Linkages Discussion Paper No. 6

Managing the Links between Research and Technology Transfer: The Case of the Agricultural Extension-Research Liaison Service in Nigeria

by

Johnson Ekpere and Isiaka Idowu

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.

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May 1990

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

David Kaimowitz
Study Leader

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 problem 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 Agriculture 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.

Operational Strategy and Products

The study is being conducted over a four-year period and has been 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

technology transfer systems. They will also document the links which were involved in the generation and transfer of a small number of specific new agricultural technologies. In the third stage, the various materials which have been developed will be synthesized into one set of concrete applicable guidelines.

Ultimately, 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 are expected to 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, together with selected study group members.

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 in 1989 and most of the discussion papers will be published in 1990. The synthesis papers and guidelines will probably be published in early 1991. Copies of these papers will be available from ISNAR upon request, at the discretion of ISNAR.

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

A Conceptual Framework for Studying the Links between Agricultural Research and Technology Transfer in Developing Countries
D. Kaimowitz, M. Snyder and P. Engel

The Agricultural Research-Technology Transfer Interface: A Knowledge Systems Perspective
N. Röling

Private Sector Agricultural Research and Technology Transfer Links in Developing Countries
C. Pray and R. Echeverría

The Poltical Economy of the Development and Transfer of Agricultural Technologies
H. Sims and D. Leonard

The Implications of On-Farm Client-Oriented Research for the Relationships between Research and Extension
P. Ewell

Intergroup Relationships in Institutional Agricultural Technology Systems
P. Bennell

The Effect of Changers in State Policy and Organization on Agricultural Research and Extension Links: A Latin American Perspective
R. Martínez Nogueira

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Managing the Links between Research and Technology Transfer: The Case of the Agricultural Extension-Research Liaison Services in Nigeria

Summary

The research-extension liaison services in Nigeria have evolved from a small regional group, attached to a ministry, to an autonomous institute with nationwide responsibilities. The size, mandate and number of clients of the institute have expanded considerably in the course of this evolution. This paper traces the changes in the organizational structure of the liaison services at each stage of their development, and shows how structural factors have interacted with other factors to influence performance.

INTRODUCTION

Policy-makers in Nigeria, as in most African countries, are often puzzled as to why, after so many years of government support and huge investments in agricultural research and extension, agriculture has remained traditional and subsistence-oriented, and has failed to undergo any appreciable science-driven transformation. One reason is the poor links that exist between research, extension and farmers. An understanding of the linkage mechanisms and communication patterns between these actors is essential for the speedy and cost-effective transfer of agricultural technologies.

This paper analyzes the evolution of one particular linkage mechanism, the Agricultural Extension-Research Liaison Services (AERLS) in Nigeria. It discusses how the organizational structure, mandate, resources and performance of the services have developed, and draws some conclusions for managers. The analysis covers five periods, in each of which the services were known by a different name, reflecting a different organizational arrangement:

1. 1920-62: the Agricultural Research and Advisory Services
2. 1963-68: the Research Liaison Services
3. 1969-75: the Extension-Research Liaison Service
4. 1976-86: the Agricultural Extension-Research Liaison Service
5. 1987-the present: the National Agricultural Extension-Research Liaison Service

ORIGINS: THE AGRICULTURAL RESEARCH AND ADVISORY SERVICES (1920-62)

Public agricultural research and extension in Nigeria became institutionalized in 1910, as part of a unified Department of Agriculture. Provincial agricultural extension work stations were administered by district/divisional agricultural officers, who participated in both research and extension activities. Extension followed the British agricultural advisory service mode, with the emphasis on regulatory functions, and concentrated on export crops.

The coverage of the advisory service was not extensive. Only a few technology-related messages were available for transfer, the administrative structure was simple, and there appeared to be little need to link research and extension. The service nevertheless had some impact, as evident in the high rates of adoption of several new export crops. Appropriate harvesting, processing and packaging techniques were widely accepted by large numbers of small-scale farmers. However, at independence (1960), the service's impact began to wane.

Between 1957 and 1960 a constitutional change known as "regionalization" divided Nigeria into three regions (eastern, western and northern). Soon afterwards, the regional Ministries of Agriculture of the eastern and western regions established agricultural information sections, which operated as back-up units in the Agricultural Extension Services Division.

The information sections' main function was to produce teaching aids and other materials which field extension staff could use to train farmers. They were also active in rural cinema, showing films about recommended agricultural technologies.

Most of the sections' operating funds came from the Ministry of Agriculture, with staff and material inputs from the Ministry of Information. Both ministries jointly produced bulletins, leaflets and posters, made films, prepared slide sets, and organized agricultural shows. These joint activities were relatively successful. Resources were not a major constraint.

The situation was somewhat different in the northern region. There the Ministry of Agriculture was organized into two divisions: a Specialist Services Division, with specialist officers responsible for research, and a Field Services Division responsible for advisory services, policy and development. The Specialist Services Division and the provincial offices of the Field Services Division were both located at Samaru, near Zaria. The Field Services' regional headquarters was in Kaduna.

Most research was conducted on farm centers near Samaru. The primary purpose of these centers was the demonstration of new technology by extension workers to farmers. Research results were discussed at annual cropping scheme meetings, at which staff from both divisions participated. These meetings decided which new technologies to recommend, and were the most important forum for research-extension interaction.

Despite this close collaboration, there was little transfer of relevant knowledge and skills to farmers. The problem was that research recommendations were seldom packaged in a form that the Field Services staff could use to educate small-scale farmers. In response, the Northern Ministry of Agriculture established an Extension Demonstration Unit (EDU), similar to the information and communications sections which existed in the other regions. This unit, whose work was relatively successful, became the basis of the subsequent Research Liaison Services.

ESTABLISHMENT: THE RESEARCH LIAISON SERVICES (1963-68)

Creation

With the transfer of the Specialist Services Division to Ahmadu Bello University in 1963, the Ministry of Agriculture feared it would lose all control over research. To ensure a continuing and effective link, it established the Research Liaison Services (RLS) in 1963, modelled on the EDU and using most of its staff members.

Negotiators from the university and the ministry agreed to divide the university's research responsibilities between two separate units: a Faculty of Agriculture, with a mandate for teaching and more basic research, and an Institute of Agriculture Research (IAR), that would develop technologies suited to the needs of the northern region.

The new institute, headquartered at Samaru, only a few kilometers from the university itself, was to respond to demands for new technologies from the ministry.

Before the RLS was established, the United States Agency for International Development (USAID), in collaboration with Kansas State University and the regional Ministry of Agriculture, had begun a joint extension project in selected areas of the northern region. The project made coordination between research, extension and training one of its principal goals. The USAID team's audio-visual aids advisor was made responsible for developing an organizational structure for linking research and extension.

Thus the conditions for establishing strong links were ripe. The ministry was aware of the need for links and concerned about losing control over research. Donor pressure, supporting funds and expertise were available to develop linkage mechanisms.

Mandate, Activities, Structure and Resources

Mandate and activities. The original mandate of the RLS was: to ensure the maximum flow of appropriate research information from the IAR to the Ministry of Agriculture and its field personnel; to inform the IAR about the production problems facing farmers; and to keep the IAR sensitive and responsive to the needs of the region's agricultural industry.

To fulfil this mandate the RLS was to perform the following activities:

- Produce radio programs, teaching aids and other publications for extension workers and farmers
- Provide in-service training for extension staff in the ministry
- Provide advisory services to the ministry in areas such as pest and disease control and soil fertility problems
- Provide feedback from extensionists and farmers to the IAR and other research institutes.

The IAR was to supply the necessary technical information to support these activities.

Structure. The RLS was physically located at the IAR in Samaru, but was legally part of the Northern Region Ministry of Agriculture.

The service had only two sections: a subject-matter specialist section and an audio-visual section. Subject-matter specialists reviewed research results in their field and translated them into a form that extension staff could use; they also brought problems needing research to the IAR's attention. The audio-visual staff produced audio-visual and other information materials based on the work done by the subject-matter specialists. Both groups undertook in-service training and conducted field visits.

Resources. The RLS started work with one USAID agricultural information specialist, a Nigerian counterpart and three extension specialists seconded from the Ministry of Agriculture. By the end of this period, in 1968, it had five extension specialists and four audio-visual specialists. The ministry was the principal source of funds; the IAR contributed some resources, but not a lot. USAID provided funds for staff development and the purchase of equipment.

Management Issues and Performance

Coordination with research. Located at the IAR, the RLS enjoyed strong links with research. The extension specialists were located in the IAR department or section most relevant to their academic discipline and duties. IAR researchers and RLS extension specialists conducted joint evaluation tours to assess crop demonstrations and production practices. When RLS staff made visits alone, they circulated their back-to-office reports to research staff. The IAR sought comments from the RLS on its research programs, both informally and at its annual cropping scheme meetings.

The RLS and IAR cooperated closely in preparing publications and extension bulletins. The IAR vetted all the technical publications prepared by RLS staff. Both groups participated in the in-service training of ministry extension staff.

Responsibility for coordination was assigned to supervisors in both the IAR and RLS. Because of the small size of the two organizations and their unity of purpose, managing the links between them was straightforward. Relatively few people had to be involved.

Coordination with extension. All RLS staff were employees of the Northern Region Ministry of Agriculture. They therefore retained strong links with the extension service, which remained the service's only client. RLS staff interacted with extension staff in training and providing advisory services, and in conducting evaluation tours.

They also provided extension with publications, and prepared radio and television programs at their request.

Only staff with an aptitude for RLS work were deployed to the services. They spent from a few months to a year at RLS headquarters to become familiar with the organization, and were then assigned to specific extension duties in the field. After a year in the field, they returned to RLS headquarters. This procedure helped integrate their work for the RLS with that of the extension service.

Responsibility for coordination was assigned to the Chief Extension Officer in the ministry. During this period the ministry demanded a variety of services from the RLS and received them promptly. The RLS clearly recognized that its survival depended on meeting the ministry's needs.

Capacity for on-farm research and farm demonstrations. Although the extension specialists of the RLS were well aware of the research going on at the IAR, they did not significantly participate in on-farm research, of which very few of them had any significant experience. Instead, they spent most of their time translating existing research results into usable forms.

The extension service's regional Field Services Division conducted most of the demonstrations. The RLS concentrated its dissemination efforts on information: the press, publications, posters, visual aids, radio and cinema. Nevertheless, the RLS was more involved in farm demonstrations than it was in on-farm research. Its staff frequently made evaluation and supervisory tours of demonstration plots and farms.

Input/feedback into research program formulation. The RLS was an active participant in IAR's annual cropping scheme meetings. RLS extension specialists provided input and feedback into IAR's research program during informal discussions. As mentioned above, RLS specialists distributed their back-to-office reports to researchers and passed on ministry requests requiring an in-depth response from research. Farmers' questions to which the RLS had no clear answer were referred to the IAR for clarification. Problems identified by extension staff during in-service training were collated by the RLS and passed on to the IAR. The Ministry of Agriculture was also notified of all problems communicated to the IAR.

All this notwithstanding, the staff of the RLS were at a disadvantage in their interactions with IAR researchers because of status differences caused by disparities in training and research experience. Key informants suggest that the real impact of RLS feedback and input on research program formulation was slight.

Provision/organization of information materials/events. In 1963 the RLS developed an Agricultural Information Production and Training Plan for Northern Nigeria. The plan's primary objective was to provide information and training support to the ministry's extension service.

In 1964 the Nigerian counterpart to the USAID agricultural information specialist returned to the RLS from overseas training in the production of agricultural visual aids. Since then, he has provided continuous leadership in this activity. His long tenure has provided stability, increased performance and enhanced proficiency in the production of specialized communications materials.

At first, the RLS did little more than produce crop demonstration signboards for the provincial offices of the Ministry of Agriculture. As the RLS improved its staff complement and competence, it developed a strong program to address the ministry's needs for audio-visual teaching aids and other specialized information products. Table 1 shows the production of information materials from 1963 to 1967. A total of 23 conferences and seminars were organized between 1964 and 1969.

Table 1. Type and number of information materials produced by the RLS, 1963-67

Type of material	1963	1964	1965	1966	1967
Extension bulletins	4	6	10	10	10
Leaflets	8	42	60	60	60
Posters	4	16	24	30	30
Village notice boards	15	175	500	2000	3500
Photographs	100	1000	1500	2000	2000
Slide sets	-	6	10	10	10
Tape-recorded programs	-	6	10	10	10
Films	-	-	-	10	10
Radio programs	-	12	24	52	52
Agricultural shows/exhibitions	-	6	13	13	13
Extension newsletters	1	4	6	12	12
Crop demonstration signboards	1300	2000	5000	10000	15000

Source: AERLS, 1988

GROWTH: THE EXTENSION-RESEARCH LIAISON SERVICE (1969-75)

Creation

In 1968, six states were created from the original northern region. An Interim Common Services Agency was established to administer and fund the institutions that had been under the northern region but whose programs and services now cut across all six new states. The RLS was one of these institutions. As an administrative solution, to which all six states consented, responsibility for the RLS was transferred to Ahmadu Bello University and the service was merged with the IAR at Samaru, where it was already located. At the same time, it became the Extension-Research Liaison Service (ERLS).

Key informants suggest that the decision to merge the RLS and IAR was the best option at the time. Being the least disruptive to current physical arrangements, it was seen as a good way of maintaining continuity in the efforts to link research and extension, and was the preferred option of staff in both the IAR and RLS. The only other alternatives would have been to abolish the service, grant it autonomy, or split it into six services for each of the six new states.

Although the decision to merge with the IAR was sensible, for the first half of 1968 the ERLS had no operating budget, and no firm decision was taken on the career prospects of the ministry staff that had been seconded to it. This organizational and administrative instability created stress within the ERLS. Confidence in its ability to continue offering the same level of services began to wane. Some states started looking elsewhere for assistance in technology transfer.

Changes in Mandate, Structure and Activities

The change from RLS to ERLS did not coincide with any significant change in mandate, but there were significant changes in structure and activities.

The concept of linking research and extension was reinforced by the transfer to Ahmadu Bello University, since it allowed closer links with research on subjects such as animal science and agricultural engineering. However, the ERLS now had to service the technological needs of six states instead of one region, a task which was to become all the harder when the Interim Common Services Agency was dissolved toward the end of the period, in 1975.

The head of the ERLS was the Deputy Director (Extension), who, like the Deputy Director (Research), reported to the Director of the IAR. The service itself was divided into four sections:

- Agricultural Library
- States Experiment Unit
- Publication and Information Unit
- Agricultural Extension Services

The creation of the States Experiment Unit was a response to demands from the states to have technologies tested under their specific agroecological conditions, and to the existence of a better trained research-extension specialist team, which wanted to undertake on-farm adaptive research. From this point on, the extension specialist staff of the ERLS began to develop greater competence in on-farm research.

Management Issues and Performance

Coordination with research. With the creation of the States Experiment Unit, the development of professional expertise and research competence among the extension specialists of the ERLS encouraged them to become more involved in on-farm research, sometimes to the exclusion of the IAR researchers. The extension specialists had become university staff members, and now felt the need to pursue research similar to that of IAR scientists and to publish in learned journals to enhance their careers. The specialists' higher degree training and greater professional competence made them feel more independent of IAR researchers.

Coordination with extension. The new demands placed on the ERLS by the creation of the states had to be met with existing staff and resources. Staff strength did not increase significantly during this period, as many staff left for specialized training. The division had budgetary

problems that limited its ability to coordinate its activities with the state Ministries of Agriculture. Even though the states continued to appreciate the services provided by the ERLS, for which they paid, they began looking elsewhere for assistance. In effect, coordination was weakening, services to the states were becoming diluted, and performance was declining.

Capacity for on-farm research and farm demonstrations. The staff of the ERLS mounted more field trials and demonstrations in collaboration with state extension staff than they had with regional extension staff during the previous period. There was a higher level of confidence and job satisfaction amongst the service's extension specialists, who were undertaking research relevant to farmers' needs with less supervision from IAR staff. When IAR staff were involved, there were fewer joint site visits. The liaison service's extension specialists began to manage, analyze and report on their findings independently.

Input/feedback into research program formulation. The participation of ERLS staff in this activity became more informed, but also more conflictive. The ERLS was mandated to play a central role in verifying research results and releasing new technologies and recommendations. The IAR Council set up a committee on recommended practices headed by the Deputy Director (Extension), who was also the head of the ERLS. Through this committee, ERLS staff began to insist that the IAR provide conclusive evidence and additional proof of the superiority of their new technologies. This caused resentment among IAR staff and delays in making the technologies available to farmers.

Provision/organization of information materials/events. Between 1969 and 1975, the ERLS produced a wide variety of information materials, with distribution increasing markedly over the period (*see* Table 2). The service also operated a fleet of extension information vans and produced color slide sets for farmer training *in situ*. A vivid and popular radio program and a television program were also launched during this period. The number of conferences, seminars and specialized training events organized by the ERLS between 1970 and 1975 also increased.

Table 2. Type and number of information materials produced by the ERLS, 1969-75

Type of material	1969	1970	1971	1972	1973	1974	1975
Flipbooks	5120	6500	6500	1500	45000	3000	55000
Posters	168430	145000	14000	170000	230000	225000	417000
Leaflets	198591	150000	345000	315000	470000	445000	715000
Guides/recommendations	46662	70000	110000	-	105000	132000	120000
Bulletins	-	-	5000	25000	35000	15000	15000
Daily records	19613	30000	30000	30000	30000	30000	30000

Source: ERLS, 1969-76

An Attempt at Replication: The National Accelerated Food Production Program

In view of its early impact in the northern region, efforts were made to replicate the concept of the ERLS under different names for other parts of Nigeria, since the ERLS did not yet have a national mandate.

One program that had many of the characteristics of the ERLS was the National Accelerated Food Production Program (NAFPP). Although the organizational setting of this program differed from that of the ERLS, it was intended to complement the efforts of the ERLS in the northern states of Nigeria and to test whether the concept could be applied in the southern states. In the first few years after the NAFPP had been launched, there was close collaboration between it and the ERLS. Because the two organizations were funded from different sources, there was no problem of competition between them for resources.

Funded by USAID and the Federal Ministry of Agriculture, the NAFPP was initiated in 1973 and administered through the International Institute of Tropical Agriculture (IITA) in Ibadan. The program's plan called for:

- The organization of research and extension teams on a commodity basis
- The use of farmers to identify and distribute improved planting materials and other inputs
- The training of extension workers in crop production techniques and the involvement of extension leaders in research planning
- The strengthening of links in the research and technology transfer system

The program's structural components were research, extension and agro-service units. The research component

was implemented through centers created at selected research institutes on the basis of their ecological location and their capacity to generate appropriate technologies for specific commodities. A center for sorghum, millet, wheat and cowpea was established at the IAR. Other crops were assigned to centers at institutes in Ibadan and Umudike. These centers were expected to generate high-yielding crop varieties and complementary technology packages and to deliver them to the state extension services.

The extension component had crop specialists, who trained extension workers and sometimes communicated directly with farmers. Comprehensive career plans and training for extension workers were provided. Extension used the "kit" approach to disseminate new technologies. The agro-service component supplied farmers with inputs.

The NAFFP is generally believed to have succeeded in bringing together the research, extension and input delivery services in an integrated effort to accelerate the production of six essential food crops. The time period between the release of new technologies and their mass adoption was reduced from over eight years to about three years. The yields of rice, maize and cassava were increased significantly. Research institutes received regular feedback and, according to the 1976 NAFPP Annual Report, over 1 500 000 farmers participated in the program.

When USAID funding ended in 1980-81, the concept of the program as an innovative replication of the ERLS could not be sustained. Federal and state sources were not sufficiently committed and did not provide the necessary funding. Though the three centers still exist on paper, they are moribund in practice. The Federal Ministry of Science and Technology remains committed to the idea, but support from the Federal Ministry of Agriculture has been withdrawn.

AUTONOMY: THE AGRICULTURAL EXTENSION-RESEARCH LIAISON SERVICE (1976-86)

Removing the Liaison Service from the IAR

In 1975, the Ahmadu Bello University Council decided to separate the ERLS from the IAR and make it an autonomous entity, to be known as the Agricultural Extension-Research Liaison Service (AERLS), within the university complex. This decision was made because it was felt that the AERLS should be allowed to have a mind of its own and to criticize IAR work without fear of reprisals, whenever this work failed to meet the needs of farmers. For its part, the ERLS had developed strong technical expertise of its own and actively sought independence from the IAR.

In the period immediately preceding autonomy, the sphere of influence of the ERLS had increased from six northern states to ten. It was decided that the AERLS should seek information and technologies from research institutes throughout the country, not just the IAR. Thus, although the AERLS began with a stronger and more competent staff than the ERLS had had in 1976, it also had more states to serve and a broader spectrum of research institutions to liaise with. These factors further reduced the frequency and intensity of its links with the IAR.

Changes in Mandate, Activities, Structure and Resources

The mandate of the AERLS was significantly expanded beyond that of ERLS and RLS. It now included responsibility for conducting applied and adaptive research or surveys, especially where the need was urgent and research institute staff were not available to undertake it or where there were emerging problems that could be economically significant. The AERLS also became responsible for providing a broader range of advisory and consultancy services in agricultural development.

The eleven program areas according to which its work was organized reflect the growth of its mandate, to the extent that its activities now paralleled those of both research and extension:

- Field problem identification and feedback
- Crop technology transfer
- Livestock and fisheries technology transfer
- Agricultural engineering and irrigation technology transfer
- Food technology and home economics for rural women
- Training, rural youth and cooperation
- Farm radio and television broadcasts
- Cinematography, photography and exhibitions
- Publications and publicity
- Adaptation, demonstrations and local extension services
- Administration of headquarters and zonal offices

Following the establishment of additional national programs aimed at enhancing food production, the AERLS was ascribed three further functions. These were to:

- Act as the NAFPP National Centre for Sorghum, Millet and Wheat
- Coordinate Operation Feed the Nation programs in the ten northern states (this was a national program which had been established to promote the use of improved technology for the production of important food crops)
- Serve as an information center on agriculture for industries, banks and other organizations

With independence, the AERLS appointed its own directors, staff and governing board. The service was reorganized, to comprise three main divisions: the Administration Division, the Subject-Matter Specialist Division and the Agricultural Audio-Visual Division. The Subject-Matter Specialist Division was the largest of these, consisting of nine sections, while the Agricultural Audio-Visual Division consisted of four sections (*see* Figure 1).

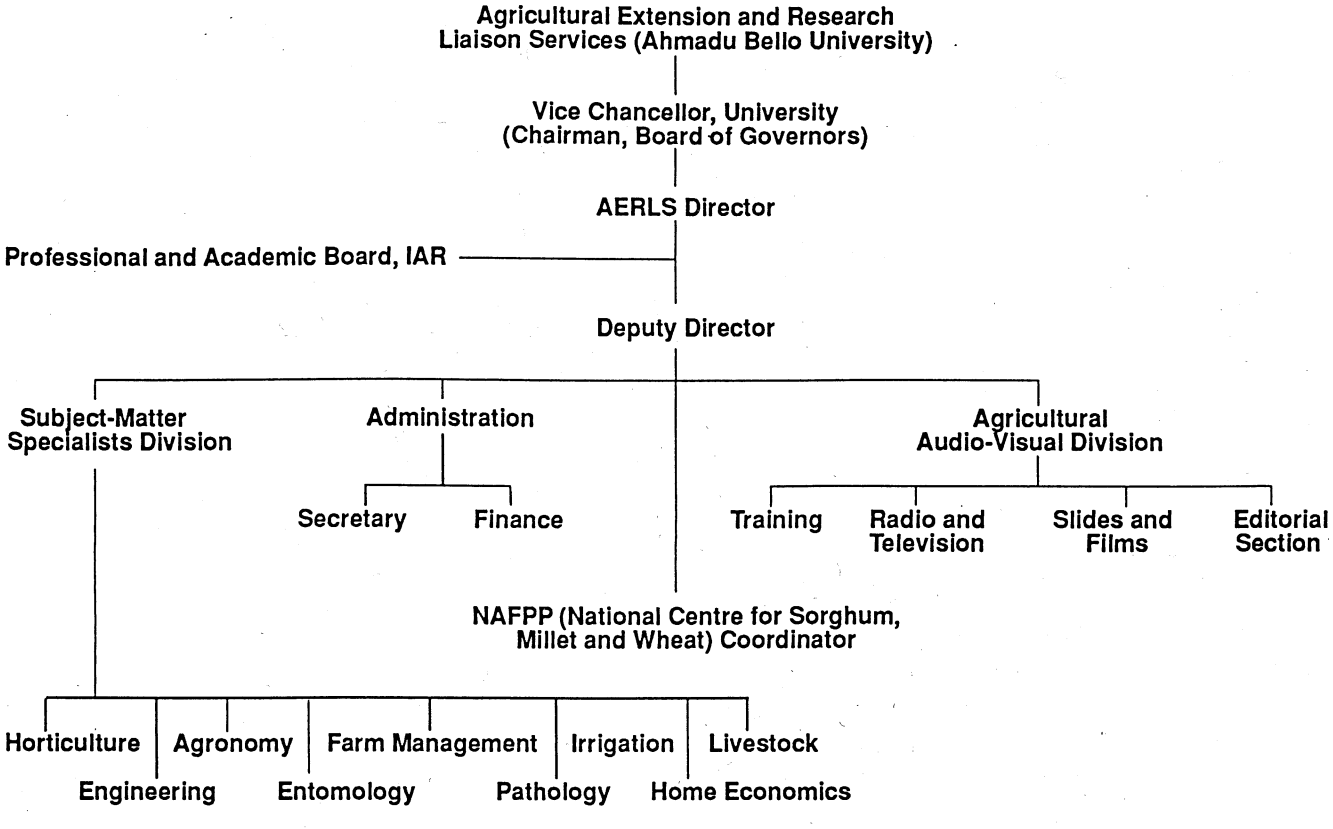
However, work was actually undertaken by multidisciplinary teams based on task/problems rather than division or section.

Between 1976 and 1980 the liaison service grew considerably, both in terms of the numbers of staff and the level of training. By 1980, the number of subject-matter specialists in AERLS had risen to 33, of whom 24% held doctorates, 55% held master's degrees and 21% had a bachelor's degree. Since 1980, the number of staff has remained more or less constant.

A major problem, however, is that funding for the AERLS has been inadequate, andhas fluctuated considerably from one year to the next. The service was not allocated enough new resources to enable it to implement its expanded responsibilities. The AERLS has had to compete with several other research institutes for funds from the same source.

From 1976 onwards, an ever-increasing proportion of recurrent expenditures was spent on salaries, with a corresponding decrease in the funds which were available for activities.

Figure 1. Organizational structure of the AERLS in 1976



Management Issues and Performance

Coordination with research. The new AERLS was still represented on the IAR's Professional and Academic Board and its Research Review Committee, but the service operated more and more independently of the IAR. It now had a core of qualified agricultural scientists and extension specialists with several years experience in on-farm research, capable of adapting technologies, recommending production practices and formulating messages for extension to communicate to farmers.

The AERLS consolidated its autonomy by increasing the resources devoted to its own internal planning. There were fewer formal opportunities for joint planning and program implementation with the research institutes.

Coordination with extension. Links with extension remained strong during the first half of the period, until about 1980. The states continued to rely on the AERLS for new technologies at the beginning of each growing season.

The situation started to change with the initiation of three pilot agricultural development projects (ADPs) in three states of northern Nigeria. During the second part of the period, links with extension focused on training, organizing meetings, and preparing specialized communication aids and teaching materials. The traditional function of making new technologies available to the states was increasingly performed, instead, by the research institutes' farming systems research programs and the ADPs.

Capacity for on-farm adaptive research and farm demonstrations. On-farm research by the AERLS remained moderately active, partly because AERLS scientists were now committed to the university and research institute ethic of publish or perish. The AERLS research publications in the second half of this period were academic in character, reflecting the standard requirements of reputable journals in various disciplines. Recently, there has been less on-farm adaptive research, and most recommendations are based on the results of earlier research. The AERLS has a high technical capacity for farm demonstrations which is not fully used because of lack of funds.

Input/feedback to research program formulation. Despite participation by the AERLS on the IAR Professional and Academic Board and at its annual cropping scheme meetings, collaboration between the two organizations in determining the research agenda appears to have declined during this period. AERLS and IAR staff have become more responsive to the demands of their separate organizations than when they were together in one institute.

Provision/organization of information materials/events. The AERLS continued to be highly proficient in producing specialized extension materials and organizing workshops, seminars and training programs. There was a high demand for these activities from the states, and the AERLS had developed substantial expertise in providing them. Emphasis on farm broadcasting increased, and training was provided in a wide range of subject areas.

Alternative Sources of Technology: The Agricultural Development Projects

In 1975 the World Bank launched a number of ADPs to improve the traditional extension services. The ADPs used the Training and Visit (T&V) system of extension and had three main components: Technical Services, including on-farm adaptive research and message formulation; Commercial Services, to distribute inputs; and Infrastructure Development, responsible for land clearing and preparation, irrigation and drainage, and road construction and maintenance.

To link research and extension, the ADP Technical Services used subject-matter specialists, who facilitated the exchange of information between the ADPs, AERLS and IAR. However, they were less well trained than specialists in the other institutions, which put them at a disadvantage.

To solve this problem, the ADPs employed better qualified staff to set up on-farm research activities to liaise with the research programs of the research institutes. Several joint pilot schemes undertaken between 1980 and 1985 confirmed that mutually beneficial links between the two could be sustained. The principal linkage mechanism used was the monthly technology review meetings, which were an integral component of the T&V system of extension. The meetings undertook the following activities:

- Upgrading the know-how of ADP subject-matter specialists
- Providing feedback to researchers about farmers' problems
- Developing and/or modifying production recommendations
- Participating in joint field visits
- Cooperating on joint planning and regular reviews of work plans
- Developing technologies compatible with the resource base of poor farmers
- Encouraging farmers to adopt new technologies on an experimental basis
- Monitoring farmers' responses to new technology

While the meetings and the activities to which they gave rise were not an exact duplication of the functions of the AERLS, their implementation in states where the AERLS had previously been very active rendered the service somewhat redundant. Because the coordinators of the meetings were from the IAR, state ADPs preferred to interact directly with the IAR rather than with the AERLS. Attendance at meetings by AERLS staff appeared to be at the discretion of the coordinators. When they did attend, the AERLS was required to fund their participation.

In some states the ADPs have completely displaced the AERLS in its traditional function of linking research and extension. The states' interest in the AERLS began to decline as new states were created and AERLS program activities began to be spread more thinly among them. While there is no evidence that the ADPs were created specifically because of the declining effectiveness of the AERLS, it is noteworthy that the first three pilot ADPs were initiated in the north. The states which hosted them accepted the ADP idea with enthusiasm and committed resources to its programs because it provided a welcome alternative to the services provided by the AERLS. In recent years, the AERLS has concentrated more on training and preparing information materials, and has been less important in providing the states with new technologies.

Another Attempt at Replication: The Regional Units

In the early years the concept of a liaison service as a necessary research-extension link was widely accepted in the north. As we have seen, efforts were first made in the early 1970s to replicate the idea in the southern states.

In 1981, a review panel recommended that four regional AERLS units should be established to perform similar linkage functions and that they should be fostered by the AERLS headquarters in Samaru.

This recommendation was partially implemented through the creation of AERLS units in several research institutes in the early 1980s. These units have been underfunded and understaffed, and have had little guidance in their work.

NATIONAL STATUS: THE NATIONAL AGRICULTURAL EXTENSION-RESEARCH LIAISON SERVICE (1987-THE PRESENT)

Rationale for the Change

In 1985-86, in the course of discussions on reorganizing the research institutes, the issue of where to place the AERLS, which was now liaising with several research institutes, was reconsidered. There were several options, including:

- Merging the AERLS and IAR, thus returning to the pre-1975 structure; this option was unattractive because of the service's current size, specialization and expertise
- Retaining the AERLS in its present form, but refurbishing the regional units recommended in 1981; government budgetary limitations made this option impossible
- Establishing the AERLS as a national institute to enable it to eventually provide links between research institutes and extension agencies throughout the country

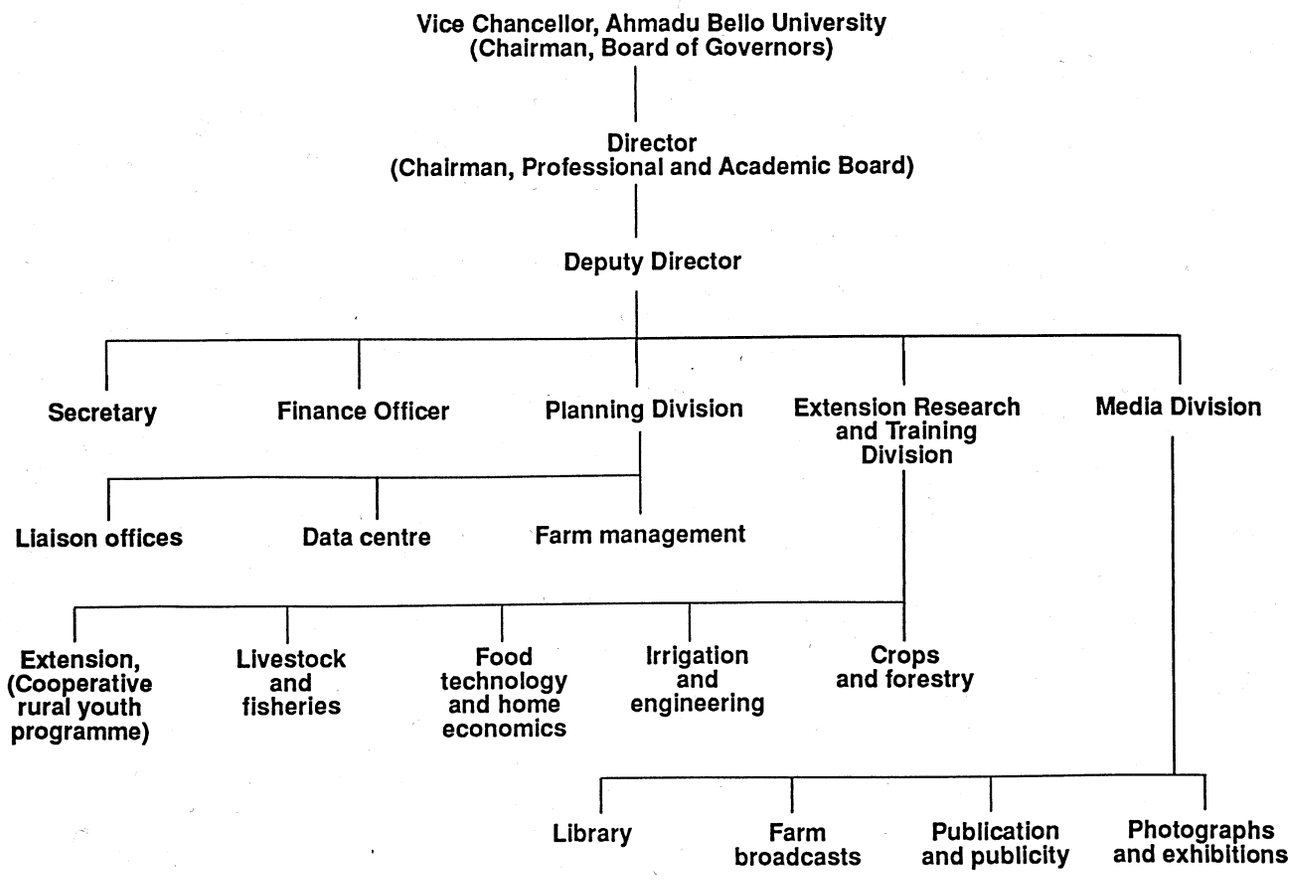
The third option was seen as the most desirable. It would allow the AERLS system to be improved and applied to other areas of information and technology transfer in science and industry, beyond agriculture. A national AERLS would have more clout and would be more likely to obtain the funds needed to develop its regional offices and institute-based units. In this way, the success of the AERLS in the north would be replicated in the south.

Changes in Mandate, Structure and Resources

The mandate of the AERLS was revised to reflect its new status as a national institute. The revised mandate is:

- To coordinate the overall planning and development of extension liaison activities throughout the country
- To collaborate with the research institute-based AERLS units
- To coordinate national training activities, conferences and workshops
- To conduct research on technology transfer and adoption
- To publish the *National Journal of Extension*, technical bulletins and more detailed extension publications
- To act as an external reviewer of the activities of research institute-based AERLS units

Figure 2. Organizational structure of the national AERLS in 1987



By implication, interpreting and publishing research results and disseminating them to Ministries of Agriculture and other agencies was now the responsibility of each research institute, through its own AERLS unit. The national AERLS was to be involved only where the technology had national relevance and was beyond the mandate of any one research institute.

The structure of the national AERLS is shown in Figure 2. The divisional arrangement has been retained to provide stability and coherence within subject-matter disciplines, but the sections within divisions have been integrated into three programs that operate as multidisciplinary teams, in keeping with the program approach adopted by other institutes in the country. The three divisions are now known as the Extension, Research and Training Division, the Planning Division, and the Media Division. Under this arrangement, the director has only three division heads, the secretary and the finance officer reporting directly to him.

The resources of the AERLS did not improve when it was "nationalized". There continued to be about 30 subject-matter specialists on staff. The budget rose only slightly in 1988, and may not have kept up with inflation.

Management Issues and Future Prospects

Because the AERLS has been a national institute only since 1987, it is too soon to assess its performance. The new institute has spent much of its time getting organized, planning its activities and forging links.

As noted above, the service has restructured itself into programs. In addition, it has established the four regional offices that were first recommended in 1981. These are intended to liaise with local institutes and provide feedback during evaluation tours and at the monthly technology review meetings. The AERLS is represented on the committees of various research institutes, and these institutes are represented on AERLS committees. The means of collaboration seem to have been established with

most research institutes, although there is still some resistance to the concept of the AERLS as a national institute.

The AERLS has now grown well beyond its original mandate. It is responsible for links between a large number of research institutes and technology transfer agencies. Its success will depend on its ability to develop and sustain the spirit of collaboration that made the RLS, the IAR and the Ministry of Agriculture work harmoniously together during the 1960s. However, additional funding will be required to cover the new scope of activities. Finally, skilled management will be needed to coordinate the larger number of actors now involved in the research and technology transfer system.

SUMMARY AND CONCLUSIONS

We may summarize Nigeria's experience with a research-extension liaison service as follows:

- In the period following its creation (1963-68), the RLS successfully met the needs of the Northern Ministry of Agriculture. It enjoyed adequate financial and policy support, had a mandate restricted in scope to functions in keeping with a liaison service, and had only two clients — the ministry and the IAR. It began to build an expertise in the production of information materials, a missing task well suited to the role of a liaison service, and one that remained well performed throughout the subsequent periods of organizational change.

- During the period when it was merged with the IAR (1969-75), the liaison service improved its expertise in on-farm research. In so doing it improved its status, a trend that was further enhanced by its location in the Ahmadu Bello university complex. It was here that its specialist staff began to develop academic aspirations that threatened to reduce their focus on the needs of extension and farmers. At the same time, they began to challenge the relevance of IAR research. The need for freedom to criticize research — a legitimate function of the liaison service — gave rise to its subsequent autonomy.

- Autonomy proved a mixed blessing. While it brought the necessary freedom to criticize research, it also brought reduced levels of contact and collaboration with its major partner, the IAR — a wholly inappropriate result for a liaison unit. At the same time, the mandate and size of the service expanded substantially, without a corresponding growth in funding. The expansion of the mandate, which now included a broad range of advisory tasks in addition to those of technology transfer, resulted in a service which duplicated the roles of both research and extension. The service had become an implementing agency instead of a coordinating one.

- Meanwhile, the number and organizational complexity of the service's clients had also grown, a trend which made it much more difficult for the service to achieve and demonstrate its impact. As the sources of supply for relevant technology diversified, its clients began to look elsewhere and demand for its services weakened. The expanded geographical coverage implied by recognition of the service as a nationwide institute placed further demands on its limited resources.

- The liaison service has given birth to a 'second generation' of 'mini-AERLS' — the regional offices and other decentralized units attached to research institutes in different parts of the country. However, the growth of these fledgling services has been stunted by the same shortfall in funding that has afflicted their parent institute. It remains to be seen whether or not they will survive, and, if they do, whether or not they will repeat the sins of their father.

In conclusion, managers who are seeking to strengthen links through liaison units must strike a delicate balance: they must build a unit sufficiently competent in the skills of both research and extension to be an equal partner in collaborative activities, but at the same time they must restrict both the power and the scope of such units in order to prevent the duplication of activities and the attenuation of impact. Maintaining this balance is more difficult in large countries with organizationally complex national systems.

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