both T & V and general extension groups rated financial support for their work as low. The T & V group rated salary support and vehicle allocations as adequate. General extension groups rated these items as inadequate. Availability of resources for in-service training was termed moderately high by both groups. Logistical support was viewed as moderately adequate by both groups.

*Job skills* T & V and general extension officers did not differ significantly in job skill ratings. The scores for both groups reflected a similar need for improvement.

*Research/extension linkages* The composite score for both groups indicated that access to research findings was rated as low and there was no significant difference between the two groups.

*Farmer participation* There was no significant difference in degree of farmer participation between the T & V group and the general extension group. However, the general extension group scored higher than the T & V group on farmer participation regarding fertilizer application, storage methods, and farm management.

*Methods and media* The general extension group was rated higher as compared to the T & V group in its effectiveness and use of teaching methods, audiovisual equipment, and design and implementation of extension campaigns.

*It is suggested that for extension to improve its performance, there is need for a continuous and systematic evaluation of activities.*

#### *Summary and conclusions*

The results of this study indicate a lack of significant difference in performance effectiveness between a general extension model and the T & V model. Each group rated extension performance low. Service conditions, effectiveness of teaching methods, and the ability to involve farmers in program planning had not improved under T & V. For example, T & V officers attended more in-service training, but their management skills had not improved.

Farmer participation under T & V did not differ from that found in general extension. Extension/research linkages were rated low for both systems (due in part to the fact that research and extension come under separate ministries in Ghana). The findings are consistent with criticisms that the T & V approach has not resulted in improved extension performance.

It is suggested that for extension to improve its performance, there is need for a continuous and systematic evaluation of activities. When expensive pilot projects such as T & V are introduced, they should be tested for cost and long-term viability under local conditions. Absent findings to the contrary, the T & V strategy should not be replicated in the remaining regions of Ghana unless communication skills problems are addressed. Some specific recommendations are:

- Include communication skills training for T & V staff in Ghana.
- Get agricultural universities to become more involved in extension as a means of improving research/extension linkages.

*Excerpted and adapted from a conference paper by Edward Ntifo-Siaw, Robert A. Agunga, and Larry Miller, Department of Agricultural Education, The Ohio State University, Eleventh Annual Conference, Association for International Agricultural and Extension Education, 23-25 March 1995, Little Rock, Arkansas.*

# Spotlight on FAO

## Food and Agricultural

### Second International Training Course

#### Strategic Campaign Development (30 October - 8 December 1995)

This is a six-week intensive course designed to enable participants to plan and implement agricultural extension programs using the FAO-developed "Strategic Extension Campaign" approach. The cost of the course is US\$3,300 plus international travel and living expenses. Applications may be obtained from:

The Admissions Officer  
Continuing Education Center  
Asian Institute of Technology  
GPO Box 2754, Bangkok 10501  
THAILAND

Tel. No. (66-2) 524-5270  
FAX No. (66-2) 524-5247  
Cable: AIT Bangkok  
Telex: 84276 AIT TH

Applications must be received by 01 October 1995.

### Desktop publishing—A new tool for agricultural extension and training

Prepared by: Roger Stringer and Harry Carey under the guidance and sponsorship of the FAO Agricultural Education and Extension Service. (1992)

This 54-page pamphlet deals with preparing extension teaching materials by methods that have come to be known as "desktop publishing" or DTP. The manual is based on experiences of Zimbabwe's Agricultural Technical and Extension Services Department stemming from experience as that unit installed a computerized educational materials production system. The undertaking was under the aegis of a UNDP/FAO project carried out during 1989-1991. The goal of the project was to improve technology transfer to small-scale farmers as a result of having produced relevant and effective educational materials in a timely fashion. The pamphlet does not explain how to "do" desktop publishing but rather how it can be used to fill a particular need.

DTP is defined to mean the production of documents on a personal computer by using specific software packages which can lay out text and graphics on pages which are then printed on a laser printer in camera-ready format ready for reproduction. DTP has implications for training since one person replaces experts who design, illustrate, proof-read, edit, typeset, paste-up, do art work, and print. And it can be accomplished economically. However, DTP does not determine the best means of delivering information, or how much to transmit, or the complexity of the message. It merely facilitates the process once decisions have been made regarding those other issues. Ease of production, speed of operation, low cost, improved quality, and in-house control are cited as the benefits.

Equipment and software requirements are spelled out. There is a discussion of how to train staff. And there is a treatment of how to evaluate a publication's usefulness and how to set priorities. One of the primary benefits of DTP is that it gives organizations the ability to consider projects that could not be attempted otherwise because of cost considerations.

### Introduction to microcomputer technologies

Prepared by: Tim L Wentling and Rose Mary Wentling, University of Illinois and Illinois State University, under the guidance and sponsorship of the FAO Agricultural Education and Extension Service, Human Resources, Institutions and Agrarian Reform Division. (1993)

This FAO manual is a sourcebook of possible computer-oriented applications in agricultural extension, education, and training. It covers microcomputers, word processing, electronic spreadsheets, database management systems, graphics, desktop publishing, decision support software, CD-ROM, communications, and training. It is written in non-technical language (at least as non-technical as can be the case when covering this kind of technical subject).

Each section ends with a short bibliography giving relevant titles of materials that readers may access if they wish to dig deeper. The manual also contains an index that provides the names and addresses of many of the leading software firms in the world.

The section on electronic spreadsheets serves as an example of how the authors approach their task in each case. It describes how a spreadsheet makes it possible to present numerical information in a structured way and to carry out various mathematical functions automatically. The benefits of spreadsheets are that they improve productivity of users, increase accuracy, and allow users to "play with numbers" or to develop "what if" scenarios. Such scenarios help managers in decision making and in reducing costs. The electronic spreadsheet has become a very common computer program.

There is an explanation of how an electronic spreadsheet works, and some examples are given showing different applications of spreadsheets. It is pointed out that any task that requires the manipulation of numbers can be done on a spreadsheet. Minimum equipment requirements are given in terms familiar to persons with basic computer skills. The prices of several popular spreadsheets are shown, and information is provided as to how a person might learn more about the subject. Finally, there is a short discussion of likely developments that will affect future directions.

## anization of the United Nations

### *The potentials of microcomputers in support of agricultural extension, education and training*

Prepared by: Reuben Ausher, Abraham Blum, Ehud Gelb, and Dan Marom under the sponsorship of the Agricultural Education and Extension Service Human Resources, Institutions and Agrarian Reform Division. (1993)

This is a comprehensive study of the introduction and application of microcomputer technology in support of agricultural extension. It has application to both developed and developing countries. It probably should be assigned to the category of "must" reading for anyone involved with or concerned about delivering extension or agricultural education programs in today's world.

The report consists of an executive summary, an introduction, and chapters on microcomputer use by extension organizations, agricultural education and training in developing countries, matching needs and opportunities, and what happens to an organization once computers are introduced into it.

Decision-supporting tools and systems that benefit farmers are identified as the main potential benefit from the use of microcomputers. And within that group, decision support for crop production, farm management, and market information are best aided by computer technologies. Extension organizations get the highest payback from computers by using them to assist with educational activities and for communication. However, the report points out that moving to the use of computer technology may not be appropriate for countries that have difficulty in providing basic services, such as dependable electrical services.

An especially interesting discussion is the review of what has happened to computer technology over a 30-year period. Data show the change in the cost of performing one million instructions per second (Mips) over time: It used to cost more than US\$1 million to accomplish a Mips, and it took a mainframe computer to accomplish it. The cost of a Mips carried out on a personal computer was down to US\$100,000 in 1980. Now, that Mips cost is about US\$100. This represents a decline in cost of 34 percent per year. Reduced-instruction set computers perform computations even more efficiently—they currently have a Mips cost of about US\$10.

### *Planning for effective training—A guide to curriculum development*

Prepared by: Tim Wentling under the guidance and sponsorship of Agricultural Education and Extension Service Human Resources, Institutions and Agrarian Reform Division. (1993)

This easily understood guide is designed to assist people who have responsibility for training. It is noted that training is the key mechanism for developing skills of people. The manual's focus is on curriculum development, a process that makes training more systematic. Thus, curriculum development helps to build human resources.

The training process is broken down into three phases: curriculum development, implementation, and evaluation. In the first phase, the trainer determines what he/she wants to achieve and how to do it. Implementation is conducting the training according to the content and procedures that have been identified. And the third phase is to determine if the objectives were reached. These phases are further broken down into individual steps, and each step is discussed in some detail.

The author discusses how to determine what to include in training. This process includes needs identification, needs analysis, and skill gap analysis. And these steps depend in part on task or job analysis, which is a procedure for dissecting a job into its component parts. Work sheets (both completed and blank) are provided as examples of how to conduct a job analysis, a training needs analysis, and a skill-gap analysis.

Chapter 5 lists a number of learning principles that are worthy of being kept in mind by all trainers. They include: Learning is an active, participatory process, and opportunity to practice must be built into training (among others). This chapter also deals with a number of organizing principles, such as moving from the known to the unknown. It then proceeds to the process of developing lesson plans.

The author points out that even for a short presentation, some minimal form of planning is necessary. It must be determined in advance why a presentation is being made and what the trainer wants an audience to gain. Larger-scale training activities justify a more systematic planning activity.

This guide will serve trainers and others well as an excellent resource on the training function.

## On building a partnership in Mali between farmers and researchers

### *A few facts on Mali*

*Mali is one of the poorest countries in the world with a per capita income of US\$280 (in 1991). Social indicators such as life expectancy, literacy, and access to basic health services are among the worst in the world.*

*A decisive factor in Mali's future will be the on-going degradation of its natural resources, characterized by massive erosion, accelerated degradation of forests and rangeland, soil salinization and acidification, decline in fish catches in the Niger River, and the accelerated loss of biodiversity.*

### *Introduction*

The need to establish a partnership with farmers' organizations emerged during the appraisal mission for an International Development Association (IDA)-financed agricultural research project. The project supported a major restructuring in the Institut d'Economie Rurale (IER), Mali's main institute for agricultural research. The project aims to help IER develop experiment stations, purchase equipment, train scientists, and invest in research programs. An overriding concern is to reduce the production of technologies that are irrelevant to farmers' needs and to increase the number that are relevant.

IER has created a Farming Systems Research (FSR) department similar to ones found in other developing countries. FSR has been extremely successful in helping departmental researchers to improve their understanding of diverse production systems, to identify niches for new technologies, and to sharpen the focus of adaptive research. However, outside the FSR department, researchers and those who make decisions about the content of research have been making little use of this improved understanding

and information. At the time that the IDA-financed agricultural research project was designed, it had already become clear that an FSR department alone would not solve the problems. Something else would need to be done if research was to generate technologies that responded to farmers' needs and which they would therefore be inclined to adopt.

Cotton research in Mali points to a mounting and compelling argument that user participation is a critical ingredient for innovative, relevant, and efficient technology development. Users not only define the characteristics of the technologies, but they also are an important source of innovation.

There is also ample evidence that organizations of farmers are more effective in promoting a demand-driven research agenda than individual farmers. Indeed, in many developed countries, farmers' associations have played a critical role in the development of agricultural research and extension. Inspired by these experiences, IER decided to initiate a partnership with farmers' organizations in Mali.

### *Rural organizations in Mali*

In developing countries the opportunity for researchers to work with existing rural organizations is limited because farmers tend to be poorly organized and to lack skills and power. This is the case in Mali. An interesting type of organization there is the village association. There are some 1,500 village associations in the cotton-producing region—some dating back to 1910. They distribute inputs, collect cotton for sale, and invest marketing revenues in social and income-generating activities. More recently, water-user associations have been created. They co-manage infrastructure maintenance funds and participate in land-use allocation and management. Another interesting form of organization that has emerged since

1988 has been that of the grassroots savings and loan association. Such associations tend to have many members and they have been able to mobilize impressive amounts of savings.

### *Establishing the basis with IER for interaction with farmer organizations*

In the FSR department, farmers' information had been used to help design experiments at the "on-farm testing and evaluation" stage. However, it was recognized that if technologies are to be developed in response to farmers' needs, input would have to be obtained at a much earlier stage. Farmers and researchers would need to work together throughout the process of generating new technology. Participatory research methods and group management techniques would need to be used to ensure effective farmer input.

A framework for planning research was developed that included two levels of decision making: regional and national. The process starts at the lower level with Regional Technical Commission meetings. These involve staff from a number of agencies concerned with agricultural development. The regional-level commissions review and evaluate the previous year's results, select those that should be diffused to farmers, and recommend the content for both station and on-farm trials for the coming year. The national level, represented by the National Agricultural Research Council (NARC), concerns itself with defining long-term strategy and setting broad directions and priorities.

It was decided that representatives of farmers' organizations should be included on the regional commissions. But in addition, it was felt that farmer input was needed at the national level as well. A Users Commission made up of representatives of farmers' organizations was created. To guard against "tokenism," it was decided that farmers should have

their own committee at the national level to enhance their power and to enable them to debate issues among themselves in their own language. Their representatives would participate in meetings of the NARC.

The above measures were designed to make research more relevant to farmers. But one additional step was taken as well, namely to hold researchers accountable for the results of their work. The idea is to progressively transform research activities into contracts between IER, its scientists, and NARC. For each program, the contracts

will commit the scientists to produce an expected result according to an agreed-upon timetable. It is anticipated that by 1997, the scientists will have been shifted entirely over to contracts and will no longer be permanent civil servants.

### Setting up the users commission

Having set up the framework for bringing farmers in as partners, the next step was to form the Users Commission at the national level and to determine how farmer representatives would be selected. This was found to be a most difficult problem which was finally resolved by creating Regional Users Commissions (RUC). It was decided that each RUC would select its own representatives to serve on the national Users Commission.

The selection of which farmer associations to include on RUCs varied from one RUC to the next. Determinations were made based on recommendations by rural development agencies. Members of RUCs do not receive remuneration except for compensation that covers costs of attending meetings of the commission.

### Problems

- Communication was a problem. Researchers did not know how to

present their activities and findings in ways that farmers understood. Farmer representatives had only a limited understanding of research and did not know what information

would be useful to researchers. Researchers found it hard to link the information brought by farmers to their own research activities. But in spite of these difficulties, the interaction was rich, auguring well for future collaboration.

*The ultimate objective of establishing a partnership between research and farmers is to produce technologies that better reflect farmers' needs and that are therefore widely adopted.*

Interviews conducted a few months after the meetings revealed enthusiasm on both sides as each recognized the gains which are possible from direct communication.

- Extension services were suspicious and uneasy about research forming direct ties with farmers. The plan was for extensionists to be included in the meetings, but some meetings were held where extension was excluded.
- The intent was to bring about a client-oriented approach to conducting agricultural research. But it was decided that the Farming Systems Research program should not appear to be spearheading the RUC activity. However, it became evident as soon as the first meetings were held that the incoherence of IER research planning was obvious. It became apparent that FSR should be involved and that work should be jointly planned.
- The role for non-governmental organizations (NGOs) was not made clear. It was found that NGOs could serve the important function of facilitating and mediating between research and farmer organizations. They helped to set up the RUCs and helped organize the first meetings and with communications generally.

### Conclusions and lessons learned

The idea of building a working relationship between farmers and researchers has profound implications for the way research is carried out. The Malian experience highlights the fact that the formation of a successful partnership between research and farmers' organizations requires important institutional changes. These include:

- Changes in governance of the research institute so that it becomes accountable for results;
- Changes in instructions to scientists so that they become individually accountable;
- A program planning and review process that involves farmer input.

The ultimate objective of establishing a partnership between research and farmers is to produce technologies that better reflect farmers' needs and that are therefore widely adopted. Thus, the impact of the RUCs on the content and priorities of research needs to be monitored.

It was recognized that the selection process for members of the RUCs should be in the hands of farmers. Otherwise, the IER would be able to retain an element of control which would defeat the purpose of empowering farmers with respect to research. However, the IER suggests that the term of office for RUC members be two years with one-third of the members leaving the commissions every two years.

And finally, there is need for training of both farmer representatives and researchers in on-farm participatory research methods.

*Excerpted and adapted from an article by Marie-Helene Collion published as Network Paper 54 by ODI Agricultural Administration Research and Extension Network, sponsored by the Overseas Development Administration (ODA), 94 Victoria Street, London SW1E5JL. M.H. Collion can be contacted at The World Bank, West African Department, 1818 H Street NW, AF5AE, Room J 9127, Washington, DC 20433, USA. Fax: +1(202)473 5146.*

## The state of world rural poverty

Rural poverty affects the lives of close to one billion people. Rural poor constitute 36 percent of the total rural population in more than 114 developing countries. While urban poverty is a growing phenomenon, the rural poor still account for over 80 percent of the poor people in those countries.

The lack of reliable data renders comparisons between time periods and between countries hazardous, but evidence from 41 countries suggests an overall increase in the absolute number of rural poor in the world. Although the percentage of rural poor living below the poverty line declined from 35 to 33 between the sixties and the eighties, the absolute number increased from 511 million to 712 million. The number of rural poor could grow to 1.3 billion by 2000 if a comprehensive strategy is not pursued.

The following data from selected countries illustrate the trends:

Country	Rural Poor Numbers (000)		Change (000)
	1965	1988	
Bangladesh	45,387	82,133	36,746
Brazil	27,609	25,966	-1,643
China	35,178	119,526	84,348
Ethiopia	16,310	16,873	563
India	213,098	251,418	38,320
Indonesia	42,365	34,608	-7,757
Kenya	3,564	9,903	6,339
Mexico	9,882	12,361	2,479
Nepal	6,688	10,146	3,458
Pakistan	18,787	23,006	4,219
Philippines	12,268	22,390	10,122
Tanzania	7,136	11,958	4,822
Thailand	14,952	14,464	-488
13 Countries	453,224	271,696	181,528

Food production per capita has improved in almost all countries. However, demographic pressure has caused a steady decline in food self-sufficiency.

### Food security index

Food security is a major concern in all countries. In 1988, as many as 37 out of 113 developing countries had low food-security status. In many regions and countries, the growth of food production has not kept pace with the growth of demand. The "Near East and North Africa" region is the least self-sufficient among the five regions of the developing world.

### Macro-economic adjustment policies

During the 1980s many countries, including most Near East and North Africa countries, embarked on significant structural adjustment programs. The purpose was to achieve macro-economic balance and to pave the road toward externally oriented, market-based economic growth. These countries

sought to reduce expenditures, adjust overvalued exchange rates, rationalize interest rates, control the supply of money, and eliminate subsidies. Institutional reforms were carried out in ways designed to curtail state monopolies in the distribution of inputs and in the marketing of products.

Certain poverty groups

stand to gain in the long run from enhanced growth potential, but in the short run there is a decline in economic welfare. Groups can be hurt in three ways. First, those whose incomes are

### Food staples self-sufficiency by region, 1965-1988

Region	1965	1988
Asia	96	97
Asia (excluding China & India)	99	94
Sub-Saharan Africa	98	93
Near East and North Africa	92	76
Latin America and Caribbean	112	93
Total 114 countries	98	95
42 least-developed countries	100	95

derived from productive activities may lose their employment. Second, as consumers, their standard of living may fall due to changes in the price of goods and services. And third, the switch to market products (because of price signals) has had adverse consequences on weaker members (notably women and children) when combined with curtailment of infrastructure expenditure and public investment.

Reorienting government policies and institutions to help the rural poor

A number of countries underwent significant policy adjustments in the 1980s to attain macro-economic balance. But given that the income and general welfare of the poor are not automatically guaranteed by reform measures—either in the short or in the long run—these kinds of adjustments must increasingly be geared to achieve both internal and external balance. The incentive framework for small-scale producers needs to be changed through the elimination of bias in taxes, tariffs, subsidies, exchange rates, public expenditure, and credit allocation. It may even be necessary to introduce bias in favor of rural poor to enable them to attain their productive potential.

### Promoting rural women in development

Rural women should be at the center of strategies to transform the cycle of

poverty into a cycle of growth. The socio-economic status of women must be improved if there is to be an impact on high birth rates and the progressive deterioration of the environment.

### *Preserving the environment and alleviating rural poverty*

Long-term poverty alleviation depends largely on reversing the

complementarity between poverty and degradation of the environment. Projects must be designed and implemented within a framework of an internally self-sustaining, conservation-oriented strategy. And it is only through the active participation of the rural poor themselves that such a strategy can be implemented.

*Condensed and adapted from "The State of World Rural Poverty, A Profile of the Near East and North Africa," compiled by Abdelhamid Abdouli, Senior Economist, Policy and Planning Division, International Fund for Agricultural Development, 107, Via del Serafico, 00142 Rome, Italy, 1994.*

## INTERPAKS Announcements

### *An electronic discussion group*

Our electronic discussion group focuses its attention on extension-related concerns—extension methods and technology transfer in an international setting. Persons interested in participating in the group (either as passive listeners or as active participants) will need to formally join (or subscribe). There is no charge. And when a person no longer wants to receive the e-mail being created by the group, all that is necessary is to "unsubscribe." Both actions are accomplished by sending a message to our "list processor."

Instructions for subscribing to INTERAG, the INTERPAKS discussion group, are shown on page 12 under the heading "Electronic Services."

### *INTERPAKS data bases accessible now via the World Wide Web*

Readers are advised that the INTERPAKS data bases are now accessible via a "home page" on the World Wide Web. This means that readers who have shifted to the WWW graphical interface may go directly to the

information desired, as opposed to leaving the "web" and coming back in via a gopher server. Instructions for finding the home page are on page 12.

### *DIGEST editorial policy:*

The DIGEST is published by INTERPAKS to serve extension professionals and applied research scientists worldwide. The information provided is intended to help readers become more effective in their work and to have greater impact on clientele served. The focus of DIGEST is on research on extension methods, on ways to more effectively and efficiently organize to bring about technology transfer, on important trends affecting the potential for human and economic development, and on current and emerging policy concerns in the areas of agricultural and human development.

Authors are encouraged to submit unpublished manuscripts at any time for inclusion in a subsequent issue of DIGEST. It is highly desirable that manuscripts be no longer than four double-spaced pages. Submissions that are too long for available space will be reduced in length by the DIGEST Editor. Books, other published material,

speeches, etc. also may be excerpted for inclusion in DIGEST (with permission).

Communications concerning submissions should be sent to: R. P. Bentz, DIGEST Editor, INTERPAKS, 110 Mumford Hall, University of Illinois, 1301 W. Gregory Drive, Urbana, IL 61801, USA. The voice telephone number is (217) 333-5831 or FAX (217) 333-5835. Internet address is [r-bentz@uiuc.edu](mailto:r-bentz@uiuc.edu)

### *Two major block grants received*

We have received two major block grants or bulk purchase orders for 1995 issues of DIGEST. The Food and Agriculture Organization of the United Nations and the Illinois Cooperative Extension Service each have made financial commitments for 1995. And while these commitments do not cover all costs, the grants should enable us to publish all three issues in 1995. Other organizations are urged to consider making a grant or a bulk purchase for their offices and staff. Bulk rates are available upon request.



## INTERPAKS electronic services

INTERPAKS databases can be reached electronically. There is no fee for this service.

To access these services, the reader may use one of four alternatives:

1. Dial into IDEA (Illinois Dial-up Extension Access)

Phone: (217) 244-5158  
 Speed: 1200, 2400, 9600, or 14400 BAUD  
 Parity: None  
 Stop Bits: 1  
 Data Bits: 8

2. Telnet into IDEA

IP Name: idea.ag.uiuc.edu  
 IP Address: 128.174.134.152 or 128.174.134.153  
 Username: interag

3. Gopher connection

Host: cesgopher.ag.uiuc.edu  
 Pprt: 70  
 Select: "International-Agriculture-INTERPAKS"

or

Host: esusda.gov  
 Port: 70  
 Select: "Information Servers Cooperative Extension Service (CES)"  
 "University of Illinois"  
 "International-Agriculture-INTERPAKS"  
 Username: interag

4. World Wide Web connection

Host: http://www.ag.uiuc.edu  
 Port: 70  
 Select: "International-Agriculture-INTERPAKS"  
 Username: interag

On-line help services are available to users by selecting the option "INTERPAKS-Help-Information" on the initial screen when you access INTERPAKS data bases. Users are prompted in how to navigate among the several menus, in searching the data bases, and in how to download or electronically mail material to themselves.

5. Discussion Group

InterNet Address: interag-mg  
 Group Mail Address: interag-mg@ilces.ag.uiuc.edu  
 List Server Address: almanac@ilces.ag.uiuc.edu

To subscribe to the list: Send an e-mail message to the List Server (almanac@ilces.ag.uiuc.edu) and type "subscribe interag-mg *First name Last name*"

To unsubscribe: Send an e-mail message to the List Server any type "unsubscribe interag-mg *First name Last name*"

To see who is a member of the list: Send an e-mail message to the List Server and type "list alias interag-mg"

To send e-mail to the members of the list: Send an e-mail message to the group mail address (interag-mg@ilces.ag.uiuc.edu)

The discussion group is intended for public discussions of topics related to technology transfer in an international context. Individuals are invited to join the group and participate freely.

Anyone needing additional assistance should contact the IDEA Network Manager at (217) 333-9519 or contact the editor via his InterNet address: r-bentz@uiuc.edu

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# DIGEST

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## *Editor's Corner*

Readers are encouraged to submit manuscripts for possible inclusion in future issues of *Digest*. And those with access to computers are encouraged to make use of INTERPAKS electronic services and to help us make these services more useful. We are open to receiving materials to be added to the INTERPAKS electronic data bases. Material in electronic format will be identified as to its source.

## *Decision-making in third world agriculture*

As in other parts of the world, rural tropical societies and decision-making within them have drastically changed as the result of widespread outside interference in hitherto undisturbed systems. Whereas the EU brought major changes in rural Europe, and the agricultural extension systems in the US, "colonization" and the "green revolution" were major landmarks in the tropics.

## *Decision-making in traditional farming systems*

Before widespread interference in tropical rural systems some 100 years ago, shifting cultivation was a major dominant farming system throughout the world while lowland rice-based systems supported large populations in Asia. Shifting cultivation was practiced by very small, isolated communities marked by a high degree of self-sufficiency. Since these communities had to rely on themselves, decisions concerning farming were taken by a selected group of elders from within the community. Decision-making was taken very seriously, since the right or wrong decision concerning matters like "where and when to grow which crop" would make the difference between starvation and self-sufficiency.

Because decision-making was taken seriously and because the shifting-cultivation communities had generations of experience with it, decisions were usually based on rational grounds within the resource base and institutional contexts in which they operated. It is only in recent years that there is agreement among scholars that tropical peasants act, in fact, rationally; that their behavior must be understood as the result of recurrent decisions about the use of productive assets, the organization of labor, marketing, saving, and investment; and that many indigenous rural farm production systems are sensitively adjusted to local ecological, economic, and political conditions and their fluctuations. However, until some 20 years ago it was generally assumed that tropical peasants were primitive, ignorant, and little productive.

Decision-making at the farm level in the very productive, lowland rice-based systems of Asia was quite similar to that in shifting-cultivation systems but more complicated at higher levels. Already several thousand years ago, Asia knew a well-organized and highly developed society with petty kings who controlled fairly large areas through a complex bureaucracy. To support this system they would tax the peasants (mostly in the form of rice). In return, the rulers would provide security and some essential production inputs such as irrigation systems and metal tools. Nevertheless, when it came to decisions regarding farm practices, they were largely left to their own devices. This resulted in a sustainable system of lowland rice farming (paddy) which lasted for centuries.

All this drastically changed with the onset of the so-called green revolution based on the introduction of external inputs, such as chemical fertilizers and high-yielding varieties of crops bred by international research institutes. Although the green revolution brought badly needed increases in grain production to feed burgeoning urban populations, it soon became apparent that it had a large number of inherent disadvantages, many related to mounting environmental problems such as soil erosion and salinization. What also happened was that farmers lost their independence and became dependent on technology from outside and on external production inputs. At the same time, the character of production changed from self-sufficiency to market-oriented production.

## Decision-making in the 1990s

The green revolution of the 1960-1980s has resulted in a complex web of dependencies. Even the most remote tropical farming family is now indirectly dependent on the world at large and the world economy for essentials such as farm production inputs (particularly fertilizers and insecticides), fossil fuel, etc. The internationalization of trade has distorted farm produce prices in the remotest parts of the globe. The major dependencies are:

- The tropical farmer depends on the rural agricultural extension officer for advice on fertilizer use, variety selection, and modern production methods. He also depends on rural infrastructure and transport for the supply of these inputs.
- The extension officer, in return, relies on packages of technology generated at international research centers.
- The rural community depends on external inputs which have to be supplied by regional and national governments.
- The overall economic and financial situation of the country in question determines whether the government system can supply the needed inputs.
- National governments depend on world market prices, international loans, and external (economic) advice on the supply of inputs and services.

Since the Marshall Plan and Official Development Assistance (ODA) which followed the plan, the supply of inputs and the provision of loans and advice has mostly been done in the form of "projects." Indeed, development projects have been the major vehicle for cooperation between tropical countries and the West for the past three to four decades. In many countries, most investments are done through ad hoc projects which are financed with external loans. It is only in the New Industrialized Countries (NICs) of Southeast Asia that the private sector plays a significant role.

Those who control projects are thus those who, to a large extent, control decision-making in the tropics. The aid organizations that provide loans for projects are also heavily involved in policy-making and the dissemination of know-how and thus, indirectly, in opinion formation and in decision-making.

## Decision-making in international development

The bilateral and multilateral organizations that provide advice on and finance for international rural development have had a profound influence on the developing countries during the past two to three decades; in fact, since these countries became independent. Not only directly, as when such organizations make certain policy changes a direct precondition for loan effectiveness, but also indirectly; for example, when they provide scholarships for study abroad. In the worst cases, "brain washing" has been a major objective of the granting of scholarships; in other cases, indoctrination has been a byproduct of the otherwise neutral education process of the leaders of developing countries.

If international organizations have had such a profound influence on the development of Third World countries, it seems logical to seek a solution of the present ills of these countries in the international establishment. There are a number of major phenomena that have led to the present problems of developing countries — environmental deterioration, hunger, indebtedness, etc.

In the following section these are briefly discussed, and it will be shown that the root cause of the problems can often be traced to policies prescribed by

and forced upon the developing countries by the international bureaucracies.

## The preponderance of economics and financial thinking

Probably as a result of the Marshall Plan, which successfully met its objective of the reconstruction of Europe through the provision of loans and economic measures, cooperation between the West and the Third World has always heavily concentrated on finance and economics. In the early days of ODA, most assis-

tance went to physical infrastructural development, which required massive financial investments.

Now the field of activities is much wider, but economic and financial criteria always play a dominant role. This ignores the fact that in most developing countries the constraint on development is

not economics and money but political problems, institutional weaknesses, and low levels of social awareness and education. The latter have frequently been totally ignored. Nowadays, decision-making is dominated by economists and others with very limited technical and socio-cultural know-how and insight.

## Extreme specialization

Although the extreme specialization of the past decades has caused problems in the West, damage has been restricted because Western societies have gradually grown into them. In Third World countries, specialization is often not appropriate. Nevertheless, because of Western influences, extreme specializa-

*If international organizations have had such a profound influence on the development of Third World countries, it seems logical to seek for a solution of the present ills of these countries in the international establishment.*

tion has created a situation in the tropical world where there is a dearth of people who have an aptitude and broad-enough outlook and experience to be able to have a clear perspective of the complex multi-disciplinary subject of technology transfer in rural development.

This means not only that there is not enough lobbying for change in the decision-making bodies but also that it is difficult to find appropriate staff for drawing up meaningful policies and strategies. It is not only the fault of individuals and their deficiencies but also the fault of the tendency to compartmentalize that characterize agricultural education and institutions. Because of this, most researchers, however eminent, only think in terms of research; economists' thinking is heavily biased towards economic aspects, etc. In actual life — in any normal society — however, decisions have to be based on a multitude of factors or systems as a whole rather than an only one or two factors.

### *Lack of systems thinking and insight*

The importance of systems thinking was recognized about two decades ago and is now gaining popularity; it has revolutionized the thinking of many agricultural researchers. It is now recognized that the domain of every agricultural discipline is only a small part of the total system; that there are numerous interactions between the various sub-systems; and that knowledge of these is essential. It is not possible for individual agricultural workers to know all about the whole system and the various interactions, but it is necessary to be aware of them.

This awareness has significantly changed the thinking and approach of researchers, particularly in the temperate animal husbandry field. They now tend to work more in teams and produce research results which are applicable under practical farming conditions. Unfortunately it has so far only marginally affected the thinking of policy- and decision-makers in the international bureaucracies, mostly because they rarely keep up to date with developments and also because the proportion of decision-

makers with a technical background is small. In fact, in a recent book, MacDonald sadly states that he is of the opinion that the international development agencies are no longer able to advise the developing world on its rural development problems, for the simple reason that their officers no longer have had any direct practical experience of the farming system of the tropical farmer. They have no appreciation of the farmers' skills, their mastery of the environment, and the delicate balance between survival and disaster. Consequently, according to him, decisions are made by those who do not know what they are talking about.

### *Lack of appropriate policies and strategies*

As a result of this lack of insight and one-sided approaches, development policies and strategies are often based on wishful thinking and rhetoric rather than on an understanding and analysis of complex, real-life situations.

For the future of sustainable tropical rural development, it would seem to be of paramount importance that better, clearer, more-comprehensive, and more-realistic strategies and policies are drawn up. They should be both medium- and long-term, global, national as well as regional, and involve everyone concerned — farmers, agricultural technicians, national planning bureaus, multilateral and bilateral aid agencies, the UN system, etc. Some of the most-urgent issues to be addressed are

- The effects of agricultural production techniques on the environment;
- The effect of food aid and imports on national agricultural productivity;
- The pricing of agricultural produce and inputs — including the incentive (or disincentive) effect they have on productivity;
- Farm size and land consolidation;
- Land tenure and land reform;
- The level of investment in mechanization;
- The needs for and possibilities of rational crop selection (i.e. the growing of the right crop in the right place);
- The institutional, political, and

socio-economic frameworks that encourage adequate agricultural productivity.

Most of the work that is now being done on these issues is done in isolation and rarely results in corresponding action. There needs to be greater admission and awareness that many existing policies have failed. Unfortunately, as individuals and organizations tend not to want to lose face and are not prepared to admit that mistakes have been made, they continue to promote inappropriate and ineffective measures. Whereas top decision-makers, such as presidents and prime ministers, are re-elected or often changed every five years or so, those who decide on agricultural matters are frequently allowed to remain in power for 30 years or more! As a result, some of the international decision-making bodies have been barking up the wrong tree for years.

### *On how development can become sustainable*

If Third World food production is to keep pace with population growth and if the carrying capacity of the earth is to be preserved, new approaches to development must be found and implemented. New, determined initiatives, imaginative ideas, and the willingness to act on them are essential. Ideas and initiatives can only bear fruit if they are allowed to flourish; this is often difficult given the present decision-making process. Prompt and vigorous changes in the decision-making process and in public-policy formation are consequently needed.

The search for new and better approaches to tropical development will be a long and painful process. New ideas and approaches must be tried. Some failures are to be expected, but the search must continue. If we do not succeed, millions of people will starve to death in Africa and other parts of the Third World, and a large part of the globe will be destroyed and become unfit for human habitation. The concluding part of this paper summarizes what is required for development in the tropics to become sustainable.

### Good governance

"Good governance" is the latest catchword in development circles. The international donor community has placed good governance high on the agenda, and a flood of publications, policy guidelines, and directives has recently appeared. Unfortunately, it would seem that the prevailing good governance approach is based on a stylized generalization from Western and particularly Anglo-American economic history and that it represents models of development, which are often irrelevant in developing countries. Moreover, the exact form of good governance should highly depend on local conditions whereas the donor agencies very much use a blanket approach.

The current emphasis on good governance is very relevant, but the set of criteria to be used will still have to be developed. Following MacDonald's line of thought, it seems improbable that the present decision-makers are capable of working them out, and they would have to deal with the governance of their own institutions before they can deal with that of the Third World.

### Improving the project approach

"Projects" play a pivotal role in Third World development, and the design, funding, and implementation of projects determine to a large extent what

happens to the environment in the rural tropics. There is a growing belief that most projects fail outright, and according to a report of a World Bank vice-president, W. Wapenhans, the quality of World Bank projects is even declining. When measures to improve the quality

*If projects are to become more realistic, they will have to be smaller. More bottom-up planning is needed. Local people and all those involved in project implementation will have to be involved right from the start, and more attention will have to be paid to the technical and socio-cultural aspects as is the case at present.*

of projects are discussed, rhetoric thrives and the discussion is always centered on cosmetics while the real issues are never discussed.

In the first place, it is highly questionable whether (ad hoc) projects are the right vehicle for development. Second, in those cases where a narrow-focused project can be the correct response to a development problem, the changes that would be required to make projects meet more of the actual needs and to make them more relevant would be so drastic that a complete overhaul of the

system would be required. Now, decision-making is totally geared toward quantity, toward keeping the money moving, and not toward sustainability and environmental considerations. Careers in project departments depend on the number of projects, not on quality. It is also because of this that large projects are favored and small ones ignored.

If projects are to become more realistic, they will have to be smaller. More bottom-up planning is needed. Local people and all those involved in project implementation will have to be involved right from the start, and more attention will have to be paid to the technical and socio-cultural aspects as is the case at present. Again, to enable this, a totally new approach is required, which in turn is only possible if the decision-making process is overhauled.

### Changing institutional contexts, ethics, and decision-making

At the moment, no progress can be made because within the present institutional contexts no real changes seem to be allowed. There seems to be a stalemate, and everything supports the status quo. It is like Nobel Prize-winner Milton Friedman said in a recent interview, "Bureaucrats are rational decision-makers; they will choose what is in their personal interest and not what is in the interest of the world at large!"

The question therefore becomes: "How can the constitutional context within which the present decision-making process operates be changed and how can those who see the need for change and have important potential contributions to make but are now excluded from the decision-making process be included?" In the first place, a major change in ethics will be required, and awareness of the urgent need for changes in direction and decision-making will have to be raised. Several organizations such as Greenpeace have already affected major changes in public opinion on environmental and development issues but perhaps not sufficiently among decision-makers in the field of tropical rural development.

The final conclusion of this paper is that the impetus required to change the decision-making process can only come from the political arena and in a democratic system from the public at large through the electoral system. The most-urgent action, therefore, seems to be to increase the awareness of the public at large among all concerned.

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Excerpted and adapted from a conference paper by Dr. Willem C. Beets, Agronomy Department, University of California at Davis, First International Tyndall School Symposium, Carlow, 7 September 1994. W. Beets can be contacted at P.O. Box 1, 1050 Brussels, Belgium, or by e-mail: [agbeets@pophost.eunet.be](mailto:agbeets@pophost.eunet.be)

## Looking for more than new knowledge

Most of us are familiar with the Evaluation Hierarchy which includes learning gains or KASA (Knowledge, Attitude, Skill, and Aspiration). However, many times knowledge gain is examined only in terms of the amount of new knowledge acquired by program participants. This definition of knowledge change comes straight out of formal education (kindergarten-college), where it is assumed the young person knows nothing about the subject and the expert or teacher knows everything. That is often not the case with adults.

We shortchange the potential value of our programs when we look at knowledge change only in terms of the number of people acquiring new knowledge. Adults who know something about a topic are most likely to voluntarily come to a session. In these days of easy access to multiple information sources and increased educational levels, adults are picking up bits and pieces of both practical and technical information from a variety of sources. They are seldom starting from base zero.

It is important, therefore, to give participants an opportunity to indicate other changes in knowledge that occur, at least in part, as a result of participating in an extension program. Here is a partial list of other knowledge gains that may give ideas about other kinds of results programs may be stimulating:

- Expanded my understanding of the topic
- Gained greater insight into what I already knew
- Clarified some things that I had heard
- Refocused my attention on the topic
- Helped me put together pieces of information I had heard
- Helped me better understand why I believed something
- Reinforced something I had learned from experience

- Challenged me to rethink something
- Helped me develop an answer to a problem
- Provided interest in learning more about the subject
- Stimulated me to think about the topic/problem in a new way
- Provided ammunition to use in an argument
- Triggered ideas based on the information
- Provided confidence in what I already knew
- Helped me apply something I knew to a new situation
- Encouraged me to act on what I already knew
- Provided confidence to tell someone else what I believed
- Helped me understand myself better

When you begin to think about how hearing information one already knows might be useful, you will come up with other possibilities. Some of these alternative outcomes can be especially useful in attempting to determine the value of extension public policy and issue programming.

The most frequently indicated gains are often surprising. For example, a video program aimed at "top" farmers badly underestimated its audience. Only 17 out of 75 farmers said they gained new information, but 44 said they were challenged to think about some aspect of their feeding program. The other items in the list and the number of farmers checking the items were: 43, reinforcement for what I already knew; 36, better

understanding of something I already knew or was doing; 19, new ideas that I will try; 3, an answer to a question or solution to a problem; and 2, nothing much that seemed valuable to me.

In another instance, 72 participants in a program for parents of teens responded to a program evaluation which included a checklist of gains they might have received from the program. The choices and numbers indicating each gain were as follows: 48, better understanding; 44, new ideas; 42, reinforcement and reassurance that we are on right course; 41, feeling of support from meeting with other parents; 34, desire to change or try something suggested; 29, more awareness of local resources; 23, new questions; 26, awareness of symptoms of problems; 4, help with a specific problem.

The short list that you actually use in an evaluation should be tailored to your audience and to the topic. Giving people an opportunity to identify gains including, but in addition to, new information, is important both to the participant and to you. It helps program participants feel more satisfied with their participation and better

understand the kinds of help they get from extension. It helps you have a greater understanding of how you are helping your clientele.

*We shortchange the potential value of our programs when we look at knowledge change only in terms of the number of people acquiring new knowledge.*

This paper was authored by Dr. Sara M. Steele, University of Wisconsin-Madison. It is reprinted with permission from the *Journal of Extension*, Volume 33, Number 3, June 1995.

# Spotlight on FAO

## Food and Agricultural

*Integrating environmental and sustainable development themes into agricultural education and extension programs, expert consultation*

This report was compiled by Michael Stocking with editorial assistance of Scott Perkin and prepared by the Agricultural Education and Extension Service of FAO. The expert consultation involved 20 experts, 2 consultants, and more than 40 FAO professional staff. The consultation consisted of plenary and small workshops and was enriched by five background documents and a keynote address. The report itself contains those various documents and summarizes the findings and recommendations of the expert consultation.

The keynote address was presented by H. W. Hjort, deputy director-general of FAO. He noted that there is widespread concern about our collective ability to ensure that all people have access to the food they need. There is concern, too, that producers of food should meet this challenge by using methods that will maintain or improve the quality of the natural resource base.

He cited the fact that actual increases in population are unprecedented and are still rising. During the current decade, the average annual growth is expected to number in excess of 93 million people. The earth's population totalled some 5.3 billion in 1990. It is expected to grow to 6.2 billion by 2000 and 8.5 billion by 2025. Between 90 and 95 percent of the increase is occurring in developing countries.

There is *growth* in food production, but it is slowing down and it is expected to continue to slow. By 2010 it is anticipated that world food supplies will still be adequate, but progress is expected to be uneven. It is expected that by 2010 the developing countries as a group are likely to be net importers of food. Currently, there are on average around 2,700 kilocalories available per person per day worldwide. People in developed countries have more available to them than those in developing countries where the average is 2,500 kilocalories. A significant proportion of the world's people lacks sufficient food to lead a healthy and productive life. The latest assessment for 93 developing countries indicates that there are nearly 800 million seriously undernourished people.

The natural resources needed to produce food are used with varying intensity. Overall, the productivity of those natural resources is higher than ever before. However, a significant proportion of these resources is being used in a non-sustainable manner. In some places, ground water is

being used faster than it can be replaced. Water is sometime used inappropriately, and soil quality is being adversely affected. Some land is too fragile to permit continued intensive use, and in other places land is being used in an extensive manner when it could be farmed more intensively.

Hjort observed that it is possible to increase agricultural efficiency without environmental degradation. He suggested that this is accomplished through better research, more effective education and training, improved access to markets, and more ecologically suitable farming practices. Nevertheless, there are stubborn geographic, economic, and social obstacles. He pointed out that there are hundreds of thousands of agricultural teachers, extension workers, researchers, and technicians worldwide to lead their societies through the difficulties ahead.

The objective of the consultation was to examine agricultural education and extension organizations in regard to their role in promoting sustainable agriculture and rural development. The output was intended to guide policy makers in how to integrate the concerns of sustainable agriculture into agricultural education institutions and extension programs. It was noted that current practice does not demonstrate widespread integration of environmental and sustainable agriculture themes in programs.

Participants noted the necessity for maintaining productive resource bases to meet not only current needs but also the longer term. And they were aware of the need to deal with the problems of population growth and gender inequalities while dealing with environmental degradation and rural development. They discussed the adequacy of various approaches, including top-down delivery of messages, but concluded that a more-effective means of protecting the environment and agricultural resources is to empower local people directly involved in the management of those resources.

Eight issues were identified where improvement could be affected.

### 1. *Roles and functions of agricultural education and extension institutions*

The consultation called for an explicit reappraisal of the challenge to empower local communities to solve their own problems of sustainable agriculture and rural development.

### 2. *Policy and mandate*

The consultation noted that there is confusion as to

## anization of the United Nations

what constitutes "sustainable development." There was support for clear policies and unambiguous institutional mandates.

### 3. Institutional capacity

The consultation noted that many existing institutions do not have the capacity due to lack of resources and training and because of other commitments to integrate and carry out programs associated with environmental issues. The consultation concluded that much-closer liaison and integration of programs was called for between agricultural institutions and other organizations.

### 4. Target groups and coverage

The consultation advised that education and extension have to design their programs for specifically targeted audiences. Yet because sustainable development is a fundamental goal for all of agriculture, environmental issues must permeate formal and non-formal education.

### 5. Environmental content and extension topics

The term "critical conversations" was used by the consultation to describe needed interactions between institutions and all strata of society. The consultation noted that there is an impressive array of environmental topics covered by various institutions but that some issues are covered less well than other. Of special concern was the idea that blame for unsustainable practices be ascribed to certain groups or individuals. The consultation argued for a balanced approach.

### 6. Integration approaches and methodologies

An ultimate goal was identified, namely to make environmental issues inseparable from the production goals of farmers, the objectives of industry, and the needs of society. The consultation highlighted the importance of how these environmental topics are to be integrated with production concerns. A variety of technologies and teaching methods was suggested.

### 7. Training and reorientation

It was recognized that many education and extension systems would need to make substantial changes. Properly trained personnel will be vital to success. New models for analysis, which accommodate global perspectives and socio-economic considerations, will be required.

### 8. Funding and resource allocations

The consultation emphasized reappraisal, reorganization, and reorientation in lieu of the expectation of greatly increased resources. It was suggested that some

savings will be possible from better cooperation and liaison between institutions.

Participants in the consultation encouraged FAO to combine the promotion of sustained agricultural production with the maximum effort to conserve natural resources.

### *Strategic extension campaign — a participatory-oriented method of agricultural extension*

The FAO published this case study of experiences in 1994. The publication was prepared by Dr. Ronny Adhikarya, extension education and training methodology specialist at the Agricultural Education and Extension Service, FAO. The need for the publication grew out of a decade of field experiences. It was observed that extension programs need to be oriented more directly to problem solving. They need to be based more on farmer needs, and programs need to be planned more strategically to achieve their objectives in a cost-effective and efficient way. The publication summarizes FAO experiences in applying an approach called the strategic extension campaign (SEC), an extension method that addresses these issues.

The SEC methodology was developed by FAO and introduced in Africa, the Near East, Asia, and Latin America. It emphasizes the importance of people's participation. It starts with a farmers' Knowledge, Attitude and Practice (KAP) survey. Practical workshops are conducted to train extension personnel in the skills they will need to carry out the survey as well as in the other skills required. A goal is to have staff apply to their programs systematic, rational approaches to planning, implementing, managing, monitoring, and evaluation.

This SEC method has been replicated in many countries with FAO assistance with topics including line-sowing of rice, maize production, cocoa cultivation, tick-borne disease control, etc. In addition to the SEC replications in various countries, persons trained in SEC methods have served as consultants and resource people in a number of other countries.

Key to success of SEC is its participatory planning approach. SEC tries to understand farmers' local indigenous knowledge, values, and beliefs and builds on what people already know. Its participatory approach ensures program relevance and helps make recommendations acceptable to

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farmers. Its success is attributed to the following points:

- It advocates a participatory planning approach.
- It is needs-based and demand-driven.
- It uses an integrated systems approach.
- It takes into account human and behavioral dimensions.
- It is oriented to solving problems.
- It employs a cost-effective, multi-media approach.
- It provides specific support materials and training.
- It provides for process documentation and evaluation.
- Its method is applicable to other extension programs.

The strategic extension campaign is defined as an extension method that can reach large numbers of targeted beneficiaries in a short period of time. The SEC is strategically planned and directed at solving problems. SEC advocates the need to carry out extension activities in a systematic and sequential manner, but it is not seen as a separate undertaking. Rather it is viewed as only one part of a larger,

yet integrated, process. The intent is to increase awareness or knowledge of an identified target audience and to alter attitudes and/or behavior. SEC uses specifically designed and pretested messages and cost-effective, multi-media materials to support its intervention activities. There are ten steps to SEC:

1. Problem identification and needs assessment
2. Formulation of objectives
3. Development of strategy
4. Analysis of audience
5. Selection of media
6. Message design and pretesting
7. Management planning
8. Training of staff
9. Field implementation
10. Documentation of process and summative evaluation

The last four steps should be supported by a management information system. That system provides answers to such questions as "who will do what and when?" The author notes that in developing countries where resources are, by definition, limited, the strategic-planning approach can help to identify critical extension education intervention areas — the ones most likely to create

significant impact.

SEC is not a substitute for an agricultural extension system. Instead, it is an approach that may be followed for a portion of extension's work. It is a non-formal education method that should be an integral part of how extension organizations carry out some of their work.

The SEC puts a premium on systematic procedure to determine needs of beneficiaries and to identify problems. This makes possible the development of precise objectives that are relevant and appropriate.

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Adapted from two substantial FAO publications. The first is titled "Integrating Environmental and Sustainable Development Themes into Agricultural Education and Extension Programs." The second is titled "Strategic Extension Campaign." They are published by the Food and Agriculture Organization of the United Nations, Rome. To obtain further information or to obtain copies, write to the Publications Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome, Italy.

## *Institutionalizing farmer participation in the testing of adaptive technology*

The purpose of farmer participation in agricultural research is to involve small farmers as active decision-makers in the development and transfer of new technology. The result is they get the technology they want and can adopt. Bureaucratic, public-sector agricultural research systems consistently fail to serve the majority of small farmers effectively — especially in developing countries. This is partly because small farmers lack the formal channels to communicate

their needs and ideas to technology designers in these research systems on a regular basis. Research systems also lack institutionalized procedures for responding to the priorities of many diverse farm communities. The resultant gulf between public-agency priorities and small farmers' needs is reflected by the many technical recommendations which are never adopted by farmers. At the same time, farmers on their own continue to invest in and adapt locally appropriate

farming practices without the integral support of modern science.

One reason why new technology is not adopted is because small farm systems (particularly those in tropical agriculture) are so highly diverse and location specific. Public-sector institutions cannot afford accurately to adapt new technologies to each local set of circumstances. Instead, they rely on blanket recommendations. This causes farmers to lose confidence in public

agricultural research services. As a result, farmers feel all the more need to test and adapt recommendations themselves.

Farmers who experiment with new ways of farming are an important resource helping rural communities solve their farming problems. Yet these experimenting farmers are generally unrecognized, unsupported, and disconnected from the often-substantial investment in formal agricultural research. Poor countries cannot afford this waste of a valuable human resource.

Experimenting farmers are a neglected resource because conventional approaches to agricultural-technology generation are top-down. Technology is designed by scientists who make decisions about what to recommend to farmers without giving farmers any direct say in this process. The conventional approach is like a doctor-patient relationship. The researcher and extensionist (like the doctor) are supposed to formulate a prescription to cure the farmer-patient's ills. When the doctor or scientist cannot diagnose problems correctly nor formulate appropriate prescriptions because farmers' needs are many and diverse, this approach breaks down.

Developing technology that is suited to the particular, location-specific needs and problems of the 1.5 billion people who depend on complex, diverse, risk-prone agriculture requires a different approach. Participatory methodologies, which aim to institutionalize a role for farmers, usually start out with a menu of technological alternatives. Instead of being taught blanket recommendations, farmers take part in selecting promising items from this menu and are involved in experimenting with them. They participate in evaluating the results of their experiments and in formulating recommendations. If a technology cannot be locally adapted, this information is systematically fed back to researchers. Experience with this approach shows that new technology selected with farmer-participation methods is better adapted to local conditions than that recommended by researchers working on their own.

## *Principles and assumptions*

### *1. Knowledge of scientific methods is useful to experimenting farmers*

One of the basic principles is that training in the method of controlled comparison is useful to experimenting farmers. The alternative is folk experimentation (an approach which does not make use of controlled comparisons). Farmers may compare this year's results with last year's. Or they may contrast results in a distant field with those in a nearby one. Researchers, on the other hand; who have introduced controlled comparison to experimenting farmers, are primarily interested in the validity of results obtained. Both approaches have value. One benefit of the use of controlled comparison in folk experimentation is that it strengthens farmers' capacity to exert "demand pull" on formal research and extension systems. A basic principle then is that farmers' knowledge generation through adaptive technology testing can draw on both scientifically controlled comparisons and folk experimentation.

### *2. Resource-poor farmers cannot afford the risks of experimentation*

Conventional research and extension systems try to minimize farmers' exposure to risk by validating technology before disseminating it. But this is not viable when local conditions are highly diverse. A solution to this problem is the creation of local committees that have access to a special fund (owned by the community). The committees then make decisions to allocate those resources so as to provide a "safety net" to absorb losses when experiments fail. Another strategy for facilitating innovation is to spread risk by working with groups of farmers within a common geographical area.

### *3. Investment is more cost-efficient than "aid"*

Folk experimentation uses sequential (but uncontrolled) "treatments" that are repeated over and over by different farmers. One of its advantages is that it is very cheap for the individual experimenter. Nevertheless, any experimen-

tion does have a cost as well as the potential for gain. Conventional agricultural research and extension systems attempt to provide cost-free results to farmers as a form of aid. However, their ability to deliver useful results is severely affected by their own cost constraints.

Our hypothesis was that the costs of experimentation can be subsidized more efficiently. A fraction of the amount it would take to provide resource-poor farmers with a less-than-comprehensive adaptive testing service would provide resources for a permanent fund to support operational costs of applied testing. The fund would be managed as a rotating investment fund and would generate interest. All major responsibilities for adaptive testing would devolve to farmers (who invest time, land, and locally available inputs). Resources from the permanent fund also would cover farmer losses incurred as a result of experimentation.

Investing in farmers' capacity to do research should increase the productivity of researchers/extensionists. By devolving major responsibilities for adaptive testing to farmers, the professionals should be able to help larger numbers of clients and provide a greater diversity of on-farm trials.

### *4. Investment in management skills is more valuable than providing recommendations*

One of the serious obstacles to devolving responsibility for adaptive research to farmers and their organizations is that they lack managerial skills. The creation of these skills is integrally related to "empowerment," the formation of leadership capacity, and the generation of confidence to negotiate with external agencies.

The principle that no experiment is a failure is basic to the training approach. Each and every farmer's trial is an opportunity to learn, not only from the results of the experiment but also from the experience of managing the process. For this reason, monitoring, self-evaluation, and self-correction are part of the approach.

## *The results of testing the method*

A project was conducted in Cauca, in southern Columbia, over a four-year period from 1990 to 1994. Committees of farmers based in rural communities were formed to carry out technology testing in cooperation with public-sector agricultural research and extension agencies and intermediate organizations. The purpose behind establishing these farmers' research committees (called CIALs) was to mobilize farmer leaders to take responsibility for experimenting with previously unknown (in the community) technologies. By the fourth year of the project, CIAL committees had been formed in 48 communities. The area covered was 1,605 square kilometers. There was direct contact with 4,000 farmers of whom 220 participated in training as members of the CIAL committees. The 48 CIALs were supported by 3 paraprofessionals backed up principally by one trainer-agronomist. It was found that:

1. *The CIAL committees did indeed implement on-farm experimentation.*

Experience indicates that farmers' committees working on their own can accurately record the results of on-farm tests. They effectively implemented on-farm experimentation and did so with a steadily decreasing level of institutional support.

2. *The experiment agenda evolved over time.*

The research agenda defined by the CIALs evolved over time. They started with a search for new crops and varieties but then moved on to an interest in cultural practices. A total of 117 experiments were conducted over the four years of the project involving 15 different "topics" (such as vegetable production, potato production, and maize production).

3. *Quality of research was judged.*

The average success rate of trials (as measured in terms of whether useful knowledge was generated) was found by farmers' criteria to be 90 percent. Use of statistical criteria suggested a more-conservative success rate of 75 percent. However, it was also noted that five of the CIALs became inactive (11 percent of the total) during the four-year period. It was found that there needs to be at least one literate farmer on each CIAL for there to be success.

4. *Costs of experimentation were manageable.*

The cost of operating a CIAL in 1994 amounted to \$502 (US). Experimentation cost \$90 and the rest was spent on operational costs of the CIAL (\$122) and for the personnel (\$290) who guided farmers in their on-farm trials.

## *Conclusion*

It was found that a fully trained CIAL could take responsibility for executing most of the activities involved in the kinds of adaptive research trials required in 48 participating communities. The experimental results generated useful knowledge. They contributed to the diversity of technology tested and increased the flow of technologies to the participating communities.

Adapted from a publication by Jacqueline A. Ashby et. al. titled "Institutionalising Farmer Participation in Adaptive Technology Testing with the 'CIAL'," Network Paper 57, July 1995, Overseas Development Institute, Agricultural Research and Extension Network, Regent's College, Inner Circle, Regent's Park, London NW1 4NS, UK. (fax No. +44 171 487 7413).

## *INTERPACKS Announcements*

### *INTERPACKS Announces 1996 Short Courses*

INTERPACKS will offer three short courses in 1996. The courses and the dates for each are as follows:

*Organizing Integrated Pest Management (IPM) Extension Programs*  
May 19-June 15

*Improving Extension Management*  
September 2-October 3

*Enhancing organizational communications*  
October 13-November 2

The application deadlines for the three courses are respectively April 1, July 15, and August 30.

The director also announced that INTERPACKS is prepared to offer a limited number of tailor-made short courses or study tours either in the U.S. or elsewhere during 1996. Persons wishing further details should contact the director.

### *International extension forum created*

An August, 1995, issue of the first IEF Newsletter announces the creation of a new extension forum. The group, based in the Department of Agricultural Extension, Tamil Nadu Agricultural University, Coimbatore- 641 003, India, received seed money from the Ford Foundation as well as a number of other organizations. A membership application and subscription form may be obtained by writing to the above address. The cost of a foreign membership is \$60 (US).

### *Foundation for European conferences on higher agricultural education*

Biodiversity, an issue in higher education is the focus of the 3rd conference organized under the auspices of Agropolis/Reseau Agronomique Mediterranean with participation of FAR, UNESCO, CC, and French Ministries. The conference is to be held in Montpellier (France) September 18-20, 1996. For further information, contact:

Chairman of the International Conference Committee

Dr. Robert van-Haarlem  
Central Office  
P.O. Box 9101  
6700 HB Wageningen  
The Netherlands  
Tel: (31) 837084018  
Fax (31) 837085123.

### *Information gap threatens poor nations*

The Panos Institute, a non-governmental organization funded largely by Scandinavian countries, warns that "information poverty" threatens the developing world. The report notes that about 70 percent of computers linked to the Internet are in the U.S. and only 10 percent are in Africa. (*Toronto Globe & Mail*, 17 October 1995)

### *USAID information exchange center*

The Environmental Education and Communication Project (GreenCOM) operates an information exchange center accessible via mail, fax, and e-mail to environmental educators and communicators in developing countries. It currently houses more than 3,700 publications, curricula, newsletters, brochures, posters, videos, and other materials on environmental education and communication (EE&C). The center is also continually looking for additional information and welcomes donations of materials to make known to the EE&C community.

The center provides bibliographies, articles, photocopies, samples, and suggestions for further contacts. Requests for information should be as specific as possible, recognizing that the collection contains EE&C materials only. Contact the GreenCOM Information Exchange Center by mail at 1255 23rd St. NW, Washington, DC 20037, USA; by fax at (202) 884-8997; or by e-mail at [greencom@aed.org](mailto:greencom@aed.org)

GreenCOM is funded and managed by the U.S. Agency for International Development and is located at the Academy for Educational Development in Washington, DC.

### *Electronic discussion group*

Our electronic discussion group focuses its attention on extension-related concerns — extension methods and technology transfer in an international setting. Persons interested in participating in the group (either as passive listeners or as active participants) will need to formally join (or subscribe). There is no charge. And when a person no longer wants to receive the e-mail being created by the group, all that is necessary is to "unsubscribe."

Both actions are accomplished by sending a message to our list-processor.

Instructions for subscribing to INTERAG, the INTERPAKS discussion group, are shown on page 12 under the heading "Electronic Services."

### *INTERPAKS data bases accessible now via the world wide web*

Readers are advised that the INTERPAKS data bases are accessible via a "home page" on the world wide web. This means that readers who have shifted to the www graphical interface may go directly to the information desired, as opposed to leaving the web and coming back in via a gopher server. Instructions for finding the home page are on page 12.

### *Digest editorial policy*

The *Digest* is published by INTERPAKS to serve extension professionals and applied research scientists worldwide. The information provided is intended to help readers become more effective in their work and to have greater impact on clientele served. The focus of *Digest* is on research on extension methods, on ways to more effectively and efficiently organize to bring about technology transfer, on important trends affecting the potential for human and economic development, and on current and emerging policy concerns in the areas of agricultural and human development.

Authors are encouraged to submit unpublished manuscripts at any time for inclusion in a subsequent issue of *Digest*. It is highly desirable that manuscripts be no longer than four double-spaced pages. Submissions that are too long for available space will be reduced in length by the *Digest* editor. Books, other published material, speeches, etc. also may be excerpted for inclusion in *Digest* with permission.

Communications concerning submissions should be sent to: R. P. Bentz, Digest Editor, INTERPAKS, 110 Mumford Hall, University of Illinois, 1301 W. Gregory Drive, Urbana, IL 61801. The voice telephone number is (217) 333-5831 or FAX (217) 333-5835. Internet address is [r-bentz@uiuc.edu](mailto:r-bentz@uiuc.edu)

## INTERPAKS *electronic services*

INTERPAKS databases can be reached electronically. There is no fee for this service.

To access these services, the reader may use one of four alternatives:

1. Dial into IDEA (Illinois Dial-up Extension Access)

Phone: (217) 244-5158  
 Speed: 1200, 2400, 9600, or 14400 BAUD  
 Parity: None  
 Stop Bits: 1  
 Data Bits: 8

2. Telnet into IDEA

IP Name: idea.ag.uiuc.edu  
 IP Address: 128.174.134.152 or 128.174.134.153  
 Username: interag

3. Gopher connection

Host: cesgopher.ag.uiuc.edu  
 Port: 70  
 Select: "International-Agriculture-INTERPAKS"

or

Host: esusda.gov  
 Port: 70  
 Select: "Information Servers Cooperative Extension Service (CES)"  
 "University of Illinois"  
 "International-Agriculture-INTERPAKS"

Username: interag

4. World Wide Web connection

Home Page: <http://www.ag.uiuc.edu/~interpak>

On-line help services are available to users by selecting the option "INTERPAKS-Help-Information" on the initial screen when you access INTERPAKS data bases. Users are prompted in how to navigate among the several menus, in searching the data bases, and in how to download or electronically mail material to themselves.

5. Discussion Group

InterNet Address: interag-mg  
 Group Mail Address: interag-mg@ilces.ag.uiuc.edu  
 List Server Address: almanac@ilces.ag.uiuc.edu

To subscribe to the list: Send an e-mail message to the List Server <almanac@ilces.ag.uiuc.edu> and type "subscribe interag-mg *First name Last name*"

To unsubscribe: Send an e-mail message to the List Server and type "unsubscribe interag-mg *First name Last name*"

To see who is a member of the list: Send an e-mail message to the List Server and type "list alias interag-mg"

To send e-mail to the members of the list: Send an e-mail message to the group mail address <interag-mg@ilces.ag.uiuc.edu>

The discussion group is intended for public discussions of topics related to technology transfer in an international context. Individuals are invited to join the group and participate freely.

Anyone needing additional assistance should contact the IDEA Network Manager at (217) 333-9519 or contact the editor via his InterNet address <r-bentz@uiuc.edu>

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# DIGEST

Volume 4, No.2  
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## *INTERPAKS in transition*

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*World population summary*

*INTERPAKS electronic services to continue to be available via the World Wide Web*

### *Editor's Corner*

Persons with access to computers are encouraged to make use of INTERPAKS's electronic services. Instructions for accessing these data bases are found at the end of this publication. Appreciation is extended to authors who submitted articles for publication in the *Digest*. The editor thanks the many readers of the *Digest* who have written to comment on content and value of the publication.

After nearly 14 years of operation, INTERPAKS is undergoing a major transition. As a result of the reorganization of the University of Illinois College of Agricultural, Consumer and Environmental Sciences, INTERPAKS was transferred from the Office of International Agriculture to the Department of Agricultural and Consumer Economics on August 21, 1996. On that same date, the Office of International Agriculture was discontinued. We anticipate that INTERPAKS's move to a regular academic department will result in significant changes to programs and activities.

First, INTERPAKS will focus mostly on research in the future. We do not intend to continue offering our regular, ongoing short courses for international participants in the areas of extension management, extension communications, technology transfer, and technical program areas.

We do expect to retain the capacity to organize special, tailor-made short courses or study tours for individual countries, national programs, or international donors on a limited basis. Similarly, we are prepared to continue providing technical assistance in our areas of expertise. Persons interested in obtaining these services should contact us at the address shown below.

Another important part of our international outreach program has been the publication of the *INTERPAKS Digest*. We will be discontinuing the *Digest* with the mailing of this issue. Some of the recurring costs of editing, publishing, and mailing the *Digest* to approximately 3,000 readers around the world have been covered by donor agencies, and there has been some subscription income as well. We want to express our thanks to those who subscribed to the publication and also our partners in this enterprise: the Food and Agriculture Organization (FAO) of the United Nation in Rome and the Illinois Cooperative Extension Service. Without their support, it would not have been possible to produce the publication.

I would like to take this opportunity to commend Dr. Robert P. Bentz, senior INTERPAKS advisor, for providing intellectual leadership for this important and useful outreach activity for the past five years. Also, Dr. Bentz has maintained our electronic databases. These databases may be accessed without charge by extension professionals and others via the World Wide Web. For the present, we plan to continue these electronic services. Announcements regarding any changes to those services will be posted on our home page.

Over the past 13 years we have witnessed many changes and accomplishments. During this period we have carried out a number of research and evaluation studies for the FAO, IFAD, USAID, and the World Bank. These studies have resulted in research papers, technical reports, case studies, and training modules. During this time we collaborated with several international agricultural research centers, including CIMMYT, CIP, CIAT, IRRI, and ISNAR. In addition, we have produced five books that have been published by the FAO as well as a monograph for the UNDP. INTERPAKS associates have undertaken numerous technical assistance assignments for bilateral and international donors and national programs; many have also served as lead instructors in our short course program. From 1984 through 1990, INTERPAKS published the *INTERPAKS Interchange*, which evolved into the *INTERPAKS Digest*.

Perhaps the most-tangible accomplishment has been the contact with the many extension professionals from around the world who have participated in our various short course and study tour programs. By the end of 1996, we will have worked with approximately 400 people from over 30 countries who have participated in these

three-to-five-week training activities. We have gained much from these extension leaders who have become INTERPAKS alumni over the past 12 years. We hope these training and outreach activities have made a contribution to the improvement of extension systems in each participant's home country. We have many pictures, plaques, paintings, and other memorabilia on our walls to help us remember the many extension colleagues who have become part of the INTERPAKS family.

In closing, I would like to recognize the efforts of John B. Claar, Eldon Johnson, and John Woods, the three

former directors of INTERPAKS; also, Eldon L. Johnson served as the editor of the INTERPAKS *Interchange*. Each of these people provided outstanding leadership for INTERPAKS during its formative years. Although INTERPAKS may become less visible in the years ahead, we will continue to focus on the problems of technology transfer, human resource development, and the task of strengthening extension institutions at home and abroad. We hope that all of our friends and colleagues around the world will continue to stay in touch and to send along information about their programs and accomplishments. If we

can be of further assistance, please let us know at our new address which follows. Our telephone and fax numbers and e-mail address will remain the same.

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## *Don't stop the world, we want to get on — Decision making in the globalizing world market economy*

### ***Stop the world, some may wish to get off***

The INTERPAKS *Digest* winter edition lead article by Dr. Willem C. Beets is entitled "Decision-making in third world agriculture" (vol. 4, no. 1). An appropriate subtitle would have been — *Stop the world, scholar finds that some "tropical peasants" may wish to get off.*

Beets asserts that rural tropical society — and decision making within it — has drastically changed as the result of widespread outside interference in hitherto undisturbed systems. While Beets notes that the formation of the European Union (post-World War II) and the extension system in the United States brought changes in farming systems, he contends that colonialism some 100 years ago and more recently "the so-called green revolution" have reduced the sustainability of rural production systems in tropical countries.

"Tropical peasants" he finds, "are caught up in a complex web of interdependencies," which, he concludes, make rural communities totally dependent on agricultural chemicals, fossil fuels, and the advice of agricultural extension officers financed by external donor development agencies. He asserts that the internationalization of trade has "distorted farm producer prices, even in the remotest parts of the globe. Good governance," he finds, "is not much more than

the latest catchword in development circles" (emphasis added).

I might add that some G-7 country political leaders and some UN agency officials are also arguing that *internationalization and liberalization* of global markets are contributing to the *marginalization* of the trade-disadvantaged, economically small, low-income countries. Their solution, though, is not isolation but pleas for special trade-rule concessions and increased flows of food aid, grant assistance, and concessional loans. Unfortunately, additional aid funding is not likely in the current difficult budgetary environment caused, in part, by the all-too-frequent hatchet jobs inflicted on development programs designed to bring about positive change in the world's least-developed nations. However, it is fair to ask whether the mid-to-longer-term social, economic, and environmental interests of rural communities would be better served by the reconstruction of barriers to international trade and investment and to technology transfer.

### ***Don't stop the world, we want to get on!***

Public- and private-sector leaders in the growing number of dynamic market economies of Asia and South America and the formerly centrally planned countries of Eastern Europe are becoming

strong supporters of the orderly reduction of barriers to trade, including trade in food and agricultural products where the negotiations are often sticky. Most are moving quickly to divest publicly owned or managed properties and firms and are beginning to throw open their borders to foreign investment. The pressure for change is not coming from the IMF, the World Bank, or donor extension agents, although their support certainly helped to get it started. It is coming from a newly re-energized private sector and from consumers with increased purchasing power who are demanding greater consumer choice, better-quality and safer products; better housing, and better education.

Membership in the new World Trade Organization (WTO), post-Uruguay Round of the GATT, has grown to about 80 countries with roughly 40 more at some stage in the process of accession. Governments are pursuing negotiated agreements to reduce trade and production-distorting subsidies and quota arrangements. They are joining and supporting regional trading blocks with the desire to grow the effective size of local and regional markets. Isolation and self-sufficiency are not viable options for countries that take the aspirations of their citizens seriously. The consistent message is "Don't stop the world, we want to get on."

## ***Agriculture underpins society***

Let's take a moment to look back at a limited slice of the evidence as to the willingness of tropical society and rural communities to accept change and the importance of international investments in research to build agricultural innovation and trade. Are there lessons as to how we might lend a hand to the least-developing countries to help them get a better hand-hold on this thing called trade liberalization?

Starting with the archeological record, the founding of ancient civilizations was accompanied in every case by significant improvements in agricultural technology, labor productivity, and trade. These social and technical innovations made it possible to increase consumption levels beyond those needed to meet the bare subsistence requirements of small, extended-family groups. As Beets notes, the discovery and spread of the paddy rice soil- and water-management technologies, supported by appropriate public-sector bureaucracies, accompanied the expansion of the Mayan, Aztec, and Inca civilizations in pre-Columbian Central and South America.

The Age of Discovery in the 15th and 16th centuries kicked off the global distribution of what were the most-adaptable cultivated plant varieties and domesticated animal species. The early Portuguese, Spanish, and Dutch explorers, I might add, were initially looking for an economic advantage in the spice and silk trades — both high-value, specialized agricultural products adapted to some tropical farming systems. Within a historically brief period of time, all of the common starchy staple food crops, the fruit and vegetable varieties, the beverage crops, and even many woody species were disbursed and cultivated far from their genetic sources of origin.

Rural communities in the tropics quickly took up their cultivation wherever the physical resource base, climate, land tenure, and markets made their adoption feasible in farming systems. Today, there is a pan-tropical distribution of common tropical crops

such as cassava, ground nuts, sugar cane, coffee, cocoa, tea, oil and coconut palm, and multiple varieties of bananas, citrus species, rubber, cotton, and tobacco. As society discovers more about the sustainable management of tropical soils and plant and animal pests and diseases, and as barriers to trade are dismantled, production of tropical crops destined for the dynamic market economies could expand quickly to meet that need. The catch is that competition will be sharp, and producers must be able to meet the quality, phytosanitary, and sanitary standards and product-labeling requirements that are now required by importing countries.

## ***Research on tropical food and export crops has a distinguished history***

In the late 19th Century, the colonial administrations of Great Britain, France, and other European countries did understand that ecological and market conditions do make a difference. They made investments in public-sector research institutes and in training and outreach programs. The focus of the research, shared across their colonies, was the improvement of tropical food and cash crops, which could form the basis of an export industry. These were needed to expand the tax base to finance not only the colonial administration but also public-sector services such as roads, post and telegraph systems, and education and health programs.

The second wave of investments in tropical research started just preceding World War II in Central and South America. It was financed by the United States as part of the war effort to expand its sources of food and industrial raw materials. Leadership was provided by Secretary of Agriculture and later Vice President Henry A. Wallace.

In a third wave after World War II, the Ford and Rockefeller foundations financed the establishment of the first group of International Agricultural Research Centers (IARCs), which focused initially on the genetic improvement of wheat and maize (Mexico), rice (the Philippines), and potatoes (Peru). What is noteworthy is that as soon as

improved varieties wheat and rice were available, their cultivation spread *within a decade* throughout the world to farms where the physical and market conditions were right, including the tropical zone countries. Today the IARC system draws financial support from many developed and developing nations, and their mission has been expanded to additional food crops, aspects of livestock production, the management of tropical soils and forests, and insect physiology. Without an international capacity to generate more resource-efficient agricultural technologies, frequent global famine would have become a fact, not just the bad dream of prognosticators of the post-WWII period. Today, more people are better fed, clothed, housed, and educated than ever before in part because food and agricultural commodity prices have trended downward throughout much of the period.

It is no coincidence that the tropical-zone countries such as Brazil, Colombia, Costa Rica, Malaysia, Thailand, and Indonesia that inherited and continued to invest in broad-based research programs were able to expand export markets for a wide variety of tropical food and industrial crops such as natural rubber, palm oil, arabica and robusta coffee, cocoa, cane sugar, citrus, and bananas. Because of their foreign exchange earnings and credit worthiness, they are also the countries that have become the emerging markets for U.S. agricultural products and services.

## ***Open markets and technology transfer — they do make a difference***

The globalization of agricultural production and markets is occurring for three principal reasons. The first is the continuing revolution in scientific discovery, its translation into useful technologies and management systems, and their very rapid disbursement often in less than one year to any location in the world where conditions favor application and use.

The second was a vision, captured in the Marshall Plan and its sequels, that countries working together to solve

common problems would no longer feel the need to resort to economic or military aggression and blackmail. This vision led to the chartering of the UN family of organizations, the Breton Woods Institutions, and a series of regional organizations. Without the existence of the international and regional organizations, the evolution and maintenance of the rule-based system of trade and finance would not be possible.

Third is the dynamic nature of the global private sector on the eve of the 21st Century. The genie is out of the bottle and

can't be put back in. It is the genius of entrepreneurial firms of all sizes that is driving input development and supply, product fabrication and marketing, and customer and food services from nuts and dates to management seminars.

In this continually changing tableau, the benefits of trade liberalization can't be captured in UN-published tables on trade volume and values between countries alone — although the volume and value of most categories of agricultural trade are growing once more. Nor can they be captured in the expanding number of categories of items entered in national trade registers — although there is an ever-expanding array of entries for foods and food supplements; feed grains and feed supplements; animal products; genetically modified plants, seeds, and animals; natural fibers and paper products; and equipment for processing, packaging, and marketing agricultural products from corn flakes to bubble gum. New technologies are here to sterilize, package, and extend the shelf

life of foods from whole milk to tofu. Even more difficult to assess is the impact of trade in information products, services, and invisible products — the know-how and know-when of production and marketing to complement the local entrepreneurial talent and capital.

*All countries,  
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their  
own economic  
and social progress.*

the fact that the trade and sustainable-development opportunities tend to be more constrained for the economically smaller, low-income countries. In this group, the countries of sub-Saharan Africa are faced with particularly difficult trade and environmental problems that seriously constrain their ability to meet the basic human needs of their citizenry.

Let's also recognize that natural and mineral resources are not equally distributed among nations either in their quality, quantity, or accessibility. There are also critical differences in the level of training and skills of human resources and in the management skills of public- and private-sector persons. As a consequence, there is a large and growing disparity in the rate of per capita income growth observed in the dynamic market economies in comparison with the least-developed countries.

The evidence is conclusive that centralized economic planning and government direct management of

### **Not all countries start on an equal footing**

Let's be honest about the fact that *not all countries are on an equal footing when it comes to trade promotion and sustainable development.* While choosing the right policy direction is a "necessary" first step, this is never a "sufficient" step in and of itself. Let's also be honest about

production and marketing enterprises are unworkable. Most public enterprises are poorly managed, under-financed, and slow to adjust to changing consumer preferences for product quality, dependability, and safety. The evidence is equally conclusive that countries open to trade and private investment have consistently outperformed those that have chosen to erect barriers to trade and investment and to new technologies and management systems.

All countries, regardless of their level of income, must take active responsibility for their own economic and social progress. Those individual countries that continue to need help must be prepared to reach out to the international community for ideas and assistance. They must be willing to reformulate national policies and to reform public services along lines which promote private-sector saving and investment.

Because of the accelerating rate of scientific discovery and rapid development and testing of new technologies, the global trade outlook is a positive one. And there is a growing consensus and understanding as to the reasons for the economic disparity among nations. The task now before us is to build a consensus as to how to best help all nations, large and small, advanced and developing, to benefit more quickly from the expanding and constantly evolving global product markets and financial market systems.

In conclusion, the operative paradigm is that cooperation, based on mutual interest and benefit, has been and will continue to be a powerful tool to minimize political tensions among nations and to improve the status of human welfare on a global basis. The goal we share is for improved economic, food, and environmental security for all nations.

*By Dr. Donald S. Ferguson, International Organization Affairs Adviser, Foreign Agriculture Service, U.S. Department of Agriculture, Washington, D.C.*

## Smallholder farmers' perceptions of extension agents by gender in Tanzania

For decades agricultural extension has been an important tool in educating farmers on better farming methods. Extension bridges the gap between technical knowledge and farmers' practices and has been shown to be cost-effective (Birkhaeuser, Evenson, and Feder, 1991). In the past agricultural extension officers in sub-Saharan Africa have been male, relating primarily to male farmers. But in Africa, where women contribute more than half the agricultural labor, choose seeds, and are increasingly making decisions on agricultural production, it has been argued, especially during the last 15 years, that women should be hired as extension agents. Custom often precluded male agents from disseminating information to females, and husbands often did not bring information home to their wives (Spring, 1988; Due, Mollel, et. al., 1987; Chenoweth, 1987; Saito and Weideman, 1990; Due, Sikaponde, et. al., 1991 to mention only a few). Since 1985 some female extension agents have been hired in Africa, but little research has been undertaken to ascertain smallholder farmers' attitudes toward female agents. This study is one of the first (to our knowledge) to ascertain farmers' attitudes regarding each gender of officer.

In Tanzania's Ministry of Agriculture and Livestock Development, one-third of its village extension officers (VEOs) are now female. Men and women receive the same training. In October 1995 Due and Magayane conducted a study to ascertain farmers' attitudes to VEOs by gender. In one earlier study had been undertaken in which only female farmers were interviewed as to preferences for female VEOs, 70 percent said they preferred female VEOs (Rutachozibwa, 1993). The Due-Magayane study was conducted in the Morogoro Region where 240 male and female farmers were interviewed. Sets of villages in close proximity and with similar soils, rainfall, and crops were chosen, one of which had a male and the other a female VEO. Each of the VEOs had the same training and approximately the same years of experience. Farmers were asked if they preferred a male or female extension officer and the reasons for their preferences.

The authors found that of the male farmers sampled, 35 percent preferred a male VEO, 30 percent a female, and 35 percent either (as they had the same training). Of

the female farmers, 40 percent preferred a female, 26 percent preferred a male, and 34 percent were neutral. Of the total sample reporting, 31 percent preferred males, 35 percent females, and 34 percent were neutral. These preferences for or neutrality toward female VEOs are surprising in a predominantly Moslem area. Farmers often stated that what was important was that the extension agent had information to assist them and not the gender of the agent. A district supervisor said, "Character is more important than gender in assisting farmers."

What were the reasons for their preferences? Thirty-four percent of the male farmers reported *no cultural bias* (men working with women, etc.); 22 percent said their choice was determined by how active and responsive their agent was, not the agent's sex; 21 percent indicated that their preference was determined by how well the agent explained things; 17 percent were neutral as to gender; and 6 percent had other reasons. The women farmers said their choices were 35 percent no cultural bias, 24 percent neutral, 23 percent explained things better, 12 percent more active and responsive, and 6 percent other reasons. Female farmers stated they preferred a female VEO since she was freer to discuss their problems with them. Women also expressed different time preferences for meetings than male farmers.

The large emphasis on *no cultural bias* was surprising, as it was the principal reason given by 35 percent of both male and female farmers. However, this is a predominantly Moslem region and cultural values remain.

Although the VEOs receive the same training, the sampled farmers who responded thought female extension officers presented better information than males (34 percent to 29 percent with 37 percent neutral), came better prepared (34 percent to 29 percent), and presented more useful information, especially on crops, livestock, and nutrition (39 percent to 25 percent).

In 1994 and 1995 the T&V extension system was modified since it was not working well. Up to that time, VEOs disseminated information to contact farmers, and they in turn disseminated information to non-contact farmers.

Following the modification, the system called for VEOs to disseminate "impact points" that are received monthly by groups of farmers — male, female, or mixed — rather than by individual contact farmers. Unfortunately, the VEOs interviewed had only formed two groups of 10 to 12 persons each in 1995, and more than a two-thirds of the farmers interviewed reported they had had no contact with the VEO that year. The VEOs are going to have to work much harder at organizing and working with groups of farmers if the revised approach is to be effective.

### What policy recommendations follow?

1. More female VEOs should be hired, as the female farmers prefer them and male farmers do not object to them. Farmers believed that female VEOs provided better information in many cases.
2. More sensitivity training for male VEOs is needed to explain why they should work with male and female farmers.
3. VEOs should be assisted in group formation and be sympathetic to preferred times of meetings of female and male farmers.
4. VEOs should provide more training of farmers in specialized crops for different districts. Farmers are not likely to be able to feed their families for a year following "blanket" recommendations.
5. VEOs should receive more training in the challenges to farmers brought about by privatization. VEOs seem less prepared than farmers to deal with the changes which are occurring and will occur with this government policy.
6. More field days should be held, as requested by farmers

By Jean M. Due, Flaviamus Magayane, and Anna Temu, University of Illinois. Summary of a 1996 report with the same title. Copies of the report are in the University of Illinois, Urbana, Illinois and the Sokoine University of Agriculture library, Morogoro, Tanzania.

# Spotlight on FAO

## Food and Agricultural

### *Fighting AIDS in the rural areas:*

### *A new threat and challenge for agricultural extension and training*

The FAO's Agricultural Extension and Education Services (SDRE) has developed a new initiative and activity on "AIDS and its implications for agricultural extension," which is supported by FAO's own regular program funds. The main objective of this initiative is to develop and test normative and generic methodologies for designing and incorporating HIV/AIDS awareness, prevention, and coping mechanisms education for rural population through agricultural extension and training.

#### **The problem:**

Such an initiative is critically needed as the HIV/AIDS pandemic is now rapidly spreading to the rural population. Moreover, the *New York Times* (21 Jan., 1996), citing WHO data, reported that in 1995, "the number of people infected with HIV, the virus that causes AIDS, was larger in Asia than in Africa. By the turn of the century, more people will be infected each year in Asia than in the rest of the world combined." Thus in Asia alone, where a majority of the rural population live, WHO predicts that the number of infected Asians will rise from 3.6 million in 1996 to about 12 million by 2000.

The victims of the HIV/AIDS pandemic are those who belong to the most economically productive segment of the population, including the skilled and trained agricultural labor force. A reduced agricultural workforce as a result of HIV/AIDS infections could spell national disaster. As indicated in its State of Food and Agriculture (SOFA, 1994) publication, FAO estimated in 1994 that GDP growth rates in sub-Saharan African countries will be halved in the next five years as a consequence of HIV/AIDS. Research in these countries

indicates that farmers often cope with reduced labor supply by adopting farming practices that jeopardize immediate and future agricultural productivity. Delays, inadequate execution, and cessation of routine farming operations such as tilling, weeding, planting, and mulching lead to poor harvest and an alarming perpetuation of crop pests and diseases.

Labor shortages force farmers to reduce the land under cultivation. Crops are often chosen for their low-labor requirements rather than their nutritional value or marketability. In addition to labor shortages, deaths or even the illness of productive farmers can erode century-old indigenous agricultural knowledge regarding local cultivation techniques and other specialized cultivation skills. In rural areas where HIV/AIDS infections are rising steeply, the potential economic impact of HIV/AIDS on agricultural production can be devastating. The human and social cost will also be huge.

#### **The initiative:**

In connection with the above, a planning workshop supported by FAO/SDRE was successfully conducted in Penang, Malaysia, from 4 to 8 December 1996. Participants were from Kenya, Malawi, Malaysia, the Philippines, Thailand, Nepal, Italy, and the United States. In the small working group sessions, the participants developed:

#### *Fighting AIDS in the rural areas*

- A. A list of critical HIV/AIDS issues which are relevant to agricultural extension and training;
- B. The Critical Information and/or Technology Acquisition Package (CITAP) on HIV/AIDS and its implications for agricultural extension and training.

Based on A and B, the workshop participants then developed:

- C. A suggested generic, prototype Knowledge, Attitude, and Practice (KAP)-survey questionnaire on AIDS and its implications for agricultural extension (AIDSIMAX).

#### **The follow-up:**

The workshop also shared and discussed the process, results, and experiences of developing a CITAP and KAP survey questionnaire on HIV/AIDS and its implications for agricultural extension in Malaysia, which have been carried out by the Muda Agricultural Development Authority (MADA) in collaboration with the Universiti Sains Malaysia, Ministry of Health, and Faculty of Allied Medicine, National University of Malaysia with technical and financial support from FAO/SDRE. Such a collaborative activity will be continued using the above mentioned workshop outputs in conducting in the MADA area in North Malaysia the first KAP survey, the Focus Group Interviews that will start in mid-April 1996.

The KAP survey results will then be used as inputs for developing strategic extension campaign plans, messages, and multi-media materials as well as in determining the specific contents and developing HIV/AIDS prevention and coping mechanisms training curricula and modules/materials for use by agricultural extension planners and trainers. The generic and prototype KAP survey questionnaire will be adapted and translated by interested institutions that plan to undertake similar agricultural extension and training activities on HIV/AIDS such as in Malaysia.

As a result of the workshop's discussions and the initial activities in

## Organization of the United Nations

Malaysia, written summary proposals for conducting KAP surveys on HIV/AIDS and its implications for agricultural extension (AIDSIMAX) have been prepared by the Ministries of Agriculture in Malawi and Kenya, the Philippines Rural Reconstruction Movement, the Central Agriculture Training Centre, Nepal, and the Thai Royal Project Foundation. FAO/SDRE is now in the process of reviewing these institutions' proposals for support of said activities in Malawi, Kenya, Thailand, the Philippines, and Nepal.

The following documents/reports are now available for review, and we invite

any comments and suggestions for further improvements:

1. Summary of critical issues on HIV/AIDS implications for agricultural extension and training;
2. Critical Information and/or Technology Acquisition Package (CITAP) on HIV/AIDS implications for agricultural extension and training;
3. Suggested generic prototype Knowledge, Attitude, and Practice (KAP) survey questionnaire on AIDS and its implications for agricultural extension (AIDSIMAX);
4. Workshop Report on "AIDS and its implications for agricultural extension

(AIDSIMAX)," 4-8 December 1995, Penang, Malaysia.

Copies of these documents may be obtained by contacting:

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By Dr. Ronny Adhikarya, SDRE.

### ***FAO expert consultation on rural youth and sustainable development***

Twenty-three high-level experts from Africa, Asia, Latin America, the Caribbean, Europe, and the United States participated in a three-day *Expert Consultation on Extension Rural Youth Programs and Sustainable Development* from 28 November to 1 December 1995 in Rome. They affirmed the importance of rural youth programs and the positive impact they make toward sustainable development in developing countries. Female and male youth make up a large segment of total rural population, and yet they are often neglected and overlooked by government policy makers and international development strategists. This can be attributed, in large part, to the overwhelming concern for immediate solutions to problems of national development with an accompanying inaccurate perception that youth are not yet productive and contributing members of society.

Where they exist and are functional, rural youth programs play an important role in building life skills of individual young people; strengthening families and

communities; and working towards sustainable agricultural and rural development as a major contributor to the overall progress of a country. Rural youth programs actively promote the application of appropriate technology to improve agricultural production on a sustainable basis. Young people tend to take special interest in conservation and management of natural resources and are more ready than adults to accept and promote sound environmental practices. Rural youth programs can become a catalyst that energizes the process of environmental education in a country, leading to practical applications on a large scale, thus contributing to sustainable development.

The assembled experts felt FAO should intensify its efforts of advocacy on behalf of rural youth and play a role in assisting governments formulate national youth policy with special considerations for rural young people. Specific recommendations to governments included the need to provide sufficient resources to strengthen and expand

existing rural youth programs and create and maintain new ones. Rural youth programs should become a part of all comprehensive strategies of national agricultural extension services that target rural families. Governments should encourage partnerships and volunteerism in youth policy and programs as well as facilitate entrepreneurship and income-generating activities for rural youth.

Recommendations directed to FAO, governments, and national rural youth programs were also made in the areas of institutional strengthening, program management, and educational content and delivery systems. Consultation participants think FAO should help rural youth programs in member countries design and implement participatory strategic planning processes to enable them to develop action programs for expanding and strengthening existing programs or creating new ones. This would include the development of guidelines and prototype training materials.

In a time of reduced budgets, rural youth programs are encouraged by consultation experts to play a greater role in resource development at all levels of the organization through local community-based fund raising to the development of national foundations to support rural youth work. FAO should play a role in helping governments through information, training, and manuals to carry out effective financial resource development, including assistance in establishing and maintaining national private-sector foundations.

A major theme discussed throughout the consultation was that FAO needs to play a greater role in helping build partnerships and facilitate the exchange of information. This includes encouraging collaborative working relationships at the national level among government and non-government organizations to exchange information, share resources, and work jointly on projects to eliminate unnecessary duplication of effort and to more-effectively reach greater numbers of rural youth with higher-quality programs. On a regional basis, it would involve the facilitation of forums and meetings to enable professional youth workers to exchange ideas and information related to critically important topics. At the international level, the

recommendation was made to expand *Youth Works*, the FAO newsletter published twice a year, so it would reach larger numbers of rural youth professionals worldwide on a more frequent basis. FAO should also play a role in facilitating the exchange of information related to rural youth programs electronically through e-mail and/or the World Wide Web and serve as a clearing house for selected high-priority topics such as rural youth development, income-generating activities, and micro-enterprise development.

Another major area of recommendations had to do with staffing of rural youth programs, both professionals and volunteers at all levels in the organization. FAO should assist governments in developing national youth-worker training curricula and materials. It should carry out research to identify successful training programs and models and disseminate this information. Experts encouraged governments to provide adequate staffing at all levels of an organization and to implement effective in-service training programs and staff development opportunities. Governments should facilitate the exchange of rural youth experts from other developing countries through the FAO Technical Cooperation among

Developing Countries (TCDC) approach to technical assistance.

Another suggestion to rural youth organizations is to create initiatives to identify the research and knowledge base in order to improve their programs. In terms of educational content, rural youth programs should establish priorities and initiate activities to develop publications and teaching aids to support staff and volunteer leader training as well as member learning. They should ensure that programs and materials are age-appropriate and are adapted to meet the varying needs of diverse groups in a country. FAO should be prepared to provide assistance in helping member countries develop appropriate subject-matter training and teaching materials designed specifically for rural youth programs targeting boys and girls in a variety of non-formal educational settings.

The report of this expert consultation is available from the Rural Youth Officer, FAO, SDR Division (D-404), Viale delle Terme di Caracalla, 00100 Rome, Italy (FAX: 39-6-5225-3152 or e-mail: William.Seiders@fao.org)

By R. William Seiders, Agricultural Training and Extension Officer, Rural Youth, Extension, Research and Training Division, FAO, Rome.

## "Performance Evaluation Guide"

Prepared by Dr. Mohottige U. Sedere and Dr. A. Soedradjat Martaamidjaja under the sponsorship and guidance of the (FAO) Agricultural Extension and Education Service (1995).

This 218-page guide book is intended for managers, planners, evaluators, and/or trainers of agricultural training programs. The book is a generic methodological guide for the evaluation of training efforts. It was developed originally for use by Indonesia's Agency for Agricultural Education and Training. It is separated into six chapters:

"Introduction to Performance Evaluation,"

"Performance Analysis,"

"Formulation of Performance Objective,"

"Procedural Considerations,"

"Formulation of an Assessment Instrument,"

"Interpretation of Performance Assessment Data."

Illustrative examples of performance evaluation methods are presented in a step-by-step manner in a format that is easy to read and facilitates reader comprehension.

Agricultural training institutions strive to increase the cost effectiveness

and quality of their training programs. A means to achieve qualitative improvement is to apply competency-based performance measures to training activities. This guide book offers an explanation as to how to do that. Results can be used as inputs for improving the process, method, materials, delivery, and impact of training activities.

To obtain further information about this publication, write to the Publications Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome, Italy.

## Improving Agricultural Extension: A Reference Manual

A manual by the title *Improving Agricultural Extension: A Reference Manual* was published by FAO in 1984. That manual, edited by B. E. Swanson, was prepared under contract for FAO by INTERPAKS. Over the intervening years, it has been translated into a number of different languages and has seen widespread use. Earlier publications with the same title were released by FAO in 1972 and 1973 and were authored by Addison H. Maunder.

A 1996 edition of *Improving Agricultural Extension: A Reference Manual* has recently been submitted to FAO in accordance with contract terms by INTERPAKS. This version was edited by B. E. Swanson, R. P. Bentz, and A. J. Sofranko. Release to the public of this edition is anticipated shortly.

The new manual is divided into four major sections: Overview of Extension in Agricultural and Rural Development, Improving Extension Programs and Processes, Improving Extension Management, and Current Trends and Developments. Chapter titles and authors are as follows:

1. "History, Development, and Future of Agricultural Extension" — Gwyn E. Jones and Chris Garforth (University of Reading, Great Britain)
2. "Alternative Approaches to Organizing Extension" — Uwe Jens Nagel (Humboldt-Universität of Berlin, Germany)
3. "Context of Extension in Agricultural and Rural Development" — Warren Peterson (International Service to National Ag Research, The Netherlands)
4. "Economic Contributions of Agricultural Extension to Agricultural and Rural Development" — Robert Evenson (Yale University, USA)
5. "Assessing Target Group Needs" — N. L. McCaslin and Jovan P. Tibeziinda (The Ohio State University, USA, and Makerere University, Uganda)
6. "Using Rapid or Participatory Rural Appraisal" — Jules N. Pretty and Simplice D. Vodouhe (International Institute for Environment and Development, Great Britain, and National University of Benin, Benin)
7. "Developing and Delivering Extension Programs" — Artur Cristovao, Timothy Koehnen, and Jose Portela (University of Trás-os Montes and Alto Douro, Portugal)
8. "Selecting Appropriate Content and Methods in Program Delivery" — Dunstan A. Campbell and St. Clair Barker (University of West Indies, Trinidad)
9. "Improving Women Farmers' Access to Extension Services" — Janice Jiggins, R. K. Samanta, and Janice E. Olawoye (University of Guelph, Canada, National Academy of Agricultural Research Management, India, and University of Ibadan, Nigeria)
10. "Implementing Strategic Extension Campaigns" — Ronny Adhikarya (Food and Agriculture Organization, Italy)
11. "Evaluating Extension Programs" — David Deshler (Cornell University, USA)
12. "Formulating Extension Policy" — Tito E. Contado (Food and Agriculture Organization, Italy)
13. "Improving the Organization and Management of Extension" — M. W. Waldron, J. Vsanthakumar, and S. Arulraj (University of Guelph, Canada, and Sugarcane Breeding Institute, India)
14. "Managing Human Resources within Extension" — K. Vijayaragavan and Y. P. Singh (Indian Agricultural Research Institute, India)
15. "Training and Professional Development" — Abdul Halim and Md. Mozahar Ali (Bangladesh Agricultural University, Bangladesh)
16. "Acquiring and Managing Financial Resources" — Robert P. Bentz (University of Illinois, USA)
17. "Monitoring Extension Programs and Resources" — D.C. Misra (Secretary of Agriculture, Government of Goa, India)
18. "Establishing a Management Information System" — A. Ramesh Babu, Y.P. Singh, and R. K. Sachdeva (Indian Agricultural Research Institute, India, and Indian Institute of Public Administration, India)
19. "Strengthening Research-Extension-Farmer Linkages" — Burton E. Swanson (University of Illinois, USA)
20. "Extension's Role in Sustainable Agricultural Development" — Niels Roling and Jules N. Pretty (Wageningen Agricultural University, Netherlands, and Institute for Environment and Development, Great Britain)
21. "Establishing and Strengthening Farmer Organizations" — Shankariah Chamala and P. M. Shingi (University of Queensland, Australia, and Indian Institute of Management, India)
22. "Privatizing Agricultural Extension" — William M. Rivera and John W. Cary (University of Maryland, USA, and University of Melbourne, Australia)
23. "Role of Nongovernmental Organizations in Extension" — John Farrington (Overseas Development Institute, Great Britain)

The Publications Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome, Italy, will announce availability of the publication and other details.

## Agricultural extension strategy in the Punjab

The Punjab is the most agriculturally advanced state of India. Its geographic area is only 1.5 percent of the country, but it produces 25 percent of the wheat, 10 percent of the paddy rice, 22 percent of the cotton, and 10 percent of the milk produced in the country. The Punjab state benefits from highly developed research-extension linkages, which help to account for its productivity.

### Developing recommendations for farm practices

Each year, seven workshops are offered by the Punjab Agricultural University, Ludhiana (PAU). The purpose of these workshops is to finalize recommendations with regard to crop production, agricultural engineering, animal husbandry, fodder-feed production, and horticulture crops. Scientists, extension workers, and field extension staff attend the workshops where research findings are discussed, views are shared, and problems and experience in the field are highlighted. Eventually, a consensus is reached as to how recommendations should be modified for the coming crop year. Packages of practices are revised, based on the recommendations developed at each of the workshops. Books containing the recommendations are then printed by the PAU and distributed to extension workers for use in working with farmers.

### Training extension personnel

The Department of Extension Education, PAU, Ludhiana, regularly organizes training courses for extension workers in the Punjab. Both induction and refresher training are provided. But it is not only extension workers who are trained. Training is also provided to staff of other organizations in direct contact with farmers. Included are staff from banks, corporations, and all of the various governmental agencies. In this way, competencies and subject-matter knowledge of staff of all groups serving farmers are updated and enhanced.

### Disseminating information

PAU and the various development agencies of state government diffuse agricultural messages among farmers. Built-in linkages among the several agencies ensure that the messages are complementary. All of the usual extension methods and media are used. These include:

#### (1) Training farmers and farm women

PAU has emerged as the largest training center in Asia for farmers, farm women, and youth. Training courses are offered in a wide range of subjects with courses being of various lengths. Training is provided on a continuing basis via correspondence lessons on a monthly basis.

#### (2) Training youth

Youth development programs are offered on a continuous basis. Youth clubs have been organized in villages. Training is accomplished via individual and group projects conducted in homes, on farms, and in schools. The program provides young people the opportunity to "learn by doing" and to "earn by learning." Practicing young farmers are worked with separately from other audiences. Their training helps them to achieve higher proficiency in farming and helps them become volunteer change agents. PAU also offers training in integrated home science practices to young girls from rural areas.

#### (3) Farmers club

Some 2,000 progressive farmers belong to the Punjab Farmers Club. This is a non-political organization created by PAU. It meets on the PAU campus and receives special technical and organizational support from PAU scientists. The club meets monthly and has a quarterly magazine. Using these methods, PAU experts transmit information to members of the club regarding the latest recommendations.

#### (4) Farmers' fairs

PAU began organizing farmers' fairs in 1967. Today two fairs are held at the PAU campus each year. Two fairs are also held annually at each of the four regional research stations. More than 20,000 farmers and farm women participate at each of the fairs.

#### (5) Extension publications

PAU publishes written extension materials on all of the important crops, farm machinery, and home science. More than 20,000 farmers subscribe to monthly magazines.

#### (6) Television, radio, and newspapers

Scientists at PAU contribute articles for use in weekly supplements to local newspapers. There is a quarterly schedule of farm telecasts and radio broadcasts. PAU has developed effective links with the media. These linkages help to ensure that agricultural information reaches farmers through the mass media.

#### (7) Farm advisory service

The PAU has a well-developed system of farm advisory services through the state. A team of scientists representing a number of subject matter areas is assigned to each of the district headquarters units. These teams are responsible for carrying out on-farm adaptive trials and for providing advice to farmers in the district. They cooperate with staff of other agencies that conduct extension-like activities.

#### (8) Agricultural knowledge centers

To meet demands that are location specific, agricultural knowledge centers have been created at the district level. These centers provide training for farmers, farm women, and youth. Programs at the centers are specifically tailored to local needs and potential for agricultural development.

### Summary

All available extension methods are utilized by staff of the Punjab Agricultural University. As a result, new agricultural technology is disseminated to the farming community, and farmers are helped to fulfill their aspirations in a world changed by the liberalization of trade. Information reaches farmers from a variety of sources. In this way, they are more likely to know of the innovation and to quickly adopt new practices that result in higher productivity.

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## Gender sensitization in agriculture: a training module

### Rationale

Agriculture is the single largest livelihood system in India. It contributes about 31 percent of the GDP and employs nearly 62 percent of the workforce. Women, who represent nearly half of the total population, are a sizeable presence in the agricultural labor force. For instance, 38 percent of all agricultural laborers, 20 percent of cultivators, and 29 percent of livestock and forestry workers, according to the 1991 census, are women. Hence, the majority of them can be considered to be "farmers" — working as independent cultivators, unpaid workers on the family farm, wage laborers, or some combination of these.

But although "women hold up half of the sky," as Mao Zedong says, they have remained invisible in most agricultural development policies and programs in India. A review of such programs indicates that the understanding and concern for women's issues at the policy and program-formulation level get considerably attenuated by the time the programs are implemented on the ground. Besides the normal lacuna of implementation of any government program, women's development programs have also experienced indifferent performance.

### The need for a gender-sensitization module

The neglect of women by the development planners can be predominantly attributed to several gender-specific biases inherent in our development process:

- Use of "household" approach in most development programs, including poverty alleviation, which quite often prevents women from receiving the benefits;
- Inadequate recognition of the special needs and constraints of women participating in economic activities;
- Male-oriented delivery structure with no or marginal presence of women extension staff and no reorientation of the male staff;

- Little attempt to promote non-traditional economic activities for women either at the training stage or the stage of supporting economic activities.

In order to tackle such overriding problems, changes are warranted in the organizational as well as the functional dimensions of program-implementing agencies. In addition, such changes in these agencies should be supported by appropriate human resource development endeavors. The capabilities of planners and program executives at various levels need to be built up so they may tackle gender issues in agriculture and its component sectors.

The share of training programs aimed at gender analysis or gender sensitization was almost nonexistent until about a decade back. In agriculture, most training programs deal with technological and managerial issues where the focus is invariably on the knowledge and skill dimensions of reaching out to people. But sensitization to gender issues goes much beyond the mere knowledge or skill levels of competence of development functionaries. It involves a combined exposure on knowledge, skill, and attitudinal parameters. Consequently, it is necessary to evolve a module that will facilitate changes in behaviors of development executives and practitioners.

An effort was made by the National Institute of Rural Development to evolve gender-aware modules in agriculture with active support from the United Nations Development Fund for Women (UNIFEM). The effort culminated in a series of modules capable of sensitizing policy makers to gender issues in agriculture. The parameters contained in these modules included "inputs," "process," "outputs," and "implications." A more-detailed presentation of the modules is available from the authors.

### The framework

The framework for gender sensitization stands primarily on the operational definition of "agriculture." That

definition was conceived in the wider context of land use as practiced by farm families. Having defined "agriculture," the primary purpose of the framework is to facilitate the creation of a training module that is capable of sensitizing agricultural development people to gender issues. The framework has four interdependent components: Inputs, Process, Output, and Implications.

### Inputs

Various types of inputs were studied through intensive research and selected for inclusion in the module.

- Conceptual analysis of gender and issues related to agriculture
- Policy analysis of agricultural development programs from a gender perspective
- Analysis of intrapersonal realities by development staff concerning gender perception
- Case analysis of realities of development projects from a gender perspective

### Process

The process of organizing inputs into a module structure made clear the need to develop appropriate training materials and to arrange these materials in sequence.

- Self awareness exercise with respect to gender perception
- Activity analysis exercise for a typical rural family to demonstrate the triple-role burden of women and to show the importance of the "production" role carried by women
- Examination of the various sectors in agriculture to provide understanding of gender needs with respect to roles in each sector
- Case analysis to strengthen the perception about realities and help development staff see the need for corrective action and to make programs more responsive to the needs of women

### Outputs

The organization of inputs as shown above makes it possible for agricultural development staff to be led through a process consisting of specific sessions that will help to change "knowledge," "skills," and "attitudes." The modules were test administered in four regional workshops conducted so as to incorporate agro-ecological variations. The modules were subsequently "fine tuned," and they are now being offered to others for their use.

If the modules are to receive wide utilization, it is suggested that a nationwide network of training institutes or organizations be created. NIRD has an established network of 22 state institutes of rural development in India. These institutes are being utilized to deliver the gender-sensitivity module in India.

In addition, a number of sector-oriented supporting modules have been developed. These modules cater to the sensitization needs of specific clientele groups such as sericulture and seed agencies. Experience to date in administering these modules has been encouraging. Participants have grown in their appreciation for the need to take

corrective actions and to formulate specific action plans.

### Implications

Increased gender sensitivity on the part of development executives is a positive result from using the module. These executives develop a better understanding of roles, status, interventions, and intended benefits. Their sensitivity is likely to be evidenced through more pragmatic planning and the implementation of development interventions. Agricultural development programs become more gender responsive.

A characteristic of the module is its applicability in large numbers of developing countries. In these countries, agriculture is the mainstay of rural living with women playing a major role in the process. Consequently, the module requires little change from country to country for it to be applicable.

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## INTERPAKS data bases will remain accessible via the World Wide Web

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## World population summary

If we could shrink the Earth's population to a village of precisely 100 people with all existing human ratios remaining the same, it would look like this:

- 57 would be Asian, 21 European, 14 from the Western Hemisphere, and 8 African
- 80 would live in sub-standard housing
- 70 would be non-white; 30 white
- 70 would be non-Christian; 30 Christian
- 70 would be unable to read
- 50 would suffer from malnutrition
- 50 percent of the wealth would be in the hands of 6 people (all Americans)
- One would be college educated

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