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Preparing Professional Staff for National Agricultural Research Programs

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International Agricultural Development Service

Preparing Professional Staff for National Agricultural Research Programs

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FOREWORD

This report, which sets forth the recommendations of a meeting of 30 agricultural scientists and educators from 10 countries, addresses a vital development issue: how to prepare professionals to staff and manage the agricultural research and related programs of the developing countries.

In the effort to make supplies of basic foods keep pace with increasing populations, a number of developing-country governments have launched efforts to increase agricultural production, usually through higher yields per hectare. They recognize that lack of food and income among large numbers of rural people represents a genuine threat to orderly government. Many now believe that basic food supplies are essential to national well-being. Some governments are initiating forced-paced food production programs.

Today, we know a great deal about how to increase agricultural production quickly. Country by country, this knowledge must be translated into goals, strategies, and action founded on sound research. We need research to develop, adapt, and test technology to increase yields and solve production-limiting problems, including those of input supply and marketing. This research demands professional manpower, competent in the relevant sciences, capable of establishing goals, and able to initiate and manage effective programs.

When resources are scarce, as they usually are, the most efficient approach to increasing productivity rapidly is multidisciplinary, coordinated research and production programs for single commodities. While this approach permits maximum progress in minimum time, such programs bypass the families who do not produce that particular commodity, who live in regions where the technology is not adapted, or who do not have access to inputs or markets. A defined-area program, where the goal is to increase production of all commodities to the extent feasible and to increase the incomes of all people in the area, can be an effective complementary approach. Both types of programs require public and private efforts synchronized to ensure the supply of goods and services and to arrange for purchase and processing of the produce.

The principle of interdependency emerges as a major dynamic in the successful acceleration of agricultural development. Effective extension, for example, depends upon research which produces useful technology; long-term success in agricultural development depends upon favorable public policies and an active private sector. Thus, responsible persons concerned about the rapid development of their countries must be aware of the importance of and continually strive to develop and strengthen the linkages among all of the relevant components.

Above all, successful development calls for the efficient application of expertise and experience, both in technical and managerial issues. As we develop technology, agriculture, and countries, we must exploit every possibility for developing the potential of people.

Sterling Wortman

SUMMARY AND RECOMMENDATIONS

Several proposals to improve the preparation of professionals who staff and manage national agricultural research systems in the developing countries were formulated in a workshop at the Bellagio Study and Conference Center in February 1979.

Meeting at the invitation of the International Agricultural Development Service and the international agricultural research centers, 30 individuals from developing countries, bilateral and multilateral assistance agencies, regional and international centers, foundations, and universities recommended that appropriate agencies initiate high-priority action on several training and orientation programs.

These proposed programs would address the specific operational needs of several target groups of agricultural scientists and administrators: young professionals entering into their first major work responsibility; mid-career scientists moving into managerial positions; and senior government officials responsible for policies and priorities in national agricultural development. In addition, the participants recognized the need for encouraging the development and improvement of in-service training opportunities within each country.

IADS representatives said that with the concurrence and cooperation of interested parties, IADS could serve as the initial executing agency for any or all of the proposed programs. In this role, it could undertake the surveys indicated, identify and bring together potential cooperating institutions, initiate development of training materials, and explore ways of financing various programs.

IADS would be prepared to transfer responsibility to other organizations at any time. Given the magnitude of the problem and the number of institutions around the world already contributing to solution of these and other problems, the goal would be to decentralize and regionalize efforts as quickly as possible. The workshop participants agreed on this point. They endorsed the idea of convening another workshop within a year to review and evaluate progress, and to identify additional areas for attention.

The Problem

Discussions at the workshop helped define the types of problems particular to each target group:

Young professionals, seeking their first regular employment after obtaining advanced degrees in agricultural science, need experience in multidisciplinary, problem-oriented research aimed at accelerating agricultural productivity in developing-country situations. They lack both experience in such research and an understanding of and orientation to development.

Mid-career scientists represent a different challenge. Managerial posts frequently are filled by persons qualified in research but with limited background and experience in management procedures and skills. These scientists include (a) persons who will be responsible for carrying out agricultural research in the developing nations, and (b) expatriate personnel involved in technical cooperation projects to establish and strengthen national research systems. Both groups usually require, in addition to management training, orientation to the process of defining and achieving national development goals.

The orientation for senior government officials, it was noted, would be familiarization of planners and decision-makers with agricultural research as a prime instrument in national development. Participants regarded this as essential for support of the research necessary to provide a sustained flow of improved technology.

National program personnel at all levels were identified as a continuing concern, one which no single program can address. There is a continuing need in every organization to provide in-service and on-the-job training as well as more formal programs in both technical and management issues. The capacity for in-service training in most organizations has not been developed fully and, too frequently, such programs are not effective. Middle-level managers were identified as a group to receive top priority.

Proposed Programs

Recommendations of the workshop with respect to these groups include:

Young professionals

- o Initiate a 5-year program in which 100 young professionals (25 each year) would be enrolled for 2 years, spending the first year at an international agricultural research center and the second year in a developing-country program in which a center or another development agency is participating. Intensive orientation sessions would be included on significant development issues.
- o Organize a series of workshops for management and faculty of agricultural universities in the developing countries, to encourage more practical training as well as improved integration of curricula, facilities, and faculties with local agricultural problems, including program and research planning.
- o Conduct a comprehensive review of ongoing activities in training for agricultural research; FAO was requested to consider such a study.
- o Consider a seminar, of up to 3 months in duration, for outstanding young scientists in national or international programs. Such a seminar, under the direction of a senior agricultural scientist with development experience, would entail visits to selected international centers and a wide range of national programs.

Mid-career scientists preparing for top management posts

- o Organize and conduct a series of 3-month intensive courses, involving case studies of research management successes, difficulties, and problems, visits to selected institutions and organizations, lecture-discussions with experienced authorities, and selected readings. Each course, for about 30 persons, would consider development strategies, institution building, management responsibilities, techniques and styles of management, and provision of support services.
- o Regionalize such courses, as soon as possible, through existing regional and national organizations concerned with agricultural research and its management.

Senior government officials

- o Organize, on a regional or area basis, a series of up to eight 7- to 10-day seminars (30 persons each) on the role of agricultural research in development, and the importance of management training for those responsible for agricultural research and development programs.

Middle-level national program managers

- o Survey situations in selected developing-country institutions and/or national agricultural research systems and international centers, to determine training needs and how they are being met.
- o Identify materials useful in training as well as gaps to be filled
- o Design models to assist organizations in analyzing effectiveness of present in-service training efforts.
- o Develop models for designing or improving national in-service training systems.
- o Develop and test techniques for use by national institutions in monitoring and evaluating in-service training.
- o Consider regional workshops for persons responsible for in-service training programs.
- o Explore possibilities for developing activities in cooperation with the International Federation of Agricultural Research Directors.

Details regarding each recommended program are included in the reports of the three work groups. Other activities endorsed by the participants included thesis research abroad programs and the course being organized in Europe to prepare persons for development-oriented research.

Participants in the workshop are identified on the following page.

CONFERENCE PARTICIPANTS

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I. THE PROBLEM

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PREPARING PROFESSIONAL STAFF FOR NATIONAL AGRICULTURAL
RESEARCH AND RELATED PROGRAMS

Background Review

Staff of IADS

National and international organizations responsible for agricultural development face a pervasive and serious problem: identifying, qualifying, and maintaining the corps of agricultural professionals necessary to staff the range of posts involved. The problem is particularly acute within developing-country institutions.

Accelerated rates of agricultural development are needed in most countries to meet the growing demand for food and to generate jobs and income in rural areas. The role of new, improved technology in increasing production and productivity is now well recognized. But technology usually must be tailored to specific agro-climatic and socio-economic conditions, a process requiring competent national research and development programs, including experiment stations in different environments.

While qualified manpower is a prerequisite to the building of national research capabilities, few developing nations have anywhere near adequate numbers of professionals with the necessary education and experience. Competition exists for the experienced professionals. Further, the quality of research management greatly influences the productivity of this scarce manpower, and, in general, the number of qualified managers is limited.

Concern for such issues has been expressed frequently within the technical assistance community. Ten years ago, the Pearson Commission addressed the problems of recruiting, preparing, and retaining personnel for technical assistance assignments. It urged assistance agencies and donor governments to improve the training of their expatriate staffs, and governments, institutions, and private firms, through career guarantees, to encourage professionals to undertake technical assistance assignments. Among other recommendations, the commission proposed the

creation of a corps of experts who would make a career of technical assistance. (25)*

Recognizing that few of the commission's proposals had been implemented, authorities of assistance agencies, meeting at Bellagio in November 1976 to consider ways to accelerate agricultural development, endorsed new initiatives in this area. Similarly, in a meeting at Bellagio in February 1977, 11 representatives of developing countries recommended that IADS give high priority to three areas: comprehensive national agricultural development programs, development-oriented literature, and human resource development. (15)

In subsequent months, IADS initiated discussions with representatives of the World Bank, the U.S. Agency for International Development, and the Board for International Food and Agricultural Development (BIFAD), the group directly concerned with the involvement of U.S. universities in technical assistance projects.

These discussions led to IADS's distributing a tentative proposal to the directors of the international agricultural research centers. Out of this interaction came the decision to organize a workshop on preparing professional staff for national agricultural research and related programs. The objective of the workshop would be to formulate specific proposals for action and funding by appropriate agencies.

Questions raised in the planning included: Who is to be trained? For what kind of work? Where and by whom? What will be the focus of training? What time periods are involved? What can be taught, and what must be learned through experience? How adequate are existing programs and approaches? How might these be expanded or made more adequate?

Planners of the workshop decided to concentrate on three not necessarily mutually exclusive groups of professionals:

- o Developing-country nationals working in mid-level and senior positions in research or research-related organizations in their own countries;
- o Mid-career scientists of any country who wish to prepare themselves for advisory or staff positions related to organization and management of national agricultural research and related programs in developing countries;

*See bibliography at end of report.

- o Young professionals of any country seeking responsible first positions in their own or other countries, or with an assistance organization.

Planners also reaffirmed that the problems the Pearson Commission noted, and other problems related to meeting the personnel needs of agricultural research and development, still exist:

1. There is a worldwide shortage in developed and developing countries, as well as in technical assistance agencies, of experienced agricultural professionals to staff or to serve as advisors to national agricultural programs.

2. There is a particularly acute worldwide shortage of agricultural professionals with experience in establishing and managing agricultural development strategies, organizations, and programs.

3. Young professionals encounter serious obstacles to obtaining their first international assignments.

4. Mid-career professionals who desire to qualify themselves for international work find few organized, readily available opportunities to do so.

5. There are organizational and logistical obstacles to the exchange of professionals who already have expertise and experience. It is difficult for a professional to become experienced in international work while maintaining a career base in a home-country institution.

6. In educating young scientists in agriculture, few universities provide opportunities for them to learn about development or about managing development organizations. Some young professionals do not avail themselves of such opportunities when they do exist.

I. The Professional Challenge

Professionals engaged in agricultural development operate in a special set of complex biological and social variables, and a vast array of constraints and obstacles. Superior performance depends upon education and experience, but the demands for accelerated development leave little time for adequate preparation or qualifying experience. In addition, each of the three broad categories of professionals has specific problems.

Unique Context

If they are to be successful, professionals engaged in national agricultural development--at whatever point--must know what to do. Moreover, they must know how to do it, when, where, within what time frame, and with whom. They must learn to anticipate and identify constraints and develop the ability to avoid or surmount obstacles. They must understand goals and strategies for reaching them as quickly and at as low a cost as circumstances permit.

Agricultural development involves complex biological variables in complicated socio-economic situations. While the problems may be old, much of the technology is new, perhaps introduced from outside the country, and must be locally tested and adapted.

National goals and food-poverty problems dictate speed, but research and related operations usually are limited by low budgets for facilities, equipment, maintenance, and personnel. The depth of professional support staff is shallow.

Generally, field programs are hampered by inadequate infrastructure--communication, roads, bridges, transportation. Effective linkages between research, extension, and farm production frequently are missing. Synchronization and coordination of services are minimal.

Personal Qualifications

To perform effectively in this unique context, a professional needs special qualifications. In addition to preparation as a scientist or other specialist, he must have knowledge and understanding of the social, economic, and political aspects of development, as well as the ability to adjust to living and working in what may be unfamiliar and stressful organizational or cultural settings--an ability especially important for the expatriate.

Advanced degrees normally equip professionals to plan and conduct research in their specialty, but not necessarily to identify and work on significant production-limiting problems in complex environments, nor to function effectively in multidisciplinary teams.

Excellence in academic qualification, therefore, must be accompanied by dedication to working on agricultural research and development and understanding, patience, and the other personal qualities needed for good working relations. Generally, success will be associated with the professional's ability and willingness to function in a low-key manner, as a member of local research organizations and teams in problem-solving studies.

Specific Group Issues

While the three groups share many problems and opportunities, each group has specific difficulties in acquiring the education and experience necessary for effective development careers.

National Program Personnel. By far the largest group of concern is composed of nationals working in their own agricultural research and related programs. Generally, they face the following limitations:

- o Many lack agricultural or rural background.
- o Few, in obtaining their first agricultural degrees, had extensive laboratory or field experience.
- o In obtaining their advanced degrees, usually at a foreign university, few had opportunity for study of or orientation to either development or management issues.
- o They do not have years of experience in national programs to obtain this orientation. Instead, because of the scarcity of trained personnel in their countries, they advance rapidly to managerial posts; they are subject to frequent transfer within government, sometimes to posts outside of agriculture.
- o Senior officials, and juniors, in turn, are subject to political pressures that influence the speed, magnitude, and coverage of development programs.
- o The proliferation in the sources of funding and technical assistance poses problems of allocation of attention, effort, and resources.
- o Once in their posts, it is difficult for personnel to be absent for extended periods of training.

Mid-Career Scientists. This category includes both nationals desiring to qualify for more senior posts in their own or other countries, as well as professionals in developed countries or in international centers interested in working as expatriates.

When assignments go beyond the actual performance or direction of research, the roles become complex and take most agricultural scientists into areas in which they have acquired little or no experience. As advisors, coordinators, managers, or senior administrators, they usually work at higher organizational levels than previously experienced, and in roles which require building and maintaining effective relationships between and among many organizations and institutions. (5)

Most countries still requiring expatriates for staff or advisory posts insist on senior personnel with both demonstrated expertise and previous international experience. Several factors influence these demands:

- o As they tend increasingly to obtain loans rather than grants, countries expect to decide how the money will be spent.
- o More countries have their own young professionals, and want expatriates capable of directing and inspiring them.
- o Some countries have had unfavorable experiences with junior personnel or professionals on short-term tours.
- o Overall, they want to benefit from the experience of expatriates, not provide it to them.

In most cases, their positions require experienced research administrators with a broad knowledge of agricultural development problems. Some observers say the situation calls for "agricultural statesmen" with the diplomacy and skills needed to establish close working relationships and the competence to advise on a broad range of issues.

Young Professionals. Many factors contribute to the complexity of the problems of this group, not the least of which is the reluctance of organizations to give the young professional his first international assignment. This is most serious for personnel of developed countries, but the young national, returning to his own country with an advanced degree, also has problems:

- o His expectations of position and attendant rewards are often much higher than reality permits.
- o If assigned to a research post, he misses the professional support (personnel and equipment) experienced abroad.
- o Because he has an advanced education, he frequently is given increasingly responsible administrative duties.

For many young nationals, these circumstances lead to frustration, and they may seek higher-paying or more rewarding employment opportunities in international agencies eager to have a wide spectrum of nationalities represented on their staffing rosters.

Other factors can adversely affect a young professional's efforts to equip himself for a career in agricultural development:

- o To an increasing extent, the majority of those studying agriculture, regardless of their country of origin, lack agricultural backgrounds. Whether this is important continues to be debated.
- o Most institutions offering advanced degrees in the developed countries operate under temperate-zone conditions; most of the developing countries are in the tropics or sub-tropics.
- o Generally, advanced-level training is oriented to an academic discipline, rather than to practical problem solving or to ways of working in multidisciplinary teams.
- o Limited financial support and in some cases university regulations make it difficult for students to carry out thesis research in developing countries.
- o Pressures to complete a degree in minimum time conflict with a student's desire to take relevant elective courses in fields outside his major.
- o Once graduated, young professionals have difficulty building and maintaining linkages on an international basis.

II. Factors Affecting Manpower Needs

Institutions concerned with preparing professionals for development not only must consider the context in which the individual will operate and the skills he may need to operate successfully, but must address other issues as well. Policy changes, both international and national, influence the demand for people and the kind of work for which they will be responsible. Perceptions of the urgency of the overall situation, the differences among countries, and the multitude of organizations involved in preparing and employing scientists affect the availability and commitment of potential staff. Finally, the philosophy of development itself is constantly evolving, and must be considered by organizations whose staffing and training programs help determine the ability of

the countries they serve to manage their development programs with the accuracy and skill required.

This section briefly describes a few of these issues: need vs. demand for professional personnel; changing emphases in technical cooperation; the special demands on management in agricultural development situations; and the development roles of women and families.

Need vs. Demand for Professional Personnel

It is much easier to speak of the need for professional staff than to estimate the actual numbers involved. Oram cites several methods of determining the need for trained manpower:

- o Comparing manpower needs with financial yardsticks, e.g. expenditure as a percentage of GDP or of value of agricultural product.
- o Relating need for staff to production of major commodities.
- o Relating manpower requirements to numbers and types of farmers.
- o Estimating numbers required to replace losses because of death, retirement, resignations, etc. (23)

Despite the limited success of these and other methods of determining the probable demand for manpower, Oram concludes that the need for training is great:

In respect of research and extension alone, the various attempts made in recent years to assess supply and demand for trained manpower in the developing countries and to relate the balance to training needs, suggest that very large orders of magnitude and potential costs are involved.

Oram indicates that the agricultural research manpower of the developing countries seems to be concentrated in nine countries (Argentina, Brazil, Colombia, Mexico, Egypt, India, Philippines, South Korea, and Thailand, each having at least 600 graduate research workers). Most developing countries must expand their professional staffs significantly if they are not to depend increasingly on others for technical assistance. To double the present developing-country research staff in 10 years, with allowances for 10 percent staff replacement and 30 percent student dropout, more than 5,500 new students must be started each year. More than 20,000 additional graduates would have to be produced each year to meet the needs of extension and related services.

Even more critical, however, is the need for experienced senior managerial and planning staff. The need for in-service training for national staff in these positions is probably without limit; the need for expatriates to fill these positions when required is difficult to estimate.

The ability to meet this need is also difficult to assess. Nationals in key posts are seldom able to leave for extended training periods. An expatriate selected for an assignment rarely has sufficient time or opportunity to acquire additional orientation or experience before assuming his new role. Similarly, young professionals, anticipating difficulty obtaining a first international post, cannot realistically be expected to take extraordinary measures to acquire additional knowledge or experience.

As countries continue to develop their own professional staffs, the long-term need for expatriate personnel is likely to diminish, but over a relatively long period, particularly in the smaller, less-developed countries. This does not necessarily imply a reduction in the desirability of providing internationally oriented training for developed-country professionals. It may signal, rather, a changing rationale for providing the broadened education and experience required in technical assistance. As the world becomes increasingly interdependent, it will be important for developed countries to prepare their personnel, not solely to work abroad, but to bring to their work at home a world view, making them better scientists, educators, and citizens.

Changing Emphases in Technical Cooperation

Significant changes in the international scene directly influence the number and kinds of personnel needed in national agricultural research and related programs. Among these changes are the growing population, mounting food demands, the increasing desire of nations to be self-sufficient, and the changes in policies and emphases of donor and technical assistance agencies. Some of the changes most significant to professionals in agricultural development programs and the organizations who train them are described briefly below.

Speed of Development. It is now recognized that many of the developing countries must double their food crop output within 15 years, some in as few as 8 years, if they are not to be dependent upon external sources for their basic commodities. (38) Achieving these growth rates will require exceptional research and development efforts, concentration on goals, synchronization of services, and favorable public policies. The task calls for scientists and administrators with a broad understanding of the overall problems and the competence and dedication to appreciate and work within the context of each other's skills and needs.

Emphasis on the Small Farmer. The technical cooperation community and many developing countries have shifted their focus and now stress the importance of helping the small farmer and meeting the basic needs of the rural poor as the first step toward successful economic development. In many developing countries, this signals major changes in planning and implementation of programs.

Increased Flow of Technology. The international agricultural research centers are producing an increasing number of selections of improved plant germplasm and production technologies. These pose new opportunities and problems for national authorities, who must mobilize and manage their limited resources to maximize the opportunities this new technology offers, and still mount and maintain programs for other commodities not covered by the international centers.

As international centers expand their programs and outreach activities and services in individual countries, they may unintentionally relate the bulk of local resources to such externally generated research. This, in turn, may lead to a distortion of national research priorities and programs. If not properly managed from within as well as from outside, institutional structures may be disrupted and costs and returns to research thrown out of perspective.

New Emphasis on Technology Transfer. Concerned with the slow adoption of new varieties and cultural practices by many farmers, the international centers and many national programs have been reviewing the question of technology transfer. Some research organizations are changing strategies for identifying and solving the problems of small-scale and subsistence farmers, paying more attention to social variables, and conducting multidisciplinary studies of mixed- and multiple-cropping

systems. Old and new methods of extension are being reviewed to develop effective ways of reaching small farmers.

It has become clear that aggressive extension efforts without technology appropriate to the situation can only result in failure. Moreover, appropriate technology, in the sense of technology that is biologically adaptable, economically viable, and socially acceptable in the locale where it is to be used, can only be created through an interaction of research and extension, and a continuing dialogue between scientists and farmers.

The new sophistication of this approach places an extra responsibility on professionals dealing with extension or research: whatever the approach, the situation calls for individuals who understand research, agricultural technology, teaching and extension methods, and the circumstances of small farmers.

Increased Funding and Resulting Problems. The new emphasis on development has brought an increase in the available funds for agricultural programs and projects, and, at the same time, additional reasons for in-service training of national program staffs. In addition to increased amounts of money available through the World Bank and regional banks, the International Fund for Agricultural Development, which came into being in 1977, has at its disposal more than one billion dollars to help increase agricultural production in the developing world, particularly in the poorest food-deficit countries.

But increased availability of funds does not automatically accelerate agricultural development:

- o Lack of adequately trained people to identify and develop sound proposals leads either to funding of poorly conceived projects or to non-utilization of the money by countries most needing it for development. As a consequence, donor and lending agencies frequently compete for the privilege of supporting well-planned projects.
- o When new projects are funded, they create additional demands for people, especially for those with managerial abilities.

Management skills to deal with this increased amount of investment capital are often lacking, particularly in the smaller, poorer countries that are meant to be its beneficiaries. In a 1976 report the Consultative Group on Food Production Investment pointed out:

The aggregate supply of local management staff in most developing countries is chronically short. This undoubtedly diminishes the marginal efficiency of investment in agriculture. . . . by far the most frequent problems affecting project implementation are in the area of management. (8)

In summarizing its report, the CGFPI particularly noted the managerial problems of the supporting services:

The larger part of increased food production in the LDC's comes from the expanded use of yield-raising inputs in the areas already cultivated. The efficiency of investment in the expansion of supporting systems--input supplies, credit, and extension--depends critically upon the allocation of management personnel. . . .

The report also cited problems associated with funding for developing the research capabilities of developing countries through counterpart training and the supplying of technical assistants. Noting the dual nature (technical assistance and training) of many such projects, the report pointed out that frequently expatriates are selected for technical skills rather than teaching abilities; thus the original training objective is not fully achieved:

In view of the above, it should be discussed whether efficiency could be improved, and frustrations on both sides lessened, if a workable distinction were made between technical assistance and institutional projects, the former being limited to the supply of technical skills locally not available, the latter having the purpose of strengthening an entire institution through staff development at various levels, investment in physical facilities, and improvement of operating methods, procedures and personnel management. The latter approach, almost by definition, requires both a careful selection of foreign personnel, as well as a long-term commitment, possibly as much as ten years.

The situation suggests a staffing strategy that emphasizes the assigning of a minimum number of experienced, highly qualified expatriates and the creation of a multiplier effect through in-service training of nationals.

Shifting Assistance Policies. Donor governments and assistance agencies sometimes change their style of operation and project criteria. Countries, usually involved with several aid agencies, have difficulty adjusting rapidly to these changes, particularly when the objectives, policies, and procedures of various agencies appear to be contradictory.

Increasing Recognition of Development as a Social Process. There is growing recognition worldwide that development efforts, if they are

to succeed, must be managed as more a human than a technological process, the success of which depends upon knowledge and understanding of those "being developed." This approach to development requires professionals with social science as well as technical and managerial skills. A central issue is the need to take into account and build on the traditional and potential role of women and families in agricultural production and rural community life. This aspect is discussed in a later section.

Management Demands of Agricultural Development

In considering management skills as an essential component of training programs, we need to be aware that agricultural and rural development programs place special demands on managers: (4)

1. The urgency of the food-poverty situation requires action, not contemplation. Managers in development must be able to move ahead confidently and aggressively. This requires experience, commitment, and courage.

2. Agriculture, by its nature, is constantly variable, and the rapid growth of current technology makes it more so. Those who manage agricultural development must understand the biological, environmental, seasonal, and economic factors responsible for this variability.

3. The manager also must be able to recognize agricultural development as a social and economic as well as a technological process, and to identify and marshal resources for solving human and organizational problems.

4. Success in development depends on the synchronization of a vast range of services provided by many agencies over which the manager has no direct control. The manager must be able to persuade and lead: he deals with political leaders who often do not understand agriculture or the circumstances of farmers and rural life; similarly, he can motivate, encourage, and demonstrate to farmers or others what is necessary, but cannot direct them.

This context places a premium on innovation, ingenuity, and problem-solving skills, what one writer describes as "the art and science of pushing strings." (30)

Development Role of Women and Families

The current concern about the role of women and families in development indicates a recognition that the development process must include women--not because they are women, but rather because examination of the realities makes clear the critical role they and their families already have in survival and development. The success of new efforts depends upon understanding and taking their existing role and functions into account.

Germain puts the issue most succinctly:

Women, especially low-income rural women, are possibly the most underrated development resource of 'resource poor' Third World countries. Long recognized as reproducers, they have been steadfastly ignored as producers. . . .These hardworking, shrewd, and productive women are agents, not simply beneficiaries, of development. Not merely welfare problems, they are resources upon which development planners should draw. In order to do so, planners must do more to enhance women's non-mothering productive tasks, an effort only begun. Progress is hampered by the fact that there are few experienced staff or useful program and policy models on which to draw. (13)

In this light, the subject of women in development becomes relevant in discussions relating to the preparation of professionals for responsible development roles. Some aid and funding agencies already insist that new projects clearly indicate how women will be involved and benefit. The Percy Amendment added to the U.S. Foreign Assistance Act of 1973 the stipulation that assistance given in the areas of food and nutrition, population planning, health, education, and human resources development, and any other selected development problems

shall be administered so as to give particular attention to those programs, projects and activities which tend to integrate women into the national economies of foreign countries, thus improving their status and assisting the total development effort,*

Concurrent with the growing emphasis on the role of women as an important mechanism in development has been a broader concern about the need to recognize and take into account the total family. Nelson advances the argument:

*Public Law 93-189, 93rd Congress, s. 1443, December 17, 1973; Sections 103-107 and Percy Amendment Section 113.

As we plan international programs for implementation in developing countries and as we strategize to prepare ourselves and our students to work in these programs, we need to consider appropriate ways to sequence decision making opportunities for men and women, for parents and children, for teachers and students. Managerial skill development built into long-term projects for all people will contribute significantly to the goals of human rights and world development. (22)

To what extent and in what way these issues can be addressed in programs to prepare professionals for national agricultural research and related programs are possible subjects for debate at Bellagio, perhaps in the spirit Boulding sets forth:

Neither women nor men have gender-linked skills that uniquely qualify them to deal with the problems of either world hunger or of large-scale planning. They do have culturally differentiated life experiences--a phenomenon that may not continue into the twenty-first century, but one that we must consciously utilize as long as it exists. It is precisely in using these differentiated knowledge stocks by putting women and men into collaborative teams for social problem-solving that the absurd and useless aspects of that differentiation will gradually undergo erosion in the future. (2)

III. Sharpening the Focus

Obviously almost any kind of orientation or training program would in some way benefit most professionals. But the problem is too great, the issues too important to proceed without a sharper focus.

It is important to know and understand the kinds of operational problems which administrators and scientists in national programs observe and encounter. Equally, some issues and problems are of particular concern to those who staff technical assistance programs or operate planning and implementation agencies.

Similarly, current formal and informal education and training programs have certain strengths and limitations with respect to the three professional groups of direct concern.

Finally, given a set of desired performance outcomes for each professional group, it is necessary to decide what combinations of organized instruction and arranged experiences are necessary to achieve the objectives.

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STAFFING AND MANAGEMENT PROBLEMS IN
NATIONAL AGRICULTURAL RESEARCH PROGRAMS

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The lack of well-trained personnel is perhaps the most serious limiting factor in increasing food production in the developing countries. Almost any kind of talent is in short supply; the problem is becoming more acute, because there is concern over food supplies in more nations, and because more funds are available for agricultural development.

A number of governments of developing nations have launched efforts to raise agricultural output. They have realized that industrial growth, so fervently sought in the 1950's and '60's, usually is achieved only from a sound agricultural base. They also know now that basic food supplies are strategic items essential to their national well-being. International and regional donor and assistance agencies, also convinced of the importance of increasing basic food supplies and incomes, have moved aggressively to do something about it.

The relatively new interest of developing-country governments in food production, coupled with the availability of substantially more money for this purpose, has resulted in the initiation of many agricultural research and production projects. These projects have claimed the services of nearly all the experienced scientists and technicians and quite a few of the not so experienced or qualified.

Agricultural scientists need several competencies. One essential is professional knowledge. There is no substitute for mastery of the current information and research techniques relating to a scientist's chosen field. A solid formal education is essential, but learning is or at least should be continuous. A serious deficiency in research in developing countries is that too few of the research workers have the training to conceive and execute meaningful research.

It is best to develop scientific manpower in national systems through continuous training efforts. The approach used in the Turkish wheat project was particularly effective. Young persons joined the project immediately after having obtained the B.Sc. degree in agriculture from a local university. These men and women usually had reasonably good training in general agriculture, but lacked depth in any discipline. They could not do field experiments or, for example, conduct a plant breeding program or rural economic survey. After about a year of working with more experienced scientists, the most promising young scientists were sent to CIMMYT on a 7-month training assignment.

They returned to the wheat research project as much more productive workers. After 1 or 2 years, the most able were selected for graduate training abroad, not only at a particular university but with a specific professor. Professors were chosen who were familiar with Turkish agriculture and who had strong research projects that could be applied to Turkish conditions. Research in the field was emphasized, and pertinent thesis topics might be suggested by the wheat project. During their study period, some were able to travel to or even conduct their thesis research at CIMMYT. When these scientists returned to the project they were generally well prepared to fulfill their research roles. Such a training schedule is time-consuming and expensive but produces more effective research workers than the conventional graduate program.

Probably the most needed and least available talent today is the able, experienced scientist who is also a skilled manager--a person who can judge the research needs of his country and accurately evaluate scientific results and, at the same time, manage finances and personnel and interact effectively with his superiors. In the United States, education in science has almost completely neglected attention to management. When successful scientists are promoted into managerial and administrative positions, the results sometimes are good, occasionally disastrous. This deficiency in our training has been recognized.

Another aspect of agricultural research receives little attention in our educational institutions. This is a "team" approach where each scientist, in playing his position, helps the team accomplish the task. It is the "team" which succeeds, not the individual. Today multidisciplinary commodity- or problem-oriented research projects are being

launched by many developing nations. But where does a young scientist learn how to be a team player?

Probably not at developed-country universities, which are organized by scientific disciplines and where promotion is keyed to individual performance. Universities often use a multidisciplinary team to pursue a research project, and at one time the U.S. federal research organization was heavily committed to this approach; but these teams tend to exist mainly on paper, with little contact or communication among team members. Rarely does the philosophy of multidisciplinary research infiltrate the training of graduate students. A few universities in the United States have experimented with the team approach to research in their graduate programs. Cornell and Kansas State universities, for example, have done so with considerable success. Most of the international centers' training programs use the team approach. CIMMYT involves its trainees in the work of multidisciplinary research teams. I understand that the other centers also emphasize this approach in their training programs.

Multidisciplinary research must be administered differently from traditional research and scientists who lead national programs must understand this. Before the Turkish wheat project was initiated, the director of each of 12 experiment stations had full control of activities at his station: he approved research plans, he approved budgets, he authorized expenditure of funds, he approved travel by scientists, and he allocated vehicles and other equipment for specific purposes. Now, the research plans for the whole network of stations are prepared by the scientists in an annual workshop. A single budget for the project is prepared by the project director with the advice of the individual scientists. These new methods require changes in administrative procedures.

Within the wheat project, research plans are made by the scientists so that research at the different experiment stations is complementary. Each scientist has a well-defined role in carrying out the nation-wide research activities. In my experience helping scientists and administrators develop an understanding of the concepts of a coordinated, multidisciplinary research project has been the most difficult training task encountered.

The role of a foreign scientist in a technical assistance project calls for a high degree of professional competence and managerial talent, but also for the ability to perceive the advantages and limitations of a foreigner working in partnership with a national government. One can acquire this understanding only through experience. For this reason, therefore, I believe that all staff of the centers should gain experience in a national research program of a developing country.

We have a dilemma when we attempt to arrange this kind of experience for scientists, especially young professionals. These scientists cannot qualify for international assignments until they gain experience in developing countries, but they cannot get such experience because they are not qualified.

Three additional points are important and relevant:

Education to the doctoral level generally is not necessary to conduct most of the production-oriented research required in the developing countries. Obtaining a Ph.D. is time-consuming and expensive; it often increases the probability that the recipient will seek employment outside his country. Problem-oriented studies in the field, which comprise the bulk of research needed to produce technology, do require supporting research of a more basic orientation. It is desirable for scientists with Ph.D. training to conduct this supporting research. Also, the broader, more intensive training at the doctoral level is valuable for scientists who manage research systems. But the need for supporting research is significantly less than for problem-oriented research, and scientists with M.Sc. degrees can do the problem-oriented research well.

Many countries create too many experiment stations, diluting financial support and spreading scarce human resources thinly. In the Turkish wheat project, for example, there are 12 research stations where, in my view, six would adequately represent ecological conditions throughout the country. Research would be significantly more effective if the financial and physical facilities and the human resources now spread out among 12 stations were concentrated in six.

One of the most important and least appreciated posts in national research organizations is that of the experiment station manager. He is

the man who makes things work, who is responsible for providing the day-to-day services required on experiment stations. Other than modest training activities at CIMMYT, CIAT, and ICRISAT (and perhaps other centers), I know of no place in the world where one can obtain training in experiment-station development and management. This is a serious gap in our overall training efforts.

MOST SIGNIFICANT STAFFING AND MANAGEMENT PROBLEMS
FOR ADMINISTRATORS OF NATIONAL RESEARCH SYSTEMS

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Observations in the paper prepared by IADS for this conference are similar to the situation existing in Turkey for recruiting and training young professionals, and to management problems of administrators in agricultural research and commodity improvement programs.

Almost all countries first utilized new land to fulfill their food needs, then developed new technologies and know-how through research and commodity development programs, to increase yields per unit area. But economic, social, and political constraints have forced us to integrate all available data on resources, research findings, and funds to cope with an ever-increasing population's food needs. This has led to a focus on rural development schemes, which in Turkey we have named "Planning Agricultural Production," a systems approach for production of food to cover consumption, loss, and export.

Since this model integrates all institutions related to agricultural production and its utilization, it helps identify bottlenecks and thus mobilize decision-makers to take immediate action. This model, we find, is the most efficient way of utilizing hard-to-find administrators in agricultural research and related programs.

Before defining the problems involved, I would like to describe the qualifications of administrators who would be considered successful in a developing country:

- o Scientific: he should have an academic degree in agriculture, at least an M.Sc., better yet a Ph.D.; he should prove himself scientifically competent by publications and representation in scientific meetings; he should be trained in identifying problem areas on the spot.
- o Social: he should have full command of at least one foreign language; he should have a wide spectrum of interests and general knowledge; he should be modest and patient.

- o Economic: he should have proved himself in finding financial assistance for research projects conducted by his colleagues and himself.
- o Bureaucratic: he should be politically uncommitted in order to earn and keep the trust of decision-making organs; job stability and continuation in one field of interest is essential; he ought to be able to take part in a working team and constantly transfer to his colleagues his experiences with decision-makers.

It is not easy to arm a young professional with such qualifications. Thus we believe that the starting point for an administrator has to be in selecting promising candidates during their practical and graduate training in agricultural sciences and encouraging them by granting them scholarships, arranging their attendance at various internal and external professional meetings, i.e., by giving them more and more authority and testing them under a variety of conditions.

Staffing Problems. Problems of staffing are mainly economic. Prompt promotions and allocation of official housing and transportation usually balance income deficiencies. Establishment of an environment where the team approach is working effectively and efforts are made to produce constructive output, together with the passing on of authority as individuals are ready, also helps create sufficient interest to attract new personnel.

Management Problems. Management problems are generally related to bureaucratic procedures and regulations that are difficult and time-consuming to change. This can be discouraging to young administrators. However, giving these administrators a chance to take part in making decisions and developing dynamic action programs with sound economic returns have started to show positive effects. When such action programs are supported by specially arranged funds that are not subject to routine financial procedures, dynamism in implementation is further enhanced.

STAFFING AND MANAGEMENT OF
NATIONAL AGRICULTURAL RESEARCH PROGRAMS
Status Paper--India

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In India, there are more than 20,000 agricultural scientists who do research on a part- or full-time basis. There are about 5,000 research scientists in Government of India service under the Indian Council of Agricultural Research (ICAR) and about 15,000 scientists in the 21 agricultural universities covering most of the states of India.

The chief coordinating agency for agricultural research in the country is the ICAR. The areas covered are field crops, horticulture, animal sciences, veterinary medicine, fisheries, agroforestry, home economics, agricultural engineering, post-harvest technology, agricultural economics and marketing, rural sociology, and several other related areas.

About 5-10 percent of the new entrants to these research services possess doctoral degrees, while the rest are mostly master's degree holders, not prepared to do independent research. They need to be oriented towards the objectives and goals of agricultural research in the country and also, to obtain technical skills, must train under senior scientists in their respective fields of specialization.

A revolutionary change in agricultural education has taken place in India during the past two decades. Twenty-one agricultural universities have been set up to serve the rural areas through integrated teaching, research, and extension education and to coordinate the different branches of agriculture. The traditional method of teaching and annual examinations has given place to continuous internal assessment. Also, independent research to obtain a master's degree is being emphasized. These rapid changes and expansions of academic programs have resulted in a shortage of trained manpower, especially for heading teaching departments and for academic administration.

Another major advancement made in India is in the area of coordination of research activities. Since 1956, several new all-India coordinated research projects sponsored by the ICAR have been implemented. The all-India Coordinated Rice Improvement Project, for example, has more than 50 research centers in the major rice-growing areas of the country. Some of these are under the ICAR, while most are under the respective agricultural universities of the research centers. The workers specializing on rice breeding, physiology, agronomy, etc. have an opportunity to work together to set and pursue objectives, frequently meeting to exchange notes, review progress, and formulate programs of work. Today, there are 56 such projects covering all the major areas of interest and spread all over the country.

Such expansions in the research programs have caused certain strains in the research quality. In several areas of specialization, we are yet to reach the minimum quality levels in research.

The major problems facing Indian agricultural research programs are:

- o Inadequately trained manpower in certain areas of agricultural science;
- o Lack of proper orientation and pre-service training of new recruits to carry out research with objectivity and clear-cut goals;
- o Inadequate managerial skills in middle- and top-level scientific personnel to effectively implement research projects and achieve goals; and
- o Outmoded administrative procedures, adopted under government and university setups, that hamper implementation of research programs.

Recognizing the need for pre-service and in-service training of research scientists, the ICAR has set up a new center to train agricultural scientists at all levels and science administrators in agricultural management. To be named the National Academy for Agricultural Management, the center, being built at Hyderabad, is expected to close the gap in the future. In time, the academy will be able to open about 10 percent of the admissions to agricultural scientists from other developing countries.

PREPARING PROFESSIONAL STAFF FOR
NATIONAL AGRICULTURAL RESEARCH AND RELATED PROGRAMS

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The performance of any institution is conditioned by the kind and quality of training received by its personnel, especially those working at the technical level. This training establishes limits which the institution will not be able to surpass, no matter how much other variables are reinforced or fortified.

This statement is particularly valid in the case of national agricultural research and related institutions, whose actions and results are based on the correct and wise application of scientific knowledge to the generation and adaptation of technology oriented to the solution of problems that affect society.

Determining what knowledge, abilities, and skills this personnel should have and how they could be provided, at the highest academic levels compatible with a sound cost/benefit ratio, will be at least part of our task. But if this is all we do, we will have only partially satisfied the concern of IADS in convening this group. The Background Review stated that most countries need to achieve accelerated rates of agricultural development in order to satisfy their growing demands for food, and to generate employment and income in the rural areas. In other words, we cannot train personnel for agricultural research institutions totally out of context, but must do so in terms of their commitment to rural development.

This does not change nor invalidate the need for solid academic scientific training. On the contrary, it is a necessary condition, but it is not sufficient to assure the best performance of personnel and of the national institutions to which they belong.

Science and technology are a means and not an end to rural development. They are undoubtedly important and should be of excellent quality; but in incompetent hands, they can be used inefficiently or even negatively.

In recent years, the agricultural production of a certain region in Latin America grew at a rate of over 10 percent per year. At the same time, however, infant mortality moved from 50 to 86 per 1,000 in rural areas. In another region, the introduction of intensive soybean cultivation accounted for substantial increases in production, with the soybean even becoming an exportable product. This, however, led to the concentration of land ownership and usage, a reduction in the need for manpower, and the consequent creation of hundreds and thousands of unemployed who wander down the roads searching for occasional jobs with which to support their families.

One of the frequently heard criticisms of the "Green Revolution" (whose effectiveness from a scientific and technological viewpoint is indisputable) is that it has not been able to reach the small farmers, sharecroppers, and rural workers in the countries that have most benefited from it, and in this way has served to aggravate the problems of income distribution and rural poverty, with a consequent increase in social tensions.

These examples only serve to illustrate in different ways the responsibility that falls on the scientist. It does not matter where the scientist is or where he works. In every instance, and particularly when working for rural development, he exercises a responsibility that is beyond the simple acquisition of knowledge, abilities, and skills.

Moral and doctrinary training should accompany academic training, so that the individual's attitudes and aspirations will be compatible with a true spirit of service and a sensitive social conscience. The individual and elitist training still prevalent in many of our institutions of higher education; the acquisition of the ability to "do things" more efficiently without considering "why" they are being done; the transitory exposure to working conditions and life styles that go far beyond what can normally and reasonably be expected, are not compatible with the acquisition of desirable attitudes and aspirations for the type of professional we want and need. Unfortunately, these conditions contribute frequently to the brain drain that sterilizes and neutralizes the many great efforts made to develop human resources.

For these reasons, I think we should not only occupy ourselves with academic training par se, but simultaneously and perhaps even preferably,

also be concerned with the ethical and philosophical preparation of professionals who will work with national institutions in agricultural research. Personnel with these qualities will surely be useful in national institutions, and also for long or short missions out of their countries.

Finally, we should discuss an additional point. The availability of a minimum critical mass of human resources is a necessary condition for effective research and technological development. Here, training programs play a fundamental role. However, the availability of this critical mass does not depend solely on training efforts, but also on the ability of the institutions to retain highly qualified personnel.

In Latin America, and surely in other parts of the world, examples can be cited where a country's investment in human resources--of either internal or external origin--was completely adequate for its needs, and yet it is now faced with a serious lack of trained personnel, because of the exodus abroad or into the private sector. This point should be considered along with our other deliberations if we want to put them in perspective and avoid a repetition of unproductive or even counter-productive experiences.

STRENGTHENING AGRICULTURAL RESEARCH ORGANIZATIONS

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This conference is directed toward exploring the types of training necessary to produce the kinds of personnel required for the ultimate success of a worldwide effort to strengthen national agricultural research systems in the developing countries. This is a critical issue, central to determining the potential the world might have for resolving its massive poverty, food production, human nutrition, and agricultural development problems.

In this context, we are not concerned with a homogeneous category of professional agriculturists; rather, we must be concerned with a broad spectrum of professionals who have the range of backgrounds, education, training, and experiences necessary to the development and management of complex research institutions and of aggregate systems of individual research organizations. This range of skills will be essential to achieve the primary objective of creating indigenous agricultural research systems capable of meeting knowledge, information, and technological requirements for the modernization and sustained growth of agriculture in the developing nations.

Others have spoken to a variety of needs within this range. We will focus our remarks on a category of professionals that appears to be essential to attainment of the primary objective. This is the set of individuals who are assigned, or take it upon themselves, to create new or change existing agricultural research institutions and systems.

This category of individuals must be differentiated from those involved in managing established research institutions, and from those

involved in conducting research in such institutions. Managers of established research institutions generally make adjustments to on-going research programs. Research workers concern themselves primarily with investigation of biological factors, economic issues, and social phenomena. Those who analyze, make decisions, take action, and bear responsibility for creating national agricultural research systems must address a quite different set of questions, ranging from national development priorities and strategies to technological requirements, support mechanisms, and research priorities.

Thus an individual who is highly productive as a scientist may not be effective in institutional development. The orientation, preparation, and skills associated with the two functions are entirely different. Equally, there is little reason to believe that an effective administrator of an established institution or national system will have the specific talents essential to develop new or to change old research organizations. It seems imperative to give attention to the specific talents required of such professionals. This information will facilitate the design of educational programs to prepare people for this unique role.

During the 1950's and 1960's, a great number of professionals were involved, in one way or another, in "institution building," and a considerable body of theory and general principles relative to the institution building process merged. Some of the materials included in this body of literature are listed at the end of this paper.

Milton Esman provided substantive leadership in conceptualizing the process of institutional change. Among his contributions was the identification of categories of institutional characteristics which institution builders must recognize and address in their efforts to bring about appropriate change. These include:

- o Doctrine: includes the perception of the role and purpose of the particular organization, its style of operation, what it means to its clientele, and why it merits support from the public.
- o Leadership: includes much more than just top management--it takes in middle management, "the power structure," and those who influence decision-making. It is imperative that leadership understand and be fully and deeply committed to the institution's doctrine.

- o Program: doctrine translated into action. Its priorities reflect judgments about the greatest good to be derived from the resources available.
- o Resources: include technical competence, capital outlays for land, buildings, and equipment in addition to such things as operating funds and library resources.
- o Internal Structure: includes the ability of leadership to stimulate performance and encourage the flow of ideas and information in addition to the usual patterns of control.

These characteristics, when coupled with essential institutional linkages to relevant political, social, and other supportive elements of an institution's environment, determine the products and services which the institution must provide the society and those which it must receive from the society if it is to be viable in the long term.

The early conceptual and empirical work by Esman and colleagues is a useful basis upon which to construct an effective program of institution building. Unfortunately, much of this work found its way into the literature at a time when development assistance agencies were turning away from institutional development activities and toward capital transfer and shorter-run, action-oriented agricultural development interventions. Thus, the "theory and practice" of institution building is largely static and descriptive in nature; it has not evolved to a stage of being truly dynamic and capable of providing adequate guidance over the range of issues with which those involved in bringing about institutional change must deal. This is in no way to be critical of the work which has been done to date. It merely reflects the waning of general interest in and support for work in this area.

It does suggest that increased emphasis and support will be required for research on the process of institution building, if we are to have an adequate body of empirically verified knowledge upon which to base educational programs for those who will be involved. In the interim, the work which was completed some years ago provides a base for those engaged in the currently expanding institution building initiatives.

Creating adequate national agricultural research systems around the world is of critical importance. This will require a relatively large group of dedicated professionals, within host countries and from abroad, having the unique skills, abilities, and understanding to play

the "change agent" role implicitly associated with this endeavor. A major initiative to develop the educational programs, the pedagogic materials, and the institutional arrangements to implement programs is clearly needed.

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II. PAST AND PRESENT ACTIVITIES

SPECIAL UNIVERSITY PROGRAMS

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University programs for agricultural students from developing countries have been primarily concerned with preparing students to assume a teaching or research position in a field of specialization, usually technical. Administrative exposure has been largely neglected, despite the fact that returning scholars have moved rapidly into administrative assignments. The discipline orientation of professors in developed countries, including the United States, and the desire to train students in great depth in narrow fields, often precludes enrollment in courses other than those directly related to the major area of study.

Recognition of the need for managerial as well as technical preparation has increased in the past 10 years. The Research and Training Network of the Agricultural Development Council was one of the first groups to address the need for administrative training, sponsoring a management workshop in the early 1970's and developing and testing materials suitable for management training overseas.

In the mid-1970's a group of faculty members from several disciplines at Cornell University developed a course in the administration of agricultural and rural development. The course, which includes lectures by a team of professors in different areas of expertise and group discussions, provides a sensitization to the problems and processes of administration to graduate students from abroad.

The course gives the students an opportunity to apply administrative concepts to planning a simulated development program for an agency within a developing nation. Staffing, budgeting, implementation, analysis and evaluation are considered in the context of agricultural and rural development projects. Students with experience in a government agency are invited to make presentations based on their own experiences.

The course is not intended to develop instant administrators, but to facilitate the transition from research scientist or teacher to

administrator, and to make biological, physical, and social scientists more aware of the need for interdisciplinary action in planning and implementing programs.

Some of the students who have taken the course have completed their studies and returned home, some to administrative positions. The limited numbers to date make overall evaluation difficult, but there are some interesting observations. The social science students and faculty members were expected to react more positively to the course than the biological scientists, and they did. The biological science faculty largely felt that the programs for students were already too full to include an unnecessary course in administration. Attitude is changing: so much so that this year's teaching faculty includes a plant scientist!

The course in general appears to be more meaningful for and more readily handled by students with experience in an organization overseas. They have a greater appreciation for organizational structure, operation, and development, and problems and constraints of administrators as they interact in competition with other agencies or groups. Greater use of the case study method of teaching may rectify part of this problem.

Few universities offer similar courses or programs. In 1977, a workshop was held at Cornell University on Teaching Agricultural and Rural Development Administration (TARDA). Sponsors included the Agricultural Development Council, IADS, the Cornell Program in International Agriculture, and the Cornell Rural Development Committee. The purpose of the workshop was "to bring together experienced trainers, teachers, practitioners and those active in international agriculture and rural development to explore the content and design of academic activities in development administration for graduate students in agriculture." The participants reviewed courses and materials available, and attempted to define the need for courses or special training programs. The focus was on graduate students already enrolled in U.S. universities.

There was agreement at the workshop about the need for such course work or training as part of the overall education for the target audience. Reference materials and case studies are available, but they are of varying quality. The number of faculty members and institutions offering such courses is limited, though it is expected to grow. Although programs in agricultural management are rare, courses are available for planning

and decision-making, for personnel management, economic development, and organizational structure and behavior. The time devoted to these courses, however, is in conflict with time needed for courses in the discipline specialization.

A major limitation at Cornell and other institutions in planning courses in administration for agricultural and rural development is the lack of a faculty member for such full-time responsibility. The newness of the area and, in some cases, the lack of understanding of what is involved and needed discourage acceptance of total responsibility by an individual or a department.

A relatively new graduate program at Cornell that provides students from abroad opportunities for developing their administrative knowledge is the Master of Professional Studies (MPS) Program in International Agricultural and Rural Development. This program is primarily intended for professionals with experience who wish to have an opportunity to return to the campus for further training, but are interested in a broad education that is not research-oriented.

There is a great need for capable administrators at all levels in the developing countries. The good ones quickly rise to the top or are drained from government agencies or universities by the private sector. There will continue to be a need for more and better administrators, and the universities can play a role in developing the potential administrators as part of their normal graduate programs.

The issue may be whether administrative training should be a role of universities or of some other agency or institution, and whether it should be given in the United States or in the developing country itself. Theoretically, the universities could play a major role in at least sensitizing graduate students to administration. However, some major questions need to be answered: How far are the universities prepared to move in this direction, and to what extent will the students' major professors guide students into such opportunities? To what extent will the students' home agency, institution, or government, and their sponsors, support the inclusion of administration courses in the students' general program?

ASSOCIATE EXPERT AND RELATED PROGRAMS
Training for International Agriculture in The Netherlands

Jaap J. Hardon
Ministry of Agriculture and Fisheries
The Netherlands

The Agricultural University at Wageningen

Wageningen is the main center of agricultural research and training in the Netherlands. At the university, tropical agriculture and tropical forestry have been taught since 1878. At present the university offers special curricula leading to a "doctoral" degree (equivalent to an M.Sc.) in tropical crop husbandry, tropical land and water use, and non-Western sociology.

Tropical orientations are offered in a number of other subjects, such as horticulture, soil science, plant pathology, plant breeding, animal husbandry, development economics, nutrition, agricultural engineering, and forestry. Specifically for students from developing countries, the university organizes a 2-year (post-B.Sc.) course, in English, leading to an M.Sc. degree in soil sciences and water management.

Approximately 20 percent of the overall study program at the university is concerned with agriculture in developing countries. In past years, approximately 100 out of a total of 500 graduates annually have found employment abroad, mainly in developing countries.

A rough estimate suggests that in 1977 about 500 graduates were working in developing countries while, in addition, 200-300 were employed by consultancy bureaus, international organizations, and the government, working wholly for developing countries but stationed elsewhere. So far there has been little indication that the demand for Dutch graduates in developing countries is decreasing, despite an increasing number of graduates in the developing countries.

In fact, it is expected that for quite some time additional expertise from developed countries will be necessary to meet the requirements of agricultural development in the third world, and to technically support

assistance programs. What is evident, however, is that minimum standards set for such graduates are gradually raised and often include a number of years of field experience. To meet these standards, postgraduate training is available in the associate expert program.

Expertise at the university in agricultural development is maintained by employment of agricultural specialists with long-term experience in developing countries. In addition, university departments are actively involved in research programs dealing with developing countries, partly out of the regular university budget (40-50 percent), partly financed by special funds made available out of the budget of the Ministry of Overseas Cooperation and other organizations (50-60 percent). Research in this category accounts for approximately 15 percent of the total research effort of the university.

The Associate Expert Program (AEP)

The main objective of the AEP is to strengthen multilateral assistance programs by providing assistance to "full experts." At the same time, the program provides young graduates with on-the-job training in ongoing development programs.

Associate experts are employed by the executing agency but costs (salary, travel, per diem, and servicing costs) are fully reimbursed by the respective governments. The average annual cost of an associate expert in 1977 was US\$29,000.

The AEP started in 1955 with five associate experts (AE's) assigned to FAO. Initially, AE's were employed for 2 years. Since 1972, however, extension to a maximum of 3 additional years has been possible on request, with the understanding that, within this period, efforts will be made to offer a full expert position in the organization concerned.

The program has grown steadily. Disciplines other than agriculture are now included. In addition, multilateral organizations besides FAO are now making use of this program. In a recent development, AE's have also been made available to bilateral assistance programs and the international institutes of the CGIAR.

Seventeen countries participate in the program. The Netherlands, from the beginning, has been the largest participant in the AEP with, at

present, close to 400 AE's in the field, or 49 percent of the total. Other main participants are Belgium, Denmark, and Germany.

FAO is still the major beneficiary of the program, with approximately 400 AE's (of which \pm 180 are Dutch) in various programs working for an average of 4 years. The Netherlands Government does not consider it desirable to further increase its contribution in view of the already existing imbalance. In fact, to help stimulate technical cooperation among developing countries, greater emphasis may be placed on helping AE's from developing countries gain experience abroad under the new "In-Service Training Award Program" (INSTA). Present plans aim at having \pm 30 INSTA-holders on assignment by 1980.

The annual requests to the Netherlands for AE's in the field of agriculture total 300 to 400. This does not indicate the demand. AE's are provided at no cost to the recipient organizations, and there is essentially an unlimited market for such "free" labor. But each year only about 40 Dutch agricultural graduates are entered in the program; consequently, a choice has to be made.

Important criteria in the selection procedure are:

- o Quality of the project concerned and the scope it offers to gain relevant experience;
- o Field of activity: attempts are being made to balance the various disciplines on the basis of past experience and taking into account future demand for trained personnel;
- o Quality of the available candidates.

The AEP appears to have worked well, both in providing a valuable service to various multilateral and bilateral programs and by training people available for work in development programs. Judging from an FAO evaluation in 1978, most host countries also have a favorable opinion of both the program and the general quality of the AE's.

Starting initially with university graduates, the program now includes a growing number of graduates from applied technical schools.

A problem remains in the selection of projects. There are no really reliable forward estimates of the demand for trained personnel, and division among disciplines is done rather casually. Data being collected on career development of persons that have come out of the AEP are not yet available.

The percentage of AE's working in the Least-Developed Countries (LDC's) is so far not considered adequate (in 1977, 31.2 percent with a target of 40 percent set by FAO). Two factors restrict the numbers: (a) living conditions in LDC's are generally more difficult than elsewhere; and (b) LDC's often require generalists, who are more difficult to find than specialists among young professionals. This problem requires closer attention.

POST-DOCTORAL AND OTHER TRAINING PROGRAMS
OF INTERNATIONAL AGRICULTURAL RESEARCH CENTERS

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Educational and training opportunities have always been an integral component of the programs and activities of the international agricultural research centers. As the centers are at various stages of "maturity," opportunities likewise vary. The overall goals of their educational and training programs were summarized by Fernandez in 1977: "to help national commodity programs increase their scientific and technical manpower in research and production . . . to facilitate the validation and transfer of Center-developed technology to national institutions, as well as to increase national yields of commodities in the Centers' mandates."¹

Educational Opportunities at the Centers

The educational and training opportunities described here mainly are those of the more "mature" centers.

Post-Doctoral Fellowships. These fellowships are 1- to 2-year appointments of young Ph.D.'s from developing and developed countries. They carry out advanced research in collaboration with center scientists.

In some instances the post-doctoral fellow's research is part of a collaborative effort between the center and national research institutions or universities, either in a developing or a developed country. In the latter case the post-doctoral fellow's research, although directed to solving a production-related problem, is often "basic" in nature.

¹ F. Fernandez, "Objectives and Content of Training at the International Centers of Agricultural Research," paper presented at the "Forum on Training," International Centers' Week, CGIAR, Washington, D.C., September 1977.

At the International Rice Research Institute (IRRI) the objectives of the post-doctoral fellowship program are:

- o To strengthen the research program of IRRI;
- o To give scientists the opportunity to reorient, sharpen, and update their skills, techniques, and knowledge of rice research;
- o To serve as a "training ground" for scientists who may be employed in international agricultural work; and
- o To help scientists from developing countries who recently obtained their degrees from developed countries adjust to the research problems they are likely to encounter upon return home.

Post-doctoral fellowships at the other centers have similar objectives, although the ratio of post-doctoral fellows coming from developed and developing countries varies among centers.

These fellowships are funded from the centers' core budgets, except those from Germany, the Netherlands, and the United States, which are financed by their own governments or through foundations.

Other Programs. Other training opportunities at the centers are discussed briefly below:

Non-Degree Research Training Programs. These are "apprenticeship"-type programs; the participant works under the guidance of a center scientist on a specific research project.

Academic Graduate Degree Programs. The participants are candidates for either the M.Sc. or Ph.D. degree, and conduct their thesis research under the guidance of a center scientist.

This type of program is implemented in cooperation with universities. The older centers have different arrangements with numerous universities in their host countries and abroad.

Short Courses. These courses may be aimed at training production specialists, who will conduct adaptive research, or at training the trainers. Examples are the production specialist programs at the International Center for Tropical Agriculture (CIAT) and the International Institute of Tropical Agriculture (IITA), and IRRI's 6-month rice production course. The short courses may also be in support of the international research network, as is IRRI's 4-month genetic evaluation and utilization (GEU) training program.

Training for Research Support Services. The centers offer three kinds of training opportunities directly applicable to commodity research. These courses are offered particularly when the kind of training needed is not available elsewhere. The types of training that fall under this category include management of experiment stations, documentation and information exchange, and seed production.

Value of Center Training Programs

The center training programs of greatest value to the categories of personnel of direct concern to the present workshop are:

- o The post-doctoral fellowships; and
- o The graduate degree program, particularly at the Ph.D. level.

In relating the value of each kind of training to the three categories of personnel, I have drawn almost entirely upon the experience of IRRI.

Academic Graduate Program. The graduate degree program, particularly at the Ph.D. level, is most useful in preparing middle- to senior-level developing-country nationals and to a limited extent in preparing young professionals.

IRRI's cooperative country program with Indonesia will illustrate the usefulness of the academic graduate degree program for preparing middle-level and senior national personnel. In Indonesia IRRI works with the Central Research Institute for Agriculture (CRIA). Shortly after the cooperative project was started in 1972, CRIA staff members were jointly selected by IRRI and CRIA for graduate training abroad. All of them completed course requirements at a U.S. university, receiving their credits at the University of the Philippines at Los Banos (UPLB). Thesis research was conducted at IRRI under the guidance of either an IRRI scientist or a UPLB professor. The degree was granted by UPLB. By 1975 the scientists had started to return to Indonesia to occupy positions of responsibility in their research organizations.

The use of the graduate degree program for preparing young professionals is less deliberate. The centers are generally not involved in preparing young professionals from developing countries who are seeking responsible first positions in their own countries, but tend to accept

young scientists already employed in national research organizations, particularly in organizations with formal cooperative programs with the centers.

This may be a disadvantage, as the centers are limited in their choice to those already employed in national organizations. These individuals are not necessarily the best available for training and for doing the job afterward.

The graduate degree program might be used to prepare a corps of scientists from developed countries for responsible first positions in developing countries, as staff members of either a center or an assistance organization. The most desirable arrangement would be for individuals to complete the course requirements for the Ph.D. degree at their home universities and proceed to the center for their thesis research. By conducting his thesis research at a center the young professional would gain understanding of the challenges and the opportunities in helping solve food production problems in developing countries.

Two Ph.D. students from the United States who conducted their thesis research recently at IRRI were employed immediately after completion of their degrees, one in Indonesia and the other in the Philippines. In most cases, however, such individuals should undergo further training (e.g. in a post-doctoral program) to gain more experience before they are assigned to developing countries.

In involving the centers in preparing young professionals, the critical question is how many participants the centers could or should accept, keeping in mind that the centers give priority to scientists already employed in national institutions.

Post-Doctoral Program. At some centers the post-doctoral program is used primarily for national personnel. This is the case at IRRI. As currently implemented, the post-doctoral programs are quite effective for these personnel. The developing-country scientists, by undertaking research projects in association with center scientists, are able to sharpen and update their knowledge and research methodologies. More importantly, the association and research collaboration between the developing-country scientist and the center scientist in most cases continues after the former returns home.

There is a need to modify the post-doctoral fellowship program if it is to prepare young professionals from developing countries seeking responsible first positions in other countries or with assistance organizations. While the program presently does a good job in the technical aspects and in emphasizing teamwork in solving production problems, training is needed on how to work with developing-country scientists and administrators. It must be kept in mind that the level of scientific and managerial competence in the developing countries is improving and that the national personnel are expecting experienced individuals to be assigned to work with them.

As in utilizing the academic degree program for preparing young professionals, the critical question is how many post-doctoral fellowships the centers could afford for this purpose without adversely affecting their commitments to cooperative efforts with developing countries.

Preparation of Mid-Career Scientists for Advisory/Management Positions. I believe the centers have practically nothing in the way of a deliberate effort or program to prepare individuals for such positions. The minutes of the June 1978 meeting of the center directors sum up the attitude of the centers:

The directors discussed the subject in considerable detail and it was pointed out that several institutions had management courses. It seemed generally agreed that the centers should take advantage of the available courses rather than attempt to initiate such training activities as individual centers or collectively. The point was made that the center directors were concerned with management improvement and training at a number of levels and that every advantage should be taken of existing possibilities for such training.²

² CGIAR, Minutes of the Center Directors' Meeting, Washington, D.C., November 1978.

MANAGEMENT TRAINING FOR AGRICULTURAL DEVELOPMENT

A Viewpoint from IIMA

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Indian Institute of Management

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The role of functionaries in performing development tasks at different levels--senior executives, middle-level managers, and young professionals--varies a great deal; so also their training needs. The training of the senior functionaries should be directed toward policy analysis and management of large complex organizations. That for the middle-level managers should be in general management with the aim of equipping them to integrate various functional tasks to fulfill the objectives of their organizations. The young professional should be trained to handle specific project-oriented tasks. His training should include project identification, appraisal, implementation, and monitoring.

Ideally a person should go through all these stages in his career path. Since this may not be possible in every case, particularly in the case of technicians who start with a high degree of specialization, two types of training strategies can be recommended. Those at a higher level can be acquainted with and given a modicum of competence in the tasks performed by the functionaries at the immediately preceding level. Thus, middle-level executives would be broadly familiar with project-related tasks, and senior functionaries would have some grounding in general management. Alternatively, all three levels of functionaries in an organization can undergo training in their respective areas, preferably in the same institution, so that the organization acquires a culture of professional management.

The second of the two approaches has been tried out by IIMA rather successfully in the area of enterprise management, under what is known in the Institute as the 3-Tier Program (3TP). Young professionals, middle-level managers, and senior executives from the same organizations are invited in separate groups and each group receives training specifically designed for its level. Training for young officers lasts for

about 6 weeks, that for the middle-level managers for 3 to 4 weeks; senior executives are invited for seminars lasting 7 to 10 days. In 3TP the emphasis throughout is on general management, and the differentiation is made mainly in terms of depth of training needed at different levels.

The other approach--task-oriented training for different levels--is also being tried, though not as systematically as the general management approach. For the last 3 years the Institute has run a traditional program called Project Identification, Formulation, and Appraisal (PIFA). This is a 3-month course mainly geared to the needs of the junior- to middle-level project administrators in the public sector. A variant of this course, meant exclusively for the administrators of agricultural projects, will be organized this year with the assistance of the Government of India and the World Bank. The course is organized for young Indian professionals but can be easily broadened to include project executives of the same level from other developing countries.

For middle-level managers, the Institute is running a 6-month General Management Programme (MEP), geared basically to private enterprise management. There is, however, no comparable program for public-sector development administrators. We are planning to offer a 6-month general management program for middle-level executives in the public sector, including agriculture. There are some indications that the international aid agencies may support this program.

At the moment IIMA has no regular program for senior executives in either private enterprise or the public sector. A beginning has been made by organizing one or two seminars in crucial areas of public policy. The first was organized around the theme "Public Policy for Large Businesses." The second, which will be held in March 1979, is a "Policy Seminar on Transport." Similar meetings of senior executives and advisors in the development area are being contemplated.

It is hoped that within the next few years two parallel three-tier training programs will be offered by the Institute, one for managers in private enterprise and the other for managers of the public sector. We strongly feel that these two streams will be mutually reinforcing.

We recognize that management is not a panacea to resolve all the problems of the developing world. Development is essentially a social process, and major variables like technology and institutional relations

have key roles to play. Organizational or even policy interventions act as fine-tuners in this process. The main advantage of management-oriented training, however, is the multidisciplinary, problem-solving, target-group-oriented approach that it inculcates. More than the content of the courses, it is this approach which will be of relevance to development administrators.

VISITING SCIENTISTS AND SABBATICAL LEAVE PROGRAMS AT
INTERNATIONAL AGRICULTURAL RESEARCH CENTERS

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The international agricultural research centers are designed essentially to provide national institutions with improved food production technology that can be validated, adapted, and finally synthesized into specific agricultural production systems. Thus the success of the centers depends largely on the degree to which national institutions are able to transform innovations from the international level into effective national production systems, and to provide the feedback essential to the generation of suitable technology. The centers count on competent national research and development programs to provide a link between international efforts and the ultimate beneficiaries--the producers and consumers in the developing countries.

Obviously, competent national research and development programs depend significantly on the availability and quality of technical manpower. The centers have contributed to the development of this manpower through the training of a large number of nationals in research methodology as well as the use of improved production technologies.

Whereas the large majority of these training participants are young researchers and development workers, more senior professionals clearly are needed to act as advisors, coordinators, managers, or senior administrators in agricultural development. If the centers are called upon to contribute to the development of senior professional staff (whether national program personnel and/or other mid-career scientists), they could do so through their visiting scientist programs.

Current Programs

In general, the centers currently budget a limited amount for the support of visiting scientists (at CIAT approximately one percent of the

core budget). These scientists are invited to engage in well-defined research projects that have one of two purposes: (a) to resolve a particular research question best investigated at the centers and sufficiently specialized to require an outside expert; or (b) to explore the feasibility of a center's eventually mounting a core-financed research project.

Centers also receive visiting scientists who wish to gain experience in research on tropical agriculture at the international level. In this case, the initiative for obtaining a visiting scientist position at a given center usually rests with the applicant and/or his home institution.

Of the 73 visiting scientists during 1977 and 1978 at seven international centers surveyed, 38 had been invited to work on special research projects, while the remaining 35 participated in ongoing research projects.

All members of the former group had been invited from universities and other research institutions in developed countries. A large majority (70 percent) of the latter group had also come from home institutions in developed countries.

The majority of the visiting scientists who worked on defined research projects were brought to the centers through inter-institutional arrangements that did not involve sabbatical leaves; a majority of the scientists that visited the centers to participate in ongoing research projects, on the other hand, did so through sabbatical leave arrangements.

Development of Senior Professional Staff

Several factors must be taken into account if the centers' potential contribution to the development of senior professional staff is to be successful:

Selection of Candidates. The number of professionals that centers can receive as visiting scientists is obviously limited. Since the mandate of the centers is to achieve a significant impact on the production of a set of selected commodities, it is in their interest to be involved primarily in high-level training of only those professionals who, after completing their training, will assume leadership positions likely to further the interaction of the centers and national institutions,

and in which they can be instrumental in increasing national food production.

Mix of Experiences. The key mission of the centers is to generate viable production technologies, and the training experiences that they can best provide are necessarily limited to the same area. While this kind of experience is essential for a senior professional in agricultural development, it is insufficient by itself to prepare him adequately for his future role. For this reason, a center's training phase must always be considered only one component in preparing professionals to play a leading role in the management of agricultural development on the national level and to advise on a broad number of issues.

More specifically, it can be expected that the centers can provide a significant input in such areas as production technologies, research methodologies, research organization, and project resource allocation. This training must be complemented by experiences in such areas as general development strategies, project management, operations research, program evaluation, and development management/administration. These experiences must be obtained in an environment other than the centers as part of an overall training program.

Length of Stay. Neither national program personnel nor mid-career scientists from developed countries can be adequately prepared for leadership in agricultural development in much less than 2 years of intensive, full-time preparation. Because of the limited experience of many national program professionals, their training may need to be somewhat longer--perhaps about 3 years.

It can be generally argued that both groups should spend 50 percent of this preparation period in a setting that stresses agricultural research and technology development. Thus national program personnel would spend from 12 to 24 months at a given center (or a combination of centers), while other mid-career scientists would stay perhaps 8 to 15 months. These extended visits would ensure that the experience participants gained at the centers would have a significant impact.

Number of Candidates. Responses from seven international centers surveyed indicate willingness to participate actively in hosting national program personnel and mid-career researchers as visiting scientists. It appears that, on the average, each center could host possibly six to

eight entrants per year. Among the 11 centers, some 80 individuals could be hosted on a yearly basis.¹

Financing. Since the centers do not normally budget for the type of high-level training discussed in this outline, it must be assumed that some third party would support the candidates' international travel, personal expenses (including family support), and other direct costs they may incur during the study period.

The centers fully recognize the need for training senior scientists and are readily willing to consider plans for providing relevant experiences to professionals chosen to fill senior positions in agricultural development. At the same time, it is of great importance that a visiting scientist make effective contributions to the host center's programs. To do this, he must remain at the center for at least 6 months. He must also be of sufficiently high professional caliber to blend in smoothly with the integrated team research efforts carried on at the center. From the viewpoint of the centers, it is important that only such individuals, technically qualified and able to spend a minimum of 6 months at the centers, be considered as visiting scientist candidates.

¹ These figures must be taken with caution as only seven centers responded to the survey associated with this outline. In addition, it must be considered that the centers included in the survey had responded to a rather hypothetical set of data.

INTERNATIONAL COURSE FOR DEVELOPMENT-ORIENTED
RESEARCH IN AGRICULTURE (ICRA)

Adapted from the Concept Report, November 1978, of the
European Community Task Force

During recent years the European members of the CGIAR have found it increasingly difficult to supply qualified scientists to work on agricultural research in the developing countries. The main reasons for this are lack of suitable training opportunities, limited long-term career opportunities, and the fact that the scientists cannot apply many of the disciplines in their own countries because of the different farming and climatic conditions.

To confront this problem and achieve at least improved training opportunities, the meeting of the European donors of the CGIAR held in Reading, England, in April 1978, decided to form a task force.

The main conclusions at Reading were that, although every donor has several ways in which it trains its own nationals, all felt that there was a gap in the training spectrum that needed to be filled. It was the general consensus that developing countries' nationals should be included in any scheme that was devised. There were several suggestions as to the form and content of the training required, but delegates were agreed on the broad objective of building a network of high-quality scientists who would have a key role in the future development of tropical agriculture.

Meeting in May and September 1978, the task force reached the following conclusions:

Shortage of local scientific manpower at all levels places a major constraint on the development of effective national research programs in the developing countries. There is a continuing need for developed countries to maintain adequate numbers of scientists with tropical training and experience to be able to respond to requests for assistance from national and international agricultural research organizations. An international training course, sponsored by interested donors, should be established to help meet this need.

The training program should be designed to provide a cadre of agricultural scientists able to apply their specialized knowledge to the benefit of developing countries and who, with some further experience, could be considered for posts in research management.

The basic entry qualifications should be an M.Sc. degree or equivalent in one of the agricultural sciences plus 1-2 years of field experience, practical training as a research assistant, or a Ph.D.

The course would have a duration of not less than 6 months and not more than 9 months, including several months of project work overseas in groups of four to five participants supervised by a field tutor. Initially, the number of participants should not exceed 25 per course.

Successful participants would be awarded a diploma. The possibility of the course being recognized as part of the requirements leading to a Ph.D. degree at an international center or other institution should be considered.

The course would be based in Europe. Three possibilities are suggested:

- o That it be based on a single institution;
- o That the secretariat be at a fixed, centrally placed location while the course rotates annually around several host institutions; or
- o That the secretariat be at a fixed location, but that different institutions be responsible for different parts of the course.

It is recommended that the course be funded from participants' fees. Thus each country would contribute in proportion to the use they make of the course.

The Current Situation

In terms of numbers of agricultural professionals in overseas assistance programs, the European countries fall into three distinct groups:

- o France and the United Kingdom, with approximately 5,000-6,000 and 1,700 professionals respectively;
- o Belgium, Germany, Italy, and the Netherlands, with about 500-600 professionals each; and

- o The three Scandanavian countries and Switzerland, with less than 100 professionals each.

The annual demand for postgraduate training is generally between 5 and 10 percent of the actual professional staff.

In all of these countries except Norway (and perhaps Denmark), training facilities for junior agricultural professionals are available. These are organized in different ways, however. Special training courses of at least one year exist in the United Kingdom (Reading and Edinburgh), Switzerland (Zurich), and Germany (Berlin). They are sponsored by the governments and carried out in cooperation with universities. In-service training usually takes place in overseas projects.

Consideration of a European Joint Program

Most donor countries face similar problems in training young agriculturists for overseas assignments and in maintaining a staff of agriculturists with experience in development. France and the Netherlands both claim an adequate supply through existing university programs. All other countries, however, including the United Kingdom, feel the need for additional training facilities.

France is prepared to look into the possibilities of providing training within its own system to European graduates, but otherwise has expressed little interest in a joint approach. The Netherlands is similarly prepared to consider providing some training opportunities for European graduates. In addition, however, it recognizes the existence of a number of gaps in training and is fully prepared to cooperate with other European donors to help fill these. The United Kingdom is already training foreign nationals in its Reading program, but similarly supports a European approach to widen the scope of training.

The advantages of a joint approach are obvious:

- o It is less costly to participating countries.
- o It gives access to a larger reservoir of knowledge and experience.
- o Its international character will provide experience in working with other nationalities.

- o It will result in an international "corps" of agriculturists in overseas development, facilitating international cooperation.
- o Participation of both donor countries and developing countries will contribute to realistic and meaningful discussion.

The Proposed Course

The aim of the course would be the establishment of an international cadre of agricultural scientists able to adapt themselves to specific overseas conditions, and to apply their specialized knowledge to the benefit of the developing countries. It is envisaged that the training would give them the background knowledge and awareness of research needs that would enable them to contribute to national, regional, and international research programs geared towards development needs and especially towards the small farmer. After some further overseas field experience, they should be able to contribute to the formulation of development-oriented research policies.

Entry qualifications for participation would include:

- o An M.Sc. degree (or equivalent) in agriculture, including agricultural economics and crop and animal husbandry;
- o One to two years of field experience in an associate expert program, practical training as a research assistant, or a Ph.D.;
- o Basic knowledge in bilateral and multilateral technical and financial cooperation, in sector strategies, and in development policies and reporting techniques;
- o Good knowledge in English as a working language and basic knowledge of a second language;
- o Good state of health for tropical conditions; and
- o Intention and motivation to work for several years in developing countries.

This approach would be a cooperative effort, involving institutions in Europe as well as one in a developing country. The participants would actively contribute to investigating real problems in the field. The program would also be expected to contribute to scientific collaboration with and strengthening of institutions.

RESEARCH MANAGEMENT (ASIA) PROJECT

Adapted from the SEARCA Annual Report, 1977-1978
Southeast Asian Regional Center for Graduate Study
and Research in Agriculture
The Philippines

The Research Management (Asia) Project of SEARCA was launched in 1974, with the expectation that within 5 or 6 years the research administration science expected to be evolved by the project would have been institutionalized in selected universities in Asia. The ultimate objective is to improve research management capability to support agricultural development in the region. In essence, the project is expected to develop an agricultural research management science and to use this as the subject matter of short-term training programs and graduate courses in developing manpower for the effective management of agricultural research.

Operationally, the project consists of two components--research and training. The research component includes surveys and case studies on national research systems and/or any aspect of such systems. The training phase consists of preparing teaching materials and organizing training sessions, seminars, and workshops for individuals who in turn organize training programs in their respective countries. The target clientele for short-term training courses are researchers and research managers, while graduate courses are intended for graduate students who are preparing to assume responsibility in their national research systems.

Initially, the SEAMEO member states were the main participating countries. However, the participation of Vietnam, Cambodia, and Laos had to be temporarily suspended and other countries such as Sri Lanka, India, Japan, Taiwan, Korea, Bangladesh, Burma, and Pakistan were included.

Each participating country has a project team which is composed of a national coordinator and two team members. The country teams operate as a network of the Research Management (Asia) Project which is being coordinated by the project manager with headquarters at SEARCA.

The International Development Research Centre (IDRC) in Canada provided primary support for the project with a grant to SEARCA for a period of 3 years. In October 1978, the IDRC approved financial support of Phase II of the project over a second 3-year period, beginning February 1, 1979.

Specific objectives in Phase II are:

- o To gain a better understanding of the problems and dynamics of agricultural research and develop approaches to solve them;
- o To institutionalize the effective upgrading of existing research managers and to develop a pool of competent research manpower; and
- o To provide linkages and better communication between the more developed and developing agricultural research systems within the region, and between national agricultural research systems and regional and international agricultural research centers.

While components of Phase II activities will remain essentially the same as in the initial years, there will be changes in content and emphasis. SEARCA has hired two full-time professionals, one to coordinate activities directed to development of profiles of national research systems under study in the region and their respective management constraints, and the other to direct the writing of cases on a country-by-country basis. There will be increased involvement in the actual writing by non-university personnel.

A regional Management Training and Case Writing Workshop for agricultural research managers was held from January 24 to February 7, 1979, at the SEARCA Headquarters. There were 39 participants from Bangladesh, India, Indonesia, Malaysia, the Philippines, Thailand, and Sri Lanka. This workshop aimed: (a) to increase the effectiveness of participants in their present positions and prepare them for greater managerial responsibility; and (b) to generate management cases, promote appreciation of the case method of instruction, and develop basic skills for writing management cases on research institutions in Asia. The participants are expected to organize similar country workshops in turn.

Available Materials

Materials produced during the first 3 years include the following:

A report on a survey of national research systems in Japan, India, Malaysia, South Korea, Sri Lanka, and Taiwan was completed in late 1977. This report is meant to serve as a basis for improving the management of national research systems as well as research organizations. It also provides material for training courses.

Each profile discusses planning, staffing, implementation, direction, and control in relation to agricultural research management. Facilities, services, and linkages are defined and solutions to problems in research productivity are identified.

Another report on a survey of "Research Capabilities, Needs, and Management Problems of Agricultural Research Centers and Stations in the Philippines" was completed in March 1978. This presents research management problems in agricultural research centers and stations.

In the Philippines, 15 case studies have been added to the 20 cases already compiled in the volume Text and Case Studies on Agricultural Research Management. This effort is expected to stimulate the preparation of case studies in other countries in Asia.

"Agricultural Research Systems in Asia" is a series of case reports on agricultural research systems in Bangladesh, India, Indonesia, Korea, Malaysia, the Philippines, and Thailand. The report includes observations which attempt to correlate and synthesize the implications of what is happening in the national agricultural research systems of the countries selected for study.

Agricultural Research Management--Asia, Volume 2, was published in July 1977. It contains selected papers from the proceedings of the national seminar-workshops conducted in Malaysia, the Philippines, Sri Lanka, and Thailand.

Six other publications have resulted from the national seminar-workshops held since 1976 in Thailand, Malaysia, the Philippines, Taiwan, Sri Lanka, and Bangladesh.

AIM/SEARCA Cooperation

In June 1978, the Asian Institute of Management (AIM) and SEARCA agreed to conduct joint research and training activities for development in the Philippines and elsewhere in Asia.

Under the agreement, AIM and SEARCA have agreed to collaborate in planning and/or implementing of training, research, and institutional consultative services in areas of mutual concern. These areas include agribusiness systems, research management, rural development, integrated area development, information systems, marine resources development, and development planning policies.

III. REPORTS OF THE WORK GROUPS

PREPARING YOUNG PROFESSIONALS FOR
AGRICULTURAL RESEARCH FOR DEVELOPMENT

Report of Group 1

The Problem

Both the need and the demand for well qualified young professionals for agricultural research are great--on the order of several thousand additional scientists per year. Of particular importance is the training of young professionals to conduct research relevant to the agro-economic-social conditions of the developing countries.

The importance of the problem is exemplified by the fact that:

- o A high proportion of the better-qualified young professionals required worldwide is needed in the developing countries, particularly for problem-solving research oriented to rapid agricultural development.
- o Donor countries and agencies with bilateral assistance programs need a continuous supply of qualified personnel who understand the development needs of poor countries, most of which are in tropical and sub-tropical regions.
- o The same need is felt by multilateral and international agencies.
- o The international centers require continuing staffing of headquarters and cooperative country programs.

Ongoing Activities

The number of national and regional postgraduate faculties in all the developing regions is increasing significantly, and the greater utilization of these facilities by both developing- and developed-country personnel for work of local relevance is commended.

Most donor countries train considerable numbers of research workers both from and on behalf of developing countries. Many of the courses (e.g. those of the United States, United Kingdom, Netherlands, and France) include some period of orientation in a developing country. Most bilateral

and multilateral development projects provide counterpart fellowships, through which many developing-country scientists receive postgraduate degrees.

Some 17 countries contribute to FAO's International Associate Expert Program, through which many young graduates annually receive on-the-job training in developing-country situations.

The UNDP/OPAB facility for temporarily filling vacancies in technical cadres is currently under-utilized in the agricultural sciences; it could benefit both the recipient country and the young professional from another country filling the vacancy, giving him on-the-job training.

Research internships for national program personnel, thesis research grants, and post-doctoral programs at the international centers provide strong training opportunities in research relevant to development, and beneficial reciprocal linkages at student and university staff levels.

Present training facilities have limitations:

- o The numbers being trained to conduct relevant agricultural research in developing areas are inadequate to meet the urgent need for increased and stabilized food and agricultural production in the tropics.
- o Training staffs and facilities frequently are insufficiently oriented toward area development and on-farm research to equip their trainees to work effectively in the social, economic, and resource-availability conditions of development in tropical areas.
- o The team approach, group thinking, planning skills, etc., in relation to agricultural development, are not often included in training experiences for young professionals.

Competencies Required in the Target Group

A broad range of competencies, in addition to sound scientific training, are desirable. These include:

- o Understanding of tropical agriculture;
- o Orientation to problem-solving types of research;
- o Sense of urgency and awareness of problems;
- o Ability to handle farming skills confidently in front of farmers;

- o Ability to conduct field experiments;
- o Understanding of the socio-economic situation of the developing countries and of the special needs of resource-poor farmers;
- o Ability to adapt to life in a different culture;
- o Ability to work as part of an interdisciplinary team;
- o Ability to forge linkages with institutions responsible for technology transfer;
- o Understanding of the compelling need to verify laboratory and experiment-station results within a prevailing farming system, in on-the-farm situations;
- o Ability to articulate; and
- o Insight into rural development strategies.

Recommendations

We endorse the IADS proposal (excerpt following this report), and suggest that it be rewritten in the light of the group discussion, and explored further and discussed with the directors of the international centers, with the intention of establishing an implementation committee.

Special consideration will need to be given to the means of supporting candidates for training (through contribution to general expenditures or sponsorship of individuals); to the intake of trainees by groups or individually; and to the content and length of the training program, in particular to the depth of orientation required. Finally, careful attention will need to be given to the selection of an executing agency from among those with international status and thus able to handle multilateral funding.

We endorse the proposal of the group of European donors to establish an International Course for Development-Oriented Research in Agriculture (ICRA), and commend the initiative. We recognize that the major difference between ICRA and the IADS-proposed program, apart from its proposed length (4 to 9 months instead of 2 years), is the possibly stronger orientation of the ICRA course toward the preparation of potential development project managers, requiring participants to have some

field experience as well as the necessary academic qualifications. We endorse the proposed case study approach and the team approach to field work.

The single largest source of trained developing-country research personnel is M.Sc. and Ph.D. training programs overseas. The growing tendency for the thesis work of such training (and that of developed-country students with interest in an overseas career) to be offered in a development situation is highly desirable. The same opportunity should be available to selected professors for supervisory visits to the developing countries. Donors who have not yet accorded this degree of flexibility to their training grants are urged to do so.

Certain other activities deserve early attention:

More support is needed to upgrade education to the master's and doctoral levels in national universities. We note the poor performance of many agricultural graduates, attributable in part to a lack of practical training. There is need for considerable improvement in curricula and facilities of faculties of agriculture and for better integration with local agricultural practices, including program and research planning. A workshop on this topic should be considered, with an emphasis on institution building, particularly in smaller countries that currently rely on external sources of training.

We consider that a comprehensive review of ongoing activities in training for agricultural research is needed, and request that FAO examine the possibility of undertaking such a study, in which IADS might consider assistance.

A possible complementary initiative would be to establish, on a trial basis, a seminar of up to 3 months duration for outstanding young research scientists in national or international programs. The seminar, in charge of an experienced agricultural development research organizer or teacher, would entail visits to selected international agricultural research centers and national programs representing the widest possible range of diversity. The seminar would provide an intensive learning situation, through lectures and study groups, to increase the knowledge and exposure of the young scientists participating, to develop a wider

and deeper orientation to tropical agricultural development and its concomitant research, and to inculcate an understanding of the broad spectrum of research applications.

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Jose Emilio Araujo
Dilbagh S. Athwal
Jaap J. Hardon
Joseph F. Metz
John L. Nickel
Dallas Oswalt
Marcos Vega
B. Webster
Sterling Wortman, Chairman

The Proposed Program*

It is proposed that the international agricultural research centers and IADS jointly undertake a Young Professionals Program to prepare, over a period of 5 years, 100 individuals for international work:

In each of the first 4 years, 25 individuals would be selected on a global basis for a 2-year orientation and staff development program. They would spend the first year at one of the centers, and the second year in a country program in which a center or IADS is participating.

In addition, they would participate in an intensive orientation program designed to acquaint them with significant issues in agricultural development and topics related to effective performance in expatriate assignments. The orientation might include a 1-week introductory seminar and a 1- or 2-week seminar after 1 year.

Upon completion of the 2-year period, the participants would be available, if they so desired, for employment by international centers, IADS, assistance organizations, or national programs. Some might return to their home countries to participate in national research programs and become available for international assignments at a later stage. It would be expected that some would advance over time to assume leadership roles in country projects of the centers and IADS.

It would be expected that aid agencies of developed nations would be willing to provide funds through the CGIAR or directly for this program.

Candidates

Special effort would be made to recruit outstanding young professionals whose academic records and personal interests and qualities suggest that they have the potential for successful careers in international work. The participants would be recruited in the developed as well as developing nations.

*Excerpt from the IADS discussion paper.

Candidates would be relatively young staff members of agricultural universities and research institutes in their own countries, or individuals who have just completed their graduate work. They would include applicants for post-doctoral appointments with centers, foundations, or other organizations; junior staff members of centers; and doctoral students who have had some international experience in programs such as the Peace Corps. The program will complement the existing post-doctoral fellowship programs of the centers, and promising fellows who have already demonstrated potential could be selected.

Suggested minimum qualifications for candidates would include the following:

- o Ph.D. degree in a relevant field of agricultural, biological, or social science;
- o Excellent physical and mental health;
- o Willingness to relocate, either temporarily or permanently--previous experience of working outside native country desirable;
- o Competence in the English language--knowledge of one or more other languages desirable;
- o Strong motivation to work in developing countries and interest in international work as a possible career; and
- o Ability to adapt to new working and living conditions.

Selection

Selection would be by a committee with members from IADS and the centers, using a selection procedure to be developed.

The donor agencies could nominate qualified individuals from their countries for recruitment, with the understanding that upon completion of the program they might choose to work for bilateral technical assistance programs funded by that agency.

The number of participants sought in different research areas would be established each year to ensure that the distribution among disciplines roughly corresponded to the opportunities expected to be available.

Program Management

A center would be expected to accommodate up to five participants on the average each year.

The assignment of a participant to a country program of a center would be at no direct cost to the host institution. In each case the participant would have a specific responsibility that would permit him to be actively engaged in an ongoing program and thus both gain meaningful experience in and contribute to those situations. Prior approval of the host country and the international center would be required for the appointment of a participant.

IADS would provide the overall management and logistics for the project.

The success of this program and the need for its continuation would be evaluated after 3 years. Such an evaluation would include appraisals of the performance of program "graduates," evaluation of the program by participants, and assessment of the projected future demand for persons so trained.

The average annual cost per person per year is estimated at US \$40,000, taking into account salary (or stipend), travel expenses, and related costs. Thus, the project would cost approximately \$1 million for the first year, \$2 million for the second through fourth years, and \$1 million for the fifth year.

After the program was underway and had demonstrated its value, some developing countries might see it as an effective way to prepare some of their potential staff for key roles in national activities, and nominate candidates for such training. Consequently, plans for this program might include how such an extension of the basic idea could be financed and managed.

PREPARING MID-CAREER SCIENTISTS FOR
LEADERSHIP IN AGRICULTURAL RESEARCH ORGANIZATIONS

Report of Group 2

The Problem

Capable management of research is essential regardless of the stage of development of a nation. Managerial posts frequently are filled by persons with training and experience in research, but with limited familiarity with management procedures and skills; or research management responsibilities are taken over by persons from governmental administrative services who have little understanding of--or appreciation for--research and technology in agricultural development.

It is essential that those responsible for national development, planning, and for allocation of resources for research and related programs, understand the operation and management of research, and know how to maximize its role in development. It is equally important that those responsible for directing research be able to relate their activities to national development goals and priorities, and possess the management capabilities to ensure maximum effective use of resources in carrying out research to achieve such goals.*

The preparation of mid-career scientists for leadership in agricultural research organizations has discrete dimensions that require specific attention. But complementary efforts to familiarize government planners and decision makers with agricultural research as a prime instrument in development would facilitate continuity of support for research essential for the sustained flow of improved technology for development.

In agriculturally advanced countries, with decades of experience with science and technology in agricultural and industrial development,

*Some responsibilities of national research system managers are listed on page 93.

research directors and managers have emerged largely through apprenticeship. The learning process includes not only close association with an immediate superior officer or scientific colleague but also the opportunity to observe operation and management procedures of other organizations in a technology-oriented society.

Few of the new nations have either strong research and educational institutions or a national government leadership oriented to the role of science and technology in society. This seriously limits the indigenous base for developing research planning, operation, and management capabilities.

There are two target groups to be considered in designing training programs for mid-career persons for research management responsibilities. The first--and most important--is the persons who will be responsible for carrying out research in the developing nations. The need to build this indigenous management capability is urgent: the scattered and frequently isolated research projects that have emerged over the past three decades through cooperative external assistance should be integrated into cohesive national research systems--under capable national leadership--as rapidly as possible. This is essential to building national self-sufficiency in agricultural research and development.

The second broad target group is the expatriate personnel helping establish and strengthen national research programs and systems. Typically, scientists in this group have had experience in research programs or systems in agriculturally advanced countries. But such experience usually does not encompass the analytical and conceptual challenges involved in planning and building a research system, and making it work, under the conditions of a developing country. An added dimension is unfamiliarity with the economic, political, and social environment--and constraints--of the host country.

We estimate that there would be a priority core group of about 2,000, including 1,000 mid-career professionals of developing countries and 1,000 expatriates who would work in cooperative planning and advisory positions in the developing countries. The core group from the developing countries would include those who are now or are likely to become leaders of national research programs, directors of research institutions,

deans, research directors or vice chancellors of agricultural universities, or research station managers.

In addition to the priority core group, another 2,000 persons from the developing countries and 2,000 from the various multilateral and bilateral agencies would benefit from familiarity with research organization and management. From the developing countries would come representatives from planning commissions, secretaries of agriculture, directors of agriculture, budget planners in ministries of finance, and others who would be involved in decisions bearing on agricultural research and development. Persons from the donor or assistance agencies would include the internal managers of research support programs, and the internal specialists involved in the preparation and appraisal of such programs. In addition, external consultants called upon by developing countries or by donor agencies for research planning and evaluation should have greater familiarity with research organization and management.

In summary, the target group would include:

A priority core group of	2,000
An ancillary group of	<u>4,000</u>
Total	6,000

Competencies Required in the Target Groups

Members of the priority core group, who would be the leaders of national or major regional research programs, research institutes, and colleges, should preferably have a doctoral degree or a master's degree with equivalent experience. They should have experience in agricultural research or development, together with an interest in and aptitude for research leadership.

The ancillary group should have an interest and involvement in agricultural research and development programs. Their academic backgrounds and experience would undoubtedly be more varied than that of the core group and, in the case of some, would be less directly allied to agriculture.

Ongoing Activities

There are a number of organizations or agencies that offer some type of training and/or experience in agricultural research management, including the following:

- o Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA);
- o International agriculture research centers (CIMMYT and IRRI);
- o U.S. Department of Agriculture;
- o World Bank--Agricultural Management Case Studies and the Economic Development Institute;
- o Harvard University--Management Case Studies;
- o In-Service Training Awards Program (INSTA), Wageningen;
- o International Course for Development-Oriented Research in Agriculture (Europe);
- o Indian Institute of Management (IIMA), Ahmedabad, India; and
- o Central Staff College for Agriculture (National Academy for Agricultural Management), Hyderabad, India.

The foregoing are in varying stages of development and operation. SEARCA first sponsored seminars in management in 1974 and has offered various special courses since that time. The Indian institutions are set up to give priority attention to national needs but expect to offer at least some opportunities for external participants.

Training programs for mid-career persons are still in the formative stage in most of the institutions. While they are not yet fully formulated, the above organizations, and others under consideration (by FAO in Africa, for example), provide the potential for a regional approach to an accelerated training program for research managers.

Alternative Actions Considered

A number of approaches to the training of mid-career research managers were considered, including:

- o Short-term vs. long-term training programs or workshops;

- o Training through special emphasis on case studies;
- o Sharply focused training in specific areas or subjects such as experiment station management, etc.; and
- o Regional vs. international training programs.

The foregoing would not be mutually exclusive and would be embodied in some manner in the plan or proposal as finally agreed upon.

Recommendations

In view of the diverse groups involved, from government officials through research directors, we propose that two types of courses be offered:

- o A 7- to 10-day course for senior government officials; and
- o A 3-month comprehensive course for rising middle-level scientists who are to become senior research directors or leaders.

The 7- to 10-day course would take the form of an introductory or indoctrination course for senior officials to describe the content and convince them of the value of the 3-month management training program. This course would include formal lectures and some illustrative case studies. Probably 30 persons per course would be maximum and selection of participants should be global. If possible, two participants would attend from each developing country. To cover all developing countries, at least eight such courses would be necessary. Participants chosen for the first course should preferably be from developing countries where agricultural research management is relatively advanced.

The 3-month course would consist of highly intensive training for rising mid-career scientists employed in agricultural research in developing countries.

The curriculum would include the following subjects presented and illustrated through formal lectures, case studies, and visits to research organizations and institutes:

- o Development strategies;
- o Institution building, including the philosophy, doctrine, and strategy upon which research programs are based;

o Management responsibilities:

- Planning
- Organization and staffing
- Direction and control
- Allocation of resources, including financial, human, material, and time

o Tools, techniques, and styles of management; and

o Ancillary services, including policy, administration, and technical services.

Case studies would include identified and disguised examples of research management successes, difficulties, and problems.

The participants would be invited to present and discuss problems of research management that have occurred in their own countries. Particular emphasis would be given to the discussion of styles of management including organizational diplomacy, relations with governing boards and government authorities, and of systems of incentives and rewards for staff at all levels of employment.

It would be desirable to establish training capabilities eventually on a regional basis. This will depend upon the emergence and development of suitable training facilities--and sponsorship. For example, SEARCA or the National Academy for Agricultural Research Management, Hyderabad, India, might run a center for Southeast Asia. An arrangement with IICA might be considered for Latin America.

The group agrees that a single agency such as IADS should be designated to formulate and administer the program. One central (non-regional) course should be conducted as a trial run, with subsequent courses established on the basis of this initial experience.

Form and substance of the courses would be determined by IADS, in consultation with other organizations, with mutual attention to:

- o Strategy formulation and implementation;
- o Location for initial training course;
- o Solicitation of support;
- o Substantive materials, including working experience and case studies;
- o Selection of participants; and

o Issues to be addressed. The attached list, "Some Responsibilities of the Manager of a National Research System," identifies some relevant factors and problem areas.

Any second phase would be determined from first experience.

Core support funding should be sought for the first one or two courses, with multiple sources of support for subsequent short-term and longer-term courses in the various regions.

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Asrat Felleke

Joseph H. Hulse

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Murat Oktar

G. Rangaswami

Jackson A. Rigney, Chairman

Bill C. Wright

August Schumacher

Some Responsibilities of the Manager of a
National Research System

1. Developing and maintaining interest in and support of research by his government.
2. Interacting with national development planners to ensure technical feasibility of proposed projects and research attention to high-priority goals and objectives.
3. Establishing and maintaining liaison with the ministry of finance and other agencies concerned with funding.
4. Interacting and cooperating with complementary agencies concerned with credit, inputs, markets, regulatory agencies, etc.
5. Developing manpower and managing personnel in the areas of recruitment, promotions on merit, incentives, etc.
6. Developing facilities, including the national network of research stations and laboratories, essential major equipment, and essential supplies and materials.
7. Integrating scientists into multidisciplinary research teams.
8. Establishing relationships among the institutions collaborating on specific research programs.
9. Interacting with extension or other agencies involved with evaluation and application of improved technology.
10. Dealing with external funding and technical assistance agencies.
11. Interacting with and responding to special interest groups.
12. Meeting political or administrative pressure to divert resources to low-payoff research or to non-research functions.

IN-SERVICE TRAINING FOR MIDDLE-LEVEL RESEARCH MANAGERS
IN NATIONAL PROGRAMS

Report of Group 3

The Problem

While qualified manpower is a prerequisite to the building of national research capabilities, few developing nations have anywhere near adequate numbers of professionals with the necessary education and experience. Competition exists for the experienced professionals. The quality of research management greatly influences the productivity of this scarce manpower, and, in general, the number of qualified managers is a limiting factor.

The capacity for in-service (and on-the-job) training in developing-country agricultural institutions is greatly under-utilized. Progressive management already sees staff development as an ongoing responsibility of all scientists and administrators, and there is a need to instill in all institutions of developing countries a sense of urgency with regard to in-service training, opportunities, and responsibilities. This atmosphere of urgency is evident in the international centers and some regional institutions; their responsibility to their own research programs, however, precludes their ever satisfying the great and continuously growing needs of developing nations.

Comprehensive long-range training plans, developed from careful diagnoses of developing-country human resource needs and national capabilities, could help institutionalize efforts and obtain needed financing to assure success, both from national and international sources.

The development of staff is an organizational responsibility and it can be executed through:

- o Individual attention by all scientists and managers to guidance and orientation of those responsible to them, particularly young professionals;
- o Institutional arrangements for short courses and workshops on specific activities of the organization;

- o Provision for giving staff access to training opportunities outside the organization, either for formal courses or individual study; and
- o Aggressive pursuit of training opportunities and execution of comprehensive training plans.

Training can be one of the most efficient tools for establishing good institutional communications. The efficiency of scientists can be greatly enhanced by in-service management training, whether or not they are in managerial posts. Such training is even more effective for those who are in management positions and who have had previous formal management training. Combined in-service management training and formal or academic courses is ideal. Periodically, such opportunities should be made available to all important managers and scientists in developing-country agricultural institutions.

Rationalization of ineffective developing-country research services--and one could quote: "they have personnel and funds for salaries, but no operating funds"--is a symptom of poor management, a frequent one. Where this example is not applicable, there are many others of years of unproductive efforts, traceable to poor or no goal-setting or to lack of clearly defined objectives. Exercise of management principles, where politics permit, could partially correct such situations.

Ongoing Activities

Many developing countries have important in-service training programs, as do the international centers. Most of the center programs, however, are directed to forming specialists with production and/or special research competencies; and few have management content. In-service management training in developing countries utilizes expatriate "experts." During their assignments these experts seldom train more than two or three nationals, who have worked with them as "apprentices"--usually at great cost, though the cost is seldom realized. These training efforts would be more rewarding if participants (both trainer and trainee) were better prepared and if the trainer side were supplemented by nationals. These efforts could also be shorter and include a larger number of trainees. Finally, trained nationals, especially those trained by scarce expatriate talent, should immediately assume the role of trainers,

multiplying their own numbers and thus assuring capable successors as they move on. Most of the aspects of this difficult in-service training for technology and management can be formalized and institutionalized.

Recommendations

We recommend that an effort be made to:

- o Survey different training situations in selected developing-country institutions and/or national agricultural systems and international centers;
- o Locate materials relevant to the above for use in training and identify gaps in materials;
- o Design models to assist in analysis of existing training systems by national institutions at differing levels of sophistication or development;
- o Develop models for designing (or improving) training systems according to the development situation; and
- o Develop monitoring and evaluation techniques for use by national institutions.

It is our judgment that in-service training in the developing countries is of overriding importance and needs much more attention.

We recognize that a specific international program for training young professionals and a similarly tailored international program for mid-career persons just assuming managerial responsibilities will be important. But we are convinced that the much greater need is to provide resources and tools for developing countries to use in the in-service training of scientists and specialists in scores of national agricultural programs. This is necessary so that these professionals can be made more capable of contributing to the agricultural development of their countries. Much of what needs to be done can be accomplished, especially in the larger countries, with relatively minor help from the outside. But most countries need well-selected contributions from the outside, including materials and insights related to in-service training programs developed in other countries.

In addition, we suggest that the above should be made a group effort with the participation of developing-country training leaders--that is, that these leaders take part in the recommended survey and in the

design and development of suggested models. These recommendations suggest the need to make arrangements for an executing agency and for financing.

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Francis C. Byrnes

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APPENDIX
Selected Background Materials

Extract from

THE IMPORTANCE OF MANAGEMENT IN AGRICULTURAL DEVELOPMENT¹

Luis B. Crouch
Dominican Republic

Management is the active process of determining and guiding the course of an institution toward its objectives. Management of an agricultural institution is a large complex of activities which consists of analysis, planning, decisions, communications, leadership, motivation, evaluation, and control. Decision making is the base of successful agricultural management. Peter Drucker has said, "The end-products of management are decisions and actions." In any institution when objectives desired are not reached, actions should be reviewed and management questioned. If the proper decisions are made and actions taken, objectives should be obtained. The principal problem of a developing nation's agriculture is a lack of appropriate management.

The industrialized nations developed their agriculture, especially since the eighteenth century, along with the other sectors of their economies. For many years production and productivity continued to rise, and have, in reality, seldom constituted problems except for those associated with excess production. The majority of this production entered the market economy. Farm products were a "glut" on the market, and agricultural production was not a concern of the more sophisticated segments of industrial societies. In great measure this is the result of public intervention on behalf of agriculture for more than a century, from the land grant colleges to cooperatives, to federal support of cooperatives or public electricity, price supports, etc.

Through continuous improvement of agricultural technology and public action, agricultural development has been reasonably acceptable in industrial countries. Because of this development and a diminishing relative importance of agriculture in the economies and an increasing ability of other segments of the economies to absorb population growth, there has been no questioning of decisions and actions of agricultural management. So agricultural management was not an object of attention nor was it subjected to pressures for upgrading, as were business and industrial management education.

It was not until the fifties, and perhaps spurred by speculation in land and a surge in diversification, that the technostructures of the large corporations began to look at agricultural enterprise and there developed a new interest in agricultural management. More or less in

¹ Presented to Conference on New Approaches to Technical Cooperation in Accelerating Agricultural Development, Bellagio, Italy, February 1977.

the mid-fifties the Harvard Business School began to develop a program in agribusiness, using successfully the case method, as is its approach. But this innovation has been studied by or used in few other institutions of agricultural education. And this has, I believe, an explanation. Most industrialized societies have developed over the last century large reservoirs of trained agricultural scientists, farm managers, agricultural economists, etc., in a system free from pressures of hunger, and production crises, and have had to cope principally with productivity and excess production, problems of large scale agriculture, labor shortages, etc.. Sheer numbers of trained people, and a time frame without crisis, permitted development of a system of natural selection of leaders and institutional managers. This has not been the case with developing nations.

Efforts of development assistance organizations to respond to the need for trained manpower in developing nations, especially for training of managers or administrators, usually take one or two forms: post graduate education in the home country of the assistance organization and/or placement of a counterpart next to the administrator for a rather prolonged period (resulting "in a rather disappointing record" according to the World Bank sector paper on rural development). And when the alternative is the first--graduate training in an industrialized nation--the training is not for management but is usually a typically scientific academic post graduate program at the M.S. or Ph.D. level. The trainee loses contact with developmental problems, has little opportunity for study with appropriate materials, learns no managerial techniques and, in general, is not a better manager upon return to his home institution. More generally, the training motivates him to remain in the developed country and become part of the consumer society or to sign in to one of the international assistance agencies. And if he returns home he may well find his position filled by some other similarly trained scientist. I don't think I need labor you with additional emphasis on the need for a departure from the traditional system of training of agricultural leaders for developing nations. I'm sure you all agree.

Even if we could begin to train agricultural sector leaders in and for developing nations' institutions, we would still have serious institutional and structural problems. But we would be better prepared to cope with them if our scientists and leaders were trained to understand our people, our agriculture, our economies, our institutions, our agricultural business, our agricultural policy and finance. Since the problems of leadership, universities and agricultural institutions are interrelated I'd like to refer to all three.

Conclusions and a Suggested Model

What can we do? We cannot dispense with the people manning our institutions nor can we improvise new leadership. Nor can we wait for these to be replaced by people with more appropriate management and technical skills because our inbred universities will not have time to produce the changes.

These problems cannot be resolved piecemeal, or country by country, by AID, IDB, IBRD, FAO, or any other present international agency, or the centers, and will not be solved unless mechanisms are specifically devised for coordination of specialized assistance. It will not help us to produce more Ph.D.'s nor M.S.'s unless institutional problems are systematically identified, approached, attacked and solved. Nor is the use of isolated developed country university contracts (as in the 1960's) either with our universities or research institutions, or through the international networks going to contribute much. The international research centers do not have the logistical ability or managerial capabilities to deal with problems of this magnitude, even though when they discuss their training programs they claim they are meeting training needs. More, it is not their mandate.

There is a need for an independently new initiative. I believe the need is for an aggressive and daring move that might use as a model the existing CGIAR and become a "Consultative Group for Human Resource and Institutional Development." This Group would coordinate and/or manage a series of mechanisms designed to resolve problems described above. What mechanisms are necessary? At least five, some of which could be combined:

1. A mechanism is needed to assist developing nations to study, analyze and identify weaknesses in their agricultural institutional framework and within the institutions proper, and to rationalize, plan, program reforms (or improvements). Two important aspects of this should be the development of on-going national capabilities to carry on work of this nature and for continually evaluating progress. There should be access to international financing for assistance to simplify structures, integrate institutions or improve functioning of existing institutions. Closely related is the need for --
2. A mechanism which could assist developing countries to inventory and evaluate their human resources for managing and staffing their agricultural institutions, plan the strengthening of national capabilities in all areas, and coordinate binational and international efforts to upgrade existing research, management, training and other capabilities. This is a long term and continuing effort--not a one time contract or loan affair.
3. An institution for education of agricultural managers should be created.
 - a) A professional manager should be formed. This could be achieved by taking outstanding young biological or social scientists with some experience, and interested in management, and giving them management capabilities in a two-year post graduate course based on experience in agriculture of developing nations.
 - b) Middle management training, of two to four months duration, should be given to scientists already in management positions and who have shown exceptional leadership abilities.

- c) There is a need for management training for senior scientists with many years experience in important positions. This training should have a component of scientific updating.
- d) A training task force, capable of going to a country to run specific training and high level courses.

Those of you who are familiar with the Harvard Graduate School of Business will have identified the model. I would like to propose a postgraduate agricultural management institute, modeled on Harvard University's Graduate School of Business. I would propose that this institution:

- a) Be based in a developing nation preferably near one of the existing centers - maybe near CIMMYT or near CIAT.
- b) Use the case method for all courses. More than sufficient experience exists with which to create whole new study systems using the case method in such areas as:

Agricultural Policy	Rural Development
Institutional Organization	Agricultural Finance
Research Management	Project Planning
Organizational Behavior	Agricultural Planning and
(and/or)	Programming
Human Behavior	International Agricultural
Agribusiness	Marketing (or)
State Enterprise	Marketing
Farm Management +	Agrarian Reform
Crop Production	Farming Systems
Agriculture Credit	Nutrition

- c) Be sponsored by a consortium of U.S. universities including the Harvard University Graduate School of Business (because of expertise in the use of the case method and management education), some institutions with experience in developing nations agriculture and such as Purdue, California, and Cornell, and the international research centers.
- d) Be open to all potential or proven leaders, of industrial or developing nations, putting more emphasis for acceptance on proven leadership ability than on academic credentials.

4. There is a need for a mechanism to stimulate action programs in the whole problem area of poverty in the developing nations. With the assurance of backstopping and assistance from the U.S. (and other industrial nations) universities and research institutions, the leaders of scientific communities and universities of the developing nations would be encouraged to become directly involved in specific action programs in the areas of nutrition, food or agricultural production and rural development. Outside financing and technical assistance would

also stimulate developing nations' governments and agencies to accept direct participation by universities as agents of change. The objective of breaking the impasse between governments and universities and other research institutions (especially in Latin America) could best be achieved by avoiding those existing agencies which have become politicized or which are so perceived by developing peoples.

Were the above strategy successful, experience would be acquired and knowledge could be obtained and organized to make programs and instruction more relevant to the social realities in which they function.

5. There is a need for a mechanism for maintaining an overall view of this whole system including the coordinating of networks or other linkages with industrial and developing governments, universities and research institutions, public and private. It would be through this clearing house, a Secretariat of a "Consultative Group for Human Resource and Institutional Development," that major assistance could be channeled, monitored and progress evaluated.

Now, here are some additional references to the specific proposal for a Graduate School for Agricultural Management. A whole new world of teaching materials would have to be developed; much experience for this exists and is continuously being augmented and is not being used. The assistance agencies and their armies of personnel have invaluable experience, unused because of the lack of a system to make use of it. Much of this could be converted into case studies. Such material, developed for an international training center, would be equally relevant for national training institutions modelled on the proposed international training center. The international center would rapidly become a clearing house and documentation center on all the problems of development of agriculture.

A graduate of the institution suggested would be prepared for developing a nation's agricultural institutions. Instead of receiving a passport to emigrate he would be motivated to return to continue to struggle against all vicissitudes of developing agriculture.

Extract from

SELECTING EFFECTIVE LEADERS OF TECHNICAL ASSISTANCE TEAMS¹

P. A. Schwartz
USAID

The author analyzed 337 reports of "critical incidents" collected by interview from 38 technicians. Each incident had a significant positive or negative effect on attainment of project objectives. Having reduced the incident and action to a single sentence, the author categorized them to develop a list of critical requirements for team leaders. They are described as:

	% of Reports
Basic Qualifications	
Technical Qualifications	7
Administrative Ability	6
Interpersonal Relations	8
Job Orientation	
Motivation and Drive	8
Acceptance of Constraints	10
Development Commitment	6
Emotional Maturity	
Character	6
Personal Security	11
Leadership	
Poise	11
Backbone	14
Political Finesse	13

The author expanded on each of these and formed a basic question that evaluators could use to select among candidates.

Requirement 1. Technical Qualifications

- a. "Goodness-of-Fit" to Position.
Can this candidate trouble-shoot and solve technical problems in the speciality that is the nub of this project?

¹ Published 1973 (TAGS-2).

- b. **Practical Application of Expertise.**
Is he too locked into high-powered and sophisticated approaches to relate to his counterparts on practical down-to-earth problems?
- c. **Institution Building.**
Has he been active in the institutional as well as the strictly technical aspects of this kind of activity, and has he been effective in performing these kinds of functions?
- d. **"Paper" Credentials.**
Will his credentials carry enough weight in this country to gain him the respect and high-level access the position requires?

Requirement 2. Administrative Ability

- a. **Attention to Detail.**
Does he take care of the administrative details that are part of his present job punctually and effortlessly, without slip-ups, flurries, or special reminders?
- b. **Anticipating Contingencies.**
Has he shown himself to be skillful in planning, and to be sufficiently well-organized to stay on top of a number of ongoing activities at the same time?
- c. **Using Team Members Effectively.**
Has he shown himself to be relatively free of "blind spots" in judging the capabilities of his staff and assigning them suitable functions?
- d. **Experience With Government.**
Has he experience in working with the legal and quasi-legal aspects of contract administration?

Requirement 3. Interpersonal Relations

- a. **Empathy.**
Is he too self-centered or callous to be attentive to the needs of the people who will be dependent on him for assistance?
- b. **Proper Treatment of Colleagues.**
Does he turn off the people who work with or for him by being aloof or autocratic, or otherwise trying in his working relations?
- c. **Courtesy and Good Taste.**
Does he frequently offend others by ignoring common courtesies and conventions, or showing poor taste?

Requirement 4. Motivation and Drive

- a. Responsibility for Attaining Objectives.
Does he realize how much personal direction and push he will have to give to the project, and does he seem comfortable about playing so active a role?
- b. Initiative.
Is he an alert and reasonably aggressive self-starter?
- c. Energy and Effort.
Can he be counted on to produce on an assignment, no matter how much time or energy may be required?

Requirement 5. Acceptance of Constraints

- a. Legitimacy of USG Inputs.
Is he willing to function in a quasi-official role, as a part of the U.S. Government structure?
- b. Established Policies.
Does he fully understand the goals and mechanisms that have been established for this project, and is he willing to operate within them?
- c. Dictates of Diplomacy.
Does he realize that the exercise of "freedom of speech" in this assignment must stop short of pronouncements that his hosts would find offensive?

Requirement 6. Development Commitment

Has he shown himself to be patient and skillful in developing more junior staff members?

Requirement 7. Character

- a. Personal Integrity.
Is he one of the people who can be counted on to support a decision that is for the good of the entire institution, without getting caught up in its impact on him?
- b. Chauvinism or Institution-Building?
Does he lack the stature and influence in his own home office that he will need to look out for the best interests of the project?
- c. Standards of Personal Conduct.
Is he prone to trouble via liquor or women or other intemperate behavior?

Requirement 8. Personal Security

- a. Open-Minded and Objective.
Does he take good advice when it is given, without regarding this as a threat or an affront?
- b. Ability to Admit Mistakes.
Does he admit to mistakes candidly, without indulging in elaborate excuses or rationalizations?
- c. Relaxed Concerning Personal Status.
Is he reasonably relaxed about his dignity and status, and about exacting his just due in amenities and respect?

Requirement 9. Poise

- a. Resists Precipitous Action.
Is he reasonably unflappable in high pressure or crisis situations?
- b. Constructive Response to Mishaps.
Has his staff found him to be patient and helpful when someone makes a mistake?
- c. Acceptance of Reverses.
Has he typically been a good sport about being overruled or turned down on something he considers important?

Requirement 10. Backbone

- a. Defending Convictions Under Stress.
When he is right does he stick to his guns in a debate or controversy to the extent necessary to achieve the objectives?
- b. Firmness with Team Members.
Does he take firm and timely action on personnel problems, without weaseling or passing the buck?
- c. Willingness to Take Appropriate Risks.
Has he enough confidence in himself to deviate from prior agreements or instruction when there is an obvious need for modification?

Requirement 11. Political Finesse

- a. Developing Active Supporters.
Has he been popular and mobile in the organizations of which he has been a member?
- b. Sensitivity to Undercurrents.
Is he usually fast in catching on to the "hidden agenda" in delicate negotiations or discussion?

c. **Selecting Appropriate Tactics.**

Has he shown himself to be a skillful psychologist and tactician in getting action on an idea or approach he wants to promote?

TRAINING REQUIREMENTS FOR RESEARCH AND ITS APPLICATION--AN OVERVIEW¹

Peter A. Oram
International Food Policy Research Institute

Main Training Needs of National Research and Extension Systems

Research

i. Senior managerial and planning staff

The need for more experienced research directors has been stressed by the TAC, and was highlighted at the recent Airlie House meeting. In a review of education and training for public sector management Brothers (14) has drawn attention to the special combination of technical and managerial skills required, and pointed out that while the former are rarely possessed by traditional civil servants, the latter are often lacking in experienced scientists.

There is a real dilemma here, since increasing external assistance and the expansion of International Centres enhances the need for such expertise, yet few senior staff have the time to acquire it, and few universities teach research management. Even if they did a young graduate entering the research service would need to acquire both working knowledge of research and seniority before he had much chance to apply his management training.

This situation might best be resolved in the short run by the provision of relatively short "staff college" type of management courses for senior staff, perhaps on a regional basis at institutions such as SEARCA or IJCA, where the trainees could benefit from interaction on common problems of relevance to the conditions under which they would normally work. If this were to be coupled with the incorporation of tuition in management techniques as part of graduate training courses at selected universities a cadre of younger staff with management experience would gradually be created. Their experience and competence would be enhanced over time by inservice training. We would not advocate trying to train a new breed of graduates in research management; they would have neither experience nor status, and would probably not be popular with those who had.

¹ Prepared for the Consultative Group on International Agricultural Research for presentation at a Forum on Training during International Centers Week, September 12, 1977. The views expressed are solely those of the author.

ii. Scientific workers

These include biological, physical, and social scientists, for which which demand exists at all levels, both in the laboratory and in the field. Distinctions between "service" personnel such as senior laboratory specialists or statisticians, and "researchers," may not mean very much, since many of the former also undertake research.

Another questionable distinction, at least as far as individual training is concerned, is between "basic" and "applied" research. A sound training in a scientific discipline should enable a person to pursue a career in either, although at what stage in education specialization should begin is a controversial issue. (15) What is important, however, is the balance of scientific training at the national level; both in terms of disciplines and numbers trained in a particular discipline.

The range of potential requirements is vast, and all that can be done here is to flag some gaps which have been identified by the TAC, the International Centres and other informed sources. These include soil (and particularly legume) microbiology, agroclimatology, tropical pastures, farming systems; macro-economic policy and sector analysis, as well as farm/village socio-economic research; agricultural engineering, production agronomy, tropical horticulture, and post-harvest technology. Almost certainly many members of the CGIAR will be able to identify others.

iii. Intermediate level technicians (laboratory and field assistants)

No accepted guidelines exist as to what the balance between scientists and economists and supporting technical staff ought to be either in terms of quantity or background. In Japan, there are roughly 1:1; and at the International Centres, 1:4, although to some extent graduate trainees and post-doctoral fellows double for field assistants there. A rule of thumb of 1:3 would not seem far wrong on this evidence, but better guidance on the types of personnel requiring training is desperately needed.

¹ It is noteworthy that Japan, which spends a higher proportion of its GDP on agricultural research than any other country, and had nearly 3,500 graduate researchers in 1971, devoted under 8 percent of this manpower to "basic research" in 1971 and around a third to food crop research. The percentage change in the distribution of resources from 1970 onward was heavily in favour of "applied" research. However, the proportion going to socio-economic research (under two percent) was extraordinarily low. Similarly another Asian country forecasts a requirement of 598 soil scientists out of a total planned increment of 1,900, compared to only 38 agricultural economists.

iv. Experiment station managers

By this is meant not the overall direction but the day-to-day management of field operations at a major experiment station, or a group of stations under the aegis of a major institute working across a range of crops and environments. The role of such a manager is to ensure that everything is provided at the right time and in the right place to enable the scientific staff to work smoothly; he is responsible for land preparation, cultivations, irrigation, equipment, fertilizer, labor and the prevention of avoidable losses to experiments from thieves, predators, birds, etc. He must also be a skilled observer, and as such can be of considerable help to scientists who may not be able to visit the station every day.

Such people do not grow on trees; and, as in the case of research planning and direction, it is a common error to assume that anyone with a good knowledge of research or how to run a field experiment or even a farm, can successfully take on such a job. To our knowledge, specific courses designed to impart the special skills and judgment required, including "man-management," do not exist, and this is a gap urgently in need of repair.

v. Production agronomists at the margin between research and extension

Both CIMMYT and CIP have drawn attention to the need to forge closer links between research and extension work at the farm level, and requested funds to station regional staff in selected countries to train local workers from those and neighboring countries as "production agronomists." The latter would cooperate with extension workers in the conduct of farm trials and demonstrations, and feedback the results via their national research institutions to International Centres.

There is undoubtedly a need for such people, but how many are required, how they could best be trained and by whom, whether their training should be commodity or system oriented, and whether they should work under the umbrella of the research or the extension departments where the two are not under the same directorate, merits careful examination. The role of the Centres in this type of training, and how they might best cooperate is an important issue facing the CGIAR.

In Respect of Extension Three Main Needs Can Be Identified

i. Senior management staff

Some universities, particularly in the United States, offer extension training courses; but, as in the case of research, there may be particular advantages in organizing regional courses for extension directors or other senior administrators of extension programs, with flexible curricula along the lines of a seminar, and without being heavily structured to formal lectures. An impression gained from experience of extension practice is that it has in the past often been stereotyped in a pattern designed for developed country agriculture, and that for the developing

countries there is a great need for imaginative innovation along lines more appropriate to their own agricultural conditions and social systems. New approaches are being sought and tested, and senior level training should aim first and foremost at laying out these ideas before practitioners experienced in the pitfalls, so as to stimulate reaction and interaction and generate further thought, rather than at the repetition of routine extension manuals.

ii. Subject matter specialists

These include certain scientific disciplines, especially soil chemists, plant pathologists, entomologists, agronomists, agricultural engineers, animal husbandry and veterinary specialists, and agricultural economists, to provide backup expertise to field extension workers. In addition specialists in communication techniques are becoming increasingly important as a means of getting information to farmers who cannot easily or frequently be reached by regular extension visits, and they may provide the best means of overcoming inadequacies of extension due to lack of sufficient trained field workers and/or the high costs of servicing them properly. Most farmers have access to radio, films are often an attraction at the village level, and audio-visual presentations have the great merit of being understood by people who cannot read.

There does not seem to be any particular yardstick to indicate the optimum balance of specialists (who are normally likely to be graduates), to field extension workers who do not necessarily have to be. Indeed there may not be any set prescription, given the widely varying conditions within a country.¹ In some cases local research staffs may provide specialist advice; but in general this seems undesirable, since it is likely to interfere with their main task. However, extension subject-matter specialists should be in constant touch with local research staffs.

iii) Field and village level extension workers

The extent to which these ought to or need to be graduates is debatable. A danger with graduates is that contact with the farmer is not sufficiently close unless the extensionists are prepared to rough it. On the other hand non-graduates may have limited career prospects. In terms of available manpower countries such as Egypt, India, the

¹ In the Plan Puebla in Mexico, one coordinator, one technical assistance agent, two assistants, and one technician each for agronomic and socio-economic research were usually responsible for about 10,000 farm families (an area of roughly 25,000 hectares), (16). In the Orissa project in India five subject matter specialists and one training and information officer would support and train about fifty extension officers and 430 village level workers, each of the later serving roughly 600 farm families. (17)

Philippines and several in Latin America could probably afford largely graduate services. Many others have less freedom of choice and may be forced to employ middle level field technicians.

The extent to which international assistance is required in training non-specialist extension workers for developing countries (whether graduates or not) is also questionable. Countries with an adequate educational system ought to be able to handle this themselves.

Three fields of activity may merit external help, however. The first would be to organize extension training for a group of countries with essentially similar conditions, in the one with the strongest educational base. Finance may be the most important external contribution here. Secondly, some donors might be able to provide scarce expertise or equipment in a selected field of extension--for example fisheries. Finally, as IRRI's courses have demonstrated, refresher training can be extremely valuable, even for experienced extension workers in a country as well equipped educationally as the Philippines. Whether the latter is an approximate function for International Centres, given that their main task is research, may still be questioned.

NEW APPROACHES TO TRAINING PUBLIC MANAGERS FOR DEVELOPMENT¹

Laurence D. Stifel, Secretary
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As developing countries have widened the scope of their public sectors and increased the complexity of national plans, management inadequacies have increasingly appeared as a major constraint on development. Some observers attribute the frustratingly slow pace of development to a "management crisis." Such judgments imply that the massive investment in management education that has occurred in the LDCs has been ineffective. Since more of the same types of training would not improve public sector management, this conclusion contributes to a growing disillusionment with the conventional doctrine that formal training programs can provide what is needed for development.

Education and training programs in the field of public administration illustrate the problem. American foreign aid in this field, estimated at half a billion dollars, has helped build 75 new institutes where some 200,000 officials have been trained. Such programs have been copied with excessive fidelity from Western models. They have served to ration positions in the expanding bureaucracies without significantly improving management in the public sector. Critical evaluation has lagged because the benefits of educational certification in terms of public employment and prestige appeared to validate the process.

In contrast to these disappointing experiences, a number of the leading management institutes in Asia and Latin America have started to pioneer with new and promising approaches to training public managers for development. These institutes were established to provide education in the basic problem-solving abilities and organizational skills required for management in the private business sector. They very recently have become engaged with management problems in the public sector in response to common pressures arising from an awareness that they have the capacity to train managers who can produce greater social benefits in this sector.

Preconditions for Effective Management Training

Management training requires, as a first precondition, effective demand for such services. Governments must attach high priority to the management problem and believe that management training has the capacity to ameliorate it.

¹ January 1977.

Government priorities vary at different stages of development. By the late 1950's in India, for example, the massive expansion of the public sector was clearly impaired by management deficiencies; a large number of senior people had experienced management training programs themselves and attached value to the expansion of such training. A different sequence of priorities delayed the appearance of such perceptions in West Africa until recently. The first emphasis there was on Africanization rather than management of the government service. Faithful to the colonial tradition of generalist administrators, governments trained officials to take over the law and order functions of the government from colonial civil servants. Management problems were considered the concern of foreign firms in the private sector. As African governments have indigenized their economies and increased the scope of public activities, they are developing an increasing demand for management training. Once over the threshold of acceptance, the demand may rise rapidly (at one of the management institutes in question, Instituto Centro Americano de Administracion de Empresas in Nicaragua, the proportion of new students entering the master's degree program from the government sector increased from ten to fifty percent in the last three years).

A more fundamental precondition for effective management training in developing countries is a bureaucratic environment in which management skills can be used positively. Two major barriers to governments' capacity to absorb management training are (1) archaic civil service practices that constrict management autonomy and (2) organizational structures that are incompatible with the functions to be performed.

Rapidly expanding programs to deliver family planning services illustrate one aspect of this problem. The organizational structures for family planning are usually pyramidal, centralized at the top with a technically-specified package of services to be transmitted downward to the field clinic. Medical doctors customarily have line responsibility at each level. In spite of professional training that often prejudices them against the task of serving large numbers of patients with limited resources. The doctor-managers naturally base services on the clinic, with orientation toward the few individuals who visit it rather than the needs of the community as a whole. Management training for the doctors may have only marginal benefits until the organizational structures are changed and the community becomes involved in the process. Indeed, some argue that training of doctors is counterproductive because it diverts attention from the need for such changes.

Outside of revolutionary situations like China, radical restructuring of family-planning delivery systems is just starting to occur in a few developing countries--a trend influenced by the Bucharest conference of 1974. Innovations include the use of the private sector for commercial distribution and the decentralization of family planning programs together with their integration into broader social services at the community level. While these evolving new structures for the delivery of services are more compatible with social needs, they tend to diffuse responsibility and increase the complexity of the management task. The approach used by the management institutes is valuable in such situations, for the research and consultancy activities that lead to structural modifications

also permit the design of training programs in anticipation of new managerial requirements.

The proliferation of new organizations for development throughout the Third World demonstrates that new structures are not a panacea. Since defects can presumably be found in every bureaucratic structure, management training cannot be deferred until the illusory perfect ones appear. The institutes, nevertheless, do require a minimum compatibility between structure and function. Civil service controls and inappropriate organizations make the problem of improving management in some agencies and sectors so intractable that undertaking training programs for them would be a wasteful use of educational resources.

Relevance of Western Models of Management Education

With few exceptions, the developing countries have copied Western models of management education because no alternative or better models seemed available. World standards for these models are set in the United States where professional management programs were first established and continue to exert tremendous influence--about one-fifth of American male college students major in management studies. The three main streams of Western management education-- public administration, public policy and management, and business administration--can be related to a typology of public management functions. Within the broad range of governmental activities, it is possible to distinguish three categories with overlapping but conceptually distinct managerial requirements:

<u>Public Management Function</u>	<u>Examples</u>	<u>Western Educational Model</u>
1. Routine maintenance activities	Postal service law & order, revenue	Public Administration
2. Development sectors or public systems	Rural development, population, education	Public Policy and Management
3. Public enterprises or parastatals	Marketing boards, utilities	Business Administration

Management deficiencies in the developing countries are most severe in the second category, development sectors, which should provide the thrust for economic progress but which often are managed by technical specialists with little or no managerial training.

Over the last several decades, the public administration educational model has been transferred most extensively and with the disappointing results described earlier. Public administration training is oriented toward the routine service functions of the government, an area of secondary importance in the developing countries and one most severely crippled by civil service constraints. This educational stream has produced few of the technocrats prominent in managing development activities. The public-administration export model consists of sets of tools and techniques considered useful in administering bureaucracies according to "rational" Western norms. Without adaptation to local administrative

practices, they were often irrelevant. Moreover, public administration's theoretical foundations as a professional field were not well developed when the primary transfer to the Third World occurred. Although management problems are inherently multidisciplinary, public administration, with roots in political science, until recently had only limited interaction with the empirical investigations in other social sciences directly applicable to the practice of management.

The most imaginative experimentation is occurring with the second model, the public policy and management programs that have grown rapidly since the late 1960's in a number of major American universities. They are a response to the growing belief that the traditional educational streams were not satisfactorily preparing American students to analyze and manage the increasingly complex government systems in the United States. This approach seems most directly relevant to the management of development sectors in the Third World. The training is multidisciplinary, drawing from the social sciences--especially economic theory--and systems analysis those tools and skills useful for analyzing public problems and making decisions. Thus far, however, these programs have been restricted to the American scene because of the justifiable belief that their intellectual content should be stabilized and evaluated before being adapted for export abroad.

Although designed for the needs of private enterprises, the business administration model, number three above, is directly relevant to the management of public enterprises or parastatals. The management tasks in an enterprise, public or private, are very similar except for the problems of public accountability at higher levels of the parastatal. Substantial adaptation, however, is required to make this model appropriate for the management of government development sectors where the need is most acute.

A number of Western business schools have nevertheless been developing public management programs, thus demonstrating a capacity for effective adaptation and setting a pattern for similar institutions in the LDCs. Like the public policy programs discussed above, the business curriculum draws from the basic social science disciplines those aspects directly applicable to the practice of management. Heavy reliance upon the case method guarantees interaction between theory and reality. Cases provide practice in the analysis and resolution of management problems in the target organization, whether public or private. The educational objective is to develop the knowledge, concepts and skills relevant to the particular context.

The special case of Japan highlights the value of empirical orientation in the development of management training materials. The miracle of postwar Japan, now the world's third largest economy, attests to the success of its management system. Nevertheless, management education as known in the West is practically nonexistent and some theoretical principles of Western management seem inoperative. In the absence of organizational charts and precise job descriptions, responsibility, for example, is deliberately blurred in the Japanese organization. Collective decision making through the ringi system prevents the identification of individuals to be rewarded or censured for a decision. Since these

contrasts are usually attributed to cultural differences between the industrialized West and Japan, they create reservations about the universality of management principles. If Third World cultures require similarly unique systems, Western models of management education are severely limited unless they contain inherent mechanisms for adaptation to the practices of the local environment.

New Approaches by the Management Institutes

The management institutes responsible for the most promising approaches to management education in the LDCs were established on the model of the Western business school. Although not focused directly on development sectors, such institutes have characteristics of this model that are relevant to the attack on any management problem: organizational autonomy, multidisciplinary staff, skill orientation, and emphasis upon problem-solving and decision-making. Moreover, training is not conducted in isolation from the managerial environment meant to be strengthened. The institute approach involves long term engagement with the problems of a particular sector or system, ideally in close collaboration with the responsible government agencies in order to assure mutual commitment to improved management. The process of engagement involves three steps that, like the Chinese box puzzle, are overlapping and interdependent: research, consultancy, and training.

(1) Research-- Multidisciplinary research is necessary to understand the basic environmental factors affecting the system: cultural, economic, organizational. Case research illuminates the key decision points in the management process and provides teaching materials for the training phase. The research should identify pressure points in the system where intervention with consultancy and training would be most effective. Research then continues with evaluation of the consultancy and training activities, providing a feedback into improved interventions.

(2) Consultancy-- This involves systematic experimentation with alternative management mechanisms to improve the effectiveness of the system. An institute working on the family planning sector in India, for example, has carried out field experiments to measure the impact of restructuring district bureaus, decentralizing planning, and training family planning workers how to improve communications with their village clients. The consultants gain practical understanding of the system's dynamics and the ability to direct training activities to changing organizational requirements. (One must also recognize the value of consultancy in providing salary supplements for institute staff members who always have well-paying alternatives in the private sector.)

(3) Training-- Within this framework training consists primarily of in-service programs to impart defined managerial competencies to specified groups in the development sector. There are many possible variations in length, level, and form. The training phase normally occupies proportionally more time during the later stages of an institute's engagement with a particular sector after a solid research and consultancy foundation has been established. The training emphasizes

the improvement of skills required to cope with the problems likely to be encountered in the sectoral context, rather than the transfer of substantive knowledge.

A number of management institutes have used this approach to attack management problems in agriculture and family planning--two of the most critical development sectors. The Asian Institute of Management (AIM) in Manila, for instance, has been engaged in a long-term collaborative effort with the Philippine Department of Agriculture. The Secretary of Agriculture, trained as a professional manager himself, sought to overcome the inertia of his bureaucracy by creating a network of officials with the common experience and skills derived from management training. He sent senior staff members to AIM's two-month training program, junior staff to the one-year master's program and hired recent graduates of the regular two-year master's program. Agricultural cases were already an integral part of AIM's regular curriculum because large-scale agricultural organizations are very prominent in the Philippine economy. The officials trained in management were then receptive to consultancy-training interventions focused on special areas like the corn and land reform programs. AIM is now planning to attack the management problems of the rice sector in the Philippines and other countries of Southeast Asia.

The Indian Institute of Management, Ahmedabad (IIMA) has the longest experience in developing management education for agriculture--almost a decade. Its Center for Management in Agriculture, with a faculty of thirteen members and a research staff of forty, now has experience and intellectual strength unparalleled in the Third World. In addition to including agricultural management as a specialization in its regular master's program, IIMA trains hundreds of officials each year from India and the rest of Asia in special programs tailored to the needs of the agencies involved.

The deans of four management institutes from Asia and Latin America joined together with a group of managers of national population programs in 1973 to form an association, the International Committee on the Management of Population Programs (ICOMP). The institutes qualified for membership in ICOMP because of their commitment to the population area and their strength as educational institutions. Their objectives were to sensitize program managers to the potential for management improvement, to test and generate a core of management resources, and to develop a network of institutions capable of improving the design and management of family-planning delivery systems. ICOMP's approach is based on the model described above that integrates research and consultancy with training. The member institutes seek to expand their impact through linkages with other institutions. The faculty at the Instituto de Estudios Superiores de Administracion in Caracas, for example, assisted the Universidad de Los Andes Facultad de Administracion with the family planning program in Colombia, and he two recently participated in a major workshop organized by ICOMP which included fifteen management institutes and thirty population program managers.

Outreach to other educational institutions is necessary to justify the large investment required to establish a multidisciplinary management institute with the scope to carry out such experimentation and innovation.

The institutes directly train only a few at the middle and top organizational levels--the managerial elite. They must also be credited with the social benefits of systemic changes resulting from their consulting activities. Such institutions, however, do not have the capacity directly to meet the enormous needs at the lower levels of management or in countries too small to afford their establishment. The leading institutes should, therefore, serve as breeder stations to upgrade management competence in the colleges and universities where the great bulk of the training must take place.

In conclusion, the management institutes offer no panacea for the solution of the management problem. But they do demonstrate an approach, based on the simple concept that progress requires engagement with the entire problem--training divorced from research and consultancy invariably is formalistic and sterile. The experience of these institutes is outstanding only because so much management training has been carried out in the LDCs without heeding this essential lesson.