and Extension Group (EESDR)

The Role of the Agricultural Research

Agricultural Research System

The Emergence of a Global

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The Emergence of a Global Agricultural Research System

The Role of the Agricultural Research and Extension Group (ESDAR)

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Cover photo from the International Center for Agricultural Research in Dry Areas (Aleppo, Syria).

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# Contents

Foreword \( v \)

Acronyms and Abbreviations \( vi \)

Chapter 1 Introduction \( 1 \)

Chapter 2 The Vision of the Emerging Global Agricultural Research System \( 3 \)
- Major Trends Affecting the Emergence of a Global System \( 3 \)
- Dimensions of the Global System: Components, Roles, Partners, and Interactions \( 5 \)
- Internal Functions That Regulate the Global System \( 7 \)
- Building Collaboration \( 8 \)
- Absence of Governance Mechanisms \( 8 \)

Chapter 3 The Role of ESDAR \( 11 \)
- Global System Analysis \( 11 \)
- Global System Building \( 12 \)
- Building Donor Concert and Joint Activity in Programming and Funding \( 12 \)
Foreword

The creation by the World Bank in July 1994 of the Agricultural Research and Extension Group, now better known by its acronym ESDAR, reasserted our institutional commitment to support the development and adoption of technology in agriculture. We are indeed more than convinced that technological progress in agriculture can be a major engine of sustainable growth for many rural areas, where a large proportion of the poor live and work.

At the time ESDAR was created, the International Agricultural Research Centers supported by the Consultative Group on International Agricultural Research (CGIAR) were facing a serious financial crisis. To solve that crisis, we launched an 18-month renewal of the CGIAR, which has been quite successful. But at the same time we were well aware that much more needed to be done to support the National Agricultural Research Systems (NARS). This required not only financial resources but also institutional and political support, including a far greater degree of coordination among the instruments used by the many agencies working with, or supporting, the NARS. This is the fundamental reason why ESDAR was created, and we were very pleased that the French cooperation agencies and the U.S. Agency for International Development immediately joined us in this venture, soon followed by Germany.

This report is the first intellectual product of the exemplary collaboration that has become the hallmark of the group. The diversity of experiences of ESDAR’s members is probably its main asset and has been put at the service of a common purpose. Thus the report is truly a joint product.

The theme of the report, the emergence of a global agricultural research system, provides both an analysis of major changes occurring internationally, which demonstrates the major redistribution of roles and partners on that scene, and a call for more coordinated action among all agencies supporting agricultural research. A greater degree of coordination is possible because of a greater and clearer consensus than ever before on what needs to be done.

I am thankful to the authors for making these points clearly. However, the world is changing rapidly, as is the scene for agricultural research. This report therefore must be very much seen as work in progress. We wish to encourage all our partners, current and potential, to send us their comments and suggestions, and to continue to join with us in the ongoing efforts of ESDAR.

Ismail Serageldin
Vice President
Environmentally Sustainable Development
The World Bank
## Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ARO</td>
<td>Advanced research organizations</td>
</tr>
<tr>
<td>BIP</td>
<td>Banana Improvement Project (of the Common Fund for Commodities/Food and Agriculture Organization/World Bank)</td>
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<tr>
<td>CG</td>
<td>Consultative group</td>
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<td>CGIAR</td>
<td>Consultative Group on International Agricultural Research</td>
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<tr>
<td>CIMMYT</td>
<td>Centro Internacional de Mejoramiento de Maíz y Trigo, Mexico</td>
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<tr>
<td>CIRAD</td>
<td>Centre de coopération internationale en recherche agronomique pour le développement, France</td>
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<tr>
<td>ESDAR</td>
<td>Agricultural Research and Extension Group (in the Environmentally Sustainable Development, vice presidency of the World Bank)</td>
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<tr>
<td>GATT</td>
<td>General Agreement on Tariffs and Trade</td>
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<td>IARC</td>
<td>International Agricultural Research Center</td>
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<td>IRRI</td>
<td>International Rice Research Institute, Philippines</td>
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<td>NARI</td>
<td>National agricultural research institutes</td>
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<td>NARS</td>
<td>National agricultural research systems</td>
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<tr>
<td>NGO</td>
<td>Nongovernmental organizations</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<tr>
<td>ORSTOM</td>
<td>Office de la Recherche et Technique Outremer, France</td>
</tr>
<tr>
<td>TAC</td>
<td>Technical Advisory Committee</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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Introduction

Agriculture is a key sector in economic development of most developing countries. It plays a critical role in providing food security, alleviating poverty, and conserving precious natural resources for future generations. Large segments of the populations of developing countries derive their livelihoods from agriculture, including a large proportion of the poor, most of whom are found in rural areas and who are often the least empowered to influence policy decisions. World population is expected to double by the middle of the 21st century, further increasing the pressure on agriculture to provide livelihoods as well as adequate food and fiber. With rapid population growth will come even greater pressure on land, water, and the biological resources on which further growth of the agricultural sector depends. It is increasingly recognized that agricultural productivity growth in a manner that protects, conserves, and enhances the natural water, soil, and biological resource base for future growth is the only viable option for a sustained development of the agricultural sector.

Agricultural research, based on science and technology development, has been responsible for significant increases in agricultural productivity, and investments in agricultural research continue to show high rates of economic return. The Green Revolution, which improved the welfare of millions of poor people in Asia and Latin America, is a striking example of the success of such investments. Further increases in agricultural productivity, which are needed for continued growth of the agricultural sector, will only be achieved through increased efforts in agricultural research.

Given the demonstrated success of agricultural research in bringing science and technology-based solutions to agricultural production constraints, it is paradoxical that agricultural research is now facing a crisis of a global nature. The crisis is partly financial. Many national agricultural research institutions in developing countries suffer from insufficient financial resources—they often lack funds to buy the basic essentials or even to pay salaries on time. Although numbers of well-trained agricultural researchers have increased dramatically over the past two decades, their employment, largely in the public sector, has strained operating budgets severely. Institutions in developed countries and the international centers of the Consultative Group on International Agricultural Research (CGIAR) face similar financial constraints—of lesser magnitude but still significant.

The crisis is also one of confidence. In spite of the demonstrated effectiveness of agricultural research, policy makers are not convinced that further investments are necessary or that they can accomplish the seemingly overwhelming tasks of assuring food security to millions of the poorest of the poor and protecting the environment at the same time. The reasons for this lack of confidence differ in developing and developed countries, but the result in each case is that financial allocations to agricultural research are reduced at a time when its importance to economic development remains critical. Reduced support leads to low productivity, low visibility, and finally low political support needed to sustain the agricultural research system—a vicious circle.

The World Bank has been increasingly concerned with this continuing crisis and has undertaken several steps to address it. When the CGIAR was faced with a major financial crisis in 1994, the World Bank made more financial resources available on a matching basis with other donors, thus leading the way for a re-dedication of donor support to the CGIAR. Donors responded to that initia-
tive, matching funds were made available to stem the crisis of CGIAR funding in 1994 and 1995, and the crisis has been averted for now. In addition, the World Bank offered to commit up to $2.5 billion in loans over a five-year period for agricultural research and extension, provided that borrowing countries make the necessary reforms and investments to enhance their capabilities in agricultural research and extension. Response by developing countries to this effort has been positive but limited.

The World Bank also saw a unique opportunity to become a more active participant in the emergence of a global agricultural research system by stimulating stronger linkages between research and technology development processes in developed countries, the international agricultural research centers in the CGIAR, and the national agricultural research systems of developing countries. ESDAR was created as a result. The role of ESDAR, described in more detail in Chapter 3, is to promote and facilitate increased investment in agricultural research worldwide and to enhance the effective utilization of those investments. ESDAR will seek to develop a consensus on the direction which must be taken and elaborate a vision of the emerging global agricultural research system and the roles that various partners might be expected to play.
The Vision of the Emerging Global Agricultural Research System

A global agricultural research system is emerging from past and ongoing research efforts of international organizations and from developing and developed country national agricultural research systems. The scientific components which form the mainstay of this global research system are the same as in the past: Advanced Research Organizations (AROs), International Agricultural Research Centers (IARCs), and National Agricultural Research Systems (NARSs). However, each of these components has been undergoing change, sometimes radical, which is forcing them to move away from traditional roles, to evolve new mechanisms and new partnerships for agricultural research. The pattern which results from these new processes, mechanisms and partnerships, and the degree of cohesion and clarity that result, will shape the emerging global agricultural research system.

The partners and clients of agricultural research are undergoing a similar evolutionary process leading to an increased role in shaping the research agendas of scientific organizations and thus an increased role in shaping the global agricultural research system. For example,

- Farmers and communities are more organized, enabling them to have a greater voice
- The boundaries between public and private sectors have shifted, allowing the private sector to assume more of the research responsibilities previously shouldered by a large public sector
- NGOs are increasingly recognized for their strength in technology transfer and implementation at the farm and community level
- Greater understanding and appreciation of women’s roles in agriculture and in poverty alleviation are changing traditional perspectives.

The results of these evolutionary processes will vary within and between developed and developing countries, depending on the factors which influence the process, and could lead to quite different paths in different countries or regions. The differences need careful attention. But despite the differences, the evolutionary process has now clearly produced the concept, and thus a vision, of a global "system," one which is demonstrating the beginnings of structure, coherence and formalization of new working relationships which define a true system.

Major Trends Affecting the Emergence of a Global System

Several major long-term trends are responsible for creating multiple opportunities for new synergies and partnerships and contributing to the emergence of the global system. These trends are evident when comparing the situation in the world today with what it was when NARSs in developing countries began to emerge and when the first international agricultural research centers were created about 30 years ago (CIMMYT and IRRI). These trends will likely continue through the next decade and include:

A True Scientific Revolution in the Biological Sciences

Since the beginning days of the Green Revolution more than 30 years ago, progress in molecular biology and other basic biological sciences has been staggering. Agricultural research has benefited from new knowledge and new technology developed by advanced biological research teams,
including those in private enterprise. However, this
revolution, and the speed with which it has ad-
vanced, has continuously widened the technologi-
cal gap between North and South. Agricultural
researchers in the North and South, but most essen-
tially in the South, must now face the challenge of
forging partnerships with both public and private
sector advanced biological research teams in order
to fully capitalize on these developments. The po-
tential of the biological revolution is enhanced by
the accompanying revolution in information tech-
nology and transfer (telecommunications, com-
puter technology, digital information transfer, etc.)
which provides a powerful tool to access and share
scientific knowledge and to build new linkages and
partnerships.

The Broadening of the Agricultural Research
Agenda

Growing environmental concerns and an aware-
ness of the necessity of protecting and conserving
our natural resource base for future generations
have been set squarely at the center of the agricul-
tural research agenda. New fields outside tradi-
tional agriculture now play a critical role in
agricultural research. For example, the CGIAR has
broadened its mandate from research to enhance
productivity to include research for the manage-
ment of natural resources. Social and cultural per-
spectives are being incorporated into agricultural
research objectives to a greater degree and with a
greater realization of the critical role of women in
agriculture. Thus, a new paradigm for agricultural
research is developing and being adopted by agri-
cultural research institutions in both developed and
developing countries. A major consequence of this
broader agenda is the need to include new partners
in the research process.

Increasing Numbers of Well-Trained
Agricultural Scientists Working in
Developing Countries

Over the last thirty years the number of developing
country scientists has increased by several orders of
magnitude creating a reservoir of human resource
capacity where it is most needed. For example, the
number of persons engaged in agricultural research
increased from about 60,000 in the 1960s to almost
140,000 in the 1980s, with over fifty per cent of those
researchers in developing countries. China alone
has over 30,000 agricultural researchers. But in
order to be effective in creating and/or applying
science and technology-based solutions to agricul-
tural problems, and in capitalizing on the biological
science revolution, this expanded human resource
capacity must be effectively mobilized and skills
must be continuously upgraded. Many researchers
are not utilized effectively at present because of the
very difficult conditions in the institutions in which
scientists work, including financial, administrative
and bureaucratic constraints. In fact, because the
national environment is not conducive to successful
career development, many researchers migrate
to other careers or even to other countries. In order
to use the available human resource capacity,
developing countries will have to provide incen-
tives to continued participation in agricultural re-
search and will have to establish and maintain
partnerships with other major agricultural research
organizations (IARCs and advanced research or-
ganizations in developed countries).

The Financial Crisis in OECD Countries

The current public finance crisis in OECD countries
affects agricultural research at all levels. Tremen-
dous expertise and experience in agricultural re-
search exist in OECD countries, but the present
financial crisis is forcing major changes. Many re-
search organizations are finding it difficult to fund
their activities, to recruit good scientists and to offer
them promising career opportunities in agricul-
tural research. As a result, these organizations have
become less engaged in the global agricultural re-
search agenda as they concentrate more on domes-
tic issues to generate support for their programs.
The expertise remains but must be re-mobilized
and re-engaged through increased financial sup-
port for global activities. This depends in part on an
increased emphasis on the benefits to developed
countries from agricultural productivity in the de-
veloping world. By firmly establishing the link be-
tween international issues and domestic benefits,
institutions in OECD countries can justify increased
activity in the international agricultural research
agenda.

The funding crisis, combined with donor fa-
tigue, has resulted in lessened support for IARCs,
triggering their own financial crisis. It has also re-
sulted in lessened bilateral support for developing
country NARSs which, combined with their incipi-
ent financial problems and their own inability to
adequately fund agricultural research, places in-
creasing pressure on their ability to address their
agricultural production and natural resource man-
agement constraints through research.
Liberalization of International Trade and Privatization of Public Sector Activities

Trade liberalization—through GATT, regional trade agreements, and the structural adjustment programs underway throughout the developing world—has created new opportunities for global trade expansion enabling countries to realize their comparative advantages. Both countries and farmers will have opportunities to respond to new markets and new comparative advantages. Resources previously used in support of protectionist policies are being released for potential productive investments; it is estimated that the total cost of interventions in agriculture by OECD countries amounted to $350 billion annually. In agriculture, privatization has given more importance to private enterprise and farmer organizations which are partners in the research system. Research, including a greatly expanded private sector component, must now provide the technology for farmers and agriculture to respond to new opportunities and generate increased employment and incomes possible in the liberalized trade environment.

These trends, occurring simultaneously, have significant consequences for international agricultural research and the emergence of a global system. The most important consequence is the necessity for agricultural researchers to work in partnerships: more numerous, more diversified, more innovative, and more substantive than in the past. Trained scientists in developing countries must be paired with advanced biological research teams in the North and in the South and with individual and collective natural resource users. Opportunities for greater synergies, complementarities, and closer working relationships will lead to less overlap, less redundancy, more efficient and effective use of scarce resources and finally to a more integrated global research system and agenda.

Dimensions of the Global System: Components, Roles, Partners, and Interactions

The establishment of ESDAR, a group which is advantageously placed to facilitate the emergence of the global system, provides an important opportunity for an overview of the system as it develops. The dimensions of the system, in terms of the components, partners, roles and interactions, are described below.

Scientific Components and Their Roles in the Global System

A global system of agricultural research will have as its central components those institutions which perform research: the National Agricultural Research Systems, the International Agricultural Research Centers, and advanced research organizations.

National Agricultural Research Systems. NARSs serve as the cornerstone of the global system. NARSs themselves have many components including National Agricultural Research Institutes (NARIs), universities (private and public), and those elements of the private commercial sector, farmers organizations and NGOs which are involved in research. Components of NARSs have varying strengths in different countries and will contribute in different ways but with major strengths in applied and adaptive research (particularly NARIs, universities, and in some cases the private sector) and in technology implementation (particularly parts of NGO and farmer/community organizations). NARSs in more advanced developing countries may have the capacity to become suppliers of basic research and advanced technology.

International Agricultural Research Centers. IARCs have a comparative advantage for strategic research (directed toward solving problems of a broad global or regional nature) and applied research (directed toward solving more narrowly focused, location-specific problems and often involving adaptation of strategic research results). The fact that IARCs are mostly located in developing countries and have regional offices in a wide array of developing countries gives them the advantage of being able to work closely in specific areas with NARSs as partners. In addition to the role of IARCs as an essential partner of developing country efforts, they can play an important role in research activities of a truly international public goods nature, transcending national and regional interests. That particular set of activities, in fact, defines a role that can best be played by the international agricultural research centers.

Advanced Research Organizations. AROs are mostly located in developed countries, where they form a part of the NARs of those countries. They consist of public and private organizations and are identified as a separate group because of their advanced research capabilities and their comparative
advantage in basic research. Public groups include universities and national agricultural research institutes. Private groups may consist of universities and research corporations—multinational, national, and non-profit. In addition to the basic research capability, public universities have a long tradition and expertise in applied and adaptive (directed to adoption of technology in specific locations) research. Many universities also have expertise in strategic research, and public universities, in particular, have proven experience in integrating the utilization of research results over the entire spectrum from basic to adaptive. Public universities have had, and must continue to have, an important role in training future agricultural researchers.

**Partners and Interactions**

In order to function as a true system, all components must engage in active partnership, working in close collaboration with each other and with external partners. Several specific partnerships are critical:

**Within NARSs.** In developing countries, the efforts of many of the individual components of NARSs are marginalized, due in part to past development efforts in which NARIs had a near monopoly on agricultural technology generation. Efforts must now be made to strengthen each component and integrate the potential sources of knowledge and innovation in the technology development and transfer effort. Transforming national research institutions in ways that lead to their becoming more reliable and effective partners at the national and international levels is essential to produce and transfer the technology needed to solve national agricultural problems. Transforming universities to become better sources of science, technology and human capacity is also essential. These transformations can be enhanced by creating strong scientific partnerships with AROs and IARCs. Full involvement and utilization of the private sector capacity for research and technology development, and of farmer organization and NGO capacity for technology implementation and outreach, will lead to a well-integrated “national system” with a relevant and well-defined research agenda.

**Between NARSs.** NARSs can become more efficient through close collaboration with other NARSs in regional cooperation. Many national systems are too small to be effective alone. And large NARSs tend to become very inward-looking even though they would have much to gain from international interaction. While it is true that NARSs must remain the cornerstone of the global system, there is also a definite advantage for both large and small NARSs to regionally harmonize national efforts, particularly in the current global context of trade liberalization. For example, clearly the situations of NARSs such as those of Benin, Nigeria and India are very different; but for each, regional collaboration can be instrumental in overcoming current rigidities of national systems, stimulating results-driven efforts, increasing the value and applicability of research, and perhaps most importantly mobilizing the contributions of non-regional partners (e.g., IARCs). But there is a danger to be avoided: the regional effort must be seen not as an additional effort, but as an effort to harmonize existing national efforts and permit better use of resources devoted to national activities. Regional initiatives must not become a competition for new funds with each national team expecting a share. Instead it must be an effort in which national resources are pooled with those of neighboring countries resulting in more effective use. The danger can be avoided if national authorities in the regions themselves govern and manage regional efforts.

**Between the scientific components of the global system (AROs, NARSs, and IARCs).** More effective partnerships will result in a more integral relationship between research activities of each component. Such close relationships will serve to augment the efforts of developing country institutions as well as decrease the technology gap that exists between the North and South through timely access to rapidly developing advanced technologies. Ways must be found to continue the development of human research capacity in developing countries as an essential element to sustain the development of NARSs and the global agricultural research system. And finally, partnerships will help to insure that each actor finds the most appropriate role within the system.

**Between the global system and its users.** A client-driven system implies that farmers, farm organizations, village organizations, and community-based organizations are effective partners in setting priorities, evaluating research as it proceeds, and validating research results. Participatory mechanisms must emerge to promote the linkages needed to make clients more effective partners.


**Between scientific and other international partners.**

In addition to the scientific components of the emerging global system, other players will influence the system through policy and funding decisions. They include other components of the CGIAR system, regional organizations, the environmental community (in particular NGOs), donors, and multilateral development banks, (in particular the World Bank which plays many roles in influencing international agricultural research and development activities). These partners may sometimes exert powerful external influences and are vital to the successful emergence of the global system.

This vision of the elements of an emerging global agricultural research system, and how they may interact, accents the role of ESDAR in facilitating the linkages and partnerships which must be formed to shape a global system, and the additional investments which must underpin them. ESDAR is in the advantageous position of having an overview of the entire emerging system and can provide a neutral forum for partners to articulate their views and discuss issues of concern.

**Internal Functions That Regulate the Global System**

The efficiency of the global agricultural research system will depend on its ability to exploit the potential synergies among the various actors in the system. This will in turn depend on the coherence demonstrated among the various components. Both effectiveness and coherence of the system will rely on the simultaneous emergence of internal functions which serve to regulate it. These internal functions are similar to those self-regulating functions of ecological, biological, and social systems and which give any system the level of organization needed to function as a system rather than as a collection of individuals. Some of the regulation functions which must emerge are discussed below.

**Priority Setting**

Priorities are not static, but change in response to different conditions. They may not be set for long time periods, nor centrally even within a single country. For example, in the US, agricultural research priorities in the public sector are set by each state, or even by institutions within states, in response to the demands articulated by various users of research and with some *ex ante* knowledge of scientific possibilities for research breakthroughs.

Another set of priorities is determined by the public sector at the national level; and yet another set is established by the private sector where two-thirds of the research is conducted and which sets its priorities in response to market forces. Thus, priority setting is a diffuse type of activity in large systems but one which is essential. There are many levels of priority setting and many independent actors. However, there is much to be gained by developing mechanisms for sharing information between levels.

Globally, there is no framework or organizational structure for priority setting despite the importance of this function to a global system. Priority setting at the international level will be most effective if based on participatory decision making, building on a bottom-up approach which depends on effective priorities being established at the national and regional levels. A common method for organizing agricultural research at the national level would facilitate the development of common research priorities at higher levels. Describing research activities at the national level by discipline, commodity, and agro-systems approaches will facilitate a common language for communication of national priorities to the sub-regional or regional level where they can be aggregated to a broader set of priorities. Although the diversity of NARSs in size, resources, etc., might preclude organizing research into a common structure, the commonalities between the ways in which very diverse NARSs describe their research activities might provide the necessary framework and information needed for setting common priorities and also form the basis for organizing cooperative activities at an early stage in program development.

At present, the only mechanism for priority setting which functions at the international level is within the CGIAR through its Technical Advisory Committee (TAC). Such an advisory mechanism, based on a participatory approach, could provide a framework for priority setting at the international level through interface with national and regional priority-setting mechanisms. The interface would perhaps be best accomplished at the regional level, where national priorities can be aggregated to become more internationalized and complement international priorities, and where international priorities can be disaggregated to become more local and complement national priorities. Thus, it is critically important that effective priority setting develop at national and regional levels in order to accomplish the interface with international priorities.
The CGIAR and other actors in the global system would benefit from regional and global fora which would serve as a mechanism for greater harmonization in priority setting as well as for increasing participation of NARSs at those levels.

Programming

Once priorities are defined and broad program areas are identified, the most critical element in efficient and effective programming is financial support for agricultural research to insure the successful development of a global system is the formation of partnerships as described earlier. The need for these partnerships is a common factor through all research programming activities over all regions and countries; it is especially important in the areas of regional collaboration, involvement of AROs and particularly in enhancing the participation of universities, and in the collaboration between NARSs and IARCs. Partnerships should be in close collaboration with the end users of agricultural research, integrating farmers and NGOs in the process and further enlarging the range of partnerships developed.

Partnerships in these areas promote more efficient ways of programming and conducting agricultural research and implementing the resulting new technologies. They involve the widest range of actors in the process and increase the likelihood of adoption and positive impact.

Building Collaboration

Innovative collaborative linkages between components of the global system at the scientific level will increase effectiveness, efficiency, and coherence. New mechanisms for scientific interaction and information exchange should evolve as new partnerships develop. Examples include regional scientific efforts, consortia of IARCs, and the inclusion of farmer organizations in research processes.

Funding

The mobilization of new sources of funding is essential to the development of the global agricultural research system. Equally as important is the utilization of existing funding so that it promotes new ways of doing business in a more cohesive global framework and supports the development of the partnerships which have been described as critical to the process. But it is important to recognize that many national research institutions in developing countries are weak. Strengthening their efficiency, transparency, and accountability in utilization of funds, whether new or existing, is basic to developing and sustaining reliable partnerships. The same requirements apply, of course, to other partners in the global system.

Evaluation

Evaluation of the components of the system and the linkages that develop between various components will provide information as to the efficiency of the system as a whole. A careful analysis of who does what, and how, will provide an evaluation of the way the system is performing. Analysis and evaluation of research will provide indications of adaptation and impact of new technologies. It will generate information and tools with which to assess both the present and future performance of the system through a posteriori and a priori analysis. Priorities can be reexamined in light of these assessments and performance improved based on clearer understanding of objectives and the partnerships needed to reach those objectives.

Absence of Governance Mechanisms

Clearly a centrally controlled governance system for the global system is not possible. Moreover, experience with centrally controlled modes of governance suggests that such a solution is neither workable nor desirable. Relying on market mechanisms—traditionally the conceptual alternative to central planning—offers little opportunity at present for global agricultural research because of the limited ability of markets to capture the public goods nature of research on productivity, food security, and natural resource management.

Increasingly, consensus building among national governments and civil societies is emerging as a solution in many areas of human endeavor involving global issues, from military security and peace maintenance to humanitarian aid and global environmental problems. However, experience suggests that this type of solution has its own limitations. This leaves the intellectual challenge of conceiving effective mechanisms to coordinate a wide array of actors, activities and products in global agricultural research and, at the same time, promote an effective demand for that research.

In the absence of a governance mechanism, a facilitation function, such as ESDAR, is designed to fulfill, can contribute to the coherence of the system by helping to conceptualize the roles of various actors, how those actors relate and interact, and
what processes can be put into place to help promote the emergence of the system. In this context, the facilitation role may be best described as one of contributing to consensus building through the promotion of exchange of needed information held by various actors and actively seeking out and articulating opportunities for new and innovative partnerships. In the domain of global agricultural research, individual actors are far from fully informed about the activities and strategies of other actors. Yet, in the case of agricultural research today, the gains which each actor can make from adapting its own behavior to changes in the global system are often very great.

Thus, facilitation can play a useful role in creating opportunities for individual actors to engage in new partnerships (e.g., NARSs leaders, specific IARCs, ARO leaders and institutions, World Bank task managers, individual donors, the CGIAR as a whole). In addition, as illustrated in the case of the CGIAR which is composed of several types of actors, new mechanisms can be suggested to improve interactions among those actors and make them more effective.

Any facilitation function must be opportunistic: a facilitating intervention can only be effective if the actors are able and willing to capture the opportunity and if they perceive the mutual benefits from such a change as substantial. The challenge is to identify such opportunities, and to capitalize on them; this requires a clear vision of what is to be achieved.

The facilitation role describes ESDAR's philosophy in its present activities, even though the conceptual framework suggested here had not previously been explicitly formulated.
ESDAR is a multi-donor financed group which is dynamic, open and changing over time as staff members change. Staff include members from the World Bank and others who are seconded from various donor agencies. As secondments are normally for limited periods of time and as other donor agencies express interest in participating in ESDAR, staff will be expected to change. However, the central concept of bringing together staff with different backgrounds, expertise, and perspectives will maintain the dynamic character of the group.

ESDAR's function is to bring about synergies between the actors which comprise the global agricultural research system primarily through its contacts with donors and their resulting decisions, but also by influencing scientists within system components. ESDAR does not primarily act in a scientific capacity but it has scientific capability and expertise in its staff members. ESDAR will seek to maintain a balance of staff which insures that scientific expertise in the group is maintained in order to address various critical thematic areas of agricultural research. This scientific capability brings the additional element of intellectual contribution and the ability to suggest new and innovative ways in which scientific partners can interact. ESDAR recognizes throughout its activities the link between the content of agricultural research and the form that new partnerships will have to take to influence the content.

ESDAR will fulfill its role by providing the facilitation function described in Chapter 2. It will act at various levels but with a global perspective. It will identify and suggest institutional innovations and exchange of best practices between actors. ESDAR will contribute its experience and share lessons learned with donors and other stakeholders as the global agricultural research system emerges.

ESDAR's workplan to date is structured around three categories: global system analysis, global system building, and building donor concert and joint activity programming. A brief description of each category follows with an example of the type of activity underway.

**Global System Analysis**

ESDAR undertakes analysis of the emerging global system at several levels including:

- Analysis of the vision of the global system described in the second part of this document. ESDAR will refine this vision as the global system continues to evolve.
- Analysis of components and linkages within the system. For example, a preliminary report has been prepared on NARSS–CGIAR linkages.
- Analysis of activities in different geographical areas, by relying on work done by others, promoting interregional comparisons, and learning and extrapolating from them. For example, ESDAR works closely with regionalization efforts in Africa.
- Analysis of indicators of efficiency of the system. ESDAR will take a broad view of impact indicators and assessment of impact using information which will emerge from impact evaluation activities now being undertaken by several partners in the global system. ESDAR will use this information to re-examine priorities and partnerships within the system with the objective of suggesting methods of improving performance of the system as a whole.
Global System Building

Institutional Evolution

ESDAR works with each of the major components of the global system to conceptualize roles in the global system, help define partners and suggest institutional innovations and exchange of best practices.

CGIAR. ESDAR staff members have various functions within the CGIAR; their activities are influenced by those roles and provide ESDAR the opportunity to provide input into CG actions as the CG fits itself into the global system. For example, the Director of ESDAR serves as the chair of the CGIAR Finance Committee. ESDAR interaction with IARCs will help them to play more of a convening role than in the past.

NARSs. ESDAR’s activity with NARSs will be through donor coordination and through the opportunity to influence World Bank lending projects with the objective of helping NARSs evolve from primarily NARIs; become more financially accountable, transparent, and sustainable; become regional collaborators; and develop better user relationships.

AROs. ESDAR seeks to increase involvement of AROs as partners in the global system by providing information on opportunities for involvement and new partnerships, by helping them define their role in the system, and by helping them to mobilize resources.

Thematic Key Issues

ESDAR activities in this area seek new substance, new mechanisms and new partnerships in critical and complex key areas of agricultural research where new partnerships need to emerge and where ESDAR has specific expertise. Examples of activities in progress include:

Biotechnology. Staff members with specific expertise in this area have helped developing countries with biotechnology technical and policy decisions, including biosafety, to increase capability, increase the capacity of World Bank member countries to assess and use new technologies, and to promote partnerships with the public and private sectors.

Agriculture and the environment. ESDAR recognizes two specific issues which should be addressed: the need to better access and mobilize ‘green’ sources of funding and the need to bridge the gap between agricultural and environmental issues by making the content of agricultural research more environmentally sensitive. For example, ESDAR has been involved in a multi-donor study exploring the global interactions between livestock and the environment. This assessment provides donors and researchers (in both developing and developed countries) with the most comprehensive analysis of this issue. The positive and negative impacts of livestock and the environment are clearly articulated for the first time, as well as the formulation of a research agenda.

University involvement in the global system. ESDAR seeks to define levels of university involvement with specific partners in the global system and to mobilize new resources for university participation. For example, an analysis of US university/IARC linkages has been completed; and ESDAR is involved in a continuing effort to link US universities, IARCs and developing country NARSs through specific funding for joint activities (GREAN initiative).

Building Donor Concert and Joint Activity in Programming and Funding

ESDAR will assist donors to act in concert in funding and programming activities. Providing information and a forum for dialog between donors can lead to more useful and more effective working partnerships as they relate to agricultural research. ESDAR activities are in the exploratory phase at present and the dialog is at different stages with different donors. It is expected that continued dialog will lead to increasing joint programs and activities. At present, the level of coordination is most advanced with France and the US, and is developing with the UK, Germany, the European Commission, and Switzerland.

To give examples, current collaboration with the US is mainly focused on mobilizing the tremendous reservoir of scientific expertise for agricultural research that resides in US universities. In its collaboration with France, ESDAR aims mainly at facilitating the better integration of the large French institutions (particularly CIRAD and ORSTOM) specialized in tropical agriculture, into the global
system. As Germany considers its support to NARS the critical component of its involvement in international agricultural research, ESDAR will work with them to facilitate the coordination of German input with other donor efforts at that level, particularly those of the World Bank.

To promote and demonstrate new funding mechanisms and innovative partnerships in research, ESDAR is serving as the Project Executing Agency of the Banana Improvement Project (BIP), an international competitive grants program sponsored through collaboration of multilateral organizations (the Common Fund for Commodities, Food and Agriculture Organization, and the World Bank). BIP mobilizes scientific and financial resources to create partnerships and consortia of the best scientists in major national and international banana research programs in order to pool their talents and solve critical problems in banana production.

Although BIP exemplifies new modes of funding and scientific partnerships, joint activity in programming and funding implies going beyond this model to build truly global research programs. Such programs would be centered around major research topics, involve the entire array of scientific partners in any given topic, be organized to the extent that common priorities and goals are expressed and agreed upon, and assure that funding is coordinated and effectively channeled to reduce overlap and waste. ESDAR seeks to facilitate the emergence of such innovative research partnerships by working with donors and scientists to conceptualize and initiate global programs.

The workplan described for ESDAR is not exhaustive, comprehensive or complete but is developing over time. The overall content within the framework presented will consist of activities carried out by members of the ESDAR team and will change as the team changes.
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