

**The Role of
International Associations
in Strengthening
National Agricultural Research**

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**The Role of
International Associations
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National Agricultural Research**

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Foreword

International associations exist in many forms and serve many purposes in relation to agricultural research systems in developing countries. They represent an especially useful resource, one that could be used to advantage by many more research systems. The need for more thorough knowledge about these associations and their potential ability to strengthen national agricultural research was the motivation for the conference reported here.

Representatives of international associations, national research systems, and other interested groups came together for this conference. In addition to the importance of the subject, this conference was unique in another way. It was the first direct collaboration of three organizations which direct their primary activities to serving agricultural research in developing countries: IFARD, IADS, and ISNAR.

The conference challenged associations to seek ways to make their efforts of still greater support to agricultural development goals, and it provided stimulus to national systems leaders to make better use of the associations.

Appreciation was earned by a number of persons in relation to this conference. These include the authors of stimulating papers, the plenary session moderators, and the chairmen and reporters of group sessions; Dr. Francis Byrnes, IADS, and Dr. Byron Mook, ISNAR, who were the key planners; and especially the participants who shaped the transactions toward the findings reported here. We express appreciation also for the significant contribution of the superb conference facilities and staff, generously provided by the Rockefeller Foundation.

We regret that invitations to participate were limited by the number that could be accommodated. Only a sample of the many productive international associations could be involved directly. We hope this report will be a way to diffuse the ideas much more widely.

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Summary of the Conference

Over the past 20 years, a variety of international associations has been established whose objectives include the promotion of agricultural research. Widely known examples include the Association for the Advancement of Agricultural Sciences in Africa (AAASA), the South East Asia Regional Center for Graduate Study in Agriculture (SEARCA) in the Philippines, and more recently Programa Regional Cooperativo de Papa (PRECODEPA) in Latin America.

Such associations have had different origins, purposes, structures, and methods of funding. They have also had different relationships to national agricultural research programs. After these years it is reasonable to ask: What contributions have they made to such national programs? What contributions might they be able to make in the future?

To begin to answer such questions, 30 senior agricultural scientists and research managers met at Bellagio in December 1981. Sponsors for the workshop were ISNAR and IADS, with the cooperation of IFARD. The participants came from international associations, national agricultural research programs, and donor agencies.

The specific objectives of the workshop in December were:

- (1) to analyze the role of international associations in strengthening national agricultural research;
- (2) to discuss methods for evaluating the performance of these associations; and
- (3) to recommend ways in which these associations might develop.

The workshop was structured around discussion of a keynote paper, four "regional" papers, and several "case study" discussion notes. The keynote paper by Dr. Eduardo Venezian, Chile, is reproduced later in this volume, as are summaries of the regional papers. Most of the sessions of the workshop were plenary, though smaller working groups also functioned.

Conclusion: Can Have Significant Impact

The overall conclusion of the workshop was that international associations can make a significant impact on national agricultural research. They can provide resources that may not otherwise be available to a national system, and they can provide structure to multiply the impact of the work coming from individual systems. Discussants highlighted three considerations that, in their view, determine how strong the impact will be: (1) the articulation of clear goals; (2) the development of programs that are realistic; and (3) drawing meaningful contributions from members in the implementation of the association's program.

The workshop participants discussed in detail several associations which had or were in the process of dealing effectively with these considerations. Two associations involving national research systems in Latin America sparked particular interest: CONO SUR, the program to coordinate agricultural research activities among six nations of the "southern cone" of South America (the Instituto InternAmericano de Cooperativa Para la Agricultura plays a role in this association); and PRECODEPA (Programa Regional Cooperativa de Papa), in which six countries of Central America and the Caribbean region coordinate potato research.

A Model

The feature of the keynote which provoked most discussion was a model for categorizing international associations. Participants found it useful in organizing their thinking, even though several had questions about certain aspects of it. The model is a nine-cell matrix -- with the "functions" (of international associations) down one side and the "modes of operation" (of such associations) across the top:

In his introduction to the model, the author stressed that it was intended to categorize associations only -- not to evaluate the contributions that any particular association might make to a national research program.

Participants found the three "modes of operation" to be a particularly good starting point for discussion. Several raised the question of whether donor agencies and national research programs did not actually have different

preferences with regard to "mode": Specifically, might donors be more interested in Column 1-type associations than in Column 2- and 3-type associations? And might not national research programs prefer the latter, the coordinating/promoting?

Such questions led to a discussion of the initial purposes of international associations. Participants identified two general ones.

- (1) The building of links between national agricultural research systems themselves. There is clearly a need for increased "technical cooperation among developing countries," which international associations may be able to encourage.
- (2) The development of closer cooperation between national agricultural research systems and donor agencies.

Several participants felt that the history of "executive"-type international associations -- as described in the model -- have demonstrated the following weaknesses of this approach.

- (1) Such associations (and organizations) have shown too much interest in basic research and not enough in applied research.
- (2) As a result, they have not paid enough attention to the needs of national research programs.

	Executive	Supportive	Coordinating/ promoting
Research primary			
Research secondary			
Research incidental			

- (3) The burden for initiating cooperation between such associations and national programs has too often lain with the latter.

Some participants who held these views were pessimistic about the future of "executive"-type associations. They felt that useful change could come about only on the initiative of those countries and agencies which supported them.

As a corollary, therefore, most participants felt that "supportive" and "coordinating/promoting" associations had more short-term potential for strengthening national agricultural research. These types would not be threats to the sovereignty of members countries (as "executive" associations which actually did research might be), and since their total resources were less, they could be more easily controlled.

International Associations As Service Organizations

The four regional papers (on the Middle East, Latin America, Africa, and Asia) tended to start from the perspective of national agricultural research programs. Their first concern was the problems which these programs face -- and the authors asked how international associations do (and could) contribute to solutions.

A link to the earlier discussion was evident in the opinion of some participants that donors might see different problems than did national research managers and scientists. There was agreement that a clear understanding of problems was necessary, and if specific international associations do not offer plausible solutions to such problems they are superfluous.

The following general constraints under which national programs operate -- and to which international associations might respond -- were discussed:

- (1) Short supply of qualified manpower, both scientific and managerial. International associations might be able to take the lead in organizing training, though any association that wanted to do so would have to find answers to several difficult questions, including: What fields, both scientific and managerial, need most attention? Who should be trained? And how should such training be carried out?

- (2) Incomplete access to good information on which to base research. National research programs often find it difficult to discover what relevant work is going on outside the country. International associations could take the lead in disseminating information. Again, several questions would have to be answered first: What types of international information does a national program need most? In what form is it apt to be most useful? And how should a national program organize its own information program so as to generate material for international networks?
- (3) Inadequate intercountry coordination in research programs. International associations may be able to facilitate the exchange of persons and materials (e.g. germplasm), with the objective of minimizing unnecessary duplication. They may even be able to develop research plans which can be implemented by individual member countries. Participants agreed that there is considerable potential here. However, it is a fine line between advice (to national programs) and authority (over them). Participants were therefore interested in the experiences of PRECODEPA and CONOSUR in handling such issues.
- (4) Insufficient advocacy of research system interests. Participants agreed that both national governments and international agencies must develop a better picture of the constraints under which agricultural research is carried out. An institutional voice is needed to articulate problems and to lobby for their solution. Both IFARD and ISNAR were mentioned often in this connection.
- (5) Weakness in public/private sector research linkages. Participants noted that an increasing amount of agricultural research is being done in the private sector, particularly in northern hemisphere countries; how can "southern" countries take advantage of it? One way may be through international associations, like the ICD, which can act as intermediaries.

The matrix that follows could be useful in analyzing the types of international association best suited to dealing with particular types of problems. Other constraints mentioned but not as fully discussed at the workshop might also be included. Examples are the stability of research institutions, funding, the research environment, program

identification, program planning, input supply, program evaluation, personnel management, financial management, and delivery of the research product.

	Executive	Supportive	Coordinating/ Promoting
Manpower			
Information			
Coordination			
Advocacy			
Public/private sector linkages			

Many participants felt that donors had paid considerable attention to "executive"-type associations, and that national governments had tended to favor "coordinating/promoting" associations. Not as much thought has been given to "supportive"-type associations. Participants felt that such associations had definite potential -- particularly in advocating research system interests, setting research standards, carrying out studies, advising national research programs, and coordinating various training and exchange activities.

The Strengthening Of International Associations

Most participants agreed that international associations had not been as effective as they might have been in strengthening national agricultural research. Some participants were particularly critical of what they saw as excessive attention on international meetings, many with little tangible output. Often the goals of international associations had been left too general.

But there was not consensus on the question of how such associations might be developed. Some persons argued that international associations could do more, if they were

stronger. (The implication was that financial resources and strength were related.) Others argued that strength had to come from within -- that external support could accomplish nothing if it were not preceded by appropriate planning and organization.

The issue of politics came in here. Some participants felt that agricultural research in most countries was already too politicized; that international service associations should, therefore, be non-governmental. Others disagreed -- arguing that all publicly funded activity is necessarily political, and that international associations, therefore, should use politics rather than avoid them.

What are the main constraints under which international associations operate (and which must be dealt with if such associations are to serve national agricultural research)? Three were discussed.

(1) Unclear goals and plans.

Participants agreed that the stated objectives of many existing associations are vague. Neither "improved communication" nor "training", for example, gives sufficient guidelines for action. Associations which expect to attract international and national support must be more precise.

(2) Uncertainty over organizational procedures.

Participants reported that many international associations have informal working rules. Their effectiveness often seems to depend on the personal energy of their office-holders. The establishment of a secretariat may encourage the development of such organizational regularity, but it does not in itself guarantee success or insure against failure. The case of PRECODEPA demonstrates that an international association does not need its own secretariat in order to assist national agricultural research.

(3) Lack of stability in funds.

Most participants felt that this constraint was the biggest one. International associations have usually run at a loss, and have depended on donor agencies and national governments to make up their deficits. Where

should international associations get their funds? Some participants argued that the burden of proof was on each association to show that it was providing a service worthy of support. On the other hand, others felt that a considerable amount of seed money and time was necessary to get an association started - and that financial supporters therefore had to be patient.

An Action Model For International Associations

Participants identified five stages through which an international association must move if it is to be effective in strengthening national agricultural research. Each stage builds upon the one before it.

- (1) Evaluation of needs in national research programs. An association must be clear what it is trying to do and why.
- (2) Definition of program. Such a program must respond to the national needs already identified. An association must not become an end in itself.
- (3) Identification of resources. On the basis of the program which it has developed, an association must decide what levels of personnel and finance it requires.
- (4) Development of administrative capacity. Once resources have been procured, an association must develop the ability to manage its affairs and to become self-supporting. Other international associations or national programs may assist in this task.
- (5) Promotion of activities within national agricultural research systems.

Participants noted that several existing international associations had skipped over some of these stages. Stages (1) and (2) often received much less attention than they should; and there has been a tendency to pay too much attention too early to Stages (3) and (4). As a result, the achievement of Stage (5) -- the reason for having the association in the first place -- may have been jeopardized.

At the same time, however, there was a strong feeling that national research programs often have not done enough to encourage the development of international associations.

Perhaps they were not sufficiently aware of the benefits that such associations could bring. Participants agreed that there were four general kinds of contributions national programs must make to international associations, if the latter are to be effective.

- (1) Legitimacy. National agricultural research programs must take the lead in convincing national governments about the value of international associations.
- (2) Funds. On the basis of such persuasion, national governments must be willing to give financial support to international associations.
- (3) Personnel. National research programs must be willing to make some of their personnel available to such associations.
- (4) Counterpart linkages. National programs must make clear to both international associations and to their own national governments just how relations are to be handled.

IFARD - The International Federation Of Agricultural Research Systems For Development

IFARD was the particular international association that received most attention at this workshop. It was represented by several past or present office-holders, and a program for it was discussed in both formal and informal sessions.

The association reported plans to begin publication of a quarterly newsletter in 1982. Plans are also being developed for a worldwide conference in 1983, probably to be held in Rio de Janeiro. The Latin America and Caribbean chapter had its first regional meeting in 1981, and a second is scheduled for 1982. The Africa chapter plans to hold its first meeting in 1982.

Summary

"Potential" was the idea most often discussed at the workshop. Participants agreed that international associations have a lot of it, though most also agreed that such associations have not made as big a contribution as

they might have to strengthening national agricultural research.

Where do we go from here?

There was consensus that both the international community and national governments would be willing to support associations if good plans and programs are developed. Many smaller countries (and small research programs) could benefit particularly from participation.

The initiative must come both from the national research programs and from the associations themselves.

Lead Paper:

International Associations and National Agricultural Research

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This paper is concerned with the potential role of international associations in strengthening national agricultural research in developing countries. It identifies a sample of these associations; notes some general characteristics and behavior by looking into the associations' objectives, organizational arrangements, and activities; develops an analytical framework for studying them; and assesses their potential role in strengthening national agricultural research. In order to cast this assessment in perspective, a review is provided of the continuing needs of national agricultural research systems.

It may be helpful to define what is meant, for this conference, by "international associations." Many organizations have supported agricultural research in developing countries over the past four decades. Some commonly work on a nonprofit basis, in several developing countries simultaneously or over time, to help these nations

improve their productivity and living conditions. These include national institutions of the advanced countries, such as private foundations or government foreign aid agencies; regional, multigovernment organizations, such as development banks; and worldwide organizations, such as the United Nations and its affiliated agencies. Their shared characteristics place them under the generic rubric of "international organizations."

Most of those that have assisted significantly in agricultural research are well-established and known. Their size, years of activity, volume and kind of support for agriculture, and special achievements are well documented. The Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP), World Bank, Instituto Interamericano de Cooperacion para la Agricultura (IICA), Inter-American Development Bank, Asian Development Bank, United States Agency for International Development (USAID), Rockefeller and Ford Foundations, and International Development Research Centre (IDRC) are a sample of the most significant of the international organizations active in support of agricultural research in developing countries.*

Many other organizations have close ties to these, operating under names such as "program" (World Food Program), "campaign" (Freedom from Hunger Campaign), or "committee" (Inter-American Committee for Agricultural Development). These and all the international agricultural research centers come under this same broad category.

There are also many organizations related to agriculture that, while sharing the basic characteristics of international organizations, differ from them in several ways. For want of a better term, this second type of organization is labeled here "international associations" (IAs). Their activities and role in research are not as well known. Most IAs are not global, but rather regional or subregional in character; are not "rich" financially; and are often fragile or unstable institutionally and in their programs. Many are "horizontal" associations, involving

* See IADS, Agricultural Assistance Sources, 3rd. ed. rev. (New York: IADS, 1980) for information about these and other international organizations.

mainly developing-country institutions and individuals. Nevertheless, it appears that sometimes they help strengthen national agricultural research, frequently by affecting aspects of it that are not amenable to intervention by the larger agencies.

The limited information available on IAs, as well as time and other constraints, have restricted the scope and rigor of this inquiry. It is hoped, however, that the paper will help define the problem at hand and point to the issues that invite further consideration or action.

Setting the Stage

To set the stage for considering the needs of national agricultural research systems that might be served by international associations, it is important to review, however briefly, efforts to strengthen these research systems. At the same time, it is appropriate to review current thinking on why national research and its improvement are important to developing countries.

Research today is widely recognized as a primary source of growth for agriculture. With an increasing need to raise the productivity of agricultural resources in developing nations, greater attention is being focused by the concerned international community on the generation and adoption of new technology, and hence on agricultural research. Paradoxically, developing countries do not invest nearly as much in this activity as the economic and social returns would justify. Perhaps this is because agricultural research is complex, long-term, and largely intangible. Governments and policy-makers find it less attractive to devote public funds to it than to investments which have more visible and immediate returns. On the other hand, as agricultural research falls mostly in the category of public goods, in the sense that the product of research cannot be appropriated by those who perform it, there is little incentive for private entrepreneurs to invest in this activity. The result is that agricultural research systems in the developing countries generally are more backward or slower to improve than is socially desirable.

Given these problems, it is legitimate to consider why national research is needed at all. The need for agricultural research at the national level arises because

of the location-specific nature of farm problems and much technology. Although a great deal of scientific and technical knowledge is transferable among countries and regions of the world, its effective use by farmers requires adaptation to local conditions. Sometimes, the adaptation of a particular practice raises problems that can be solved only by engaging in basic research.

Furthermore, modern science-based technology for agriculture is often complex, and its proper adoption can be accomplished only through the work of qualified research personnel. For these reasons, agricultural scientists and research facilities are necessary in developing countries. These countries can seldom, if ever, completely rely on the research capacities of more advanced countries or of the international agricultural research centers. The scope and complexity of national systems vary according to the particular conditions of various nations; but scholars in this field generally agree that a domestic capacity in agricultural research is necessary for the effective use of scientific knowledge and modern technology.

Scientific agricultural research is relatively new in developing countries, having started for the most part since World War II. The push for it came from outside the countries, with special credit to The Rockefeller Foundation for exercising leadership to create or upgrade national research capacity for agriculture in the developing world. This initiative progressively attracted support from other agencies of the advanced countries and international organizations. By the mid 1960s, practically all developing nations had some modern research capability for agriculture, ranging from incipient institutions in some cases to well-established systems in others (India and Mexico).

The thrust of international efforts for agricultural research improvement in the developing world was redirected away from country programs, starting in the mid 1960s. Overestimation of the self-sustaining state reached by national research, or frustration with the slowness of change within countries, led the donor community to support the innovative concept of a network of international agricultural research centers.

The striking early success of the initial centers, the International Rice Research Institute (IRRI) and the Centro Internacional de Agricultura Tropical (CIMMYT), gave rise to the idea of a "green revolution" and attracted millions of

dollars in support of international centers. Thirteen centers and organizations operate presently under sponsorship of the Consultative Group on International Agricultural Research (CGIAR). There are a few others not supported by the same consortium of donors.

It has become apparent, however, that continued effectiveness of the international centers requires both suitable mechanisms to transfer the newly created technology to the developing countries and strong national research systems to absorb and complement the centers' work. A shift in the emphasis of assistance is taking place. "Outreach programs" have become an integral part of the international centers' activities. The renewed concern with upgrading research capacity at the national level has also led to the creation of specialized service institutions like the International Agricultural Development Service (IADS) and the International Service for National Agricultural Research (ISNAR), and to numerous loans to national systems by the international development banks.

Nevertheless, the strategies, techniques, and lessons of the past 40 years do not provide sufficient answers for today's problems. Not only do some familiar problems persist, but the situation has changed in so many ways that the old approaches are not as applicable as before. There are more independent countries, with great differences among them in income levels, resources, and trained manpower. Technological and economic progress in the advanced countries has created striking new opportunities for the developing countries but has aggravated their market problems by reducing their comparative advantage in agricultural production. Foreign aid resources on the whole are shrinking in real terms. Political attitudes in both rich and poor countries, as well as advances in the respective scientific communities, make the administration of technical and economic assistance a more delicate issue. The enormous growth since World War II, and the later perceived decrease in effectiveness of a broad system of official international organizations, are also significant variables.

In sum, the support of improvements in national agricultural research in developing countries today requires new thinking, new ideas, and approaches adapted to current realities. In this situation, "nontraditional" or less well-known international associations may be able to play effective roles.

National Agricultural Research Systems

Among the factors that could argue the need for new types of assistance to national agricultural research, two emerge as outstanding. One, mentioned above, is the persistence and magnitude of problems that current methods have not solved. The other is that central national research institutes, which have been the major focus of international assistance to agricultural research, do not, by themselves, constitute national agricultural research systems. These systems often contain other elements that appear to be assuming increasingly important functions in national agricultural research.

Elements of national systems

The following paragraphs provide a broad outline of what is involved in agricultural research systems in "typical" developing countries. The analysis is made with the following caveat: There are about 80 countries (excluding Communist-bloc countries) with per capita incomes of US\$100 to US\$2000 that constitute what are usually referred to as developing nations. It is difficult to make statements about these countries that apply equally to all, including descriptions of national agricultural research. More often than not, the differences from one country to another are more significant than are the similarities.

The typical organizational framework for agricultural research in developing countries can include several kinds of institutions, discussed below in rough order of significance. In the smaller or less-developed countries, only the first few are likely to be present.

Central national agricultural research institute. This is composed of several regional and local centers and experiment stations, and is usually the largest, best staffed, and best funded research institution. Programs have an applied, problem-solving orientation, are long-term, and tend to cover a broad spectrum of subjects and tasks. They usually also perform some basic research, especially in areas such as soils or diseases that are location-specific.

Decentralized and/or specialized public research institutes. These are similar to the former in organization, but they deal either with more restricted

geographical areas or with specific crops (sugar cane, coffee, livestock) or problems (dryland agriculture). They may or may not be formally linked to the central national organization.

Universities, colleges, and schools of agriculture. The degree to which these institutions actually engage in research varies greatly among and within countries. In many instances, their research function is significant. (In India, for example, agricultural universities perform the role noted in the preceding paragraph.) Usually, however, universities operate on a project basis, which means shorter-term, more specific but scattered studies; the tendency is toward less applied and more theoretical research. Links with the national institutes are frequently weak, and their relationships are often competitive.

Farmers' organizations. In many countries there exist experiment stations or research institutions supported by farmers' organizations. These are typically smaller, and more narrowly focused and applied in their research, than are the national or decentralized institutes. Links with other parts of the research establishment are informal and weak.

Industry-supported institutes. Large business or industrial concerns, often foreign, may occasionally run agricultural research institutes devoted to crops (cocoa, malt barley) or problems (seed improvement) that are of commercial interest to them. Results of this research do not necessarily become public, and the effect on domestic agriculture and overall national research is fairly limited.

Private research institutes. Though not common, there are in several developing countries agricultural research institutes supported by private groups and foundations or run by individuals for profit. Although they constitute a minor component of national research establishments, they can be important within restricted geographical areas or for specialty crops.

International support has concentrated mainly on the central national agricultural research institute. This may have been appropriate until recently, but conditions are changing. For example, as research and development is becoming increasingly profitable in many lines of agriculture (pesticides, mechanization, animal nutrition, seeds), private institutions may become more important in

developing countries -- provided that nonprofit agencies do not preempt, or governments forbid, their participation.

Continuing needs of national systems

In order to define ways and means to strengthen national agricultural research, one must have an assessment of its weaknesses, areas of potential improvement, and relative costs and payoffs of alternative actions. Evaluative reports on research systems of developing countries show certain major common areas (not all of which are present everywhere) that constitute bottlenecks for performance and growth:

Under-valuation of research. Agricultural research is not sufficiently well understood and valued by its direct beneficiaries, the farmers, and much less by the general public. Policy-makers and governments reflect this undervaluation in low expenditure for national agricultural research. Evenson and Kislev show that in 1965 developed countries annually spent US\$986 million for agricultural research, equivalent to 0.87 percent of their agricultural product, while developing countries spent only US\$127 million, or 0.26 percent of their agricultural product.¹

Neglect of research results. Research results go largely unused, or take long to reach producers, for various reasons. Some claim that the recommended technology is not adapted to local conditions or is uneconomical; others blame the lack of good diffusion mechanisms. To the extent that some of the research production is not used, the social payoff of the investment is obviously less than it could be. This discourages both the research establishment and its supporters.

National research systems are not cohesively structured. Links and communications among the institutions are weak, and thus national programs may duplicate efforts, leave significant gaps, and become routine and repetitive, or slow to respond to changing situations. This again lowers the systems' overall productivity.

1 Robert Evenson and Yoav Kislev, Agricultural Research and Productivity (New Haven: Yale University Press, 1975).

Lack of effective communication within research systems.

Weak emphasis on program planning and design. Within specific institutions, program planning and design does not receive the emphasis it deserves. Thus the setting of priorities does not reflect a continuous process of analysis of agriculture (production and marketing conditions) nor of rigorous economic evaluation of the research performed. The problem is worse in the government-supported institutions, where public accountability is usually minimal.

Scarcity of skilled management professionals. The organization and management of research institutions, typically involving many outlying stations and scattered staff, is complex and frequently inefficient. The tendency

to name either scientists or political appointees to direct these institutions exacerbates the problem. The need for professional, qualified managers is evident, but this scarce resource in developing countries usually commands higher salaries in private than in public employment.

Difficulty in training and keeping staff. The size, training level, composition,, and stability of the research staff are frequent problems. Considering the relative newness of agricultural research in developing countries, this is to be expected. The major area of international assistance for national agricultural research over the past decades has been in staff training and development. Perhaps the real problem at present is the relative shrinking of funds for training of agricultural research scientists at developed-country centers. Another factor is the limited opportunity for career development for these professionals in developing countries, partly because of salary problems.

Shortage of funding. Shortage of funding is always a problem, and is not limited to research. However, inflexible budgets are a frequent shortcoming that could be easily remedied. It is common at national agricultural research institutes that projects cannot be carried out (or started) because of lack of operating funds or transportation. This is not just an issue of internal institutional management -- it is frequently based in the national legislation for public sector agencies.

Absence of a professional research environment. The professional research environment is a key element often lacking in developing-country research systems. The production of science-based technology requires mutual intellectual stimulation, exchange of knowledge, peer

reviews, academic incentives, and recognition -- all elements that are built up slowly in any community, and that can bring success only after a minimum critical mass of scientists is in place. Even then, a complex of organizations and mechanisms must become functional to create a stable environment for research. Links to the international community of agricultural scientists also are essential. Some developing countries are advanced in these respects, but most have a long way to go.

Problems with access to germplasm and other inputs. Ready access to genetic materials and other elements required for agricultural research is sometimes a problem. Restrictive regulations by various countries are impediments not easily removed unless the nature and importance of research is much more broadly appreciated at the national level.

The foregoing list of issues, though not exhaustive, covers the most common problems hindering agricultural research in the developing countries. From the standpoint of a search for ways in which international agencies may help, it may be useful to note that these similarities are significantly tempered by differences among regions and countries. As with the elements of national systems described earlier, sometimes the differences outweigh the similarities.

It is beyond the scope of this paper to analyze these differences, but it may be noted that they stem mostly from the historical development of agricultural research and the degree and source of foreign assistance received. Size and wealth of the country, prevailing agroclimatic conditions, relative economic importance of agriculture, political and cultural traits, and other such factors also affect the nature of problems currently found in national agricultural research systems.

The persistence of the problems noted, the diversity of their incidence among countries, and the lack of obvious, tested actions to solve them show that there is still a great need for innovative ideas and approaches, particularly in assistance by international associations and other entities.

International Associations

International organizations have been a major factor in directly building up the national agricultural research institutions and human resources of developing countries. Steady support has come in the form of provision of long-term visiting scientists, consultants, construction and equipment, libraries, fellowships, operating funds, and not least, organizational techniques and innovations for systems and networks adapted to local conditions. This is not to diminish the merit of national governments and agricultural leaders, rather it is to say that research systems of developing countries would be much further behind in the absence of such massive international assistance. At present, there is a great opportunity for another type of assistance: horizontal assistance and cooperation among developing nations to stimulate and carry out research activities.¹ However disparate the levels of national research capabilities among countries, there are many ways in which they can effectively help each other. Perhaps relatively small external aid efforts can be catalytic when associated with cooperation among developing countries, filling needs that cannot be readily tackled directly by international organizations.

International associations (encompassing a variety of international bodies not included among the larger, well-known international organizations), originating in and mainly based in the developing countries, acquire special importance in this context. Knowledgeable international observers have noted significant contributions by these associations, the relatively large numbers of them in some regions (notably Latin America), their steady increase in the developing world, and the potential they show as support components for national agricultural research systems.

¹ United Nations High-level Committee on the Review of Technical Co-operation among Developing Countries, "Methodologies for promoting horizontal co-operation among developing countries in scientific and technological research," Rept. No. TCDC/2/12 (March 1981).

A list of IAs related to agriculture is a part of this paper (page 00). Associations are grouped according to world regions, and their main characteristics are shown, where information is available. This list provides a basic reference point for the remainder of this analysis. It is selective, but it purports to include the principal IAs that have had or can have a significant role in strengthening national agricultural research in developing countries. Some have much broader scope than just agriculture; however, they are mentioned as illustrative of IAs, that by virtue of their actions, can have some relatively direct effect upon agricultural research. The listing itself may also help further define the types of organizations that are included under the term "international association."

The sample of IAs listed shows a great variety of organizational forms. Studying and understanding the role of these institutions, vis-a-vis agricultural research, would be difficult and perhaps not illuminating without some generalizations about them. In devising a classification scheme that will provide these generalizations, no obvious single approach emerges, as there are several criteria that could be used for categorizing IAs. (The full names and descriptions of the associations to which the acronyms refer appear on pages 00-00.)

Common conventional division used for international organizations: intergovernmental, nongovernmental/nonprofit, and multinational enterprises. This criterion could be used for IAs, except that by definition we have excluded the multinationals.* With reference to the list of IAs, ORSA and SEARCA, for instance, would belong to the first group; ALCA, AAASA, and SABRO would fall in the second.

* This may be, however, an inappropriate restriction of the topic. For example, the Escuela Agricola Panamericana, located in Honduras and founded and supported in part by the United Fruit Company, is an international organization, in terms of its geographic area of concern, training and research objectives, staff and student composition, and even funding. The role played by its graduates throughout Latin America in agricultural education, research, and policy has been remarkable.

Structural organization. IAs could be distinguished according to their form or degree of internal organization, dependent or autonomous character, and several other such structural characteristics. For instance, CATIE and INCAP are highly structured institutions with physical facilities and permanent staff; but AFAA or ALPA have little organization, and REDINAA is a "working group."

Certain IAs such as ILMA (which ceased to exist as an international organization) depended largely on the support of FAO; CATIE was initially dependent on the Organization of American States (OAS)/IICA until transformed into a basically semi-autonomous organization. Most other IAs listed are fully autonomous.

Principal mode of action. This distinguishes IAs according to the principal form in which they carry out their activities: meetings (AAASA, ALPA), publications (AIBDA, AIBA), campaigns (OIRSA), or projects (INCAP, SEARCA).

Subject matter or specialized nature of preoccupation. Although the IAs being reviewed already constitute a subset of agriculturally oriented bodies, they could be further classified according to themes, such as plants (ALCA, APGRC), livestock (ALPA, ORISA), particular crops (PRECODEPA, APCC), natural resources (CIDIAT), area problems (REDINAA), etc.

Geographic orientation. In addition to major areas of the world, further subdivisions could be devised. Within Latin America, for example, ORISA, PCCMCA, and INCAP are concerned with Central America; UWI and CARDI with the Caribbean; ACW and REDINAA with subregions of South America.

Membership. IAs may be constituted by governments (IACO), public or private institutions (AAACU, ALEAS), individuals (AAASA, ALCA), or mixes of these, including even church-related institutions (CINDA) and corporations (SID).

Still other criteria are possible, such as major source of financial support, historical origin, principal "output" or activity, and so on. It should be apparent that several of the IAs could fit into more than one of the possible classes of institutions that emerge under the criteria employed. A multiple-entry matrix could be devised from these criteria and institutions placed in appropriate cells. There would be so many cells, however, that the

resulting classification would not help in setting hypotheses or guidelines for assessment.

Reflecting upon this fact, it seems acceptable to devise a rough index using only the criteria most directly related to the purposes of this paper. In this respect, one observes that what really matters is what IAs do, and how they do it. That is, the important aspects to look into are the objectives and the modes of operation of the IAs with particular reference to agricultural research.

A focus upon these major features permits a ready grouping of IAs in relation to the problems of national agricultural research systems, as broadly laid out in the previous section, and a ranking of IAs in terms of their relative advantages or effectiveness in helping solve such problems. This approach also would provide an objective basis on which to assess the performance of various types of IAs. Ultimately, one could end up with a broad classification of IAs into "good," "fair," and "poor" institutions, for instance, in regard to their actual or potential role in strengthening national agricultural research. One also could try to find some correlations, if any, between their effectiveness for research assistance and particular institutional characteristics. Attention might then be concentrated on those existing IAs that are effective, so as to tap their potential and perhaps foster their imitation elsewhere.

Objectives

In general, IAs are set up to achieve one or more of the objectives listed below. In parentheses are included the acronyms of IAs that would have the stated objective among their primary goals.

Training. The formation of trained manpower for agriculture can be sought either through regular academic programs (UWI, SEARCA), in which case the educational end takes first priority, or through special courses and other less formal programs, usually associated with research or other primary functions of an institution (CATIE, CIDIAT).

Research. When research, i.e., the pursuit of new knowledge, is the target, an IA may: execute research itself, in its own facilities (INCAP, CATIE); execute research in cooperation with other institutions, in others'

facilities (REDIMAA, PCCMCA); or sponsor or fund research done by other institutions or individuals (SIECA, PRECODEPA).

Technical assistance. The aim is provision of advisory and consulting services on agricultural matters. It can be done directly by the IA, or the associations can serve as vehicles or "clearinghouses" for it (INCAP, CATIE).

Diffusion of information. The objective is to facilitate access to, or to disseminate, information. This usually will cover scientific, technical, economic, and other information on broad areas of agriculture -- not just research results. Also, an IA may carry out the activity itself or support it through other institutions (AIBDA, AIBA, AGRINTER).

Exchange of knowledge, professional discussion. The task here is essentially to provide a forum and organizational facilities for direct communication among agricultural scientists, technicians, and policy-makers, for the inherent value of the exchange of ideas. Any additional effects of these exchanges would be considered under the other objectives listed here (ALCA, AAASA, AAVC, PCCMCA).

Coordination, planning, central administrative services. There are often gains to be had from cooperation among countries in many activities related to agriculture (avoiding duplication, achieving critical mass, ensuring proper control). Some IAs are set up explicitly to facilitate coordination and joint planning or to administer established collaborative agreements (APCC, PROMECAFE, OIRSA, REDINAA).

Promotion and protection. Certain IAs, especially those organized around a specific commodity, theme, or problem, are concerned with promoting, protecting, or fostering their subject. Fund-raising, lobbying, advertising, and public image campaigns, are directed to this objective (RGA, APCC).

There are few IAs being analyzed that pursue exclusively a single objective out of those above. The typical case is that two or more of these objectives are explicitly considered in their charters or action programs. Many of the IAs under discussion do not have research as an objective, let alone as their primary objective. Yet even if research is not explicitly or directly addressed, it can in various ways be affected by the actions of these associations in pursuit of their ends.

For the sake of simplifying the complex picture presented by their multiple functions, it is convenient to distinguish the IAs according to the position research takes among their objectives:

- * Research is a primary objective.
- * Research is a secondary objective, or though not explicitly addressed, is closely affected by the IA's action.
- * Research is only incidental to the IA's objectives and activities.

In this manner, the evaluation of performance and potential of IAs relative to strengthening national agricultural research can be done in a focused, positive way. This application is discussed in the next section, (page 00).

Modes of Operation

Under this topic, interest centers on examining the means and actions by which IAs carry out the functions appropriate for achieving their objectives. The purpose of the analysis is to arrive at simplified descriptive variables or categories that are helpful for assessing the roles played by IAs in strengthening national agricultural research.

The procedure followed here was to relate functionally the numerous organizational factors shown earlier in this section in sequential stages; they were reduced to form a few broad categories or "modes of operation." The procedure is admittedly empirical and occasionally intuitive, but it could certainly be refined and made more rigorous given sufficient data and time.

In the first stage, institutional characteristics were related and grouped according to three main sets of criteria, as follows:

Degree of establishment. This is a function of a variety of factors: legal setup, official recognition, historical origin (founders and reason for creation), time in existence, source and stability of funding, membership, formality of internal structure, physical base, size and stability of staffing, and so on. A rough index based on

these factors could distinguish among well-, medium-, and loosely established or organized institutions.

Definition and regularity of programs. IAs may operate with well-planned programs on a steady basis, subject to formal reviews, approval, and evaluation; or they may operate on a more ad hoc or irregular basis. Though obviously there is a correlation between degree of establishment and program, there are exceptions significant for the issues addressed in this paper. A notable case of departure is PCCMCA, for example, which has operated a good program for more than 20 years with no formal organizational structure.

Form of execution of programs. The question here is in what manner an IA carries out its functions. First, it could execute the tasks itself directly (which necessitates having its own physical facilities, staff, etc.). Second, the relevant tasks could be carried out (through agreements, contracts, grants, or other forms) by other institutions or people at their own facilities (which necessitates the maintenance of only minimal physical organization and staff by the IA). Third, an IA may carry out its functions through paperwork, coordinating the activities of others, and providing minimal organizational arrangements and funds -- practically without need for physical plant or staff. Typical examples of this third type are the international and regional professional associations, which work mainly through meetings and mailings, monitored by a secretariat at the home institution of one of its members.

In the next step of the procedure, depending on the relative values assigned to each set, these three sets of criteria can be combined to define several "modes of operation." Based on the empirical examination of the selected IAs, many of the possible combinations can be practically eliminated, either because they simply do not occur, or because they would represent subdivisions over-refined for the purposes at hand. In this manner, three broad institutional categories were determined that in rough terms separate IAs according to key operational characteristics, as follows:

- * "Executive" IAs: Agencies with regular programs mainly carried out by themselves; fully established.
- * "Supportive" IAs: Agencies with regular programs largely carried out through, or by, other institutions; fully established.

"Coordinating/Promoting" IAs: Agencies with less rigorous programs, almost exclusively carried out through their members or by other institutions; medium to loosely established.

In general, the degree of power of the various associations to implement programs and influence their fields of work would tend to decrease as one moves from the top to the bottom category, but this is not necessarily true in regard to their possible impact on national agricultural research.

Framework for Assessing International Associations

The discussion in the preceding section narrowed the complex picture presented by international associations into highly simplified subdivisions, according to objectives and modes of operation. Applying the appropriate criteria for ordering IAs under each of the subdivisions, and combining them in a double-entry matrix, results in the classification scheme shown in the table on the next page. In it the IAs under consideration have been placed in categories according to the two factors that determine a category.

International Associations Categorized by Objectives and Modes of Operation.

<u>Objectives</u>	<u>Modes of Operation</u>		
	<u>1</u> <u>Executive</u>	<u>2</u> <u>Supportive</u>	<u>3</u> <u>Coordinating/ Promoting</u>
A			
Research primary	AVRDC CARDI CATIE CIDIAT ICIPE ILMA INCAP UWI	CLASCO DESAL PROMECAFE SAFGRAD SEARCA	APGRC IFARD PCCMCA PRECODEPA REDINAA UASRC
B			
Research Secondary	AOAD OIRSA	AGRINTER AIBA AIBDA	AAACU AAASA ALCA, ALPA ALEAS, AFAA CARDI COFAF IAAE UNICA
C			
Research incidental	ALALC CARIFTA EAEC SIECA	PA SID	AAU APCC, IACO CINDA UNICA (commodity and producers associations)

The analytical and programmatic (or policy) advantage of this approach is that it leads readily to a means of assessing actual and potential roles in strengthening rational agricultural research. Thus, strategies can be

devised for tapping or encouraging different types of IAs in accord with their relative impact and productivity in fostering research.

Some hypotheses are implicit in the descriptive framework the matrix provides. For instance, row A includes the associations one would think ought to be most significant for national agricultural research systems, as research is one of their primary concerns. Conversely, the associations in row C seem, *prima facie*, of lesser significance, as agricultural research is only an indirect subject of their attention.

Similarly, the entries by columns indicate the relative impact that the various IAs should be expected to have on national agricultural systems, given their own strength and intensity of activity. Since the scheme has been developed using an inductive procedure, these hypotheses generally would be confirmed in reality. Significant departures, however, may well be found in any particular group of IAs. Herein lies much of the analytical value of the approach taken.

Thus, in cell A1 are institutions essentially equivalent to the international agricultural research centers (keeping the due proportions); indeed, these centers would all have been included in this group, had they been considered IAs in this paper. The associations in this group, therefore, have to be evaluated in relation to their effectiveness in research. Since they are international in character, their research should generally be of value to the countries served, and should reinforce the national efforts in the same direction. Nevertheless, in practice it may happen that these IAs have a detrimental effect on the agricultural research systems of some countries (for instance, if they divert national funds from agricultural research or induce the "brain drain" of scarce agricultural scientists). In this respect, it is worth recalling the conflict that the international centers have provoked in some developing countries. These countries have felt a detrimental effect on their research systems because of competition for funds, staff, and prestige, in which the centers have an advantage.

International associations in cell A2 should be next in research effectiveness; they can also be evaluated primarily in this respect. In regard to strengthening national agricultural research systems, they may in fact be in a stronger position than those in A1, since there is

practically no element of the competitive disadvantage noted above. An outstanding example is SEARCA, which has proved its effectiveness over a long period.

Cell A3 includes IAs that, though primarily occupied with research, are not structured as those in A1 or A2, and do not command sufficient resources or other means of action that they can generally be expected to have strong or wide impact on national agricultural research systems. In fact, an historical analysis likely would show a great volatility of institutions in this group: they may be easily created in response to a temporary problem, or by an energetic leader -- but they may vanish with similar ease. With the exception of PCCMCA, the IAs shown are of recent origin, and how long they continue remains to be seen. It is important to note, however, that this kind of IA may, in specific circumstances, be of great value for strengthening particular aspects or for helping solve particular problems of national agricultural research systems.

The IAs in this second row should necessarily be looked at with less expectation with regard to their impact on research, for this is not their primary concern. Their effect on strengthening national agricultural research systems may nevertheless be significant, because these IAs may deal with aspects of research (or problems, as discussed earlier) that happen to be limiting. For instance, the IAs in cell B2 deal with the question of accessibility and diffusion of agricultural scientific and technical materials. There are key elements both for facilitating research by national scientists and for making research results more available to others, hence raising the productivity of national systems.

The IAs in cell B3 are principally professional associations, and through facilitating communication and exchanges among scientists, they provide the incentives and peer review that are a basic ingredient of the "environment" for research (the lack of which so often limits national systems). Indeed, the associations in this group hold an enormous potential for increasing their impact on national systems; there are many means and actions open to them (more frequent research meetings, and specialized workshops, research prizes and honors, publications, etc.) that are barely being used in most cases. The effect of these IAs should be especially significant for research systems of the smaller developing countries, where the problem of scientific isolation is most severe.

Finally, the IAs in the third row are of interest from the standpoint of agricultural research only because of the chance that, at particular times or circumstances, they may acquire significance for support of national systems. As before, their degree of strength and potential tends to diminish as one moves to the right across the columns. In cell C1, for instance, SIECA was a powerful and effective regional agency -- especially through the 1960s -- partly because of the support of the U.S. Alliance for Progress for economic planning and integration in Latin America. Given the predominantly agricultural nature of Central America, SIECA conducted or supported many studies on this sector and sponsored or otherwise facilitated projects (institutional development, research, training) that, albeit indirectly, certainly benefitted agricultural research in the member countries. Perhaps the fact that SIECA's secretary-general at the time was an agricultural economist was a factor.

In cell C3, typical IAs are the promoting or lobbying agencies devoted to particular commodities and problems. These seldom are concerned with supporting research as such, but support for research from elsewhere may come as a by-product of their campaigning efforts. Such is probably the case of groups like the International Federation of Agricultural Producers, Rubber Growers Association, and International Sugar Organization.

Evaluation of International Associations' Performance and Potential

The analysis in the foregoing section has aimed at providing a framework for relating, in a systematic and logical way, the national agricultural research systems of developing countries with the heterogeneous set of IAs that have, or can have, an important bearing on them. The task now is to specify the analytical factors needed to achieve a sharper assessment of IAs' potential role in strengthening national systems. Defining explicit, objective standards of evaluation is essential in order to go beyond purely subjective assessments and to provide some common bases for recommendations and action.

In general, assessment or evaluation refers to measuring the degree of achievement of given objectives, which has a value relative to the costs incurred in the process. Since different individuals (e.g. IA directors and national

agricultural research system directors) may likely hold different viewpoints and expectations regarding the role of IAs, it is important to clarify the sense in which an assessment is meant here. First, the assessment of IAs must be made vis-a-vis research systems, and not in relation to their own purposes and functions. For instance, evaluation of OIRSA according to its purposes may give it high marks for its effectiveness in controlling certain animal and plant diseases in Central America (its primary task); an evaluation that uses impact on national systems as a standard may show it to have had no effect on the research capability of its member countries (not, of course, its primary role) in regard to the same problems.

Hence, the point of view here is to consider exclusively those factors that constitute elements of a national research system, and to suggest ways to quantify these factors to come up with a measurement of IAs' impact on these systems. Those factors that relate to major current problems of research systems, as reviewed earlier, merit particular attention. Evaluations of this sort are admittedly difficult to accomplish under any circumstance, but the attempt here is only to suggest possible approaches and major considerations to keep in mind if an actual evaluation were to be made.

Second, it is recognized that sometimes the presence and activities of IAs actually may have a negative effect on national systems. In this sense, IAs indeed may occasionally be a "cost" to a country. Though this cost would normally be difficult to measure, in principle it could be considered a "negative benefit" under the list of factors mentioned below that constitute benefits. Hence, this possibility of negative impact is not further elaborated.

Third, the financial costs of international associations can be disregarded for the purposes of this evaluation, and attention can be concentrated exclusively on those factors that constitute benefits. The reason is that the evaluation is meant not to determine how cost-effective particular international associations are in and of themselves, but rather to determine whether they produce anything that might be regarded as beneficial to national systems. The financial cost of IAs is immaterial here, since the IAs exist anyway and someone else pays for them (which is not to say that those who bear the cost should not evaluate IAs in cost-benefit terms).

The factors to be considered as representing benefits, over a given period, include:

- * Research projects conducted or supported at national agricultural research institutions. The size and quality of projects should be defined, and then they can be added up with the proper weights. It is to be stressed that what matters is the projects done in collaboration with nationals, and not the research by the IA itself. For the reasons alluded to earlier, an excellent research activity within an IA may actually be detrimental to a research system if the latter loses in the competition.

- * Research scientists and administrators trained for the national institutions. The level, quality, and fields of training should be specified. The training may be by local scientists and institutions, as well as research by the IA or others. Bulletins, journal articles, occasional reports, and books could all be assessed and somehow added up to quantify this factor.

- * Meetings, workshops, seminars, and similar professional gatherings organized or supported with participation of country researchers. These may be within or outside the country or region, but should be directly relevant to agricultural problems of the country. The quality of each event should be considered to give it the proper weight.

- * Funds supplied to national research institutions through grants, budget contributions, contracts, or support of joint projects. Donations of buildings and equipment are included. The monetary value of all funds made available to national institutions becomes another objective indicator of assistance to the system.

- * Staff and advisory services provided to national institutions. This includes the placing of researchers at national centers, provision of advisors and consultants, and other less tangible forms of "human" contributions -- such as discussions and informal visits by IA personnel to national centers. All of these can be measured and roughly converted to another partial indicator of support.

- * Linkage services provided. This is a hard factor to define and measure, but it refers to those situations in which an agency (IA) makes contacts with outside institutions on behalf of a national research institute --

to obtain information, place students, or identify potential staff. This can be extremely important for research institutions in small countries or in provincial settings. It is another form of helping to break the isolation of certain national institutions; it complements meetings, publications, and staff exchanges.

* Political support given and national research promoted. While it is difficult to define and measure this factor, IAs can enhance public understanding and government support of national research efforts through the press, publications, speeches, campaigns, and personal influence. As a concrete example, when international entities sponsored visits to countries by Dr. T. W. Schultz, winner of the Nobel Prize in economics, his public statements in favor of government support for national agricultural research were extremely favorable for policy decisions on this matter.

It would be beyond the scope of this paper to try the indicators suggested on the IAs under discussion -- only partly because no reliable published data are available. A large number of subjective judgments about institutions and their products must be made when evaluating them; a balanced assessment requires a team effort and first-hand appraisal of the various factors.

A general comment can be made, however, about the types of institutions included in the matrix on page 28 and their relative contribution to national agricultural research systems in terms of the evaluation factors listed. For instance, those in cell A1 are likely to be strongest in the training of research personnel and in advisory and linkage services; those in cell A2, in conducting collaborative projects, publications, and workshops; those in cell B3, in meetings, linkages, and possibly promotion; and so on. The point is that, depending on which are the relatively weakest aspects of a given national research system, one would look at different types of IAs to provide the best opportunity for a helpful role. From another standpoint, IAs may want to assess their own performance in regard to helping national agricultural research systems; the analytical scheme developed so far may help.

Alternatively, if appropriate IAs do not exist in a region, or are inactive, one strategy may be to promote their formation as a prior step to tapping their potential for strengthening national agricultural research systems. In fact, this initiative often corresponds to the practices

of the large international organizations, which view IAs as the appropriate institutions to provide continuity or to maintain certain activities (roles) beyond the time when the international organization must move on to something else. This pattern has been characteristic of the foundations and USAID, whose country programs have had more limited time spans than those of the intergovernmental organizations.

In summary, current and past experiences show that there are many areas and activities related to national agricultural research systems in which IAs can make effective contributions. These differ according to the nature of the IA and the setting in which it operates (region, country, time period). It is not possible at this stage, on the basis of the information available, to reach specific conclusions from an analysis of particular associations. But the guidelines suggested for the analysis and evaluation should provide a starting point for a more thorough, detailed study of IAs, which could lead to significant findings and recommendations for further action.

Concluding Remarks

The foregoing review and analysis brought out, albeit indirectly, several facts and issues about international associations and their roles in relation to national agricultural research systems:

* The subset of international bodies concerned with agriculture, that have been labeled "international associations" (IAs) in this paper, encompasses a relatively large number of institutions which vary greatly in structural and functional characteristics.

* There are more IAs dealing with agriculture in Latin America than in Africa, Asia, and the Middle East. Within Latin America, they are most abundant in Central America and the Caribbean. While the factors determining this distribution were not discussed in the text, it may be speculated that urgency of common problems, country size, language, geographic proximity, and influence of international organizations may be mainly responsible.

* The same argument or explanation would suggest that IAs may have an especially valuable role to play in strengthening national agricultural research systems of smaller countries by helping capture possible scale economies within the research system.

* Despite the heterogeneity, it is possible to classify IAs into a few major groups according to their objectives and modes of operation, as these relate to national agricultural research problems.

* Although we have not attempted to measure the overall importance or impact of IAs on national agricultural research systems, it has become apparent that they perform many activities that are, or can be, significant for national agricultural systems.

* The classification of IAs in major functional groups helps identify which types are most likely to help national agricultural research systems in solving particular kinds of problems. Extrapolation from a few cases suggests that IAs have a good potential to serve as intermediaries and advocates of developing countries to attract funds from international and bilateral sources, and to inform government officials and the public at large about the value of agricultural research.

Selected List of International Associations

The international associations appear alphabetically by acronym according to world region.

	Worldwide	Latin America	Africa and the Middle East	Asia and the Pacific
AAACU				*
AAASU			*	
AAU			*	
ACW		*		
AFAA			*	
AGRINTER		*		
AIBA				*
AIBDA		*		
ALALC		*		
ALCA		*		
ALEAS		*		
ALPA		*		
AOAD			*	
APCC				*
APGRC			*	
AVRDC	*			
CARDI		*		
CARIFTA		*		
CATIE		*		
CINDA		*		
CLASCO		*		
COFAF				*
DESAL		*		
EAEC			*	
IAAE	*			
IACO			*	
IAPB	*			
ICIDIAT		*		
ICIPE			*	
IFARD	*			
ILMA		*		
INCAP		*		
ISHS	*			
OIRSA		*		
PA		*		
PCCMCA		*		
PRECODEPA		*		

	Worldwide	Latin America	Africa and the Middle East	Asia and the Pacific
PROMECAFE		*		
REDINAA		*		
RGA	*			
SABRO				*
SAFGRAD			*	
SEARCHA				*
SID	*			
SIECA		*		
UASRC			*	
UNICA		*		
UWI		*		

Worldwide

AVRDC: Asian Vegetable Research and Development Center. An international center devoted to research and training on vegetable crops in the tropics. Founded in 1971, it is based in Taiwan and supported by the host country government, USAID, the Philippines, Japan, and others. Although it does not receive funds from the CGIAR consortium of donors, it has associate membership in that group.

IAAE: International Association of Agricultural Economists. A professional association in this field, similar to regional and national associations of the kind. It meets triennially and does limited publishing of research reports. Supported by members' fees and special contributions. Plays a limited, indirect role in support of economic research on agriculture.

IAPB: International Association of Plant Breeders.

IFARD: International Federation of Agricultural Research Systems for Development.

ISHS: International Society of Horticultural Sciences.

RGA: Rubber Growers Association.

SID: Society for International Development. A broad professional association of development-oriented social scientists, serving as a forum for exchange of ideas through meetings and regular publications. Supported by member fees, institutional contributions, and special grants. It plays an indirect role in agriculture through its concerns with socio-economic development studies on agriculture.

Latin America

AGW: Andean Corn Workers.

AGRINTER: InterAmerican Agricultural Information Service. The regional agency for systematizing the collection and computerization of published materials on agriculture, corresponding to FAO's Agricultural Research Information Service, AGRIS. It operates under the umbrella of IICA.

AIBDA: InterAmerican Association of Agricultural Librarians and Documentationists. The regional organization of professionals in this field; its secretariat operates from IICA's headquarters in Costa Rica.

ALALC: Latin American Free Trade Association. See CARIFTA.

ALCA: Latin American Association of Agricultural Sciences. A professional society of plant breeders, geneticists, agronomists of Latin American countries, or persons interested in the subjects. It was founded in the early 1960s, and is supported by membership fees and occasional grants. It holds annual meetings within the region, and has a rotating secretariat.

ALEAS: Latin American Association of Higher Schools of Agriculture. A group of all university-level schools and faculties of agriculture of the region. It was formed about 1960, and holds annual meetings of deans and directors, to exchange views on agricultural education and research. It is supported by the member institutions and occasional grants.

ALPA: Latin American Association of Animal Sciences. Similar to ALCA, for animal production scientists.

CARDI: Caribbean Agricultural Research and Development Institute.

CARIFTA: Caribbean Free Trade Association. CARIFTA, ALALC, PA, and SIECA are regional governmental agencies for economic integration, variously set up in the fashion of their European counterparts. Their impact on research has been mostly on economic and social aspects, including the agricultural sector. SIECA has had a greater role generally, and on agricultural technology particularly, through support of and coordination with specialized institutions in the region.

CATIE: Tropical Agronomic Center for Research and Training. An autonomous regional center for Central America, Panama, and the Caribbean, established in 1973. It evolved out of IICA, from which it inherited excellent

physical facilities at Turrialba, Costa Rica. It is a full-fledged operating organization.

CINDA: Inter-University Center for Andean Development. An association of private and Catholic universities of five Andean countries, it seeks cooperation in research, staff exchanges, and educational planning of its member institutions. Agricultural research is touched upon incidentally insofar as the universities have active research in their agricultural schools.

CLASCO: Latin American Council for the Social Sciences*. An independent regional association of social science training and research centers, including rural social science centers. It coordinates, supports, funds, and executes research in its field. Funds are obtained mainly from foundations and other donors. It has had some importance in fostering socio-economic research on agriculture.

DESAL: Institute for the Economic and Social Development of Latin America*. A regional autonomous research center, linked to and largely supported by the Catholic church. It conducts research on socio-economic aspects of development, including agriculture, and it provides technical assistance to countries.

ICIDIAT: Inter-American Center for the Integrated Development of Soil and Water. An autonomous research and training institution established by OAS in Venezuela in the 1960s. After several years of operation, its funding was absorbed mostly by the host country, but it continues to serve the region.

ILMA: Latin American Institute of Agricultural Marketing. A training, research, and advisory center, originally set up by FAO in the 1960s with member nations' support. After operating several years, it was terminated and was taken over by Colombia as a national institution.

INCAP: Nutrition Institute for Central America and Panama. A regional research, training, and technical cooperation center created in 1946 by the governments of the member countries, with sponsorship of the Pan American Health Organization. Among its activities, it carries out research on agricultural subjects such as animal nutrition and cereal grains. It is a highly structured organization.

* These two associations are only marginally related to agronomic research, but are listed here because of their interest as important cases of institutional organization at the international (regional) level.

OIRSA: Regional International Organization of Plant and Animal Health. A regional organization for control of plant and animal diseases, created in 1955 by the five Central American countries, Mexico, and Panama. Its main function is to devise and implement measures for disease control in the region, train personnel, and promote technical assistance. It is a full-fledged operating institution.

PA: Andean Pact. See CARIFTA.

PCCMCA: Central American Cooperative Program for Food Crop Improvement. A working arrangement that has grouped agricultural researchers from the five Central American nations since 1946. It operates through an annual meeting at which research results and plans are presented and discussed. It is a voluntary participation program, with no formal structure; it grew out of Rockefeller Foundation activities in the region.

PRECODEPA: Regional Cooperative Potato Program. A regional association of national potato programs of Central America, the Caribbean, and Mexico. Formed in 1978, it brings together in a loose arrangement the national research institutes that control such programs.

PROMECAFE: Cooperative Program for the Protection and Modernization of Coffee Culture in Mexico, Central America and Panama. A regional governmental program established in 1978, with participation also of CATIE and OIRSA; execution and coordination is done by IICA. Its functions include research, training, technical assistance, and other cooperative efforts aimed at improving coffee production in the region. Funding comes from member country quotas, IICA, and other sources.

REDINAA: Network of Agricultural Research for the Amazon. This is a recently established (1980) collaborative agreement among the national agricultural research institutes of seven Amazonic countries (Colombia, Ecuador, Peru, Bolivia, Brazil, and Venezuela) to coordinate their work, develop a research strategy, exchange information, etc. It has no executing organization of its own.

SIECA: Secretariat for Central American Economic Integration. See CARIFTA.

UNICA: Association of Caribbean Universities and Research Institutes. A voluntary association of Caribbean universities and research institutes dedicated to efforts for Caribbean development. Founded in 1968 by 16 universities in the islands and surrounding coastal countries, the organization now has 45 members representing a constituency of more than 300,000 students and 30,000 faculty.

UWI: University of the West Indies, Agricultural Faculty. A regional training and research institution of the former British colonial Caribbean nations, which evolved out of the Imperial College of Agriculture. It is one of the most significant agricultural research institutions in its geographical area.

Africa and the Middle East

AAASA: The Association for the Advancement of Agricultural Sciences in Africa. The agricultural scientists' continent-wide professional organization, created in 1968; it is organized in a similar professional fashion to other international and North American associations. Membership is composed of individuals, national research institutes, and agricultural faculties. Its aims are to foster the development and application of agricultural sciences in Africa and to provide opportunities for exchange of knowledge and experiences by agricultural scientists. It works through conferences, meetings, and publications. Funded through membership fees and donations.

AAU: Association of Arab Universities. This is an independent association of all Arab universities. Based in Saudi Arabia, it promotes cooperative programs, exchange of faculty, and seminars among the member universities. Its main activity is biannual meetings of deans of faculties, by subject areas, including agriculture.

AFAA: Associations of Faculties of Agriculture in Africa. This association was formed in 1973 and has headquarters at the home institution of its executive secretary (presently in Morocco). It aims generally at strengthening the development of agricultural education and research, particularly at improving course structures in its member institutions. Support comes from membership fees, donations, and grants.

AOAD: Arab Organization for Agricultural Development. An official organization of the Arab League, based in Sudan. Its mandate covers activities such as feasibility studies, publications, regional meetings, and seminars and training courses, all in relation to agriculture. Its activity in relation to agricultural research has been negligible as yet.

APGRC: African Plant Genetic Resources Committee.

EAEC: East Africa Economic Community. This was an important subregional government organization formed by Kenya, Tanzania, and Uganda, which collapsed in 1977. While it operated, it ran the major universities and agricultural research institutes as joint regional institutions.

IACO: Inter-African Coffee Organization.

ICIPE: International Center for Insect Physiology and Ecology. This center was established in 1970 in Kenya, to increase the capability of African countries in pest management and control. It undertakes and promotes research in insect science, and provides advanced training in the field. It also organizes seminars and workshops, and generally fosters exchange among professionals. It is supported by the Kenyan government and international donors.

SAFGRAD: Semi-Arid Food Grain Research and Development. A project of the Scientific and Technical Research Commission of the Organization of African Unity, it was established in 1977. It involves 26 countries. The main objective is to undertake research on five basic crops for the semi-arid region of Africa. The project is administered by an international corporation based in Upper Volta, and operates mainly by contracting research to international centers and in partnership with national institutions.

UASRC: Union of Arab Scientific Research Councils. An autonomous body based in Iraq, it is concerned with promoting scientific research, cooperation projects, and holding meetings and seminars. The Union has an agricultural committee.

Asia and the Pacific

AAACU: Asian Association of Agricultural Colleges and Universities. This group is similar to its counterparts in Latin America and Africa (ALEAS, AFAA).

AIBA. The Asian component of AGRIS, the international service for information on agricultural research.

APCC: Asian and Pacific Coconut Community. An intergovernmental organization headquartered in Indonesia, whose purpose is to foster economic cooperation in the coconut industry among the member countries. Its research is limited to economic aspects. Mainly a promoting agency, it provides information and limited advisory services to the industry.

COFAP: Committee on Food, Agriculture and Forestry. A specialized body of the regional Association of South East Asian Nations (ASEAN).

SABRO: South Asia Breeders Organization.

SEARCA: South East Asia Regional Center for Graduate Study and Research in Agriculture. A regional agricultural educational center, created in 1969, forming part of the South East Asian Ministers of Education Organization

(SEAMEO); located in the Philippines. It is funded by the host country and the SEAMEO secretariat. It is essentially an administering agency, whose programs are conducted mainly through the University of the Philippines at Los Banos and through the use of facilities of many other cooperating institutions. Its aims are basically graduate training in agriculture, sponsorship and coordination of research programs, and dissemination of findings of agricultural research.

Digests of Papers: International Associations in Four Regions

Four persons, each with experience in international associations, were invited to report on their respective regions. They considered the potential of increasingly productive interactions of international associations there with national agricultural research systems. Each approached his analysis from his own perspective. All considered major problems confronting the agriculture of countries in their region, especially as it related to constraints that would influence research systems and activities. Each discussed current activities of some leading international associations in their region and projected areas of possible increased cooperation with national research systems.

The four papers are presented in digest form on the following pages of the proceedings. The individual citations are as follow:

Citations:

Madamba, Joseph C. Problems and Opportunities
for Strengthening National Agricultural Research
Systems in Asia.

Marcano, Luis A. Problems and Opportunities for
Strengthening National Agricultural Research
Systems in Latin America and the Caribbean.

**Menyonga, Joseph E. Problems and Opportunities for
Strengthening National Agricultural Research
Systems in Africa.**

**Qasem, Subhi. Problems and Opportunities for
Strengthening National Agricultural Research Systems
in the Middle East.**

A photocopy of the full text for any of the four papers may be obtained by request directed to ISNAR.

Africa

**By Dr. Joseph M. Menyonga
Administrative Secretary-General
Association for the Advancement of
Agricultural Sciences in Africa**

Countries in west, central, and east Africa (with a few exceptions) gained political independence within the last 20 years, some within the decade. Even where there had been regional research centers, such as the East Africa Community, the emphasis is now on individual national agricultural research centers. The national centers are generally relatively young, staff strength is weak, quality may be low, and resources too few for viable research programs without external assistance. National centers often need better organization, additional trained manpower, and financial and material resources to gain results that can be delivered to peasant farmers to increase production.

Yet the countries do not now produce enough food for their people: consumption is about one-third that of persons in developed countries; fast-growing populations in some countries require imports for about one-fifth of the cereal grains they consume. As the deficit in food supply becomes larger, the strain on foreign exchange reserves becomes more intense.

The need for agricultural research is recognized in the African countries. Although methods of organization differ among countries, the nature of problems they face is fairly

general. The following are seen as major problem areas -- weaknesses -- in many of the national agricultural research systems in Africa:

Problems Within the National Research System

Poorly defined objectives. Without purposes that are clearly identified and defined into (a) immediate, (b) medium-term, and (c) long-term goals, the research manager has no firm basis for allocating the scarce resources available.

Planning without implementation. Many countries have used elaborate schemes to organize planning committees, representing small administrative units up through to provincial and national groups. However, it is typical that agricultural research plans fail to get the level of priority that will assure resources and implementation. At high policy levels, there may not be commitment to solving problems of the peasant farmers. Political pressure may come into decisions that establish specific research programs or locate research stations.

Complexity of structure. Information needs to flow among many different groups in order for research to be carried out and for its results to be applied to standards of living for the population. Most national systems are not structured to simplify the flow of information. There are often problems of coordination between national research centers and others doing research -- universities and agro-industrial corporations -- between researchers and policy makers who influence market systems and availability of inputs, and between researchers and extension workers.

Funding. Agriculture generally is given high priority in development efforts in African countries. That does not mean, however, that agricultural research receives high priority in its needs for funding. Financing for research remains a major constraint, worsened by crises in foreign exchange supplies. Often agricultural research is financed directly by the government, which leaves its programs vulnerable to the changing financial environment from year to year. Programming and financing may be responsibilities of separate services; a program committee draws up research priorities, but the allocation of funds is made by a separate finance group. As funds become limited, the priorities may suffer, often at the expense of longer-term

or even medium-term research. Another constraint may come with partial funding; for example, researcher salaries may be provided, but there is little money to provide equipment and other essential research services. (Where the proportion of resources devoted to staff may be about 60% in developed countries, leaving 40% for support services, the corresponding figures in African systems may be 90% and 10%.)

Staffing and personnel management. Research success may depend most on there being competent manpower. The characteristics of a strong system can be set out: Service conditions that ensure a high degree of permanence, a system of rewards for good workers, and opportunities for continued professional growth and interaction with others. The ideal is not often achieved in African systems. The demand for research manpower is greater than the supply. Where competent persons may be recruited, the rate of loss is often high because desirable conditions are lacking.

Manpower development and training. A coherent plan for training and developing research manpower is an essential element for a productive research system. Most African countries are faced with shortages of research manpower. Much advanced training of researchers takes place outside Africa, even though several new faculties of agriculture now exist. The present limited supply of research manpower is not always used to best advantage in African countries. Because of lack of supporting staff or functional equipment, a qualified research scientist cannot work to optimum. In some cases the researcher is diverted from his research concentration by the need to carry out administration. The creation of additional research stations, perhaps in response to political pressure, may further dilute manpower resources to levels below minimum for effective work. Under inadequate manpower levels, individual scientists may not be permitted release time for in-service and refresher courses needed to keep up in their field. Frustration may cause competent persons to seek another post or another country in which to work.

Problems of Research Within Government Services

The national research system is only one part of the complex network in the government of a particular country. Many interests compete for the attention and support of political leaders. There is usually support for agricultural research from politicians who have specific problems in mind. The problem may be, however, that the

politician needs a quick answer; he may not understand or be sympathetic to the reasons that much agricultural research requires long-term attention. This situation underscores the importance for the research manager to make good use of those instances where research has given practical and useful results; that success may have to carry support over the longer periods when results are not so quickly apparent.

Problems of the Research System and its Clientele

Although the purpose for research in a national system may be yields in the fields of subsistence farmers, there tend to be wide gaps between performance on research farms and the farmers' fields. Some of that reason -- not always fully accepted by the researchers -- may stem from the fact that the researcher doesn't fully understand the situation of the farmer. Farmers have gained knowledge of their cropping systems over several generations; their ideas may have much to contribute to programs of research that aim to improve the system. Another part of the gap may result when farmers adopt only part of the package of technology recommended by the research system. That action may itself be a key to further aspects of needed research -- why does the farmer stop short of using the whole recommendation? Researchers may not be sufficiently open and frank to gain the confidence of the farmers; for example, what may be the effect on price of increased production, and will there be transport and a market for it?

In many African countries, as elsewhere in the world, the research and extension systems are in separate organizations -- often in separate ministries. Liaison may be difficult between the knowledge-generating system and the dissemination system. The extension worker may be poorly informed technically or not kept in touch with the new ideas.

Problems in Relations with Nearby Systems

Climatic similarities among neighboring African countries are reflected in similarities in crops, production systems, and problems of producers. However, these similarities are often not utilized for what could be valuable exchanges of information. Regional associations have been formed on this logic, but there has been relatively little cooperation at the technical level. Problems include poor communication facilities, lack of all-weather roads, high cost of travel, national pride,

etc. As a result of these barriers to the flow of information, there may be duplication of research efforts and failure to share important results. Scarce resources may be wasted.

International Associations of African Origin

A number of agricultural associations may have potential to contribute to national agricultural research systems in Africa. Some are regional in type, others continent-wide. Five such groups are identified here, with some information on the kind of assistance each offers:

AAASA

The Association for the Advancement of Agricultural Sciences in Africa was founded in 1968. AAASA disseminates research reports through its semi-annual journal, proceedings of workshops and conferences, and other publications. Its 1,200 individual members represent 36 African countries; corporate members include national research institutes and agricultural faculties of African universities. In collaboration with the International Development Research Centre (IDRC), Canada, AAASA organized a 1977 workshop on agricultural research administration.

AFAA

The Association of Faculties of Agriculture in Africa, which was inaugurated in 1973, is interested in the development of agricultural education and research in Africa and promotes improvement in course structures in member institutions. AFAA contributes to strengthening national agricultural research through education and training. The institutions initiate students into agricultural sciences with particular attention to the agricultural potential of the African continent. Universities with AFAA membership are located in the main ecological zones of Africa, which permits them to relate education programs to these zones, with emphasis on adaptive research needed to solve local problems.

AFAA institutions have much potential for aiding national research systems in varied ways, from first university training in agriculture through professional level contributions.

ICIZE

The International Centre of Insect Physiology and Ecology is similar in concept to international agricultural research institutes. It undertakes problem-oriented research into insect science with special attention to insect problems in Africa. It also offers advanced training for graduate and postdoctoral research fellows, and it organizes events through which scientists exchange information. Its technical-level training programs increase capabilities of national research systems in terms of research and application of strategies of pest management. ICIZE has links with national research centers and universities in the areas of its research mandate. Its information processing and exchange capabilities also contribute to strengthening national systems.

SAFGRAD

The Semi-Arid Food Grain Research and Development project began operations in 1977. It is a project of the Organization of African Unity, having been approved by African heads of state in 1976. Its main objectives relate to research and development of five crops in 26 countries of the semi-arid region of Africa: maize, sorghum, millet, cowpea, and groundnut. SAFGRAD operates three main regional research stations, working with national systems -- Kamboinse in Upper Volta; Institute of Agricultural Research, Samaru, Nigeria; and National Agricultural Research Centre, Bambey, Senegal. Several member countries are served by production agronomists called "accelerated crop production officers" (ACPO). They serve as links between the project scientists at the center and national scientists as well as between research and extension agencies in the member country.

Training is an integral part of the SAFGRAD program. Candidates nominated by their governments are provided scholarships and other support. Workshops on farming systems were sponsored by SAFGRAD in Senegal and Botswana; the emphasis was on understanding the existing farming systems used by peasant farmers in the semi-arid zones.

WARDA

The West African Rice Development Association embraces 15 West Africa countries. Its research department

coordinates rice research in the region. Special research projects relate to specific ecological zones: deep water and floating rice at Mopti, Mali; mangrove swamp rice at Rokupr, Sierra Leone; irrigated rice at Richard Toll, Senegal; and rainfed rice at Bouake, Ivory Coast. In a decade of work, WARDA has helped West African agricultural research institutes in staff training, reinforcement of research facilities, exchange of information, and field research planning and coordination. It is funded in part by the 15 member states and the CGIAR.

Actions to Strengthen National Research

Four areas of activity by international associations could contribute to strengthening national agricultural research in Africa:

- (1) Workshops on agricultural research administration for intermediate and senior level staff -- emphasis on planning and management.
- (2) Field research focus on situation of the illiterate peasant farmer -- seeking appropriate research methodologies to aid national systems.
- (3) Training at undergraduate, graduate, and postgraduate levels for teaching, research, extension, management, and communications; also for field research management, crop production, and extension related to specific crops; and workshops for short-term training needs.
- (4) Information processing and exchange, perhaps in relation to the Pan-African Documentation and Information System, established recently by the Economic Commission for Africa.

Asia

By Dr. Joseph C. Madamba
 Director, Southeast Asian Regional Center for
 Graduate Study and Research in Agriculture

There is much evidence of an emerging agricultural modernization in Asia. A significant contribution has come

with the developing and strengthening of national agricultural research systems in the region. While these developments had begun earlier in India, for a number of Asian countries the decade 1965-74 was a time of setting up mechanisms that could help solve problems hampering agricultural growth.

Powerful limitations stand in the way of agricultural development in Asia, including rapid population growth, diminishing farmlands, and the diminishing productivity of Asian farms. The diminishing productivity can be reversed with improved technologies, which are the focus of agricultural and resource research. A number of limitations bear on development of research: average investment for research (0.3% of the gross domestic agricultural product) is well below the level (2% of GDAP) that has been suggested by World Bank analyses, although returns to agricultural research investment are often in the range of 20% to 40%; fewer highly trained manpower resources are available than needed; research and development facilities are lacking at many sites; documentation and information services need improvement; and there is lack of a sufficiently enlightened rapport between government policy makers and the research community.

The target client for agricultural development in Asia is the small farmer. The family is poor, often producing barely enough to feed themselves; they have little chance of surplus to buy inputs in the next season, and they are considered a poor credit risk. While this large group of families is considered the target of rural reforms, the efforts have frequently not served them. Several reasons seem to be involved: the rural institutions often end up catering to the more wealthy and powerful groups in the rural community; the poor families are provided little access to participate in operating the institutions or to call into account those that have failed them.

Organizing Research Systems

Such Asian countries as India, the Philippines, and South Korea have made notable progress in developing national systems for agricultural research. The experiences in those and other countries of the region offer development models and strategies.

Identifying objectives and functions. This task rests with government policy makers. Generally they deal with three main considerations: assuring that the program supports the nation's goals for development; quantifying objectives so that feasibility may be determined; and striking a balance between short-term and long-term research activities.

An implementing organization. Many observers consider the Indian Council on Agricultural Research (ICAR) as a model for a national system. Among its unique characteristics are its autonomy and its authority relationship with other organizations that function within the agricultural research system (such as agricultural universities).

Integrating socio-economic and technical research. The socio-economic dimensions of technology give meaning to the biological components, most observers agree. In Asian developing countries (as well as in others), socio-economic research lags behind the technical and biological. The principal reason is the shortage of social scientists who can deal with those topics and methodologies.

Pillars of an agricultural research system. Over recent years, Asian countries have generally succeeded in achieving an initial critical mass for resources for agricultural research. The essential capabilities (which have been called "pillars") include resources to deal with (a) genetic/cultural management considerations; the chemical revolution; the agricultural engineering revolution; activities in socio-economics, extension, and communications; and schemes for operational research or technology verification.

Problems of National Agricultural Research Systems

National agricultural research systems in Asia are at different stages of development. Problems facing systems vary with their development and other important factors. Although the specific problems may be expressed differently, the following are likely to be found:

Research planning. A few countries have developed systems that will accommodate planning for research on a nationwide basis, rather than on the basis of one institution at a time. The Philippines offers a notable example in the case of its Philippines Council for

Agriculture Resources Research: it represents national, regional, and provincial levels, dovetails national and regional requirements, and relates the plan to the different stages or levels of the research structure.

Research coordination. In some Asian countries a good number of agricultural research institutes have been created. But in the absence of an effective coordinating mechanism, considerable overlapping or omission of significant areas may result. Both India and the Philippines offer cases where bodies have authority to coordinate. PCARR, for example, has power to review all research proposals in its area and to pass on them as recommendations to the funding body. In India the system took a surge forward after coordinative functions were backed by commensurate authority.

Manpower and training. Two facets of the manpower question affect national systems in Asia, the shortage of qualified personnel and imbalance in the distribution of expertise. In India in the mid-1970s actions were taken that make it possible for a research scientist to remain in his field and move either horizontally or vertically; formerly promotion often required shifts that took the person from his science into administrative posts or to other geographic locations. A number of regional and international institutions have helped strengthen manpower programs in Asia. Scholarship and grant programs have permitted personnel to undertake studies in other parts of the world. Within the region, SEARCA has become a significant force in manpower development; in 13 years its program has graduated 296 persons from eight Asian countries. Some 4,000 others -- administrators, scientists, and researchers -- have taken part in SEARCA specialist and short-term training programs.

Participation in National Planning

In only a few Asian countries have the national agricultural research systems achieved an influential role in planning for the country's agricultural development. In some cases policy makers do not regard the researchers as sufficiently practical in their orientation (and in some cases they may be correct!). Where the agricultural research system has forged a role with planners, the results have been noteworthy.

Nature of research activities. Under a systematic approach, researchers have looked deeper into the relationships within the process of generating technology, verifying, disseminating, and using it. Location of research activities becomes an important consideration, one based on natural resources, climatic, and socio-economic situations -- including human resources. These factors become the basis for determining the numbers and sites of stations; manpower, equipment, and facilities needed; support services; operating budget; and more.

Farmers' problems. Although farmers are said to be the reasons for doing agricultural research, they may be the last persons asked about their needs. This oversight is recognized more widely now, and efforts continue in the search for means of assessing problems. More and more farmers are being involved in local exercises to identify problems and set priorities. Field trials with new technologies -- involving researchers, extension workers, and farmers -- are found to benefit all who participate in them. Much remains to be done to strengthen this link.

Relations with extension. The forward link from research to extension is weak in most Asian countries. In most instances, the two functions and services are separate; over time they have tended to set up their own programs and go in different directions. Some research agencies installed their own "extension" arm, while some extension organizations undertook some of their own experimentation. Technology verification programs, in which both groups participate, are seen as the most likely way to provide this important interface.

Financial management. Much agricultural research involves manipulation of biological entities, which are subject to seasonal and natural cycles. When financial resources are required for certain interventions, there is a matter of timing; meaningful research suffers in a situation in which resources are available only in trickles or gushes. Government financial management regulations are seldom geared to the urgency involved in biological research. The research system faces a need to gain understanding by financial managers, followed by actions that serve the special needs of agricultural scientists.

International Associations Operating in Asia

The last two decades have brought a strong roster of regional and bilateral programs to Asia through which international associations add support to national agricultural research.

Regional organizations relate to Asian national systems in a variety of subjects and commodities, including:

- * The Animal Production and Health Commission for Asia and the Southwest Pacific (APHCA): buffalo, goat, dairy, feed resources, and crop-livestock-fish farming systems.
- * The Asian Vegetable Research and Development Center (AVRDC): tomato, Chinese cabbage, soybean, sweet potato, and mung bean.
- * The Food and Fertilizer Center (FFTC) of ASPAC: regional workshops on crops, livestock, aquaculture, and farming systems.
- * The Research and Development Center of ESCAP: coarse grains, pulses, roots, and tubers.
- * Southeast Asian Fisheries Development Center (SEAFDEC): marine fisheries, milkfish, tilapia, and prawn.
- * ASEAN Agricultural Research Coordinating Board (ARCB): energy, food resources, export crops, farm mechanization, and natural resources.
- * Southeast Asian Center for Graduate Study and Research in Agriculture (SEARCA): field legumes, integrated farming systems, postharvest technology, research management, agribusiness related projects, technology generation, technology refinement, and technology dissemination and utilization.

At least 10 countries have bilateral organizations that operate research and development programs in Asian countries: Australia, Canada, Denmark, France, Germany, Japan, Netherlands, Switzerland, the United Kingdom, and the United States.

The United Nations Development Programme of the Food and Agriculture Organization of the United Nations (UNDP/FAO) operates national research and development programs in many Asian countries. The International Federation of Agricultural Research Systems for Development (IFARD) represents national agricultural research systems, with both

its international headquarters and regional activities in Asia.

Foundation programs also relate to research and development activities in Asia: Deutsche Stiftung Fur Internationale Entwicklung (Germany), Ford Foundation and Rockefeller Foundation (United States), and the International Development Research Centre (Canada).

Three major development financing institutions provide assistance to Asian developing countries: the Asian Development Bank (ADB), the International Bank for Resource Development (IBRD, the World Bank), and the International Fund for Agricultural Development (IFAD).

Program Networks

Asian experience has indicated the usefulness of efforts to create program networks. The networks encourage institutions (both the Asian research systems and external associations) to pool resources and reinforce work toward shared objectives. Networks for programs in rice, wheat, maize, and potatoes -- with leadership from the respective international centers -- have demonstrated the value of the idea. And activity or interest now exists for a number of commodity networks:

Agro-forestry, aquaculture, water, buffalo, coconut, fruits and vegetables, ornamental horticulture, goats, jute, and rubber.

Networks may also contribute in areas that relate to subjects or functions rather than commodities, such as:

Postharvest technology, research management, development support communications, rural energy, problem soils, water management, farming systems, agricultural extension, agribusiness management, rural employment, community-based forestry, role of women in rural development, and agricultural information bank for Asia.

Latin America and Caribbean

By Dr. Luis Marcano
President

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A general model does not accommodate the agricultural research organizations in countries of Latin America and the Caribbean. They vary in structure, organization, and nature. Most of the countries have, as a part of government, an institute whose main function is agricultural research. Some also have responsibility for extension or transfer of technology, but in most cases the two functions are performed by separate organizations. Where universities teach agriculture, there is some associated agricultural research. In most countries the contribution is small, but it is considerable in a few.

Limiting Factors in National Agricultural Research

A few Latin American countries had started research programs by the turn of the Twentieth Century, although they tended to be descriptive botany and zoology. Early research centers, such as examples found in Venezuela, were organized and directed by persons from Europe or the United States of America. They tended to approach research through scientific disciplines, typically operating in isolation from other disciplines. The emphasis was directed toward scientific and academic criteria. A great limitation on efficiency was that research and creation of technology was considered the goal, not a means toward finding solutions to problems of food production.

Many of the Latin American research institutions continue in their orientation to disciplines. Their conduct of research may be influenced more by preferences and curiosity of individual scientists than by problems and needs of agriculture. This orientation is publicly defended to the present time, although individuals report encountering some attitude shift toward re-orientation of agricultural research.

Most agricultural research institutions in Latin America dedicate the greatest proportion of their work to laboratories and experiment stations. Relatively little attention is given to operational or verification studies closely related to farmers' situations.

Transfer of technology, in most research systems, is considered as distinct from research; it is considered that it should be carried out by groups that specialize in informal education. Interaction is assumed between the dissemination and research organizations, but often there is no such interaction; in some cases there is actual antagonism. This problem may exist where a single institution is responsible for both extension and research. The main task to be performed is to achieve a fluent communication between organizations so problems may be identified immediately and useful results will reach farmers promptly.

Human resources are most often identified as the chief limitation in a research institution. Training tends to follow lines of discipline, producing specialists in relatively narrow fields. This emphasis may widen the gap between farmers and researchers. Specialists in production and on-farm research are not as likely to emerge from this type of training emphasis. Training needs to cover a variety of subjects and disciplines, including those that relate closely to the agricultural needs of the country. The "brain drain" is often attributed to relatively lower salaries of national agricultural research institutions. There is probably basis for that attribution, although a number of other factors may also be involved: lack of work satisfaction, lack of equipment and support personnel; frustrations with promotional systems, lack of opportunities to progress, etc.

Role of researchers in national planning seems to be less than would be desired by the researchers. They consider that little communication moves between their institution and planners -- which some consider a reflection of weak political support for the agricultural research body. The situation varies from one country to another, often associated with political changes. One problem occurs when some persons from political groups are appointed to executive positions that affect the scientific staff and work.

To Strengthen National Agricultural Research Systems

Directors of research institutions often list their main limitations as including: shortage of operating and capital funds; lack of equipment; low salaries; lack of training programs; deficiency in the extension organization; and lack of credit programs. Some may also mention inefficient planning and management as limitations, and some may identify reluctance of some prestigious scientists to accept changes. In order to identify limitations, there is a frequent practice of bringing in foreign advisers -- which is useful, but which may not be sufficient.

A systematic analysis of institutions by its own members may be a proper solution. A self-study methodology has been developed and adapted to institutions of higher agricultural education in Latin America. The methodology, perhaps under the guidance of such an organization as IFARD, could be applied throughout the region.

Universities of the Caribbean countries could be helped in their self-evaluation along similar lines. The Association of Caribbean Universities and Research Institutes (UNICA) could play a supporting role there as is suggested for IFARD with national systems.

Cooperative regional programs provide another methodology for strengthening national research programs. The Latin American region has been a leader in this field (the Central American Cooperative Program for Food Crop Improvement has functioned for more than 25 years). Two recent examples -- PRECODEPA, the regional cooperative program for potato, and CONO SUR, a six-nation project -- show that regional programs can be efficient vehicles to plan joint research activities, exchange information, and promote in-service training on specific topics.

Middle East

By Dr. Subhi Qasem
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Levels of production of food commodities vary widely among countries of the Middle East. Alarming to some observers is that in most of the countries productivity of cereals and food legumes has either decreased or increased at a rate less than 2% per year. Constraints to agricultural productivity are many and diverse in the Middle East; some are political constraints, others are social, economic, or technical.

The importance of agricultural research in improving the productivity of food has been recognized throughout the region in reports and declarations over the last decade. But that recognition has not led to effective commitment and support to agricultural research in many countries. Agricultural research has not yet developed as a fully integrated system and an effective service in any of the countries.

National Agricultural Research Systems

Agricultural research is relatively new to countries in this region. Most developed the framework of their existing organizations only since the 1950s and 1960s. There had been agricultural research earlier in the colonial period, but it was mainly pointed toward industrial crops. More than 100 technical assistance efforts in agricultural research have been implemented in these countries in the last 25 years, with progress reported here and there. But further actions are needed to enhance the productivity of agricultural research.

Many problems and constraints can be mentioned as impairing the productivity of agricultural research in at least some of the countries in the region. These include: lack of political will and support for research as essential to improve agricultural production; fragmentation in both the organizations and their processes of planning for

research; distortions in type and quality of training in relation to special national needs; differences in remuneration between agricultural researchers and those in other sectors; scarce manpower and weak ways of formulating research activities; lack of coordination of the research system and other systems for delivering research results; lack of or weak communications channels to users, to policy and decision makers, and to other research workers.

Organization. A number of organizational complexities bear on the problems of national agricultural research in the Middle East. In most cases agricultural research began as a part of activities within a national ministry of agriculture. Several countries then created faculties of agriculture, whose mandate included research -- but lines of responsibility were not drawn clearly within the overall system for agricultural research, with resulting problems of resource allocation, coordination, etc. The next development in several countries was establishment of a national research council or center involved in planning, financing, evaluating, and perhaps executing research -- including agricultural research. In some countries, where the research remained under a ministry of agriculture, a semi-autonomous research body was created to gain improvements in salary scales, independence of administrative procedures, etc. Despite many reorganizations, the need generally remains to recast agricultural research organizationally to meet the needs and special conditions of each country.

Information processing and exchange. Many of the countries have a wealth of information available from agricultural research. But it is stored in scientific journals (that farmers and extension agents can't read) or is partially treated in extension bulletins (which may be incomplete or fail to address the problems farmers face). All need to strengthen their capacity to produce attractive, simple leaflets that report understandable results that can be applied. Opportunities exist for joint preparation of materials that are not site-specific -- there are probably more opportunities than are recognized.

The lack of flow of information among researchers in neighboring countries results in some unnecessary repetition and duplication of work. Without special efforts within the region, the situation remains in which a researcher is likely to know more about research in a European than in a neighboring country. National institutions and associations

need to play a stronger role in arranging for regional meetings and information exchanges.

Research management. Following are problems or lacks in management found in Middle East agricultural research systems: Lack of systematic discussions among planners, scientists, and users of research to identify problems -- it is not common to find practical problems faced by farmers as part of the research program; resources are usually not allocated according to priorities; resources for research may be lumped with those for other activities and be controlled by central procedures that are not compatible with the nature of research; agricultural research workers typically receive lower salaries than their peers in education, industrial, and commercial sectors; no structures exist to ensure coordination and communication among researchers; research workers are often left without systematic review to ensure the quality of performance; and results may be left in the form submitted to the research system, not easily usable by extension worker or farmer.

Training. There are now about 50 colleges of agriculture in the Middle East, of which 90% were established in the 1950s and later. Some gaps exist in courses of study to meet the special needs of the region, especially in extension, water technology, and agricultural economics. Some countries export manpower trained in agriculture, others suffer from scarcity. Management expertise is one of the most commonly recognized manpower needs in countries of the Middle East.

Role in Strengthening Agricultural Research

Three bodies in the Middle East region have some involvement with agricultural research.

AOAD

The Arab Organization for Agricultural Development is called by some the "Arab FAO." Its mandate includes: carrying out feasibility studies of agricultural development projects; organizing seminars and training courses in cooperation with national institutions; publishing reference materials; and organizing regional meetings of professionals and decision makers involved in agricultural development. It is based in Khartoum, Sudan, with offices in several Arab countries.

AAU

The Association of Arab Universities promotes cooperative programs among Arab universities, exchanges of faculty members, and seminars. Its base is Riyadh, Saudi Arabia.

AASRC

The Association of Arab Scientific Research Councils is an autonomous body that promotes scientific research in member countries. It encourages cooperative projects and holds seminars and meetings on scientific and technological subjects. It has an agriculture committee that deals with specific topics in agriculture.

Actions to Strengthen Agricultural Research

A series of action projects during 1982-85 would add strength to national agricultural research systems in the Middle East. Among these actions are:

- * Research policy workshops for research directors, heads of agriculture, planners, and officials involved in agricultural development.
- * Research management workshops for research directors, senior researchers, clients for research, and senior officers in departments that influence research.
- * Training courses in research for middle- or junior-career researchers.
- * Country visits by research directors and senior researchers to compare problems and start cooperation with nearby countries.
- * Information programs that would encourage exchanges of journals (more than 50 agricultural journals are produced in the region) and other materials and perhaps stimulate sustained efforts to cooperate in preparation and distribution of information materials.

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