- PN-ABG-67

isnar

International Service for National Agricultural Research

The International Service for National Agricultural Research (ISNAR) began operating at its headquarters in The Hague, Netherlands, on September 1, 1980. It was established by the Consultative Group on International Agricultural Research (CGIAR), on the basis of recommendations from an international task force, for the purpose of assisting governments of developing countries to strengthen their agricultural research. It is a non-profit autonomous agency, international in character, and non-political in management, staffing, and operations.

Of the thirteen centers in the CGIAR network, ISNAR is the only one that focuses primarily on national agricultural research issues. It provides advice to governments, upon request, on research policy, organization, and management issues, thus complementing the activities of other assistance agencies.

ISNAR has active advisory service, research, and training programs.

ISNAR is supported by a number of the members of CGIAR, an informal group of approximately 43 donors, including countries, development banks, international organizations, and foundations.

Linkages Discussion Paper No. 8

The Training and Visit System and the Links between Rice Research and Extension in the Matara District of Sri Lanka

by

Stephan Seegers

October 1990

isnar

International Service for National Agricultural Research

INTRODUCTION TO THE ISNAR STUDY ON THE LINKS BETWEEN AGRICULTURAL RESEARCH AND TECHNOLOGY TRANSFER IN DEVELOPING COUNTRIES

DAVID KAIMOWITZ[1]

In 1987, the International Service for National Agricultural Research (ISNAR) initiated a major international comparative study on the links between agricultural research and technology transfer in developing countries. Like other ISNAR studies, this study was developed in response to requests from agricultural research managers for advice in this area. It is being carried out with the support of the governments of Italy and the Federal Republic of Germany and the Rockefeller Foundation.

The objective of the study is to identify ways to strengthen the links between agricultural research and technology transfer systems in order to improve the following:

(a) the relevance of research efforts through a better flow of information about farmers' needs for the research systems;

(b) the transfer of technology to agricultural producers and other users of agricultural technologies.

Why the Study Was Initiated

Many sources have noted the problems of poor links between research and technology transfer in developing countries:

"Bridging the gap between research and extension is the most serious institutional problem in developing an effective research and extension system" (World Bank 1985).

"Weak linkages between the research and extension functions were identified as constraints to using the research in 16 (out of 20) of the projects evaluated" (United States Agency for International Development 1982).

"All the 12 countries (in which research projects were evaluated) had difficulties of communication between research institutions and extension agencies" (Food and Agricultural Organization 1984). The serious consequences of this problem are effectively summed up by a leading expert in the field, Monteze Snyder: "The poor interorganizational relations between the extension agency and the research organization almost guarantee that research results will not reach farmers, and if they do, farmers will not be able to use them" (*A Framework for the Analysis of Agricultural Research Organization and Extension Linkages in West Africa.* PhD dissertation, George Washington University, 1986).

Despite this situation, no major international study has been dedicated specifically to this issue. While there are some good evaluation reports and academic studies in individual countries, much of what has been written on the issue has been general or anecdotal. The results of practical attempts made to improve links have been disappointing.

A systematic study is needed to provide a set of simple, but not simplistic, suggestions on how research-technology transfer links can be improved in different situations.

[1]Study Leader, 1987-1989. Thomas Eponou assumed leadership of the project in 1990.

Operational Strategy and Products

This is a four-year study divided into three stages. The first stage consists of a literature review, the development of a conceptual framework and case study guidelines, the production of 'theme papers' (see page iii), and pilot case study activities in Colombia. The second stage involves carrying out case studies in six additional countries — Costa Rica, Côte d'Ivoire, the Dominican Republic, Nigeria, the Philippines, and Tanzania. In each of these countries the studies will concentrate on specific subsets of the national research and technolgy transfer systems. They will also document the links involved in the generation and transfer of a small number of specific new agricultural technologies. In the third stage, the various materials that have been developed will be synthesized into applicable guidelines.

Four types of documents will be published as part of this special series of papers on research-technology transfer links:

1. *Theme papers* on key linkage-related topics. These have been written by specially commissioned international experts in the field.
2. *Discussion papers* which analyze one or a few major issues emanating from the case studies. About 15 such papers will be produced, written by the case study researchers. They will focus on the most outstanding features of the links observed in the cases and draw clear conclusions about them for practical use by managers.
3. *Synthesis papers* which present the lessons emerging from the case studies. These are being written by ISNAR staff.
4. *Guidelines* on how to design and manage the links between agricultural research and technology transfer for policy makers and managers concerned with the two activities. These will also be written by ISNAR staff, with input from the case study researchers, managers of national systems, and others.

The theme papers were published during 1989. Most of the discussion papers were published in 1989 and 1990, and the synthesis papers and guidelines will be available in 1991. Individual copies of discussion papers are available from ISNAR upon request, at the discretion of ISNAR.

LIST OF THEME PAPERS IN THE SPECIAL ISNAR LINKAGE SERIES (published in 1989)

No. 1. A Conceptual Framework for Studying the Links between Agricultural Research and Technology Transfer in Developing Countries
David Kaimowitz, Monteze Snyder and Paul Engel

No. 2. Intergroup Relations in Institutional Agricultural Technology Systems
Paul Bennell

No. 3. Private Sector Agricultural Research and Technology Transfer Links in Developing Countries
Carl Pray and Ruben Echeverría

No. 4. The Political Economy of the Development and Transfer of Agricultural Technologies
Holly Sims and David Leonard

No. 5. The Effect of Changes in State Policy and Organization on Agricultural Research and Extension Links: A Latin American Perspective
Roberto Martínez Nogueira

No. 6. The Agricultural Research-Technolgy Transfer Interface: A Knowledge System Perspective
Niels Röling

On-Farm Client-Oriented Research Series. Comparative Study No. 4. Linkages between On-Farm Research and Extension in Nine Countries.
Peter T. Ewell

LIST OF OTHER DISCUSSION PAPERS IN THE SPECIAL ISNAR LINKAGE SERIES

No. 1. Institutional Linkages for Different Types of Agricultural Technologies: Rice in the Eastern Plains of Colombia (1989)
Luis Alfonso Agudelo and David Kaimowitz

No. 2. Relations Between Agricultural Researchers and Extension Workers: the Survey Evidence (1989)
Stephan Seegers and David Kaimowitz

No. 3. Placing Agricultural Research and Technology Transfer in One Organization: two Experiences from Colombia (1989)
David Kaimowitz

No. 4. The Impact of Improved Institutional Coordination on Agricultural Performance: the Case of the Nariño Highlands in Colombia (1989)
Paul Engel

No. 5. Informal Linkage Mechanisms and Technology Transfer: The PACO Project in Côte d'Ivoire (1990) (also available in French)
Thomas Eponou

No. 6. Managing the Links between Research and Technology Transfer: The Case of the Agricultural Extension-Research Liaison Service in Nigeria (1990)
Johnson Ekpere and Isiaka Idowu

No. 7. Efectos de los Cambios Estructurales en el Ministerio de Agricultura y Ganadería de Costa Rica, Sobre la Relación Entre Investigación y Transferencia de Tecnología en Maíz (1990)
Viviana Palmieri

MEMBERS OF THE STUDY GROUP ON THE LINKS BETWEEN AGRICULTURAL RESEARCH AND TECHNOLOGY TRANSFER

Advisory Committee

John Coulter
David Leonard
Niels Röling
Burton Swanson
Eduardo Trigo
Taiwo Williams

ISNAR Working Group on Linkages

T. Ajibola Taylor
N'Guetta Bosso
Robin Bourgeois
Thomas Eponou
Hunt Hobbs
David Kaimowitz[2]
Deborah Merrill-Sands
Willem Stoop
Larry Zuidema[3]

Case Study Researchers

Dolores Alcobar, Philippines
Luis Alfonso Agudelo, Colombia
Assemien Aman, Côte d'Ivoire
Corazón Asucena, Philippines
Emiliana Bernardo, Philippines
Alexander Coles, Costa Rica
Johnson Ekpere, Nigeria
Thomas Eponou, Côte d'Ivoire
Hermina Francisco, Philippines
Isiaka Idowu, Nigeria
Eduardo Indarte, Dominican Rep.
Ildefons Lupanga, Tanzania
Viviana Palmieri, Costa Rica
Agapito Pérez Luna, Dominican Rep.
Kouadio Tano, Côte d'Ivoire
Soumaila Traore, Côte d'Ivoire
Germán Urrego, Colombia

Theme Paper Authors

Paul Bennell
Ruben Echeverría
Paul Engel
Peter Ewell
David Kaimowitz
David Leonard
Roberto Martínez Nogueira
Carl Pray
Niels Röling
Holly Sims
Monteze Snyder

Project Staff

Thomas Eponou
(Study Leader)
Anna Wuyts
(Research Assistant)

[2]Joined IICA, 1990
[3]Returned to Cornell University

Contents

Acknowledgements vi

INTRODUCTION 1

THE CONTEXT 2

Rice in Sri Lanka 2
Rice Research 2
Extension 3
Education and Training 3
The Training and Visit Extension System 3

LINKING RESEARCH AND EXTENSION THROUGH T&V 3

The Links between Research and Extension before T&V 3
Linkages and the T&V System: The Theory 4
T&V and the Links in Sri Lanka 4

THE EVIDENCE FROM THE MATARA DISTRICT 5

Rice Research and Extension 5
The Links between Matara District Extension and the Regional Research Center 6

WHY THE LINKS BETWEEN RESEARCH AND EXTENSION WERE POOR 8

Differences in Background 8
"Lack of Fit between the Extension Service and the Regional Research Center 8
The Expiration of Foreign Funding 9

CONCLUSIONS 9

References 10

Acknowledgements

This paper is based on a research study in Sri Lanka by the author and Kees Blok, whose collaboration in this work is gratefully acknowledged. Special thanks are due to Niels Röling and Mahinda Wijeratne for their continued support and guidance during and after the study.

The author also thanks David Kaimowitz for providing this opportunity and for his encouragement and comments on writing this paper.

Comments on earlier drafts by Thomas Eponou, Warren Peterson, and Howard Elliott were greatly appreciated. Any remaining shortcomings, however, are the sole responsibility of the author.

The Training and Visit System and the Links between Rice Research and Extension in the Matara District of Sri Lanka

Stephan Seegers

Summary

This paper focuses on the links between rice research and extension in the Matara District of Sri Lanka. Various formal linkage mechanisms were set up when the training and visit system of extension was implemented nationwide, including regional technical working groups, research-extension dialogues, bi-weekly training, and the use of subject-matter officers as liaison between research and extension. These mechanisms improved the links but could not overcome the poor communication and great social distance between researchers and extension workers. After World Bank project funding ended, the mechanisms could not be fully sustained.

INTRODUCTION

Poor coordination between agricultural research and technology transfer is a serious problem in organizing effective technology provision systems in developing countries (World Bank, 1985; Snyder, 1988). The training and visit (T&V) extension system (Benor and Baxter, 1984) has addressed this problem through systematic procedures to promote formal and informal links between the two functions.

Benor and Harrison (1977), the proponents of the T&V system, acknowledge that getting research and extension to communicate effectively is difficult. Extension is field oriented, while research is often oriented to the laboratory and experiment station. Research frequently attaches greater prestige to theory than to practical work, and this discourages coordination. Nevertheless, the two authors imply that the T&V system's formal linkage mechanisms, backed up by hierarchical control and monitoring and evaluation, are sufficient to overcome these problems.

The T&V system contributed to establishing linkage mechanisms between research and technology transfer in Sri Lanka, but effective communication between researchers and extension workers was severely constrained by human resource problems which T&V does not address, such as differences in educational level, caste, attitudes, and competition between research and extension.

At times the environments in which the technologies were generated were so different from those in which they were to be disseminated that the researchers' recommendations were irrelevant for extension. The T&V system was intended to improve this situation by establishing adaptive research units, but little adaptive research was done.

The formal links the T&V system had created between research and extension could not be fully sustained after the World Bank stopped providing funds. The government of Sri Lanka was unable to assume the full costs of maintaining the agricultural research and technology transfer activities, and the number of research, extension, and training officers in the districts and regional centers decreased, as did the length and frequency of research-extension links.

This paper summarizes one experience in Sri Lanka where human resource problems and the lack of adapted technology and sustainability hindered the effectiveness of the linkage mechanisms established by T&V. The case is drawn from research conducted during a six-month stay in the Matara District of southern Sri Lanka in 1987 (Block, and Seeger, 1988). The research focused on the relationships between rice researchers and extension workers. It began two years after the end of the World Bank's Agricultural Extension and Adaptive Research Project, which had financed the T&V system.

The research compared the "official" description of how information exchange was to occur with evidence on what was actually taking place. The formal description was taken from the operational guidelines and publications of the Divisions of Research, Extension, and Training and Education of the Department of Agriculture. Interviews with key informants, meeting attendence, and literature reviews were used to describe how research, extension, and training officers actually performed at the regional and district levels.

This paper first provides basic information on rice cultivation, research, extension, and training activities in Sri Lanka, and on the T&V system of extension. Then it looks at the links between research and extension before and after T&V was implemented. A summary of the results of the Matara research study are presented, and conclusions are drawn.

THE CONTEXT

Rice in Sri Lanka

Rice is Sri Lanka's staple food. Paddy cultivation is the main source of employment for nearly 600,000 people (20% of the farmers). There are 700,000 paddy parcels, covering approximately one-fifth of the arable land. Half of the parcels are smaller than one hectare (MADR, 1984).

Food self-sufficiency has always been one of Sri Lanka's major agricultural goals. The agricultural sector's performance during the 1960s was mixed, but paddy production grew at a healthy 4% per year. This enabled Sri Lanka to raise its rice self-sufficiency from 50% in 1960 to about 80% in 1970. High-yielding rice varieties were adopted rapidly during the 1960s.

The rapid yield increases generated by the initial adoption of high-yielding varieties leveled off in the 1970s, and paddy production only increased 0.7% annually between 1970 and 1977 (World Bank, 1979).

This poor performance was mainly due to unsupportive agricultural services. Technically, the major causes of low paddy yields were poor water management in the dry zone and adverse soil properties caused by drainage difficulties in the low-country wet zone.

Rice Research

The Department of Agriculture of the Ministry of Agricultural Development and Research (MADR) is responsible for developing and disseminating new technologies for food crops, including rice.

The Department of Agriculture conducts research on paddy farming under the supervision of a deputy director (research). In 1983 the research division had 391 researchers working on a variety of crops: 20% had PhDs, 30% had an MSc, and 50% had a BSc. About 90 worked on rice.

Until the late 1970s, there was little concern with making research results area-specific. Recommendations were only specified for three very broad zones (wet, dry, and intermediate). With the help of FAO/UNDP, the Department of Agriculture established eight regional research centers and attendant experiment stations to meet the needs of each agroecological region.

Rice research is conducted at the Central Rice Breeding Station, Batalagoda, as well as at four regional research centers and seven experiment stations. Some rice breeding and agronomic research is organized through a national coordinated research program. Unlike extension, the rice research program was organized by both administrative and ecological regions. In one district, the Matare district, Sri Lanka has had a strong rice-breeding program for many years. Farmers had widely adopted local high-yielding varieties long before the International Rice Research Institute (IRRI) developed its well-known varieties.

Extension

The Department of Agriculture's extension division is responsible for extension work on paddy rice, other field crops, and minor export crops, and is managed by a deputy director of agriculture, supported by three additional deputy directors. The country is divided into 24 administrative districts that each are managed by an assistant director of agriculture. Each district is staffed by agricultural officers, agricultural instructors, subject-matter officers, and extension field staff. Agricultural officers and subject-matter officers had lower status and a lower salary than research officers with the same years of experience and education.

The extension service in 1978 had many problems (World Bank, 1979). The Department of Agriculture did not have enough extension officers. Each officer was responsible for an average of 1,200 farm families. Extension workers lacked transport, suitably located housing, and systematic technical backstopping. Local authorities frequently used extension agents to perform nonextension duties. The Department of Agriculture had to comply with a number of other agencies' demands for special services. There was no clear, coordinated annual plan for identifying priority extension messages. The quantity and quality of the extension work was uneven and varied greatly by region and crop.

Education and Training

The Department of Agriculture's training and education division provides pre-service and in-service training to extension officers through (1) three regional training centers for in-service training of subject-matter officers, agricultural instructors, and village extension workers, (2) 14 district training centers for one-year pre-service training of extension field staff, and (3) a school of agriculture for two-year diploma-level training for agricultural instructors.

The Training and Visit Extension System

In 1979 the Sri Lankan government sought to improve its extension service by adopting the T&V system in four districts (Abeywardena, 1984). The following year, the T&V system was adopted nationwide. The World Bank began a $22.4 million, five-year Agricultural Extension and Adaptive Research Project (AEARP). Rice was one of the crops covered by the project's activities.

Specifically, the project sought to do the following:

1. strengthen extension services by establishing a unified T&V extension system for all crops (except tea and rubber) and animal husbandry;
2. establish an adaptive research network based on the country's agroecological regions;
3. improve and expand the Department of Agriculture's agricultural training institutions (World Bank, 1979).

Forty percent of project funds went to extension. Twenty-four adaptive research centers were established, each with an office and a simple agronomy laboratory. The project also included funds to improve existing Department of Agriculture training facilities, build new centers, and train and equip an expanded and upgraded training staff. It gave particular priority to training the new extension staff required by the project.

LINKING RESEARCH AND EXTENSION THROUGH T&V

The Links between Research and Extension before T&V

Prior to the T&V system, several efforts had been made to coordinate research and extension activities. However, they were all unsuccessful. The two divisions remained virtually isolated from each other, often criticizing each other. The lack of area-specific recommendations limited their usefulness to extension. There were no regular formal arrange-

ments for bringing research and extension together, so the interaction between research and extension was limited to hurried consultations, such as when extension workers sought assistence during a pest outbreak or asked the research station to analyze a soil sample. New technical information rarely reached extension workers, and when it did, it was usually through an annual conference, an in-service training session, or an irregular research publication (Abeywardena, 1984).

Linkages and the T&V System: The Theory

The T&V system tries to improve research-extension linkages in situations such as those found in Sri Lanka by creating formal linkage mechanisms and an adaptive research capacity to provide location-specific recommendations. The most important formal mechanisms are the regional joint extension-research committees and workshops, the use of subject-matter specialists, and training courses.

Regional joint extension-research committees and workshops are supposed to evaluate production recommendations, applied research, and farm trial programs, and to establish future priorities. Subject-matter specialists serve as committee secretaries. In addition, they are supposed to spend about one-third of their time visiting the nearest research station and other research facilities. Their role is to (1) keep abreast of the latest research developments, (2) make researchers aware of farmers' practical field problems, and (3) design and carry out trials on farmers' fields, together with researchers and extension field workers.

Before each season, one- or two-week training courses are supposed to give extension workers the opportunity to integrate the official recommendations with their own experiences and to enhance their overall understanding of their job. Extension staff members, particularly the subject-matter specialists, do most of the training, but research personnel and university staff also participate. Bi-weekly training of village extension workers is used to bring them up to date on the appropriate extension messages for that period.

T&V and the Links in Sri Lanka

Specifically in the Sri Lankan case, the T&V system established the following formal linkage mechanisms:

Regional technical working groups. These were established in each agroecological region to make decisions regarding regional agricultural activities. They included members from the Department of Agriculture's divisions of research, extension, and training and education. Each group's secretary, the assistant director of agriculture (training and education), convened meetings before each major crop season. The regional deputy director (research) chaired the meetings, which were expected to focus primarily on the following issues:

1. comparing the last cultivation season's progress with the pre-season targets;
2. presenting farmer responses to the adaptive research field trials;
3. formulating extension recommendations;
4. setting adaptive research priorities;
5. deciding on crop priorities for extension;
6. fixing the content of the courses conducted by the training division.

A preparatory meeting of subject-matter officers and adaptive research officers was to prepare the relevant information and proposals for the discussion and submit them to the regional technical working groups. The arrangement was meant to give all the participants joint responsibility for the agricultural program, as well as to facilitate the free exchange of views and improve coordination.

Research-extension dialogues. This was a formal forum where research, extension, and training officers were supposed to meet once a month. The meetings were convened by the regional training officer and were held either at a research station, a farmer's field, or an extension office, depending on the topic for discussion. They were supposed to discuss the common problems of research, extension, and training, make interim recommendations, and facilitate a two-way flow of information on current farmer problems and on going research.

Subject-matter officers. In the original version of the T&V system, as envisaged by Benor and Harrison (1977), the person who serves as liaison between research and extension is called a *subject-matter specialist*. However, within the Department of Agriculture this title was reserved for the university-trained personnel of the training and educa-

tion division. So the Department of Agriculture called the extension person responsible for liaison with research a *subject-matter officer*. Most subject-matter officers were very experienced diploma holders, with a specialization in rice, paddy rice, other crops, crop protection, or women's affairs. They were referred to as experienced agricultural instructors. Although the subject-matter officers had the primary, formal responsibility for liaison, extension agricultural officers (most of whom had university training and were appointed from subject-matter officer status) were also supposed to participate in liaison activities.

The subject-matter officer was responsible for solving farmer's problems at the field level and for providing technical back-stopping for field extension workers through bi-weekly training programs. For these to be effective, the subject-matter officers had to get information from research. Thus, subject-matter officers were expected to visit the research stations frequently to observe on-going research and seek materials to help them solve current field problems.

Research and extension personnel as trainers. The regional training centers were expected to call upon the services of research and extension personnel to supplement their training staff. It had been observed that bringing together trainers from different backgrounds enriched the training by allowing topics to be presented from various different angles.

Adaptive research. It was planned that research and extension would jointly conduct adaptive research in farmers' fields. Research would provide technical input and extension would provide a variety of resources. Field trials would be conducted for all field crops on new varieties, improved cultural practices, and the use of agrochemicals. The trials were meant to confirm whether the researchers' technologies were effective and whether farmers' practices were appropriate. They were also supposed to offer research staff an opportunity to familiarize themselves with farmers' conditions and help extension staff develop skills and build confidence in the research recommendations.

THE EVIDENCE FROM THE MATARA DISTRICT

Matara is Sri Lanka's southernmost district. It has four agroecological zones, mainly low-country wet zones. Almost 20% of the cultivated area is used for paddy rice. Tea, rubber, and coconut are other important crops. Three-fifths of the paddy crop is cultivated under rainfed conditions and two-fifths is irrigated. More than half the paddy area is subject to flooding.

The district has 96,202 farms, of which almost half are one acre or smaller (Department of Census and Statistics, 1985). The majority of the district's farmers are only part-time farmers. Most also have some other job during the day. An average farm does not provide full-time employment and sufficient income (Ensing et al., 1985).

Rice Research and Extension

Matara District extension was served by the Regional Research Center at Angunakolapellesa (henceforth referred to as A'pellesa). A'pellesa is located in the Hambantota District and is a 1.5-hour drive from Matara town. The A'pellesa Regional Research Center received support from the Ambalantota Experiment Station, the Matara Lowland Drainage and Reclamation Project, and the adaptive research units at Matara and Telijjewila. The center is located in a dry lowland area and is supposed to do research for 12 different agroecological areas, with principal emphasis on the dry lowland areas.

Most of A'pellesa's research is on rice, cotton, grain legumes, finger millet, and oil seeds. In 1982/83 the center had 14 research officers, five experimental officers, and 12 supporting staff (MADR, 1982-83). When the field research was conducted for this paper in 1987, the deputy director position and a number of research officer positions had been vacant for some time. By 1987/88 there were only 11 research officers, one experimental officer, and eight supporting staff (MADR, 1988). The researchers interviewed in 1987 regarded the center's incentives, equipment, support staff, and facilities as insufficient to conduct research. They also disliked living in a desolate place like A'pellesa.

The extension service divided Matara District into three segments, each managed by an agricultural officer. Each segment also had one subject-matter officer for paddy rice and one for other field crops. Two additional subject-matter officers, one for plant protection and one for women's affairs, covered the entire district. In 1987 there were 60 village extension workers, down from 85 a few years before. Many field officers had been transferred to other districts. Village extension workers became responsible for attending to 1,400 and sometimes even 2,100 farmers.

The Regional Training Center is next to A'pelessa's main building. The center is headed by an assistant director of agriculture. In 1982/83, the center had three subject-matter specialists, one training officer, and four supporting staff. But by 1987/88, there were only two subject-matter specialists, the training officer, and three supporting staff.

The Links between Matara District Extension and the Regional Research Center

The linkage mechanisms encountered in the Matara District functioned much differently from what was described in the official documents:

Regional technical working groups. Two weeks before the regional technical working group meeting, the agricultural officers from each division held their own independent preparatory meetings. That is where real decisions were made. For example, it was there that the regional deputy director (research) decided whether research priorities fowarded by extension should be accepted for adaptive research. Extension had its meetings first, the results of which were sent to research to be discussed in its meetings.

In fact the regional technical working group meeting itself had no real power and was limited to presentations of extension progress reports from the previous season and extension targets and research and training proposals for the upcoming season. The multiple functions that had been assigned to the groups could not be feasibly carried out in one-day meetings.

Usually 20 to 30 people attended the meetings. The presenters were generally extension officers from the various districts or areas, a training officer, and the research officer in charge of adaptive research. The subject-matter officers had not been invited to the regional technical working group meetings for some time. The reason for this is not clear, although the size of the group was mentioned. The meetings had become shorter over time, going from two days to one. The meetings did not include any presentation on the regional research center's ongoing or planned research. The research officer answered questions, but relatively few problems were presented at the meeting, because of lack of "domain correspondence" between research and extension. In general, the researchers were not willing to accept new questions for research experiments. They already had their own research program. As tables 1 and 2 show, some experiments were incorporated, based on problems brought up by extension at the preparatory meetings, but the number and proportion of total experiments declined over time. Besides, fewer experiments were being done every season. There was also little discussion on the extension services' presentations. This gave the impression that each district could organize its activities as it saw fit, with minimal coordination.

Research-extension dialogues. Agricultural officers and subject-matter officers rather than field staff represented extension at the research-extension dialogue meetings. The extension officers presented the biweekly messages for the coming month, both to inform the researchers and so that researchers could give additional information or ask questions. In fact, however, extension did not get much new information at these meetings. The research officers only contributed information (recently or already long developed) when the extension officers asked for it or when a problem arose. When the researchers did provide information, they usually didn't get useful feedback. This holds for both the research-extension dialogues and the regional tech-

Table 1. Experiments Done at A'pelessa Regional Research Center for Research Division and Extension Services in the Region

Season	Experiments for Research		Experiments for Extension	
	#	%	#	%
Maha 85/86	34	61.7	24	38.3
Yala 86	82	74.7*	42	25.3
Maha 86/87	32	71.8**	19	28.2
Yala 87	42	85.0	9	15.0

* This percentage is an estimation based on the assumption that all 37 problems forwarded at the RTWG which could not be answered were accepted for research.

** This percentage is an estimation based on the assumption that the number of experiments conducted at the RRC for the research division will be the same as the lowest number of experiments conducted at the regional research center during the period examined — 51 experiments.

Table 2. Problems Submitted by the Extension Service to the Regional Research Center during Research-Extension Dialogues and the Regional Technical Working Group Meeting

Season	Total #	Accepted %	Not Accepted %	Solved %	Forwarded to other RRCs %	Others %
Maha 85/86	119	20.0	0.8	35.6	27.7	15.9
Yala 86	61	8.2	—	21.3	—	71.5*
Maha 86/87	51	37.2	2.0	35.3	17.7	7.8
Yala 87	50	18.0	30.0	44.0	2.0	6.0
Maha 87/88	33**	33.3	3.0	21.2	18.1	24.4

* Thirty-seven problems were submitted but could not be answered due to a lack of time.
** Includes only the results from the regional technical working group meeting.

nical working group meetings. Fewer and fewer questions were asked by extension as time went on. Most researchers felt that extension did not effectively use the research-extension dialogues. Because of the limited discussions between researchers and extension officers, the deputy director of the A'pellesa Regional Research Center decided to reduce the frequency of the research-extension dialogue from once a month to once every two months.

Subject-matter officers. The subject-matter officers could not really function as liaisons between research and extension because of other responsibilities and the lack of "domain consensus" between them and the agricultural officers who were upstaging them during meetings. They were not invited to the regional technical working group meetings, nor were they considered spokespersons for farmers' problems at the research-extension dialogues. Researchers regarded the agricultural officers, not the subject-matter officers, as the most important recipients of their information. The subject-matter officers did not receive much information from researchers, nor did they regard themselves as sources of information for research officers. On the rare occasions when researchers were invited by extension staff to come and look at a problem in the district, it was usually the agricultural officer who accompanied the researcher, not the subject-matter officer. The subject-matter officers confirmed that they had little new information to give the field extension workers, primarily because they were tied up doing administrative work and checking the field staff.

Research and extension personnel as trainers. Bi-weekly training is done mostly by agricultural officers and subject-matter officers. On average, the training sessions last three hours. Most field extension workers were not satisfied with the bi-weekly trainings. They had been receiving the same message for a number of years. Because of the diversity of farmers and agroecological zones, the extension workers always had to change the official recommendations and make them fit the farmers' conditions.

In the courses at the Regional Training Center, training officers solved problems or answered questions that couldn't be answered at the meetings. The training officers and subject-matter specialists did not receive much information from the regional research center, although the researchers did give presentations in their area of specialization. The decline in the number of subject-matter specialists and researchers at A'pellesa and the difficulty of finding substitutes made training less effective.

Adaptive research. There was very little adaptive research done in the Matara District. The adaptive research officer had not done any adaptive research because he felt basic research should be done first. He did most of that work in only one area and not in other parts of the district, where the extension officers wanted it. The only adaptive research going on was some varietal adaptive test trials. These trials were handled completely by extension workers who got the inputs from A'pellesa and sent the results back there.

WHY THE LINKS BETWEEN RESEARCH AND EXTENSION WERE POOR

Differences in Background

Poor communication between researchers and extension officers was largely due to differences in background between them: researchers held academic degrees) and extension officers were experienced diploma holders. Although denied, there is also still a strong Buddhist caste system in Sri Lanka, creating differences in status from birth. Research's regional mandate, compared to extension's limited district mandate, also gave it greater status. The level of formal education and years of experience were major factors in the technology/information exchange.

Researchers stated during the interviews that extension officers knew less than they did and had a lot to learn from them. In field interviews they expressed concern that "extension staff don't see research as important" and that "older extension staff are always blaming research." They also felt that the extension officers didn't know how to handle scientific information or identify farmers' problems. One researcher complained, "The results (of adaptive trials) that extension gives to research are not as reliable as when research would do the trials themselves because the trials are handed over by the agricultural officers to the lower extension workers" (Block and Seegers, 1988).

The researchers rarely sought feedback from extension, and they tended to blame the extension agents if their recommendations were not adopted. This was expressed in statements like "in rice, mostly the problem is that extension says a recommendation is not working, while the research officers have to demonstrate that this is because the cultural practices weren't being followed correctly," and "on paddy, most problems were solved before and extension people simply have to be reminded of the old solution."

For their part, the extension workers tended to keep to themselves. They brought few problems to the joint meetings with research. Instead, they tried to solve most of the problems inside the service, either to be as independent from research as possible or to create the image of a good extension service. The extension workers thought researchers could provide useful information but that they knew little about farmers' problems.

Another symptom of this problem can be seen in the difficulties the subject-matter officers experienced in acting as liaison staff. All the different actors involved saw the agricultural officers, not the subject-matter officers, as the principal intermediaries between research and extension. The researchers preferred to interact with the highest ranking officer, in most cases the agricultural officer, the highest hierarchical position in the district. the situation was created by both researchers and the agricultural officers. Due to their subordinate position. the subject-matter officers were often assigned to administrative work.

Both the research and extension institutions have hierarchical structures based on the level of education and length of service, which make it easier to pass information from the top down than from the bottom up. Most extension officers even had a top-down idea of the concept of information itself: they only considered data from people higher in the hierarchy to be information.

When asked where they would like to apply for a job, the majority of staff wanted to go to research. The research division had more facilities, higher pay, greater recognition, and more access to power.

"Lack of Fit" between the Extension Service and the Regional Research Center

Originally the Matara District was linked to the Bombuwela Regional Research Center. Later it was assigned to the A'pellesa center for practical reasons — the A'pellesa center was nearer.

As mentioned previously, the A'pellesa center is situated in a dry lowland area and concentrated primarily on the conditions typical of this area. The Matara District, however, has many low and mid-country wet areas. In the dry lowland area, there is a demand for 4- to 4.5-month rice varieties. But these varieties don't perform well in Matara because of acid sulphate soils, bogs and half-bogs, and flooding.

These differences in agroecological areas created a "lack of fit" between the conditions in which the technologies were developed and in which they were supposed to be used. The researchers from A'pellesa and the extension workers in the Matara District had little common ground on which to discuss recommendations. This contributed to each group's lack of confidence in the other.

The Matara District would have been served better by the Bombuwela Regional Research Center, which was located in similar agroecological conditions. In fact, the two had no contact, except that farmers in the district made extensive use of Bombuwela-bred varieties. Matara extension officers

did not contact Bombuwela because they were supposed to address all their problems to A'pellesa.

In addition to this lack of fit in agroecological areas, the A'pellesa center and the extension service also had different target populations. Matara District's part-time farmers required different practices than the full-time farmers to which the research division is oriented. The results of experiments done at the A'pellesa Regional Research Center would be inappropriate for the majority of the Matara District extension service's clients.

The Expiration of Foreign Funding

The World Bank funding for the Agricultural Extension and Adaptive Research Project ended in 1985. The government of Sri Lanka had agreed to absorb the total expenditure when the project finished, but it did not. Apparently it was unable to take over the US.$ 1.1 million in yearly project expenses on vehicles, maintenance costs, salaries, and operating costs.

The end of project funding was directly responsible for a number of the negative changes discussed above. These include (1) linking the Matara District to the A'pellesa Research Center rather than the Bombuwela Research Center, (2) reducing the number of extension officers, (3) making many research and education & training officers decide to leave A'pellesa because of the lack of incentives and lowering the morale of those who remained, (4) reducing the length of the regional technical working group meetings and the number of participants, and (5) lowering the frequency of research visits to the districts. At the national level, the lack of funds promoted constant competition for resources among the three divisions.

CONCLUSIONS

The T&V system did make initial progress in improving the links between research and technology-transfer units in southern Sri Lanka. The systematic procedures created had a positive impact, despite their various operational problems. By giving extension officers more training and transportation, it improved their status.

However, the system failed to directly address the social distance and poor communication between researchers and extension workers, and among extension workers at different hierarchical levels. Communication was further hampered by the "lack of fit" between the regional research center and the extension service in the Matara District. The continuous competition for funds between the research, extension, and training and education divisions also contributed to the negative attitudes between research and extension officers.

Some operational measures that could have been taken to improve links under T&V include the following:

1. filling subject-matter officer positions with university graduates with more status and skills, rather than with diploma holders — this might have solved some of the problems internal to extension;
2. improving the correspondence between the agroecological zones covered by the regional research centers and the districts they serve;
3. limiting the scope of the regional technical working groups to tasks that could be performed in the available time and using them more to inform extension about work going on at the research stations;
4. developing a more manageable mechanism for research and extension to make joint decisions (more manageable than the regional technical working groups);
5. bringing together technical and administrative coordination roles, which might have made researchers less reluctant to coordinate on technical issues with subject-matter officers. As a fundamental principle of T&V, subject-matter officers should not have been given routine tasks, which made it impossible for them to carry out their technical responsibilities.

Whether these measures could have overcome the problems mentioned above, however, is not clear. Moreover, the T&V system was too expensive to be assumed by the national budget after World Bank funding ended, and the linkage mechanisms associated with it could not be fully sustained, as is the case in many donor-funded projects.

REFERENCES

Abeywardena, P. O. S. 1984. A study of agricultural extension experiences in Sri Lanka. Peradeniya, Sri Lanka: Department of Agriculture.

Benor, D., and M. Baxter. 1984. Training and visit extension. Washington, DC: World Bank.

Benor, D., and J. Q. Harrison. 1977. The training and visit system. Washington, DC: World Bank.

Blok, K., and S. Seegers. 1988. The research-extension linkage in the southern region of Sri Lanka: An agricultural information systems perspective. MSc Thesis. The Netherlands: Agricultural University of Wageningen.

Department of Census and Statistics. 1982. Sri Lanka Census of Agriculture 1982 (Small Holding Sector) Matara District report. Colombo, Sri Lanka: Ministry of Implementation.

Ensing, B., G. Frerks, and S. Sangers. 1985. Homegardens and homegardening in the Matara District: The present situation and future prospects. Colombo, Sri Lanka: Marga Institute and The Netherlands: Agricultural University of Wageningen.

MADR. 1987-1988. Agricultural implementation programme. A working document. Colombo, Sri Lanka: Ministry of Agricultural Development and Research.

MADR. 1982-1983. Agricultural implementation programme. A working document. Colombo, Sri Lanka: Ministry of Agricultural Development and Research.

Moore, M. 1984. Institutional development, the World Bank, and India's new agricultural extension programme. *Journal of Development Studies* Vol 20: 303-317.

Snyder, M. 1988. A framework for analysis of agricultural research organizations and extension linkages in West Africa. PhD Thesis. Washington, DC: George Washington University.

World Bank. 1979. The agricultural extension and adaptive research project. Staff appraisal report. Washington, DC: World Bank.

Wirasinghe, S., S. P. R. Weerasinghe, and M. H. J. F. Fernando. 1985. On-farm validation of technology in heterogeneous Sri Lankan environments. In *Research-extension-farmer, a two-way continuum for agricultural development*, edited by Cernea, M. M., J. K. Coulter, and J. F. A. Russell. Washington, DC: World Bank and UNDP.