The CGIAR at 31: A Meta-Evaluation of the Consultative Group on International Agricultural Research

Volume 2: Technical Report

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Abbreviations and Acronyms

AGM	Annual General Meeting (CGIAR)
AIARC	Association of International Agricultural Research Centers
AIDS	Acquired immune deficiency syndrome
AKIS	Agricultural Knowledge and Information Systems (World Bank)
ARD	Agriculture and Rural Development Department, formerly RDV (World Bank)
ARI	Advanced research institution
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASB	Alternatives to Slash and Burn (a CGIAR System-wide program)
BB	World Bank's administrative budget
BP	Bank Policy
BTO	Back to Office Report
CAS	Country assistance strategy (World Bank)
CAPRi	System-wide Program on Collective Action and Property Rights (CGIAR)
CBC	Committee of Board Chairs (CGIAR)
CBD	Convention on Biological Diversity
CDC	Center Directors' Committee (CGIAR)
CEP	CIMMYT Economic Program (CGIAR)
CCER	Center-Commissioned External Review (CGIAR)
CDMP	Change Design and Management Process (CGIAR)
CDMT	Change Design and Management Team (CGIAR)
CGIAR	Consultative Group on International Agricultural Research
CIAT	Centro Internacional de Agricultura Tropical (CGIAR)
CIFOR	Center for International Forestry Research (CGIAR)
CIMMYT	Centro Internacional de Mejoramiento de Maïz y Trigo (CGIAR)
CIP	Centro Internacional de la Papa (CGIAR)
CORAF	Conférence des Responsables de Recherche Agronomique en Afrique de l'Ouest et du Centre
CODE	Committee on Development Effectiveness (World Bank)
CP	Challenge Program (CGIAR)
CRM	Corporate Resource Management (World Bank)
DEC	Development Economics Vice Presidency (World Bank)
DFID	Department for International Development (U.K.)
DG	Director General
DGF	Development Grant Facility (World Bank)
Embrapa	Brazilian Agricultural Research Corporation
ESDAR	Environmentally Sustainable Development Agricultural Research and Extension Group (World Bank)
ESSD	Environmentally & Socially Sustainable Development Network (World Bank)
ESW	Economic and sector work (World Bank)
EU	European Union
ExCo	Executive Council (CGIAR)
FAO	Food and Agriculture Organization of the United Nations
FARA	Forum For Agricultural Research in Africa
FY	Fiscal year
GEF	Global Environment Facility
GFAR	Global Forum on Agricultural Research
GMOs	Genetically modified organisms
GPG	Global public good
GPPPs	Global public policies and programs
GRPC	Genetic Resources Policy Committee (CGIAR)
HIPC	Highly-indebted poor country
HRP	Special Programme for Research and Development in Human Reproduction
IAD	Internal Audit Department (World Bank)

IAEG	Impact Assessment and Evaluation Group (CGIAR)
IBPGR	International Board on Plant Genetic Resources (CGIAR)
IBRD	International Bank for Reconstruction and Development
ICAR	Indian Council on Agricultural Research
ICARDA	International Center for Agricultural Research in the Dry Areas (CGIAR)
ICLARM	International Center for Living Aquatic Resources Management (CGIAR)
ICRAF	International Center for Research in Agroforestry (CGIAR)
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics (CGIAR)
ICW	International Centers Week (CGIAR)
ICWG-GR	Inter-Center Working Group on Genetic Resources (CGIAR)
IDA	International Development Association
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute (CGIAR)
IITA	International Institute of Tropical Agriculture (CGIAR)
ILCA	International Livestock Center for Africa (CGIAR)
ILRAD	International Laboratory for Research on Animal Diseases (CGIAR)
ILRI	International Livestock Research Institute (CGIAR)
IMF	International Monetary Fund
INIBAP	International Network for the Improvement of Banana and Plantain (CGIAR)
INRM	Integrated natural resource management
IPCC	Intergovernmental Panel on Climate Change
IPG	International public good
IPGRI	International Plant Genetic Resources Institute (CGIAR)
IPR	Intellectual property right
IRRI	International Rice Research Institute (CGIAR)
iSC	Interim Science Council (CGIAR)
ISNAR	International Service for National Agricultural Research (CGIAR)
ISFM	Integrated soil fertility management
ITPGR	International Treaty on Plant Genetic Resources for Food and Agriculture
IWMI	International Water Management Institute (CGIAR)
LDC	Less developed country
LIL	Learning and Innovation Loan (World Bank)
MARP	Multi-country Agricultural Research Program for Africa
MAS	Marker-assisted selection
MD	Managing Director (World Bank)
MDG	Millennium Development Goal
MTM	Mid-Term Meeting (CGIAR)
MTP	Medium Term Plan (CGIAR)
NARS	National agricultural research systems
NARES	National agricultural research and extension systems
NGO	Nongovernmental organization
NPG	National public good
NRM	Natural resource management
ODA	Official development assistance
OECD	Organization for Economic Cooperation and Development
OED	Operations Evaluation Department (World Bank)
OP	Operational Policy (World Bank)
OPCS	Operational Policy and Country Services (World Bank)
PREM	Poverty Reduction & Economic Management Network (World Bank)
PRSP	Poverty Reduction Strategy Paper
PSI	Private Sector Development & Infrastructure Network (World Bank)
QTL	Quantitative trait loci
R&D	Research and development
RDV	Rural Development Department (World Bank)
RPG	Regional public good

SACCAR	Southern African Centre for Cooperation in Agricultural and Natural Resources Research and Training
SC	Science Council (CGIAR)
SDC	Swiss Agency for Development and Cooperation
SGP	Special Grants Program (World Bank)
SINGER	System-wide Information Network for Genetic Resources (CGIAR)
SPAAR	Special Program for African Agricultural Research
SPIA	TAC Standing Panel on Impact Assessment (CGIAR)
SRGP	System-wide Genetic Resource Programme (CGIAR)
SRM	Strategy and Resource Management Vice Presidency (World Bank)
SRO	Subregional organization
SSP	Sector Strategy Paper (World Bank)
SWIM	System-wide Initiative on Water Management (CGIAR)
T&V	Training and visit extension system
TAC	Technical Advisory Council (CGIAR)
TDR	Special Programme for Research and Training in Tropical Diseases
TF	Trust funds administered by the World Bank
TFO	Trust Funds Operations Department (World Bank)
TRIPS	Trade-Related Aspects of Intellectual Property Rights (WTO)
TSBF	Tropical Soil Biology and Fertility (CGIAR)
TSR	Third System Review (CGIAR)
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
VP	Vice Presidency or Vice President (World Bank)
VPU	Vice Presidential Unit (World Bank)
WARDA	West Africa Rice Development Association (CGIAR)
WBI	World Bank Institute
WTO	World Trade Organization

Director-General, Operations Evaluation	:	Mr. Gregory K. Ingram
Director, Operations Evaluation Department (Acting)	:	Mr. Nils Fostvedt
Task Manager	:	Ms. Uma Lele

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1. Introduction

1.1 The Consultative Group on International Agricultural Research (CGIAR) consists of 16 autonomous international research Centers with a Secretariat in the World Bank and a Technical Advisory Committee (renamed the interim Science Council in October 2001) housed in the Food and Agriculture Organization (FAO) of the United Nations. Membership in the CGIAR has grown from 18 governments and organizations at inception on May 19, 1971, to 62 today (Box 1.1). As a convener and donor to the CGIAR and lender to developing countries, the World Bank has played a key role in chairing the System, providing financial support, and housing and funding the CGIAR Secretariat and overhead costs of the System. The CGIAR's total budget in 2001 was $359 million including $50 million from the Bank.[1]

1.2 This meta-evaluation is part of OED's review of the Bank's approach to global programs. The CGIAR is rightly perceived as a unique global partnership deserving of sustained financial support, but its past successes are no guarantee of future achievements. The opportunity costs of the substantial grant resources that the CGIAR is absorbing (40 percent of DGF grants going to global programs) are rising given the increased needs to address other diverse global issues such as global environmental commons, communicable diseases, and international trade and finance that relate to the Bank's mission of reducing poverty. Equally, lessons learned from the CGIAR experience are relevant both to its own reform process and to other global programs.

Box 1.1. Portrait of a Global Program

The oldest of the global programs which the Bank helped found and supports, the CGIAR has 62 members, including 24 developing countries, 22 industrialized countries, 12 international/regional organizations, and 4 foundations. It is now cosponsored by the World Bank, FAO, UNDP, and IFAD. The CGIAR supports 16 autonomous research Centers and 8,500 scientists and staff in more than 100 countries. From 1972 to 2001 the World Bank contributed $930 million of the CGIAR's total support from the international community of $5.6 billion.

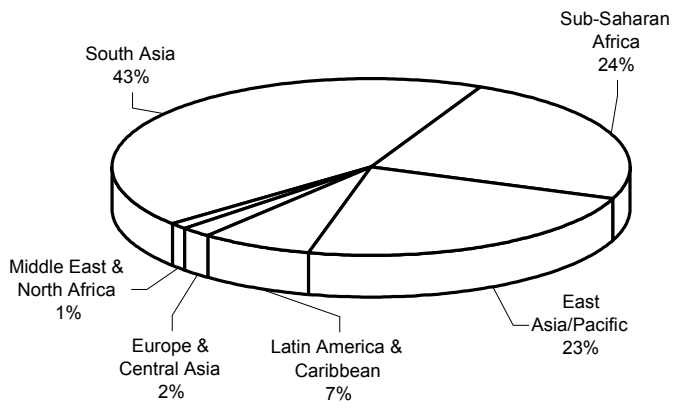
THE CHALLENGES

1.3 The world today is awash with food. Yet, close to a billion people still lack food security, primarily because they are poor. Broad-based agricultural development is crucial to reducing rural poverty, since nearly three-quarters of the poor live in rural areas. An effective global agricultural research system remains crucial for meeting the Millennium Development Goals (MDGs), which the CGIAR has undertaken to help implement. To halve the number of poor from 800 million in 1990 to 400 million by 2015 (an MDG goal established by the World Food Summit and adopted by the World Summit on Sustainable Development in Johannesburg in 2002) will require dramatic increases in total factor productivity — that is, getting more agricultural output from existing cultivated land while using fewer natural resources — particularly in Africa and Asia where 90 percent of the developing world's poor reside (Figure 1.1).

1.4 The problem is more daunting than appears on the surface. According to the CGIAR's own analysis, the decline in the number of food insecure people in the developing world slowed considerably in the 1980s and 1990s relative to the 1970s, the period of the Green Revolution. Indeed, if China is excluded, the number of food insecure *increased* in the rest of the developing world in the 1990s, while the annual rate of growth in cereal yields decelerated from 2.9 percent during the 1967-

1. This includes Center-generated income of $15.7 million and cosponsor support of $6.0 million. See Appendix 1 of the *Overview Report (Volume 1)* for the current organizational chart of the CGIAR.

Figure 1.1. Where the Poor Are

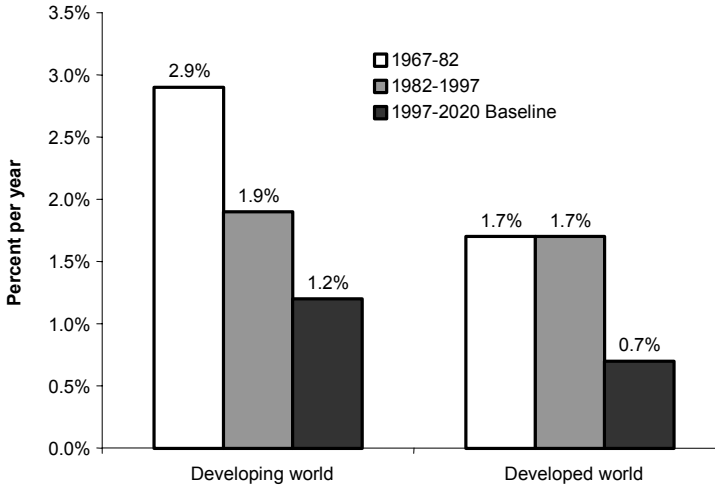


82 period to 1.9 percent during the 1982-97 period. The rate of growth in cereal yields is projected to decline even further (Figure 1.2).[2]

1.5 The original mission of the CGIAR was a strategic, science-based focus on increasing "the pile of rice on the plates of food-short consumers," as characterized by a former Chairman.[3] It was to use the best science in advanced countries to develop technologies for the benefit of food-deficit countries and populations. The CGIAR built its reputation on producing improved germplasm[4] and related technologies with sizeable impacts on poverty. But a rapidly changing external environment has led to an expanded mission and mandate. The mission statement adopted in 1998 is "food security and poverty eradication in developing countries through research, partnerships, capacity building, and policy support, promoting sustainable agricultural development based on the environmentally sound management of natural resources."

1.6 According to one former Chairman, "the CGIAR has been one of the few successful cases of international cooperation — so donors have tended to pile on it new tasks and new expectations. Each incremental change has been sufficiently related to the mission that the expansion has seemed logical."[5] The CGIAR's focus shifted from germplasm research to incorporate ecosystems considerations beginning in the late 1980s. The shift in focus included the acquisition of four existing Centers and establishment of one new Center.[6] The two forestry

Figure 1.2. Cereal yields: Slowdown in growth



Source: Pinstrup-Anderson 2001.

2. Pinstrup-Andersen 2001.

3. Interview with David Hopper, January 17, 2002.

4. "Germplasm" is the hereditary material of plants and animals that is capable of being transmitted from one generation to the next. DNA by itself is not germplasm; it is only germplasm when it has the capability of being transmitted.

5. Interview with Wilfred Thalwitz, January 11, 2002.

6. Four research Centers — ICRAF, ICLARM, INIBAP (now folded into IPGRI), and IIMI (now IWMI) — were acquired, and a fourth Center (CIFOR) was established. Inclusion of the aquatic Center (ICLARM) was undertaken after the CGIAR

Centers and the Center on marine and aquatic resources were a result of the growth in enthusiasm for environmental concerns emanating from the 1992 United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, and the Convention on Biological Diversity (CBD) adopted during the conference.

1.7 The broader mandate raises a number for questions for the future role and organization of the CGIAR that are addressed throughout this meta-evaluation. Consider, for example, the growing scarcity and variability of water supply for farming in developing countries. In Asia, 70 percent of water is used in irrigated agriculture, but the inefficiency of water usage, the rapidly growing urban demand for water, stagnating public investment in water infrastructure, and institutional and policy gridlocks are all likely to have serious consequences for the use of water in agriculture and for future agricultural productivity.[7] How water issues are handled at local and national levels will have serious consequences for the size and patterns of global food trade and aid.[8] What has been and should be the role of the CGIAR in providing new science and research on water that may be applied profitably by small farmers and that national systems are not doing or cannot do? Is the CGIAR's research organized to play to its comparative advantages and core competencies in addressing research issues that the World Bank's water sector studies and operational experience have identified at the country level? (Box 1.2)

1.8 Similarly, consider issues such as soil fertility loss in Africa, threats to the world's forests and marine ecosystems, and climate change, and their effects on the agricultural productivity and variability in the poorest tropical lowland countries. What is the CGIAR's role in researching these problems? Is the CGIAR complementing other research efforts worldwide, or is it duplicating efforts that other researchers can perform better and more cost-effectively? Is it developing effective global networks to deliver global and regional public goods on research issues that are highly diverse and location-specific?

Box 1.2. Concepts Relating to Setting and Achieving Priorities

Comparative advantage describes the ability of one economic actor (e.g., the CGIAR System) to produce a good, service, or knowledge at a lower *opportunity cost* than another economic actor. Opportunity cost is the cost of forgoing one activity in favor of another, measured in terms of those goods, services, or knowledge whose production is forgone.

Dynamic comparative advantage describes how an economic actor may develop new comparative advantages over time as a result of new investments, learning by doing, or comparable changes experienced by other actors.

Core competence refers to an economic actor's unique set of assets that cannot be replicated easily by other actors. These are typically specific production resources, technological and managerial capabilities, or reputational integrity that help actors gain an advantage over competitors.

Collective action dilemma refers to the difficulty that rational self-interested members of a group experience in achieving their common group interest, unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest.

1.9 **Chapter 2** provides the context for the meta-evaluation. It consists of an overview of the CGIAR (including recent trends in funding and expenditures), a conceptual framework for assessing the CGIAR's effectiveness in relation to its mission, a brief description of recent evaluations, and a brief overview of the current Change Design and Management Process.

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had considered and rejected it nine times during the 1970s. See Baum 1986.

7. See Pitman 2002 and World Bank 2002c.

8. See Rosegrant 2002.

SCIENCE AND STRATEGY

1.10 The CGIAR built its reputation on producing improved germplasm and related technologies with sizable impacts on reducing poverty, and the bulk of the CGIAR's impact literature comprises cost-benefit and rate-of-return studies of its germplasm research. Because some have doubted the returns and impacts claimed by its evaluations, the meta-evaluation started by assessing the CGIAR's impact studies of its research on germplasm improvement. Based on this assessment — the subject of **Chapter 3** — the meta-evaluation has determined that the CGIAR has made important contributions to agricultural productivity and poverty reduction.

1.11 The growing importance of genetic resource management, the biotechnology revolution,[9] intellectual property rights (IPRs), and private sector research in producing improved germplasm has led to a vigorous debate about the future role of the CGIAR in this new environment, which is the subject of **Chapter 4**. Some worry that rapid technological change may be leading to obsolescence in the Centers' physical infrastructure and CGIAR scientists may not be mobilizing cutting-edge science and new methodologies from the more advanced research systems, or CGIAR Centers may not be in close and effective enough partnership with advanced and developing countries to address location-specific issues of natural resource management using advanced technologies and global networks in a manner that can scale up impacts over wide areas. Others worry that the freedom built into the autonomous character of the Centers, so critical for conducting good science, may not be allowing the System as a whole to respond to rapid change in the external environment through System-wide strategies and inter-Center collaborations so that the whole is larger than the sum of the parts, making it a System rather than a collection of 16 disparate Centers.

1.12 Policy research has grown more rapidly than any other research area in the CGIAR in recent years. At the same time, the lack of a conducive agricultural policy environment at both the global level and in developing countries, and a shortage of needed social science research and research capacity, are frequently identified as major constraints to the adoption of new technologies and rapid, broad-based agricultural growth. Hence, **Chapter 5** assesses the scope, quality, and impact of this research.

1.13 Research on natural resource management has become increasingly prominent in the CGIAR research portfolio over the past decade or so, and its links to productivity growth have been a matter of considerable and continuing debate in the CGIAR, raising issues of strategic focus in the System. Therefore, **Chapter 6** assesses the quality, coverage, and impact of the CGIAR's NRM research and extracts implications for the System's science strategy, organizational structure, and financing mechanisms. The chapter also seeks to establish the global public goods nature of research on NRM — a difficult task since resource degradation has local, national, regional, and global consequences.

1.14 Strong national agricultural research systems (NARS) are also critical to ensure the CGIAR's impacts. **Chapter 7** discusses two major issues in relation to NARS. First, in some regions of the world, most notably in Africa, under-investment in NARS has adversely affected their strength and

9. "Biotechnology" has been defined by the Office of the Technology Assessment (OTA) of the U.S. Congress as "any technique that uses living organisms or substances from those organisms, to make or modify a product to improve plants or animals, or to develop microorganisms for specific uses." (OTA, New Developments in Biotechnology: Patenting Life, Special Report, OTA-BA-370. Washington, D.C.: U.S. Government Printing Office, 1989). It encompasses both "traditional biotechnology," which includes well established technologies used in commercially useful operations such as biological control of pests, conventional breeding of plants, animal vaccine production, and cell and tissue culture techniques, as well as "modern biotechnology," which includes recently available tools for expediting selection and breeding ranging from the use of recombinant DNA, monoclonal antibodies, molecular markers, and transgenic techniques, to genetically engineered live organisms used to modify a variety of characteristics in host plants and animals such as productivity enhancement, growth cycles, and resistance to a variety of environmental or genetic stresses.

capacity. In the meantime, the CGIAR's own research has moved downstream, closer to farmers. Proponents argue that this is the result of the CGIAR's dynamic comparative advantage (Box 1.2) and is consistent with a desirable trend in which clients and stakeholders become actively involved in technology generation and its dissemination. Critics argue that the downward drift is a result of the CGIAR's ineffective strategy for partnering with a more diversified set of NARS, and the declining investment in NARS and NARS capacity building. They worry that Centers are increasingly undertaking downstream, development-and-dissemination activities that should be undertaken by national systems given their lower operations costs and greater knowledge of diverse local circumstances.

1.15 Second, the CGIAR has not kept pace with the changing and highly divergent needs of NARS. The capacity of NARS in large and middle-income developing countries now substantially exceeds that of the CGIAR. Some large NARS are now world leaders: China in hybrid rice, Brazil in minimum tillage, and India in information systems. NARS argue that the CGIAR has not kept pace with their increasingly complex needs and does not consider them equal partners.

1.16 Equally important to the ongoing debate, and the subject of **Chapter 8**, is impatience with the failure of the international community, including the donor supporters of the CGIAR, to have the impact on food security in Africa that it did in Asia, despite nearly $2 billion in CGIAR's research investments and nearly $1.5 billion of World Bank lending to agricultural research and extension in Africa since 1971. Is the CGIAR effectively partnering with the NARS of African countries? Is it helping to throw light on the vexing and chronic policy and institutional issues constraining African agricultural growth that have defied easy solutions by the international development community? By the same token, is its research addressing the key technological constraints that limit the returns to policy and institutional reform where progress has been made?

GOVERNANCE, ORGANIZATION, FINANCE, AND MANAGEMENT

1.17 Notwithstanding the broadened agenda of the CGIAR, until recently donors have been unwilling to commit additional resources in the aggregate. Between 1992 and 2001, overall contributions grew at an average annual rate of 0.7 percent in nominal terms and declined by 1.8 percent per year in real terms. At the same time, the share of restricted funding tied to specific programs or projects increased from 36 percent of total funding in 1992 to 57 percent in 2001. Excluding the Bank, which provides completely unrestricted funding, the share of restricted funding increased to 67 percent in 2001.

1.18 Funding shortages in 1993-94 led to the consolidation of Centers from 18 to 16. In response to the funding crisis, the CGIAR Chairman, Ismail Serageldin, reached widely to solicit support during a process he called "Renewal." As developing countries gained seats at the table, and their regional and subregional research organizations became more organized, their enlarged membership and formation in the global forum has led to a healthy debate about whose agenda prevails in the priorities and strategies of the CGIAR, whether that of donors or developing countries, and who sets the priorities.[10] **Chapter 9**

10. The membership of the CGIAR consists of "international organizations, governments, and private foundations that support the mission of the CGIAR, participate in policy making, and provide support for the conduct of research at the sixteen international Centers." But who precisely are the members in good standing, and what are their roles, responsibilities, and privileges vis-à-vis non-members is not clear. For example, only 9 of 22 developing countries the CGIAR reports as members were regarded as members "in good standing" (whose annual membership dues of $500,000 were paid in full) and eligible for ExCo membership when it was established in 2001. And, although the CGIAR membership currently does not include the commercial private sector or NGOs, the CGIAR established a Private Sector Committee and an NGO Committee in 1995 that reported to the Group as a whole and gave the chairs of these two

reviews reforms in the organization and management of the CGIAR since the mid-1990s, starting with the 1993-94 financial crisis, followed by Renewal, the Third System Review (1988), and the Federation proposal of the Committee of Board Chairs (CBC) and Center Directors' Committee (CDC) in 2000, and concludes with an assessment of the continuing relevance of the CGIAR's founding principles to meet the external and internal challenges facing the System.

1.19 The Third System Review concluded that the CGIAR's research investments are the "single most effective use of official development assistance bar none." It recommended that the World Bank continue its support of the CGIAR, but also emphasized that the CGIAR needed to change fundamentally to be effective in the future. However, the chairman of the external review, Maurice Strong, also acknowledged that the culture of the CGIAR makes it difficult for it to reconfigure itself in response to external assessments. The four most recent Chairmen[11] of the CGIAR share that sentiment, while the current Chairman has launched a significant reform program, known as the Change Design and Management Process (CDMP), upon assuming the chairmanship. **Chapter 10** assesses how well the current reform process is addressing issues raised in previous evaluations.

1.20 The World Bank has played multiple roles in the CGIAR — as convener (founder and cosponsor), as donor to the System, and as a lender to developing countries for complementary activities. As a result of its multiple roles, the Bank has been described to OED as the indispensable guardian of the CGIAR, and as the "glue" that makes the System coherent and larger than the sum of 16 research Centers. The Bank's leadership role, its financial contributions, and its operational support are viewed by other donors as a seal of approval, giving them the confidence to continue to invest in the System. But others argue that the Bank has not exercised the leadership needed to stimulate *long-term* reforms of the System. **Chapter 11** assesses the multiple roles that the World Bank has played in the CGIAR.

1.21 The very success of the CGIAR has created risks of institutional complacency. The global coalition that has sustained the CGIAR over three decades is entitled to assurances that oversight of the disposition of CGIAR funds is sound and that necessary safeguards are in place to counter vested interests. The changes introduced under the Change Design and Management Process are creditable given that systemic changes have not been easily brought about in the CGIAR. But they may not be sufficient to enhance, let alone maintain, past levels of achievement. The current Chairman of the CGIAR has, however, suggested to the meta-evaluation team that the CGIAR's culture can only accommodate incremental, evolutionary changes based on internal consensus building, rather than the radical, revolutionary changes that the TSR and other previous evaluations and subsequent proposals (such as the Federation proposal) considered necessary in view of the external and internal challenges facing the System and which he thought possible at the time of taking on the chairmanship. Other observers of the CGIAR have noted, however, that daunting internal collective action problems stand in the way of reform, so that major systemic change may only come about through external intervention, including leadership from its main donors. Therefore, both the substance of the changes considered needed by previous reviews and the processes by which the changes are brought about are treated in this report.

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committees a designated place at the plenary table during International Centers Week and the Mid-Term Meetings, and made them full members of the Executive Council in 2001.

11. In 2000, Ismail Serageldin, CGIAR Chairman (1994-2000), stated in his farewell speech to members, "we face the prospect of ossifying…and of gradually fading into obsolescence and, ultimately, oblivion, while other actors, more swift, better endowed, and more responsive to the needs of our clients, pass us by" (MTM 2000 Summary of Proceedings). Likewise, at International Centers' Week 2000, newly installed Chairman Ian Johnson asserted, "there is strong sentiment for change in the CGIAR. Current realities require the CGIAR to gear up for change, and such change must be reflected in both form and function" (ICW 2000 Summary of Proceedings).

2. The Context for the CGIAR Meta-Evaluation

2.1 The purpose of this chapter is to define the context for the meta-evaluation. It consists of an overview of the CGIAR, a conceptual framework for assessing the CGIAR's effectiveness, a brief description of recent evaluations, and a brief overview of the current Change Design and Management Process.

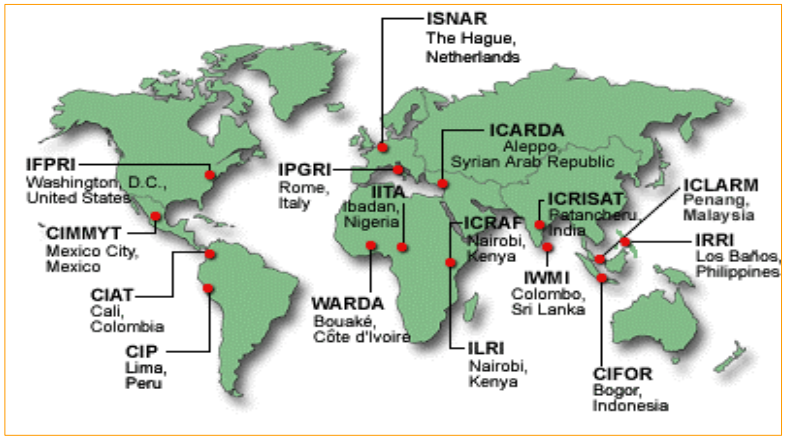
AN OVERVIEW OF THE CGIAR

2.2 Founded on May 19, 1971, the CGIAR originally consisted of four agricultural research Centers established by the Rockefeller and Ford Foundations: the Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT) in Mexico, the International Rice Research Institute (IRRI) in the Philippines, the International Institute of Tropical Agriculture (IITA) in Nigeria, and the Centro Internacional de Agricultura Tropical (CIAT) in Colombia. It had 20 members in 1971: 11 governments of industrialized countries, 6 international organizations, and 3 foundations. Its initial annual budget was about $20 million in nominal dollars.

2.3 By 1993, the CGIAR had 18 Centers, 39 members, and annual funding of $328 million.[12] A funding crisis in 1993-94, along with other considerations, led to the merger of the International Livestock Center for Africa (ILCA) and the International Laboratory for Research on Animal Diseases (ILRAD) into the International Livestock Research Institute (ILRI), and the merger of International Network for the Improvement of Banana and Plantain (INIBAP) into the International Board on Plant Genetic Resources (IBPGR). The new consolidated Center was renamed the International Plant Genetic Resources Institute (IPGRI). Today, there are 16 CGIAR Centers conducting research on a variety of issues worldwide (Figure 2.1).[13]

2.4 Membership has also expanded substantially since the CGIAR's inception. The first developing countries to become members were two OPEC countries, Nigeria and Saudi Arabia in 1975, and the first non-OPEC developing countries to become members were the Philippines and Mexico in 1980. As of January 2003, the CGIAR has 62 members: 24 developing and transition countries, 22 industrialized countries, 12 international and regional organizations, and 4 foundations. Morocco, Malaysia, Israel and the Syngenta Foundation, the latest additions to the membership, joined the CGIAR in 2002.

Figure 2.1. An Overview of CGIAR Centers



2.5 Organizationally, the CGIAR System has four components: the Consultative Group (the members); the 16 Centers; CGIAR committees (including standing, advisory, partnership, and Center committees); and the CGIAR Secretariat. The

12. Includes Center-generated income of $11.0 million and an estimated $6.0 million of cosponsor support.

13. See Annex A for the specific mandate of each of the 16 Centers.

Consultative Group is led by a Chairman, historically a vice president of the World Bank (except for the CGIAR's first few years), nominated by the World Bank's president in consultation with the group's cosponsoring agencies. The CGIAR has four cosponsors: the World Bank, the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), and the International Fund for Agricultural Development (IFAD).[14] The principal advisory committee has historically been the Technical Advisory Committee (TAC), which has been housed in FAO, is supported by a secretariat, and is now being transformed into a Science Council (the existing TAC operating as the interim Science Council since October 2001). In 2001, the group established an Executive Council (ExCo) to facilitate decision-making and implementation.[15]

2.6 The CGIAR is an informal organization. It is remarkable that such a large program has operated for so long without a written agreement, charter, or formal definition of roles, responsibilities or accountabilities. Six main principles have governed the organization and evolution of the CGIAR from the beginning: **donor sovereignty**, in which each member determines its level and composition of financial contributions to the Centers; **Center autonomy**, whereby the research Centers are constituted as international organizations governed by separate boards of trustees; **consensus decision-making** by members, facilitated by the Chairman; **independent technical advice** in priority-setting and resource allocation; **informal status**, lacking legal status or explicit bylaws; and a **non-political (non-partisan, non-ideological) nature**. Some of these principles have come under considerable stress and some are no longer relevant in the current highly changed circumstances, as demonstrated in this report, yet they remain operative even in the context of the recent Change Design and Management Process (CDMP) introduced by the current CGIAR Chairman Ian Johnson, and discussed in Chapter 10.

2.7 The CGIAR is a two-level financial system. The System level comprises the financial contributors (including cosponsors, members, and non-members), the Consultative Group itself, the CGIAR Secretariat, and the TAC/iSC. The Center level comprises the 16 Centers.[16] Traditionally, TAC recommended System-level priorities and strategies, while the Centers developed their own Center-level priorities and strategies within the overall System context. TAC and the CGIAR Secretariat have jointly carried out periodic External Program and Management Reviews (EPMRs) of the Centers and inter-Center thematic reviews, while TAC's Standing Panel on Impact Assessment (SPIA) has had responsibility since the second half of the 1990s for System-level monitoring,

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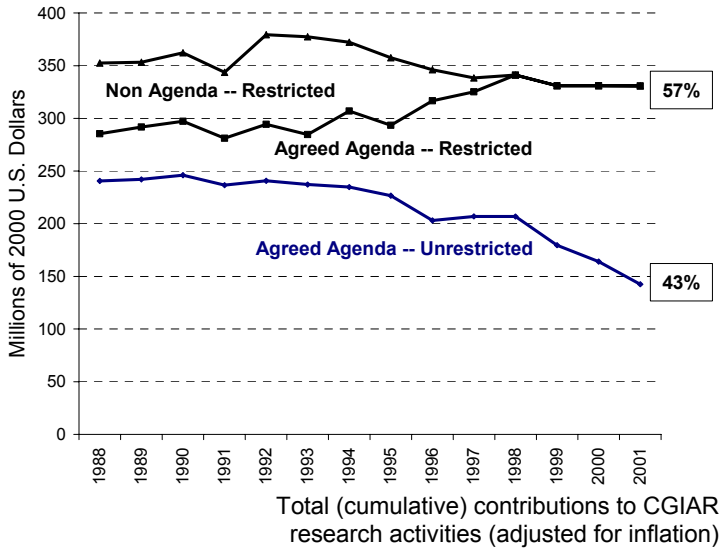
14. CGIAR Secretariat 2000e. The primary role of the cosponsors has been to impart international legitimacy and an assurance of continuity to the CGIAR. The World Bank, FAO, and UNDP have been cosponsoring agencies since the CGIAR's founding; IFAD became a cosponsor in 2001, largely to help assert the CGIAR poverty agenda. For a short time during the 1990s, the United Nations Environment Programme (UNEP) was also a cosponsor. UNDP and FAO have not been able to maintain their financial commitments, UNEP dropped out due to funding shortages, and IFAD indicated when it joined that it would not contribute funds beyond what it already did. This situation has reduced the funding for TAC/iSC making it more unpredictable and more dependent on the World Bank, affecting in part the ability of TAC/iSC to perform, whereas funding for the CGIAR secretariat from DGF has been stable and predictable. FAO's role has recently increased as a trustee of the 600,000 accessions of plant genetic material that the CGIAR Centers hold in trust and with the passage of the International Treaty on Plant Genetic Resources for Food and Agriculture (2001), (See Chapters 9 and 10 for further discussion of these organizational and management issues).

15. See Chapter 10 and Annex D for further details.

16. Annex E, Table E-1, presents the sources and uses of funds for the overall System for calendar year 2001 (equal to the fiscal year), which consolidates the System-level accounts presented in Table E-2 and the combined Center-level accounts for the 16 Centers in Table E-3. These accounts do not include two additional sources of funds. First, while the System pays for the CGIAR chairman, TAC members, and Center officials to attend meetings of the System, such as International Centers Week (ICW) and the Executive Council (ExCo), most CGIAR members pay their own way to these meetings, and donate their staff time to the System throughout the year. The total collective cost of AGM 2002, held in Manila from October 30 to November 3, 2002, which included well over 800 participants (of which more than 100 participated in the CGIAR Business Meeting itself) has been estimated at more than $4 million. Second, these accounts do not include in-kind contributions of land or buildings from developing countries for the Centers and their regional offices, genetic materials, funds devoted to collaborative research, and time spent by officials of the NARS on group matters.

evaluation, and impact assessment. The Centers themselves have conducted similar reviews of their own research activities. The CGIAR Chairman, Center directors, and Center boards have shared responsibility for fundraising. The CGIAR Secretariat has provided support services, including allocation of the Bank's unrestricted funds (until 1994), in accordance with priorities established by TAC/iSC, channeling of Bank-managed trust funds to Centers, monitoring, and overall reporting of the System level resources to the membership.[17] Over time, these roles and responsibilities have evolved considerably, however. The full range of reviews of the CGIAR and its Centers are discussed later in this chapter, and a detailed analysis of the evolution and implications of the CGIAR's organization, governance, management, and financing are contained in Chapters 9 and 10.

Figure 2.2. Non-Agenda (Complementary) Funding Has Been Folded into Agreed Agenda (Core) Funding, and Restricted Funding Has Increased



Source: *CGIAR Financial Reports, 1988-2001*

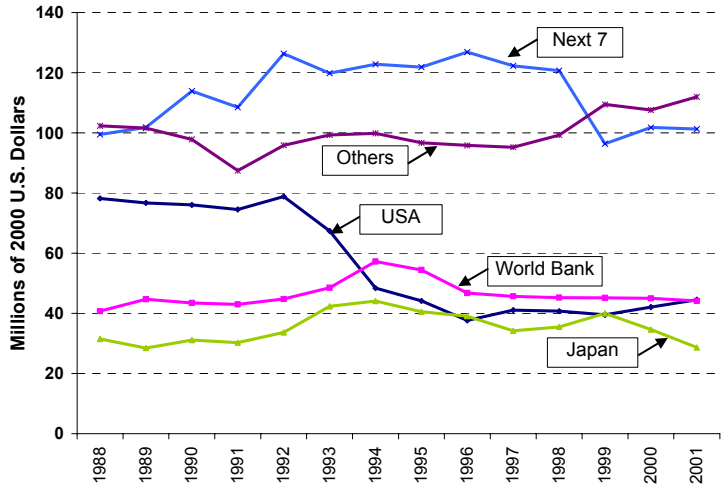
2.8 The System as a whole received financial contributions of $337.3 million toward its research agenda in 2001, of which 95 percent came from members and 5 percent from non-members.[18] Overall contributions have been relatively stable since the addition of four new Centers in 1992 — growing at an average annual rate of 0.7 percent in nominal terms and declining by 1.8 percent in real terms between 1992 and 2001 (Figure 2.2). However, the proportion of restricted funding increased from 36 percent in 1992 to 57 percent in 2001, with most of this increase occurring since 1998. While Centers may allocate unrestricted funds to any program or cost according to a Center's institutional needs or priorities, donors may restrict funds either by attribution (to a particular research program or region) or by contract (to a project, subproject, or activity). But the reporting arrangement on restricted funding is confusing at best. For example, an allocation to one Center as opposed to another is not classified as restricted, since, in accordance with the principle of donor sovereignty, donors allocate funds to the Centers of their choice (either directly or through a World Bank trust fund), not to the System as a whole. It is presumed that the allocations to the new Challenge Programs will now be classified in the same way — as unrestricted, unless restricted by attribution or contract.[19]

17. Although a finance committee existed, several informed former members of that committee have indicated that the it did not function well, and TAC members have pointed out the lack of transparency evident in decisions made by the finance committee that were contrary to TAC recommendations.

18. A modest (less than 1 percent) proportion of these are in-kind contributions, usually technical assistance (scientific experts), from industrialized countries. This does not include cosponsor support of $6.0 million from the World Bank, FAO, and UNDP to cover the operating costs of the CGIAR Secretariat and TAC/SC, nor Center-generated income of $15.7 million in 2001.

19. Although the Centers carry out long-term research, multi-year commitments are uncommon for unrestricted funding commitments, while restricted funding is often a multi-year commitment. Funding of Challenge Programs is discussed in Chapter 10.

Figure 2.3. The World Bank Became the Largest Donor in 1994



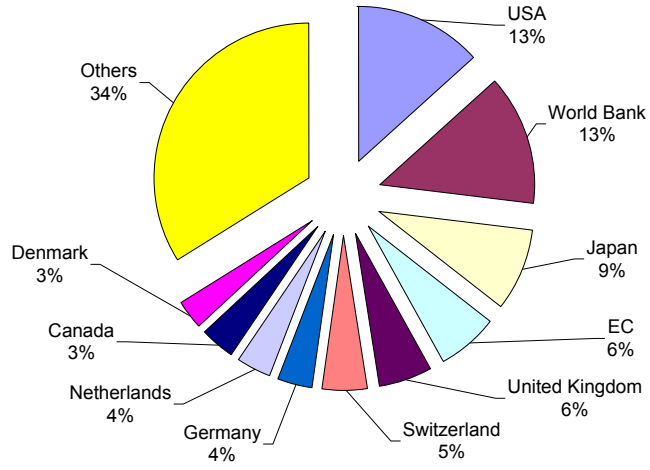
Contributions to CGIAR Research Activities (adjusted for inflation)

Source: ***CGIAR Financial Reports, 1988-2001.***

2.9 The overall picture in Figure 2.2 hides a funding crisis (discussed in Chapter 9) that occurred in 1993 and 1994 when the United States and Canada reduced their funding by $24 million and $6 million, respectively, over the two-year period. The changes in the financial arrangements adopted in 1994 sustained the aggregate level of support for the System, although fundamentally changing the way in which the System was financed.[20] Among the top ten donors, the World Bank made up $12.4 million of this shortfall over the two-year period, Japan another $10 million, Denmark $3.3 million, and the Netherlands $2.8 million (Figure 2.3). Some diversification of funding has occurred over the past 10 years, with the share of contributors other than the top ten increasing from 25 percent in 1992 to 34 percent in 2001. The top three donors still contributed 35 percent of the total in 2001 compared to 41 percent in 1992, and the top ten contributed 66 percent (Figure 2.4) compared to 75 percent in 1992. The top three donors also supplied about 60 percent of the unrestricted funding in 2001 that finances Center overheads, gene bank operations and maintenance, and longer-term research programs, compared to 45 percent in 1992.

2.10 The World Bank provides three kinds of financial support to the CGIAR System — as a donor contributing more than $800 million to the CGIAR research activities since 1971, as a cosponsor contributing $5 million a year since 1991 to the operating costs of the CGIAR Secretariat and the TAC/iSC, and as a lender to the client countries of the CGIAR.[21] The first two combined make the World Bank the largest grantor to the CGIAR System during the past ten years (contributing $500 million between 1992 and 2001, compared to $450 million for the United States). The Bank's contribution toward the CGIAR research activities is more valuable

Figure 2.4. Top Ten Donors Provide Most of the Funding



Share of total contributions to CGIAR research activities, 2001

Source: *CGIAR Financial Report, 2001*

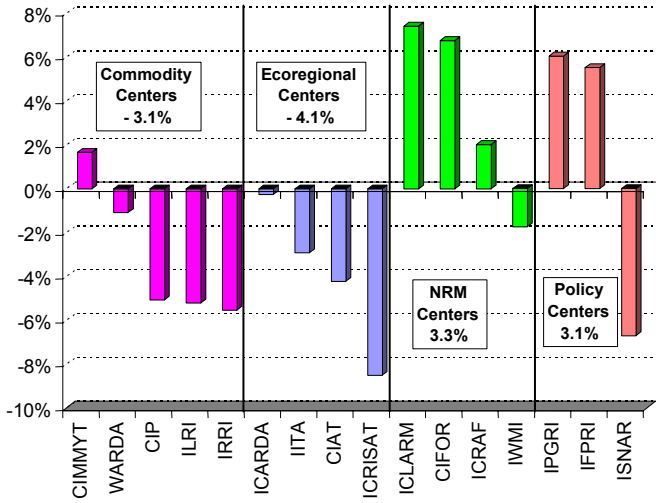
20. The 1993-94 funding crisis and the 1994 financial reforms are discussed in greater detail in Chapter 9.

21. These three roles of the World Bank in relation to the CGIAR are also discussed in greater detail in Chapter 11.

than most donors' contributions, since it is entirely unrestricted. The Bank provided almost one-third of all unrestricted funding for CGIAR research activities in 2001.

2.11 The overall picture in Figure 2.2 masks substantial differences in research funding received by each of the 16 Centers. Allocations to the four natural resource management Centers combined grew by 4.2 percent annually over the period, allocations to the three policy and capacity-building Centers grew by 2.5 percent, and allocations to the five commodity-oriented Centers and four ecoregional Centers, which largely conduct research on germplasm improvement, declined by 3.3 percent and 4.2 percent, respectively (Figure 2.5).

Figure 2.5. Allocations to Commodity and Ecoregional Centers Have Declined

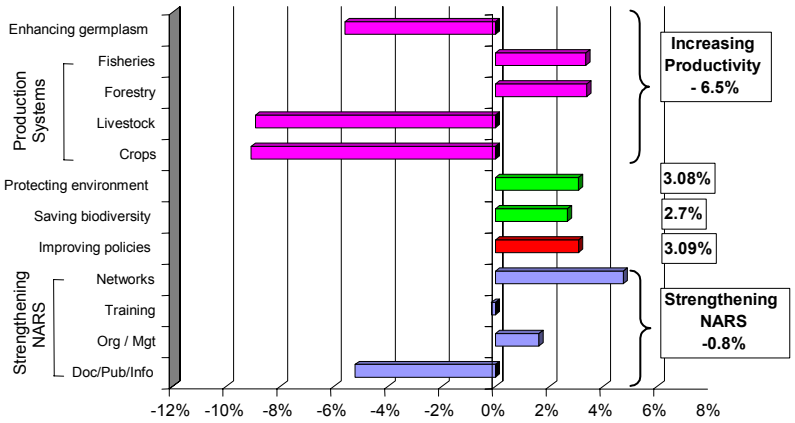


Average annual increase in Center funding (adjusted for inflation), 1992 to 2001

Source: OED calculations based on *CGIAR Financial Reports, 1992-2001*.

2.12 The CGIAR classifies the research expenditures of the 16 Centers into five categories of research activities. In the new reporting system introduced by the CGIAR leadership in 1994 as part of the financial reforms, the CGIAR's research expenditures on *increasing productivity*[22] — widely viewed as the traditional strength and comparative advantage of the CGIAR System — declined by 6.5 percent annually in real terms between 1992 and 2001, while those on *improving policies* and on *protecting the environment* (largely related to NRM) both increased by 3.1 percent annually (Figure 2.6). Research expenditures on *saving biodiversity* grew by 2.7 percent annually and on *strengthening NARS* declined by 0.8 percent.

Figure 2.6. Research with Proven Impacts on Poverty Has Declined Dramatically

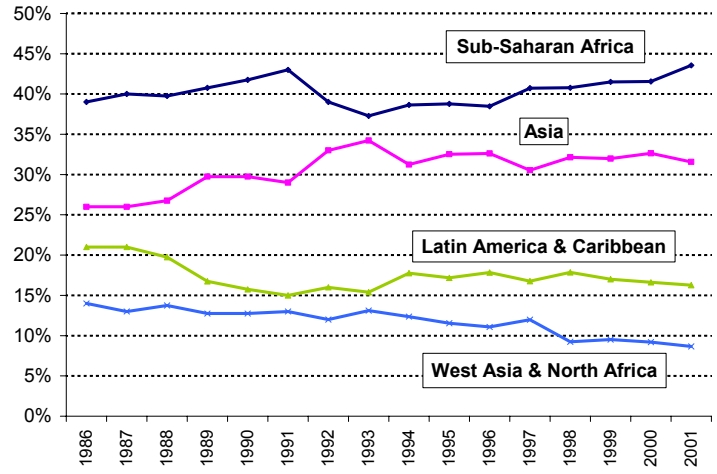


Average annual increase in Centers' expenditures by type of research activity (adjusted for inflation), 1992 to 2001

Source: OED calculations based on *CGIAR Financial Reports, 1992-2001*

22. The CGIAR's annual financial reports define "increasing productivity" as comprising germplasm improvement and production systems research on crops, livestock, fisheries, and forestry. The classification of expenditures among activities in CGIAR reports must be interpreted carefully, since the System as a whole has not maintained expenditure data that could be used for strategic planning and managerial System-level decisions due to the autonomous nature of the Centers and Center-level funding arrangements preferred by the donors. Policy and NRM research can also be important ingredients in increasing productivity, but their impacts have not been assessed.

Figure 2.7. Centers' Expenditures on Africa Have Increased Slightly During the Last Ten Years



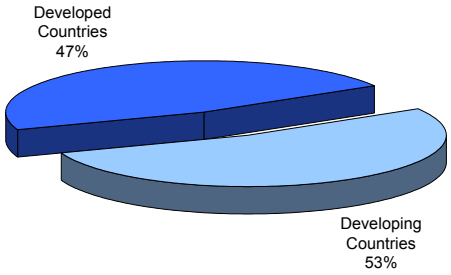
Source: *CGIAR Financial Reports, 1988-2001*

Training — which is crucial for accessing global knowledge, which represents about 40 percent of "Strengthening NARS," and which many NARS consider the most important contribution of the CGIAR after its germplasm research — has declined by 0.2 percent annually.[23]

2.13 Among the subcategories that make up "increasing productivity," research expenditures on fisheries and forestry grew by 3.4 percent annually in real terms between 1992 and 2001, and that on enhancing germplasm, livestock, and crop production systems declined by 5.6 percent, 8.9 percent, and 9.1 percent annually. This confirms the continuation, indeed, the acceleration of trends that became apparent in the 1980s toward a declining share of expenditures on increasing productivity and germplasm enhancement.[24] The Challenge Programs that are being approved by the CGIAR (and discussed later in this report) are projected by the commodity Centers to further reduce their budgets for research.

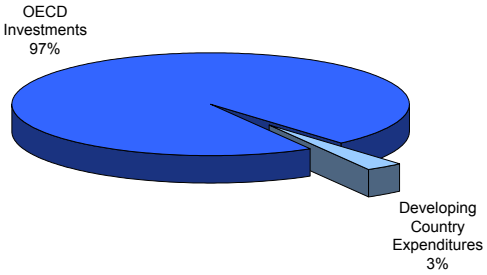
2.14 The regional allocation of research expenditures has been fairly stable since 1992 with one major difference (Figure 2.7). Expenditures on Sub-Saharan Africa increased slightly from 39 percent of total expenditures in 1992 to 44 percent in 2001, while that on West Asia and North Africa

Figure 2.8. Global Public Agriculture Research Expenditures, 1995: $21.7 Billion



Source: Pardey and Beintema 2001

Figure 2.9. Global Public Health Expenditures, 1998: $73.5 Billion



Source: "Monitoring Financial Flows for Health Research" in Global Forum for Health Research and Development 2001.

23. The CGIAR only provides data on Centers' expenditures by research activity for agreed agenda funding — that is, not including non-agenda funding. Therefore, the growth rates in Figure 2.6 include an adjustment for the redefinition of agreed agenda and non-agenda funding over this time period, in order to facilitate a ready comparison of the growth rates in the Figure 2.6 with those in Figure 2.5, which include non-agenda funding.

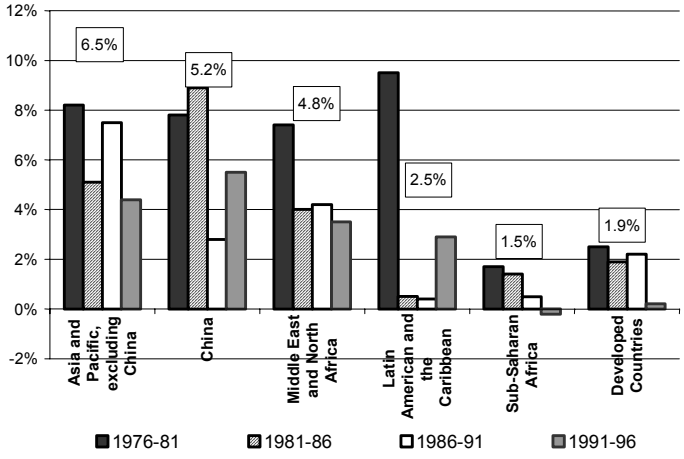
declined from 12 percent to 9 percent. The shares of Asia and Latin American and the Caribbean have been relatively constant at 32 percent and 17 percent respectively.

2.15 In the early years, sustained investment in the CGIAR had considerable positive impact on stimulating investments in research at the national level in developing countries. Conversely, and by comparison, the limited investment in health research at the global level is reflected in the limited investment in health research in many developing countries (Figures 2.8 and 2.9). But this pattern has begun to change.

2.16 The growth of complementary, public sector investments in agricultural research by developing countries has slowed down from an average of 7.0 percent in 1976-81 to 3.6 percent in 1991-96. Across regions, public sector research expenditures appear to have rebounded in China and Latin America during 1991-96, but continued their decline in the other three developing regions. (Figure 2.10). Excluding the three large countries — China, India, and Brazil — which have increased their agricultural research expenditures in recent years, the overall situation is even worse.[25] During the same period, there has been a decrease in funding from donor countries for agricultural research (Figure 2.11).

2.17 These trends are important reasons for the CGIAR's limited impact in some regions, such as Africa, and perhaps overall in more recent years. Without these complementary investments at the national level (and increasingly at the regional and subregional levels, especially where countries are too small to have a critical minimum mass of scientists) the CGIAR's role will remain particularly important, but its impact would likely remain limited, because the donors are expecting the CGIAR to fill the gap by moving downstream into areas that are not the CGIAR's comparative advantage or core competencies, as discussed below. This report returns frequently to the issue of core and complementary investments in developing countries, particularly in Chapter 11 on the role of the World Bank in the CGIAR, as the critical determinant of impact, but it is an area in which both developing countries and donors have failed miserably in recent years, with the notable exception of large developing countries such as China, India, and Brazil.

Figure 2.10. Average Annual Growth Rates in Public Agricultural Research Expenditures, by Region and Half Decades, 1976 to 1996



Source: Pardey and Beintema 2001, "Slow Magic"

24. Lipton 1999, p. 18.

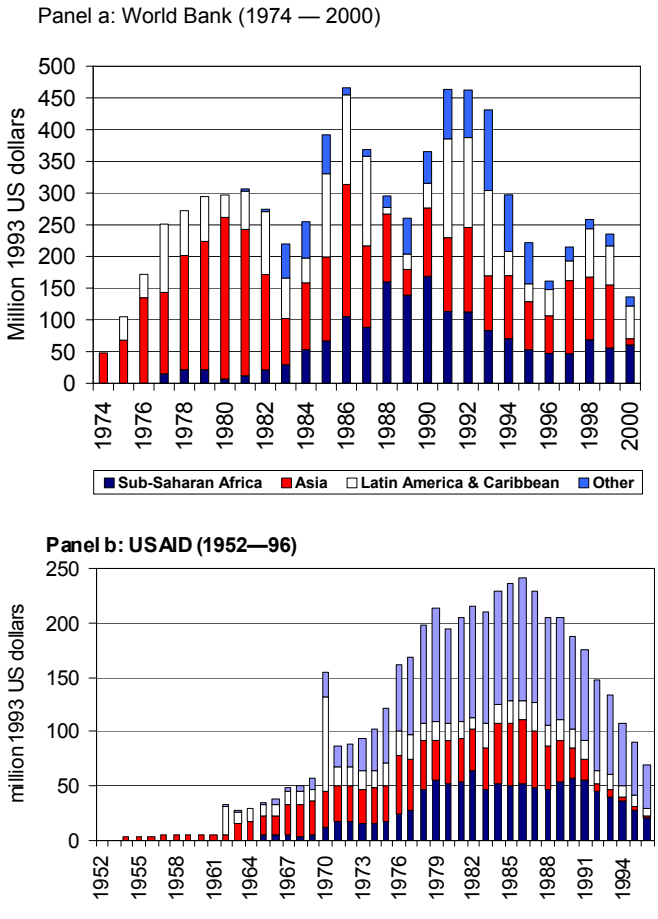
25. Pardey and Beintema 2001.

A CONCEPTUAL FRAMEWORK FOR ASSESSING CGIAR EFFECTIVENESS

2.18 This section explores issues relating to the organization, financing, and objectives of agricultural research at the global, regional, and local levels in order to provide a framework for assessing the CGIAR's effectiveness in achieving its mission. In particular, this section discusses the relevance and applicability of the concept of global and regional public goods to the CGIAR in the same way that the OED global review is doing in its other case studies of global programs.

2.19 While overall official development assistance (ODA) has remained stagnant at about $45 million annually,[26] the share of ODA being spent on global programs has increased from 5.0 percent in 1980-82 to 6.8 percent in 1990-92 and 8.8 percent in 1996-98.[27] This increase has largely been justified on the grounds that such programs supply global and regional public goods. But there is in fact much confusion among the funders of global programs as to which global programs are actually supplying global and regional public goods and, indeed, whether the provision of global public goods should be a primary criterion for the support of global programs.[28] This increase also raises issues of criteria for allocating grant funds among a competing set of programs (Figures 2.12 and 2.13).

Figure 2.11. World Bank and USAID Funding of Agricultural Research by Region



Source: OED Data, and Philip Pardey and Nienke Beintema (2001). Bank data includes research and extension; USAID data includes research only.

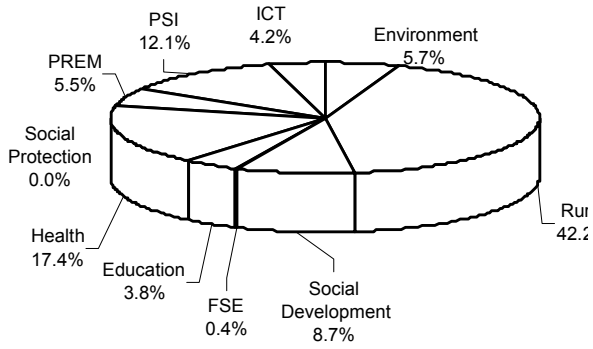
2.20 The CGIAR was the first program providing global public goods to receive funds from the Bank's net income. It currently faces increasing competition for the 40 percent share that it receives of DGF funds going to global programs, and is one of 12 global programs that the Bank's Executive Directors have excluded from the normal DGF requirement for an exit strategy from DGF

26. Ferroni and Mody 2002, p. 19.

27. Hewiitt, Morrisey, and Veldt 2001.

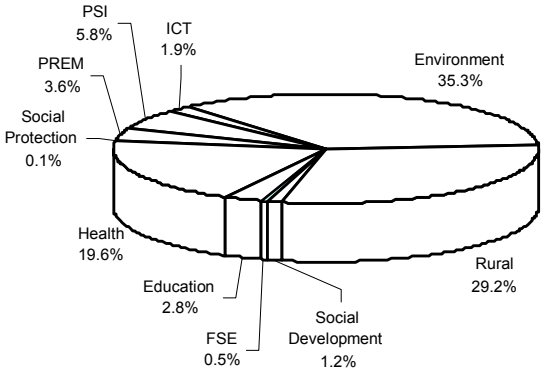
28. See Kaul, Grunberg, and Stern 1999. OED is also addressing these issues in its overall review of global programs.

Figure 2.12. Rural and Health Sectors are Prominent in DGF Allocations to Global Programs (FY02 figures)



Source: DGF Secretariat

Figure 2.13. Environment, Rural, and Health Sectors are Prominent in Overall Global Program Expenditures (FY01 figures)



Source: OED data

funding.[29] Faced with this increasing competition from global programs in other sectors, as well as challenges to its perceived sense of entitlement, the CGIAR is increasingly being evaluated according to several concepts relating to global public goods. For the purpose of understanding the role of the CGIAR in the global agricultural research system, four sets of issues are important: (1) the different types of research along the research and development continuum, (2) the production of global, regional, and national public goods, (3) core and complementary activities, and (4) the respective roles of public and private actors in producing public goods through research.

The Agricultural Research and Development Continuum

2.21 The concept of an agricultural research and development continuum provides a framework for considering the role of different actors in research and the different types of research that they conduct. Research administrators distinguish four types of research along this continuum — basic, strategic, applied, and adaptive research (Box 2.1) — all of which represent steps in the process of generating new knowledge associated with improved agricultural technologies. Knowledge transfer to the intended clientele — in the CGIAR's case, to farm households in developing countries — requires institutions capable of discovering, testing, applying, and adapting technologies developed elsewhere and ensuring their prompt dissemination. Achieving effectiveness and impact requires strong linkages and information flows across networks, regions and researchers in industrialized countries, the CGIAR, and developing countries, combined with a supportive economy-wide and sectoral policy and investment framework.

2.22 Conventionally, the CGIAR has been viewed as conducting strategic research in the research and development continuum. Representing less than 4 percent of the global total of public and private sector agricultural research expenditures, it was designed to use the best science in advanced countries to develop technologies for the benefit of food-deficit countries and

29. The Bank's Development Grant Facility (DGF) was established in 1997 to consolidate the management of existing arrangements for grant making under a single umbrella and to ensure that the use of Bank grant resources is closely aligned with sector and Bank-wide priorities. As discussed in more detail below, three main criteria for receiving grants, that were recommended by OED in 1998 and subsequently formalized in OP 8.45, are (1) subsidiarity, (2) arm's-length relationship, and (3) exit strategy.

Box 2.1. The Research and Development Continuum

Basic research involves the search for knowledge and understanding of basic organism functions or physical phenomena. The unraveling of the structure of DNA by Watson and Crick is an example of basic research.

Strategic research is mission-oriented application of basic scientific knowledge to produce global and regional public goods. It is aimed at solving specific problems that may be of interest to developing countries with a broad application over several areas using known methodologies and techniques to produce new knowledge, principles, and understanding of critical needs to developing countries. Enhanced plant parent lines that can be used by numerous countries in applied crossbreeding programs are a good example.

Applied research develops tangible inventions by adapting strategic and basic research to solve or meet field problems or needs. An improved parent line, for instance, may have resistance to major local pests transferred through genetic engineering techniques.

Adaptive research is applied research to produce local public goods and evaluation of technological innovations to assess their performance in a particular agricultural system (including its socioeconomic factors) and to then adjust the technology to fit the specific needs identified. Screening and testing are typically conducted both on-farm in farmer participatory trials and on-station. For instance, when several varieties are available, adaptive research would seek to determine those most suited to local conditions and to identify additional research problems that need to be overcome for adoption by farmers.

Technology transfer to farm households involves institutions such as national extension and outreach services, the private sector, NGOs, cooperatives, and rural development programs to inform the clientele in the use of the new knowledge or technology. Techniques include on-farm demonstrations, incubator labs, adoption networks, and farmer-to-farmer exchanges. The importance of extension increases in situations of poor communications infrastructure and low levels of education among farmers.

Source: Adapted from Lele and Coffman 1994.

populations. That said, the CGIAR has also had to conduct applied and adaptive research when developing countries lacked their own capacity to do so. Today, China, India, Brazil and some other large and middle-income countries conduct a considerable amount of upstream strategic research in addition to applied and adaptive research, and smaller countries, particularly in Africa, still look to the CGIAR to fill downstream gaps in their research capacity.

Global Public Goods and Scale Economies

2.23 The literature on the CGIAR highlights the following rationales for the CGIAR: (1) providing a global public good that would not otherwise be produced because of lack of incentives for private sector investment (that is, goods with limited markets and long-term payoffs), and (2) tapping economies of scale and scope in agricultural research that cannot be tapped through country-based research. In addition, support for the CGIAR is often justified on the grounds of generating spillovers beneficial to both public and private actors, and contributing to the improvement of incentives to international and national-level private investment in agricultural R&D.

2.24 Although the CGIAR is the oldest global program supported by the Bank, a long-time observer of the CGIAR has recently noted that the use of the global public goods concept, per se, is relatively new in the CGIAR.[30] The recent usage has been prompted by the emergence of this theme in the operational strategies of UN agencies and the multilateral development banks for the reasons discussed in OED's Phase 1 Report.[31] However, the literature related to the organization of research,

30. Dalrymple 2002b and Winkelman 1994.

31. World Bank 2002a.

including the CGIAR's role, has long considered factors such as spillovers, economies of scale and scope, and the size of targeted markets integral to the economic theory of public goods. Frequent reference to international or global public goods can also be found in documents of the CGIAR's Technical Advisory Committee (TAC) and its current successor, the interim Science Council (iSC).

2.25 Public goods are distinguished from private goods by two characteristics: non-rivalry (one person's use does not reduce the ability of another person to use or enjoy the good at the same time) and non-excludability (a person who does not pay for or otherwise contribute to the supply of the good cannot easily be excluded or prevented from using the good). Global public goods are distinguished from international (between two or more developing regions), regional, national, and local public goods by their reach (Box 2.2). Research on the CGIAR's impact has now clearly demonstrated that the spillover benefits associated with the CGIAR research accrue to both developing and industrialized countries, although some of those benefits were inadvertent and unplanned.[32] Thus, global public goods are those public goods the benefits of which spill across national boundaries and can be consumed by people in more than one country at the same time. National and local public goods, on the other hand, only benefit those who live in a single country or locality.

2.26 From such a perspective, conservation of biodiversity through gene banks and plant breeding has been widely viewed as a global public good. The CGIAR's collection of genetic resources — with more than 600,000 accessions — and its research in plant breeding have benefited both developing and industrial country agriculture, although the research was undertaken for the benefit of developing countries. These benefits illustrate the global public goods nature of the CGIAR's work and the impact assessments of this work demonstrate how this research has generated more benefits

Box 2.2. Global vs. International Public Goods

The recent spate of literature on global public goods is a response to globalization in the sense of the *deterritorialization of space,* which increasingly affects both developed and developing countries. The emerging global public goods literature stresses the *mutuality of benefits* (or costs associated with public "bads" such as the climate change, conflict, the spread of communicable diseases, etc.), which affect both developing and advanced industrial countries. The absence of a global government to deal with these issues requires voluntary collective action and investments at the global level (beyond consideration of aid as charity) to realize mutual benefits for both industrial and developing countries. Much of the Bank's growing activity at the global level has been justified in this new context of cross-border spillovers and cross-border benefits. The rapid rise of supra-territoriality, however, coexists with territorial issues, and the two interrelate in a complex fashion. (See Inge Kaul 1999, Gerrard, Ferroni, and Mody 2001, Lele and Gerrard 2002, and Dalrymple 2002b, among others).

The use of the term "global" is also broader than the CGIAR's traditional use of the word "international" (between two or more developing regions) in another sense. "Global" incorporates emerging challenges to organizing international research that the CGIAR did not previously have to contend with, such as WTO trade rules, intellectual property rights, and international biosafety regulations.

For the World Bank's grant programs, the issue of global and regional public goods has been important since the inception of the grant programs, long before the DGF was established in 1997. Grants from net profits are to be used only when other instruments, such as loans and credits, which are available to individual countries, would not be used by individual countries because of significant cross-border spillovers of benefits. A global program may also be able to mobilize resources and know-how that a single country may not be able to do, even if it is able to borrow.

32. The recent controversy over genetically modified organisms (GMOs) demonstrates the concerns over both positive and negative spillovers that the CGIAR will increasingly have to address.

than the intended international public goods.[33] But there are few truly "pure" global public goods. Most are local or national, and regional at best.

2.27 Plant breeding, for example, also illustrates the limits of non-rivalry and non-excludability. While knowledge pertaining to plant breeding can in principle be non-rival, seeds are not. And knowledge embodied in seeds is excludable where there exist intellectual property rights (IPRs), where hybrid lineages are known only by breeders, or with technologies such as "terminator" genes. Issues of IPRs as they affect public and private investment in agricultural research are discussed in Chapter 4.

2.28 Clearly, what constitutes a public or a private good is also highly contextual and varies across regions and stages of development, as shown by the increased role of private sector research in advanced countries in recent years. This requires a highly nuanced application of the concept of global public goods. However, agricultural research will remain an important public good in developing countries for some time to come, requiring continued public investments, especially given absent or incomplete markets and limited purchasing power of large segments of the population to pay for technological products.[34]

2.29 **Economies of scale and scope** are realized in the production of improved agricultural technologies when knowledge, methods, processes, and information are mobilized in ways that individual countries are not able to do because of a lack of funds or a lack of scientists or institutional infrastructure (Box 2.3). Plant breeding research and research on certain animal diseases conducted by the CGIAR Centers enjoys substantial economies of scale, and relatively large markets for these technologies, with strategic research eventually leading to production of improved breeding material.[35]

Box 2.3. Economies of Scale and Scope in Research

Economies of scale refer to declining per unit costs as the number of units of output produced increases. They are often the result of greater labor and managerial specialization and the affordability of more efficient capital as the quantity of goods produced increases.

Economies of scope occur when the cost of producing two products in combination is less than the total cost of producing each separately. Scope economies often arise because production processes require much the same overhead, or because fixed investments are large and result in some unused capacity.

Spillovers or positive externalities occur where the actions of firms or individuals generate beneficial effects for other agents, such that total social cost exceeds private costs. Spillovers may also be negative.

Spillins occur where firms or individuals benefit from positive externalities or spillovers generated from the actions of others. They are, in effect, spillovers viewed from the perspective of those agents benefiting from the spillover.

2.30 Research on agricultural production systems and natural resource management tends to have relatively low economies of scale and small "markets" because such research often produces location-specific knowledge and information about processes and practices. It is less often designed for applications across multiple agro-ecological, demographic, and policy/institutional conditions and therefore does not generate knowledge, information, and technologies relevant to a broad set of clients. Hence, to generate products (in this case knowledge rather than goods such as seeds and pesticides) that have a large market, broad applicability, and spillovers

33. See Pardey et al. 1996, and Nelson and Maredia 2001.

34. See Pardey and Beintema 2001, among others.

35. Dalrymple 2002b cites Byerlee and Traxler's findings that economies of scale are common in research areas that require substantial fixed investment, e.g., in laboratory infrastructure. Economies of scale are less common in research areas requiring fieldwork and adaptation to local environmental conditions, such as natural resource management research. See also Barrett 2002.

across several regions, requires highly coordinated research networks with a complement of many different disciplines.

2.31 By these criteria, the CGIAR should focus on strategic research related to the production of public goods that may be either global, international, or regional in character, such that they are characterized by economies of scale and scope, and that *cannot be supplied by the private sector or other sources, such as national systems or alternative sources of supply in general*, even if the latter capacity is built.[36] Where public goods can be supplied if national or regional capacity is established, for instance, all effort should be geared to generating capacity at the appropriate level rather than filling such gaps through international research, except on a short-term, temporary basis. The fact that the CGIAR is increasingly filling such gaps at the national and regional levels is an area of concern for the System that is discussed throughout this report.

2.32 Whether, how, and how much truly "global" public goods research should be financed and where it should be conducted — that is, at the international as opposed to the regional or the country level — depends on (1) whether it requires the advanced scientific methods that only developed countries, or increasingly the private sector laboratories, can provide, (2) the extent to which it requires national research systems of developing countries to bring to bear the critical national and local knowledge on policy, institutional, and resource issues, and (3) the capacity and sustainability of the national systems. The CGIAR is ideally suited for such "global" or regional public goods research, such as plant breeding and associated natural resource management research provided it focuses on research with potential for wide impacts (particularly when combined with the rapidly advancing science in industrialized countries) and enables developing countries to participate actively in the research process to help build their capacity.

2.33 What the research objectives should be, at what level the research should be conducted, and how its benefits should be conceived and generated may be quite different depending on the nature of the research problem, the type of solution needed to be brought to bear on it, and how the outcome of the research would impact on the problem. The need for advanced molecular biology techniques and methodologies available only in the laboratories of industrial countries to solve disease or pest problems, for example, would require primarily a voice for the scientists in those laboratories. But to control or eliminate infectious plant and animal diseases in tropical countries will require collaboration of national research systems of developing countries where the problem exists (but currently cannot be controlled due to the limited physical and human capital or financial capacity), given that it is the "weakest link" that will determine the final outcome. The former requires the best of advanced science, while the latter requires much more local capacity development as well as input of local knowledge in research.

Merit Goods

2.34 An important question for a global research network is how much of its effort should be devoted *directly* to the provision of "merit goods" with high social value such as reducing poverty or malnutrition, or the increased participation of women in the development process.[37] This question has

36. Henceforth in this report, unless indicated otherwise, the term "global public goods" includes both international and regional public goods as well.

37. Merit goods are goods whose value derives not simply from the economic norm of consumer sovereignty, but from some alternative norm that overrides rational choice by individual persons or, in the case of foreign assistance, individual nations. See Musgrave 1987. The concept of merit (or demerit) goods should not be confused with that of public goods, since it transcends the distinction between public and private goods (based on non-rivalry and non-excludability). When donors direct development assistance to certain uses, rather than providing pure, untied assistance to developing countries, they are implicitly attaching

become pervasive in the debate about the current and future directions of the CGIAR. The downward drift in the CGIAR's resource allocation and research thrusts documented in this report has resulted in part from the frustration of donors that the national systems of developing countries are too weak to provide the legitimate public goods function due to the neglect by both their own governments and donors of the crucial national investments and capacities. As a result, global programs such as the CGIAR have been expected to fill the gap. But the direct provision of merit goods may not always be the comparative advantage of a global program and may divert it from generating global or regional outputs with potential for large spillovers, provided complementary investments are promoted at the national level. Besides, global public goods are often only one input into achieving merit good outcomes. Poverty alleviation or women's participation require both appropriate public goods such as technologies, *which cannot be produced by the countries themselves,* as well as other complementary conditions — policies, socio-cultural, legal and economic institutions, infrastructure, agricultural inputs, and markets — *which can only be provided by the countries themselves*. Hence, critically evaluating the role of core and complementary activities is important.

Core and Complementary Activities

2.35 A World Bank report, *Global Development Finance, 2001,* distinguishes between *core* and *complementary* global activities. It defines core activities as global and regional programs that *produce* public goods (for example, vaccine research) undertaken with transnational considerations, as well as activities in one country that *generate beneficial spillovers for others*. The report defines *complementary* activities (for example, seed and fertilizer trials, or animal vaccination programs), as designed to assist developing countries in *consuming* the public goods that core activities of global programs make available while at the same time creating valuable national public goods.[38]

2.36 The range of the activities that the CGIAR (as well as other global programs OED is reviewing) are undertaking suggests that a neat division of labor between the production of global public goods at the global level and consumption at the country level is not always possible. In some cases, developing countries "produce" the global public good (such as conservation of biodiversity or the containment of communicable diseases), which both they and the global community enjoy. Hence, investment is needed *in developing countries* to research and produce some global public goods, and assessment criteria of core and complementary activities need to account for spillovers from the local to global level.

2.37 The lack of good water management or pest and disease control at the local level, may have global implications such as the size and direction of food trade and food aid flows as indicated by IFPRI's modeling work. But water should be a topic for a global public goods research agenda only when the research is helping to contribute to *new* scientific knowledge to develop a better understanding of the processes, policies, institutions, or organizational innovations across regions so as to transfer technologies or knowledge. The knowledge generated through such research is global if it is perceived by CGIAR clients (developing countries) to be of relevance to them.[39] By these criteria, much of the research on gender issues would be local, or at best national, unless it is designed to learn lessons across the immense diversity of local social systems that influence women's participation — not an easy task. Climate change also illustrates the complex research choices facing the CGIAR (Box 2.4).

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merit to their own preferences, whether the assistance is tied to the provision of public or private goods.

38. World Bank 2002b, p. 110. This definition of core and complementary goods is similar but not identical to the CGIAR's classification of core and complementary research activities up to 1994.

39. For example, India's small surface irrigation systems have widely adopted drip irrigation methods pioneered in Israel, and systems in northern Nigeria have adopted the small surface irrigation systems used in India.

Box 2.4. The Importance of the Priority Setting Process: The Case of Climate Change

What research to conduct with respect to climate change represents an example of the complex choices facing the CGIAR, illustrating the importance not only of science quality but also of relevance to client needs and the CGIAR's comparative advantage, although in each case the potential research pertains to "global" issues or global concerns. It further illustrates both the importance and difficulty of priority setting among competing demands and the tendency for mission creep in response to "global" concerns in the donor circles.

Evidence amassed by the Intergovernmental Panel on Climate Change suggests that climate change has substantial adverse impacts on the poor, lowland tropical countries. Therefore, research could be aimed at mitigating global climate change, for example, by enhancing carbon sequestration in small farmer rice production, or by increasing agroforestry coverage in developing countries. Alternatively, research could be aimed at helping poor households in developing countries to cope with the local consequences of global climate change or to benefit from the emerging carbon markets. The priorities within CGIAR's research on climate change are confusing, however, and illustrate the temptation to adapt to "fashions" or donor interests, a subject explored in more detail later. Some activities mention not just strategies (to help poor farmers) to adapt to the consequences of climate change but also research into the causes of climate change. Important as this is, it would seem to be better done elsewhere.

Of course, one should always look for "win-win" opportunities where both developed and developing countries benefit. But the primary goal of the CGIAR must always be to address the urgent needs of the poor in developing countries, while considering the magnitude of the spillovers and the likely speed of the impacts on the poor. Even where there are win-win opportunities at the local and global levels, however, it is necessary to assess the opportunity cost of resources used in downstream activities in particular research (such as the cost of field testing in developing countries compared to the likely impacts and time profile of alternatives to achieve impacts on the poor), as well as their organizational implications for the CGIAR. These issues are raised by technologies such as golden rice (discussed in Chapter 4). They emphasize the fundamental importance of a strong scientific review process for priority setting in the overall allocation of resources, not simply the science quality of the individual programs and projects proposed, and highlight the risks of undermining or taking away altogether the important System-wide priority setting and advisory function from the proposed Science Council.

The Funding of Public and Private Sector Agricultural Research

2.38 The essential problem with strategic agricultural research is that market mechanisms tend to undersupply such research, while oversupplying "public bads" such as air pollution or biodiversity loss. Hence, public resources are generally required to increase the supply of public goods. But incentives can also be put in place for the private sector to increase the supply of public goods or reduce the supply of "public bads" through taxes, subsidies, and creating new markets. This helps to explain both in general why global organizations like the United Nations and the World Bank have become increasingly involved in global programs for the provision of global public goods and for the development of global markets such as the Prototype Carbon Fund, and in particular why the CGIAR was established not just as an international financial mechanism to finance the production of agricultural technologies of importance to the food-short and mostly poor developing countries.

2.39 However, the biotechnology revolution and the growing importance of intellectual property rights (IPRs) for improved agricultural technologies are greatly changing the nature of research and technology from public goods to proprietary goods (Box 2.5). More and more agricultural research has acquired private goods characteristics and become attractive to private financing. This can help reduce the need for public finance to a certain extent. But private research will not replace public research of importance to developing countries any time soon (see para. 2.28). The private sector funded 35 percent of the $33 billion (in 1993 international dollars) spent on agricultural R&D worldwide in 1995/96 and 70 percent of the research on genomics, while possessing 80 percent of the intellectual property emanating from it. But private sector expenditure on agricultural R&D in

Box 2.5. The New World of Intellectual Property Rights

"Over the last twenty years or so there has been an unprecedented increase in the level, scope, territorial extent and role of IPR protection. Manifestations of this include:

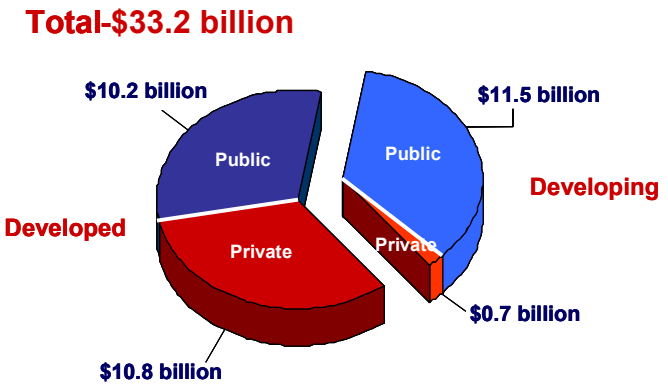
- The patenting of living things and materials found in nature, as opposed to man-made products and processes more readily recognizable to the layman as inventions
- The modification of protection regimes to accommodate new technologies (particularly biotechnology and information technology), such as the EU Biotechnology Directive or the Digital Millennium Copyright Act (DMCA) in the United States
- The extension of protection into new areas such as software and business methods, and the adoption in some countries of new *sui generis* regimes for semiconductors and databases
- A new emphasis on the protection of new knowledge and technologies produced in the public sector
- The focus on the relationship between IP protection through the TRIPS agreement, and of higher standards through bilateral and regional trade and investment agreements
- The widening of exclusive rights, extension of the duration of protection, and strengthening of enforcement mechanisms."

Source: Commission on Intellectual Property Rights 2002, *Integrating Intellectual Property Rights and Development Policy. Report of the Commission on Intellectual Property Rights*, London, September, p. 2.

developing countries was less than 6 percent of all private sector expenditures in agricultural R&D world-wide (Figure 2.14), which is also less than 6 percent of the total expenditures (both public and private) on agricultural R&D in developing countries. Nonetheless, private sector research is already raising important policy issues pertaining to research priorities for the public sector (including for the CGIAR), priorities for public-private partnerships, the control of research outputs, and access to technologies resulting from them. An improved policy environment in developing countries, including more secure IPRs, will help to increase private investments in developing countries.

2.40 Thinking about what financial interventions are needed, at what level and through what kind of institution, in order to achieve the ultimate objective of poverty reduction in the most cost-effective, equitable, and sustainable way is critical, and is increasingly challenging in the context of the growth of the private sector. Nonetheless, the principle of financial subsidiarity is a particularly important and useful concept for the World Bank in this regard, since DGF guidelines call for grants to follow this principle. DGF grants should fund *only those activities that would not qualify for other financial instruments (such as IBRD lending or IDA credits)*. This is consistent with the notion that Bank-supported global programs should not be producing purely national public goods since the Bank's grant resources are highly limited and have many competing demands on them (Box 2.2), nor should they be substituting for national-level or private efforts focused on activities that are not of high national priority, since the opportunity cost of developing countries' own resources used in such pursuits tends to be high.

Figure 2.14. Private Agricultural Research Expenditures are Small in Developing Countries, Large in Developed Countries



Source: Pardey and Beintema 2001.

2.41 A related question for the CGIAR, then, is how much of the Bank's grant funds are leveraging other donor funds for activities that should more legitimately be funded out of the much larger pool of Bank funds for country assistance for lending and loan/credit

administration — a question explored in greater detail in Chapter 7. This chapter argues that the failure of governments and donors to invest in national agricultural systems of developing countries has led the CGIAR to move downstream to invest in development and dissemination activities that should ideally be conducted at the national or regional levels to fill the gap. The possibility of using IDA *grants* rather than credits for national and regional activities now offers an opportunity to increase investments at the national and regional level, which developing countries, especially in Africa, have not been willing to undertake. [40]

PREVIOUS EVALUATIONS

2.42 OED reviewed a wide variety of evaluations of the CGIAR. While many of these reports are treated in detail in the subsequent chapters, annexes, working and background papers accompanying this report, a typology of CGIAR evaluations is presented below. The meta-evaluation team paid particular attention to three evaluations: the OED *Process Review of the World Bank Grant Programs* (1998), the OED review of the CGIAR (1999), and the Third System Review of the CGIAR (1998).

Typology of Evaluations

2.43 CGIAR evaluations can be classified into five categories: external System and Center reviews commissioned by the CGIAR; external Center reviews commissioned by the Centers; internal reviews commissioned by the CGIAR or its Centers; external reviews and audits commissioned by CGIAR members; and external audits of the CGIAR or its Centers.[41]

2.44 *External reviews commissioned by the CGIAR* include several types of evaluations conducted at different levels within the System. External Program and Management Reviews (EPMRs) of individual Centers (more recently referred to as External Reviews, or ERs) were organized exclusively by TAC until 1983, at which time the CGIAR Secretariat was given shared responsibility with the incorporation of Center management reviews into the evaluation process. At the System-wide level, external reviews also form an important evaluation tool for the CGIAR. A total of three such evaluations have been conducted: the First System-wide Review (1976), the Second (1981), and the Third (1998). System-level reviews of crosscutting, thematic, or programmatic topics are also commissioned by the CGIAR or TAC, and include various management reviews, "stripe" reviews, and impact assessments undertaken with increasing frequency since the mid-1980s. Finally, the CGIAR (or TAC) commissions reviews of central CGIAR components, such as the reviews of the CGIAR Secretariat (1988) and TAC Secretariat (1989).[42]

2.45 *External reviews commissioned by the Centers* include Center-commissioned external reviews (CCERs), designed to evaluate program and management topics at individual Centers and to support and complement CGIAR- or TAC-commissioned reviews such as the EPMRs, ERs, and System-wide reviews. External reviews of Centers are conducted by individual Centers about once every five years, with the objective of monitoring the institutional strength and contributions of a

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40. IDA deputies have recently authorized the expanded use of grants under IDA 13, in the range of 18 to 21 percent of IDA 13 resources, in the following five areas: (1) HIV/AIDS, (2) natural disasters, (3) post-conflict countries, (4) poorest countries, (5) debt-vulnerable countries. While this provides only limited scope for providing IDA grants to finance regional and national agricultural research programs in the poorest and debt-vulnerable countries, in order to get beyond short-term, small-scale funding of agricultural research, it does open the door.

41. For a detailed treatment of CGIAR evaluations, see Anderson and Dalrymple 1999, pp. 35-47.

42. CGIAR Secretariat 2000a, pp. 3-8.

Center in both a retrospective and prospective manner. Centers also commission other types of external reviews, including impact assessments, program reviews, and audits.

2.46 *Internal reviews commissioned by the CGIAR or the Centers* include impact assessments of CGIAR programs that are conducted either in-house or by independent CGIAR panels such as the Impact Assessment and Evaluation Group (IAEG) and its successor, the Standing Panel on Impact Assessment (SPIA).

2.47 *External reviews and audits commissioned by CGIAR members* include studies conducted by CGIAR donors and other partners, and span a variety of topics including science and research strategies, governance and management, finances, and impact assessment.

2.48 *External audits of the CGIAR or its Centers* include those financial and/or management audits conducted by internationally recognized firms and by the donors. The World Bank conducts its audits of the CGIAR through the Internal Auditing Department.

2.49 Since the CGIAR's inception in 1971, the focus of reviews has evolved from evaluations of the quantity and quality of research to research results, to management efficiency, to strategic directions, to impact and, currently, to science quality.[43] Indeed, the meta-evaluation team has found that the CGIAR possesses a rich history in the area of monitoring, evaluation, and impact assessment.[44] However, as will be discussed throughout this report, the CGIAR has also come up short on ensuring the quality and independence of some of these reviews, as well as providing systematic information on follow-up processes arising from this massive investment in reviews and evaluations.

OED's 1998 Process Review

2.50 OED's *Process Review of World Bank Grant Programs* (1998) was written to inform the Bank's Executive Board discussion of funding for grant programs in fiscal 1999 and beyond, under the auspices of the Special Grants Program (SGP) and its successor, the Development Grants Facility (DGF). The review focused on three issues: the relevance of the Bank's grant-making programs to its overall strategy and developmental role; the quality of grant programs management; and the efficacy of the development results of grant programs. As the largest and oldest of the Bank's grant programs, the CGIAR figured significantly in the review.

2.51 The review recommended that the World Bank's grant program be governed by three guiding principles, as follows:

1. **Subsidiarity.** The Review observed that grants should be given in situations where lending is inappropriate and there is no other source of funding to ensure that grants do not compete with the Bank's other instruments, such as its own lending programs. This principle is a defense against having grant money drive out the need for lending — a form of moral hazard.

2. **Maintain an arm's-length relationship.** The Review observed the potential for real or perceived conflicts of interest when the grantor is too closely related to the grantee. A de-facto dependency arrangement arises especially where the Bank is called upon to handle a

43. See Anderson and Dalrymple 1999, p. 39; CGIAR Secretariat 1995d; and Ozgediz 1995, p. 3.

44. Bruce Gardner, a member of the meta-evaluation team has observed that the CGIAR has had more reviews, particularly at the Center level than is typical of the U.S. agricultural research system, including its land grant college system. See Gardner 2002.

combination of fund raising, fiduciary, and administrative responsibilities within a collaborative arrangement between the Bank and its grantee.

3. **Vigorously follow an exit strategy policy.** The Review observed a risk of dependency if grants continue over a long period, potentially undercutting the independence of the grantee, impeding sustainability of program benefits and inhibiting proactive management of the grant portfolio and new programmatic priorities.

OED's 1999 Review of the CGIAR

2.52 In 1999, OED prepared a study on the CGIAR to provide background for the larger evaluation of the Bank's grant programs discussed above. The report was prepared by OED staff in collaboration with USAID staff and its primary objective was to address broad questions posed by the 1998 Process Review with respect to the CGIAR.[45] Specifically, it sought to address the subjects of (1) alignment with Bank goals and programs, (2) implementation of supervision, leverage and evaluation, and (3) accomplishments in grant efficacy and program effects. Anderson and Dalrymple awarded the CGIAR high marks in all three areas. Furthermore, they recognized the continuing and future need for production of global and regional public goods by the CGIAR and recommended:

- continued Bank sponsorship of the CGIAR, and
- improvement of Bank-CGIAR linkages in agricultural and natural resource programs, especially loans for agricultural research.

The Third System Review (1998)

2.53 The TSR, completed in 1998, was the first comprehensive System-wide external evaluation of the CGIAR since 1981. The TSR was commissioned by the CGIAR and conducted by a distinguished panel chaired by Maurice Strong. The panel focused on issues relevant to developing a strategy for the new millennium given an increasingly complex external environment, and on ensuring that resources be made available for the CGIAR to pursue this strategy. The TSR addressed two broad areas: (a) science and strategy, and (b) organization, governance and management. Among its many recommendations for the CGIAR, the TSR emphasized that the CGIAR should:

- pursue a dual strategy of integrated gene management and natural resource management
- pursue more meaningful partnerships with NARS, ARIs, NGOs, and the private sector
- undertake major reforms in governance including a corporate governance structure with legal status, and streamlining of governance systems
- undertake a more effective public awareness and fund raising campaign.

The specific recommendations set forth by the TSR are examined in detail throughout this report through a similar division of topics — the impact of CGIAR science and strategy in Part II (Chapters 3 to 8) and an evaluation of CGIAR governance and management issues in Part III (Chapters 9 to 11).

THE CHANGE MANAGEMENT AND DESIGN PROCESS

2.54 The CGIAR embarked on an internal exercise to determine how to position itself in the future beginning at ICW 1999. The exercise consisted of several initiatives: (1) a vision and strategy document from TAC, (2) an analysis of the System's structure by the Center Directors' Committee

45. The Review did not reflect the views of USAID.

(CDC), (3) an examination of governance issues by the Committee of Board Chairs (CBC), and (4) an outline of options for action based on these documents by a Synthesis Group established by the Oversight Committee. To create a concrete proposal for change, the Group established a Change Design and Management Team (CDMT) at ICW 2000, consisting of both CGIAR stakeholders and professionals from outside the System.[46] The CDMT was guided by an *ad hoc* steering group of CGIAR stakeholders, led by the CGIAR Chairman.[47] The team's work, as agreed by the Group, was to focus on:

- a restructuring action plan for the entire System with a clear rationale for program integration and/or consolidation of Centers (including analysis of options)
- a governance plan for streamlining CGIAR decision-making and clarifying the roles of all components in order to achieve net efficiency gains
- a business plan for increasing efficiency in the provision of common services, coordinating System-wide programmatic activities, and reducing overheads in order to transfer more resources to research.

2.55 Within these broader terms of reference, the Steering Group also asked the CDMT to respond to several specific issues:

- an urgent need for the CGIAR to "elevate the game" — to demonstrate the salience of its work in relation to key interests and concerns of the international community
- finding new ways to appeal to traditional donors
- improving System-wide synergies
- placing greater emphasis on strategic opportunities (for example, climate change and sustainable agricultural development in Sub-Saharan Africa and South Asia)
- increasing inclusiveness in agenda setting, including a need to interact effectively with GFAR, regional organizations and civil society institutions/NGOs
- differently managing the NARS-CGIAR relationship to reflect the changes in NARS
- expanding interaction with the private sector
- outlining new arrangements to deal with patents and intellectual property rights
- clarifying the CGIAR's role in institution building and strengthening
- addressing internal inefficiencies, including decision-making processes
- achieving congruence among strategy, structure, financing, management systems, organizational structure, etc.[48]

2.56 The CDMT's report, issued in April 2001, contained seven specific proposals for reform:

- creation of Global Challenge Programs, focused on specific outputs, based on an inclusive approach to priority setting, drawing on research competencies of the Centers and other partners, and funded largely by additional resources
- enhancing NARS through full "mobilization" of their capacities in design and implementation of the Global Challenge Programs, and through an initiative to promote financial support to NARS

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46. Change Design and Management Team 2001a. The CDMT was chaired by Margaret Catley-Carlson, former president of CIDA.

47. See Annex J for the composition of CDMT and its Steering Group.

48. The CDMT's response to how its recommendations address each of these issues can be found in Change Design and Management Team 2001a.

- enhancing science output through the transformation of TAC into a Science Council
- engaging in specific efforts to ensure longer-term financing of the System
- reducing annual meetings of the Group to one, with an Executive Council appointed by the Group to carry out delegated functions in the interval between the annual general meetings
- creation of a CGIAR System Office, to enhance efficiencies in System-level management and to serve the CGIAR Chairman, members, committees and the System at large, as well as offer some services to the Centers
- adopting an "evolutionary restructuring approach," which is to "flow from the implementation of the change proposals."[49]

2.57 At MTM 2001, the Group adapted these recommendations into four actionable areas, which have become the four pillars of the current reform effort: (a) establishment of a representative Executive Council, (b) transformation of TAC into a Science Council, (c) a programmatic approach to research through Challenge Programs, and (d) creation of a virtual System Office.

2.58 The quality, content, and follow-up of the key internal and the three external reviews, as well as treatment of the CDMT proposals, are discussed in Chapter 9 and 10, and in Annex J. It is important to note that this meta-evaluation is not intended to evaluate the reform process currently underway, only to assess whether, how, and how well the Change Design and Management Process is addressing issues raised in the previous evaluations.

49. Change Design and Management Team 2001.

PART II. The Development Effectiveness of the CGIAR

The major issues identified by the review of the CGIAR literature were examined in a detailed series of papers produced for the meta-evaluation. This part presents the findings from those papers. For detailed evidence on which these findings are based, the reader is directed to the working and background papers themselves. The main topics presented here are the returns to germplasm research; genetic resource management, biotechnology, and intellectual property rights; policy research; natural resource management research; NARS capacity building and the impacts of NARS research; and the challenges of Sub-Saharan Africa. In addition to discussing research conducted by the CGIAR and other experts, this section also incorporates NARS views, a perspective that the meta-evaluation team has found to be invaluable in its review of CGIAR impacts and development effectiveness.

3. High Returns to Germplasm Research

3.1 CGIAR's germplasm research constitutes a long-term investment program with a record of high rates of return, and an activity with strong positive impacts on agricultural growth, poverty reduction, and the environment. The CGIAR's research in germplasm improvement is an important function that has the continuing potential to increase agricultural productivity, generate positive spillover effects, and exploit economies of scale.[50]

3.2 The CGIAR's most lauded achievement, the introduction of improved cereal varieties and complementary resource management techniques in Asia during the Green Revolution, exemplifies the importance of germplasm improvement. The increase in cereal production — a doubling of rice and wheat yields in Asia and Latin America, a doubling of rice and wheat production in Asia, and similar gains in Latin America — brought about by the Green Revolution demonstrates the contribution of enhanced germplasm not only to agricultural productivity improvement but also to poverty reduction and land savings.[51] However, germplasm research has suffered more than other research areas in recent funding allocations. The decline in funding for this research seems counterintuitive given its well-documented impacts.

3.3 The meta-evaluation team is not suggesting, however, that the CGIAR revert to exclusive research on plant breeding and germplasm improvement. Rather, the team considers the research on natural resource management and policy to be essential and complementary to the CGIAR's objectives. The issues raised by the team are the insufficient evaluation of research conducted in these other areas, particularly given the rapidly changing allocation of existing and new resources in the System and the CGIAR's comparative advantage vis-à-vis other suppliers.

3.4 The bulk of the CGIAR's impact literature comprises cost-benefit and rate of return studies of its germplasm research. The studies have been criticized on various methodological and data grounds, and their claims of high returns have sometimes been questioned. Doubts have also been raised about

50. For a detailed discussion of germplasm research in the CGIAR, see Gardner 2002.

51. See IFPRI 2002.

their utility as guidance to CGIAR research priorities and resource allocation decisions.[52] For these reasons, the OED meta-evaluation team thoroughly reviewed these studies.[53]

3.5 Methodological difficulties notwithstanding, the meta-evaluation team concludes that the impact studies provide convincing evidence that the (mostly conventional) crop breeding research of the CGIAR Centers, together with the follow-up work with developing country NARS, continues to generate extraordinarily high returns to investment. Those returns, ranging from 40 to 78 percent, are well above the returns attainable from many alternative uses of public funds.[54]

3.6 Even for crops such as sorghum, millet, and cassava, which are not readily amenable to productivity enhancement because of the marginal agro-climatic environments in which they are grown, the CGIAR has made important progress. After some initial missteps and learning, the CGIAR Centers concerned with these crops have generated new technologies, and their adoption by poor people is said to be considerable, even in Sub-Saharan Africa, where successes have been more limited. There are also cases of high estimated rates of return to research on maize, wheat, and other crops in Africa.[55]

3.7 The meta-evaluation team further observes that the returns to germplasm research would be even higher without the OECD agricultural subsidies of nearly $1 billion per day — a massive constraint on the effectiveness of the CGIAR's investment of $340 million per year. Reduction or elimination of these subsidies and trade protections would raise prices, increase market access, and induce developing countries to invest more in their own agricultural research systems.

EXAMINING THE IMPACTS OF GERMPLASM RESEARCH

3.8 The strategic allocation of scientific efforts in germplasm research is of considerable importance for the CGIAR and public research programs throughout the developing world, given the high incidence of rural poverty and the continuing contribution of agricultural productivity improvement to poverty reduction. Of the 1.2 billion people subsisting on less than $1 per day, 75 percent of those live and work in rural areas. Projections suggest that rural areas will still contain over half the world's poor living on $1 per day by the year 2035.[56] Furthermore, only 11 percent of the agricultural land in the developing world is "favored" land — area having no or moderate limitations to sustained application of inputs under a given use — and only 35 percent of the rural population occupies this land.[57] The rural poor occupying both favorable and unfavorable land are often vulnerable, powerless, and voiceless with respect to assets and income; food, water, and soil; markets

52. See various papers on why investment in the CGIAR is in danger if returns to research are so high, presented at the International Conference on Impacts of Agricultural Research and Development, February 4-7, 2002, San José, Costa Rica.

53. Gardner 2002; Eicher and Rukuni 2002; Katyal and Mruthyunjaya 2002; Romano 2002; Macedo, Porto, Contini, and Avila 2002.

54. Lower-bound estimates from Maredia, Byerlee and Anderson 2000. Upper-bound estimates from Alston, Chan-Kang, Marra, et al. 2000, p. 62. For a discussion of the rates of return literature, estimation methodologies, biases and other issues, see Gardner 2002.

55. Eicher and Rukuni 2002, pp. 26-28. Eicher and Rukuni cite studies that place estimates of the rates of return to (a) hybrid maize research in Kenya at approximately 68 percent between 1953 and 1988, and (b) wheat improvement programs in Africa at 23 percent between 1961 and 1991. These studies, while incorporating periods that predate the CGIAR, are nonetheless assumed to include some level of CGIAR contribution. Still, Eicher and Rukuni's general findings on returns to research on these and other food crops are somewhat discouraging, fraught with problems such as unreliable data, episodic agricultural stagnation, selectivity biases, and methodological issues.

56. IFAD 2001; Interview with Michael Lipton, citing Martin Ravallion, June 24, 2002.

57. CGIAR/TAC 2000d.

for agricultural inputs, credit, and outputs; accessing entitlements and institutions; and applying science, technology, and knowledge.

3.9 There is no agreement, nor is there likely to be, on the best way to reduce poverty, for example, by intensifying areas with favorable resource endowments and promoting healthy migration to these areas; by creating rural employment opportunities in agriculture and value-added enterprises; by reducing urban food prices and promoting migration to urban areas; or by improving agricultural productivity in resource-poor areas. Many agricultural economists working on development widely share the view that "the power of technological solutions to solve poverty problems is extremely limited in the absence of economy-wide growth and rural-urban migration."[58] It can thus be argued that complementing CGIAR research with research on high-value, non-food agricultural activities typically carried out by non-CGIAR actors, increasing market opportunities by adding value to agricultural output, and improving policies and investments throughout the economy simultaneously is critical for reducing rural poverty and creating economic opportunity. In short, poverty reduction entails going beyond what the CGIAR can offer.

3.10 But economy-wide growth and structural transformation from predominantly agricultural to industrial economies depend critically on agricultural growth, and in turn on innovations in agricultural technology.[59] Increases in agricultural productivity as the result of technological innovations stimulate non-farm economic activities through various linkages, including (a) reallocation of labor and entrepreneurship to non-farm production within farm households as the result of the reduced labor input for farm production to produce the same amount of food for home use and market sale, (b) increased real incomes (including home-produced food) of the farm population that stimulate local manufacturing through expanded consumption, and (c) increased demands for farm inputs associated with technological innovations having the same effects on the expansion of demand for non-farm goods.

3.11 More specifically, IFPRI's Hazell and Haddad have argued that agricultural research which leads to improved technology can benefit the poor in a number of ways:

- increasing farm production, increasing marketed output, and providing more food and nutrients for consumption
- increasing employment for landless laborers and small farmers
- improving opportunities for economically beneficial migration
- inducing growth in rural and urban non-farm income
- reducing food prices
- increasing economic and physical access of poor women to better foods
- empowering the poor.[60]

3.12 There is considerable evidence that crop improvement research has contributed to increased food availability, reduced prices, employment generation, and higher wages, often to the benefit of landless, near landless, or migrant rural workers. These gains have led to growth in urban and rural non-farm sectors and have increased inter-sectoral linkages, further improving employment opportunities for the poor.[61] Similarly, research focused on resource-poor environments has

58. Binswanger 1994, pp. 624-628.

59. Hayami and Ruttan 1971.

60. Hazell and Haddad 2001, p. 9.

61. Kerr and Kolavalli 1999; Lipton with Longhurst 1989; Hazell and Haddad 2001; IFAD 2001; Gardner 2002; Delgado, Hopkins and Kelly 1998.

contributed to improving crop tolerance to drought, salinity, pests, disease, weeds, temperature, and soil nutrient deficiencies, thereby addressing a variety of economic and environmental concerns critical to poor rural producers in semi-arid and arid areas.[62]

3.13 But given that research is a long-term endeavor and given the complex dynamic interactions among population growth, poverty incidence, and the end of the extensive margin, what can the evidence of the CGIAR's impact to date tell us about the areas in which the CGIAR has the best chance of future impacts on poverty reduction?

3.14 Studies suggest that relatively better-endowed areas, crops, and farmers have benefited more from research than resource-poor areas, crops, and farmers. These benefits accrue primarily from increased productivity and lower food prices, but accrue unevenly when poorer households are unable to adopt new technologies.[63] In resource-poor areas, however, research takes much longer to produce benefits. And even where new technologies are widely adopted and hold promise for resource-poor areas, economy-wide and sector policy and investment failures can hamper productivity increases. The experiences of research in crops such as sorghum, millet, and cassava in Africa provide evidence of these issues, although increased food supply and greater stability in production have clearly helped poor subsistence households.[64]

3.15 Reduced commodity prices are usually taken to be an obstacle to technology adoption and technology investment progress.[65] But others argue that incentives to invest have weakened because, absent large new scientific thrusts, high returns are increasingly due to the success in "defending" Green Revolution gains against successive pest biotypes, and hence do not show up as sensational yield increases in the way that earlier Green Revolution advances did. This makes investments in research crucial. But several experts also argue that changing donor preferences have reduced the funding for research and hence the incentives, as has the non-appropriability of public sector research.

3.16 An additional complicating factor is the interaction between research and farm commodity taxation or support programs. In OECD countries, criticism has been made of spending on research to boost production at the same time that commodity programs try to reduce production (for example, by acreage set-asides like the United States and European Union have implemented). Several studies by agricultural economists have indicated that in this situation research spending that would otherwise have a high rate of return becomes a waste of the taxpayers' dollars.[66] Still, several experts conclude that even the largest commodity program distortions in developing countries have not changed the story of high social returns to publicly supported agricultural research.[67]

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62. IFAD 2001.

63. For evidence of these distributional effects in countries as varied as Colombia, Kenya, and China, see Eicher and Rukuni 2002; Romano 2002; Ndiritu 2002; interview with Scott Rozelle.

64. Interview with Pedro Sanchez; Eicher and Rukuni 2002.

65. Mundlak 2001, and Fulginiti and Perrin 1993 are among those who have estimated that reduced commodity prices in developing countries significantly retard technology adoption and productivity growth. It will be a sad day if OECD countries cut back on funding for CGIAR research on the grounds that the returns to adoption of new technology have fallen, when it is in substantial degree the commodity policies of the OECD countries that are responsible for the fallen returns (Gardner 2002). Examples of issues arising from trade liberalization are discussed in the background papers on Kenya (Ndritu 2002) and Colombia (Romano 2002).

66. Alston, Edwards, and Freebairn 1988.

67. Alston and Pardey 1996.

3.17 Some studies suggest that falling food prices contribute to the persistence of rural poverty, although lower prices help the urban and non-agricultural poor. However, reduced food prices that result from productivity increases also create the opportunity to shift resources from food production to non-food production activities inside and outside the farm sector, leading to economy-wide development.[68] In order to achieve success in this process without imposing undue sacrifice on food producers, public assistance must be provided for smoothing the inter-sectoral resource transfer, for example, by means of education, training, communication, and transportation infrastructure. One form of such assistance that the CGIAR may be able to provide is germplasm research for non-food crops where private sector research does not exist. So far, the CGIAR's germplasm research has been targeted almost exclusively at subsistence food crops in support of smallholders. However, with the very success of the research on food crops, the improvement of non-food high-value crops suited to smallholders may have to be included in the major agenda of the CGIAR's germplasm research. For this research to be effective, it would require close coordination with natural resource management and cropping system research, as well as private sector research.

3.18 Should research avoid germplasm improvement if markets are not liberalized today? The meta-evaluation team thinks not. Research takes a long time to deliver results, and by the time research results are available, through improved policies and investments, markets may well have been liberalized or established.

3.19 Studies suggest that productivity growth arising from germplasm improvement has also had important environmental impacts. With the end of the extensive margin, land savings represent the most important positive environmental (and poverty-reducing) impact of productivity-enhancing germplasm research. There is considerable evidence of the reduced area needed to cultivate food for rapidly growing populations in developing countries. Estimates of area saved vary widely, however, ranging from approximately 2.5 to 3.6 billion hectares of crop and pasture land saved since the 1960s. A CGIAR study estimates land savings in Asia, Africa, and Latin America attributable to all Green Revolution research at 426 million hectares, while savings attributable to research in seven of the CGIAR-mandated commodities are estimated at 100 to 300 million hectares in the developing world.[69]

3.20 However, studies also suggest that not all germplasm improvement research results in land savings. In land-surplus, labor-short economies, (a) the introduction of new agricultural technology will likely lead to increased land clearing, and (b) liberalization of trade and investment is likely to provide additional incentives to clear land for agriculture, as evidenced in the Amazon in Brazil and the outer islands of Indonesia.[70]

3.21 The evidence on returns to recent research on germplasm improvement is limited but ominous. Several of the most recent studies provide disconcerting evidence of a slowdown in yield growth even in favorable areas such as rice and wheat.[71] Slowing yield growth has been attributed to

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68. Hayami and Ruttan 1971.

69. For a detailed discussion of assessing the environmental impacts of productivity growth in agriculture, see Maredia, Pingali, and Nelson 2002.

70. See Angelsen and Kaimowitz 1999 and U. Lele et al. 2000. However, it is difficult to argue against continued research on productivity improvement, as it is to argue against trade and investment liberalization for countries where economic growth and increased incomes and employment are crucial. Rather, to develop appropriate policies and strategies needed to ensure that the most valuable land and biodiversity is not lost to agriculture nor the sources of incomes for the indigenous people who depend on them, the increased study and understanding of the impacts of germplasm research and macroeconomic and sector policies is needed. See also Lele 2002a.

71. Ladha, Fischer, Hossain, et al. 2000. See also Tiongco and Dawe 2002. However, Gardner 2002, and Keijiro Otsuka (interview, February 2002) do not find unambiguous evidence of yield growth slowdowns from recent studies of the topic.

decaying irrigation infrastructure and resource degradation, for example, falling groundwater tables, micronutrient depletion, and low-level pest buildup. Recent reports, such as IFAD (2001), take this slowdown seriously and stress the importance of renewed public sector research at the international and national levels to maintain the gains made in yield improvement and to ensure continued increases in productivity.

3.22 Resource degradation, often associated with productivity growth, can be alleviated through research. Resource degradation is commonly attributed to (a) continuous cropping made possible by new technologies and (b) changes in farming systems prompted by differential productivity growth. There are isolated NRM triumphs in the CGIAR, notably reducing the use of harmful agrochemicals and increasing sustainability by integrated pest management. But most successes are breeding-related: breeding for robust resistance or tolerance to pests and for sustainable yields in the face of soil-nutrient deficiencies. One of the CGIAR's more successful efforts to address the issue of resource degradation and slowdown in yield increases has been in rice-wheat cultivation. The initiative, undertaken by CIMMYT, IRRI, and the NARS of Bangladesh, India, Nepal, and Pakistan evolved into a System-wide initiative under NARS leadership in 1994 to promote research on issues critical to maintaining and enhancing productivity and sustaining rice-wheat systems in South Asia.[72] But the lack of stable, predictable funding for this effort has been a problem. The record on similar System-wide initiatives has been mixed.

3.23 Yet while improved NRM is crucial (and is discussed in chapter 6 in detail), there are no major scientific breakthroughs in the management of tropical soils or water. To justify diverting large sums of resources away from germplasm research, Centers need to make the necessary scientific breakthroughs relevant to the problems of developing countries. Germplasm improvement (for example, for drought-prone areas or areas with limited water availability), on the other hand, can ease the natural resource management problems that farmers face. Researching NRM as such, with little new contribution by the CGIAR Centers to the basic science for productivity growth or increasing the efficiency of resource use, therefore does not seem justified. There is currently insufficient independent evaluation of the CGIAR's NRM research that convincingly documents the negative impacts of productivity growth on natural resources and the possible contributions the CGIAR can make to this issue in ways that others, including national systems of development countries and donors, are not already doing.[73]

3.24 Linkage between germplasm improvement and NRM research is thus essential to achieve sustainable high-productivity production systems. The TSR, in its discussion of the need for a "twin pillars" strategy emphasizing productivity enhancement through integrated gene management and integrated natural resources management, stressed the two legs on which the CGIAR must walk. The CGIAR has recently adopted an integrated NRM approach, yet these two areas have frequently remained distinct in the System's research portfolio and generated considerable and continuing debate, as discussed further in Chapter 6.

3.25 Overall, the impacts of conventional germplasm have been strongly positive. However, certain issues where CGIAR impact research has been weak, or where CGIAR strategy needs further examination are beyond research disincentives and resource degradation.

72. Ladha, Fischer, Hossain, et al. 2000.

73. Maredia, Pingali, and Nelson 2002. See Chapter 10 for discussion of the Challenge Programs in this regard.

RELATED ISSUES REQUIRING FURTHER IMPACT ASSESSMENTS

3.26 Externalities such as negative human and animal health impacts or genetic diversity losses warrant further examination by the CGIAR. Health impacts are a continuing area of concern in the discussion of productivity growth arising from research in germplasm improvement, although there is little agreement among experts on the subject and particularly the role of global public goods research. Human pesticide poisonings associated with the use of improved seed and planting materials is clearly a significant cost to society, and there is empirical evidence of these costs. Evidence suggests that similar arguments can be made about chemical fertilizers. However, assessments of the negative impacts of chemical inputs on human and animal health, and on productivity, are limited in terms of data and coverage. This problem is also present in the few, but often contradictory, studies on the impacts of genetic diversity losses on crop productivity and yield stability.[74] In short, the CGIAR has not studied these issues, and they should receive attention if they are high priority issues from the perspective of NARS for a global public goods research system to pursue.

3.27 Technological adoption and variability in adoption rates are also topics in need of further research, notwithstanding the extensive literature on the subject. Despite all of the impact studies carried out by the CGIAR on the topic of productivity growth and germplasm improvement, empirical knowledge remains limited on how and why certain technologies spread while others do not. The obvious explanations — profitability, risk, and access to information — are not sufficient determinants of adoption. This points to a need for studies by social scientists working jointly with their counterparts in the biological sciences to understand the constraints to accelerated technology adoption and to meet yield and natural resource management gaps through the use of existing knowledge. But again, NARS need to lead the change.

3.28 Technology dissemination and the role of the CGIAR is yet another area in need of strategic examination. Numerous technologies developed by non-CGIAR sources need to be disseminated. Some large NARS are now world leaders: China in hybrid rice, Brazil in minimum tillage, and India in information systems. Can the CGIAR be a catalyst in disseminating their innovations globally, moving potentially beneficial technologies and processes to research systems of developing countries and farmers worldwide and in an appropriate, effective, and timely manner? Again, studies on the determinants of technological adoption would need to be conducted to help accomplish this.

3.29 Because the CGIAR has an extensive collection of genetic materials, germplasm research and returns are often attributed to the CGIAR alone. But if the germplasm were more readily available to NARS and other research institutions, then many other actors in development research could work to improve germplasm and increase agricultural productivity.

3.30 Research on the productivity of fish and livestock is also a topic that warrants increased emphasis by the CGIAR. As income levels rise in developing countries, per capita consumption of meat, milk, and fish also increases. These trends have important implications for the global supply of and demand for fish, livestock products, and feed grains, and for productivity-enhancing technologies.[75] While key Centers such as ILRI have developed strategic responses to the challenges posed by these trends, they remain underfunded due to inadequate prioritization of research that addresses these issues strategically and effectively.[76] The meta-evaluation team investigations suggest

74. Maredia, Pingali, and Nelson 2002.

75. See, among others, Delgado, Courbois, and Rosegrant 1998.

76. For a discussion of the creation of ILRI, see Box 9.3.

that ILRI lacks the critical mass of scientists to be a world leader, a situation that ILRI's director general attributes to funding constraints.

3.31 Finally, the CGIAR's research and development strategy needs vigorous examination. In recent years the focus on alleviating poverty, rather than on conducting global and regional public goods research that is likely to have a direct impact on large numbers of the poor, has led to a lack of focus on research in which the System should have a strong comparative advantage with significant potential for reducing poverty. Instead, this has led the CGIAR to address issues that may be important at the local or the national level but are marginal from a global public goods perspective. Several examples of this are discussed below.

3.32 The meta-evaluation team concurs with Hazell and Haddad that CGIAR research must focus on (a) maintaining efforts to reduce food prices through productivity growth, (b) intensifying less-favored lands, (c) helping smallholders diversify into high-value crops, and (d) increasing employment and incomes for landless and small farmers. Equally challenging, but no less important, is research on increasing the access of the poor, especially poor women, to foods rich in crucial micronutrients. Critics argue that increasing nutrient content at the cost of yields raises issues of profitability and likely adoption of the new technologies while running the risk of drawing resources away from other objectives, such as strengthening crop tolerance to various stresses. Others argue that focusing on yield increases alone reduces the constraints placed on researchers, while nutrient access can be improved with more cost-effective efforts such as the promotion of home gardening and information and educational interventions by national governments. Yet despite the poor outcomes of early attempts in breeding to enhance nutrients in staple crops (such as quality protein maize), breeding to improve nutrient content of staple crops is an area with both past successes and future potential for the CGIAR.[77] Moreover, it has the potential to work affordably for the poor, and is directly in the CGIAR's area of research specialization, wide-country application, and comparative advantage, although the CGIAR does not make a compelling case that plant breeding from micronutrients will benefit the poor.

3.33 Equally uncertain are CGIAR's actual or potential impacts on what Hazell and Haddad term the "newer pathways" by influencing the access of the poor to the components of power such as decision-making processes, information, and authority. Many other research institutions — representing an important alternative source of supply — have conducted more extensive research in this area than the CGIAR, and it is not clear the CGIAR has a comparative advantage in this field.[78] Agricultural research can contribute to the empowerment of the poor if conducted in a participatory way, but much of the CGIAR's participatory research is in testing products of research, not in setting research priorities.[79] Moreover, participatory research requires multidisciplinary work, a task that is costly and difficult to organize and replicate for developing countries on any significant scale. Farmer participation increased costs by 66 percent and accounted for 80 percent of the researchers' time in Ghana, although increased costs can be compensated by increased adoption later.[80] Besides, empowerment can only be achieved through increasing the access of the poor to education and increasing community action, areas in which the CGIAR does not have a demonstrated comparative advantage relative to other actors.[81] In addition, there are concerns about the quality of the CGIAR's social science research, as discussed in Chapter 5.

77. Hazell and Haddad 2001.

78. See Barrett 2002.

79. See Gladwin, Peterson, and Mwale 2002.

80. Asenso-Okyere, Agble, Attah-Krah, et al. 1998.

81. Gardner 2002. Empowerment also receives detailed treatment in IFAD's (2001) report on the challenge of ending rural poverty, and places agricultural research as one of many means to accomplishing this end. The IFAD report takes seriously

3.34 An important question is the comparative advantage of the NARS (as well as universities and NGOs in developing countries) relative to CGIAR Centers in participatory research or research on empowerment issues.[82] Relative to the NARS, the CGIAR is able to generate high payoffs to research in areas that NARS cannot easily undertake, such as research on plant breeding.[83] But whether the CGIAR can do this for participatory research or research on empowerment issues is unclear. An assessment needs to be conducted of the CGIAR's relative capacity in areas beyond germplasm research. The need for such an assessment has been voiced by the Brazilian NARS on previous occasions, requesting the World Bank to undertake comparative cost-benefit analysis of research at the CGIAR Centers relative to research at the NARS of advanced and developing countries.[84] And with respect to issues of empowerment, even panel members of the TSR indicated to the meta-evaluation team that they did not expect the CGIAR Centers to undertake such research but, rather, to stimulate NARS in leading such research.[85]

4. Genetic Resources Strategy and Management

4.1 Genetic resources lie at the heart of the CGIAR System. The System's collection of genetic resources is a unique, critical element in the agricultural research that has generated spectacular rates of return on investment and positive impacts on poverty reduction. The genetic resources are an important input to complementary research undertaken by NARS throughout the developing world. They have played an important but largely unrecognized role in agricultural reconstruction in post-conflict nations such as Rwanda, Burundi, and Afghanistan. They represent a significant contribution toward preserving the world's biodiversity for use by present and future generations.[86] And they have the attributes of a pure public good with almost unlimited potential for producing large economic benefits of global significance.

4.2 Yet the continued maintenance and use of these genetic resources by the CGIAR faces unprecedented challenges. TAC-commissioned studies such as the First External Review of the System-wide Genetic Resources Programme (1999) and the System-wide Review of Plant Breeding Methodologies in the CGIAR (2001) highlighted many of the challenges, and the TSR brought these challenges into a broader perspective for the CGIAR. Specifically, the TSR emphasized the need for the CGIAR to pursue efforts in genetic resource conservation; biosafety, bioethics; and public information; a legal entity to hold patents; and rules for public-private interaction over proprietary knowledge. However, the scientific advice set forth by these reviews either failed to provide focused priorities and financial options, or were underplayed for complex political, organizational, and social policy reasons, thus limiting their overall impact on the way the CGIAR manages its genetic resources.

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the objections raised by some that technological innovations have advantaged the relatively prosperous and well situated more than the poor, and hedges its discussion of conservation and environmentally aimed innovations, and commercially oriented technical progress such as in exported crops. It therefore comes as all the more powerful a judgment when the report includes crop variety improvements as perhaps the key factor in rural poverty reduction to date, and points with alarm to declining rates of increase in yields of staples (cereals, roots, and tubers) in the developing world generally and particularly in Africa. Hence the strong recommendation of the report for enhancement and refocusing of agricultural research effort on yield improvement (not distinguishing NARS and CGIAR Centers, presumably meaning both).

82. See Barrett 2002.

83. Byerlee and Eicher 1997; Maredia and Byerlee 1999.

84. See Macedo, Porto, Contini, and Avila 2002.

85. In this context, the CGIAR Secretariat providing financing to the gender program addressing issues of addressing issues of Center staffing and composition for the first time in 2002 may be a regressive step.

86. For a detailed discussion of genetic resource strategy and management in the CGIAR, see Lesser 2002.

4.3 The CGIAR's priorities, governance system, and financial prospects limit the System's ability to effectively manage and use its vast collection of genetic resources. Concurrently, the rapidly changing market, institutional, and technological conditions in which the CGIAR operates necessitate more dynamic responses and interactions on the part of the System. Combined, these factors pose a serious challenge to the ongoing, productive use of the CGIAR's genetic resources for international agricultural research. This chapter demonstrates that the CGIAR's genetic resources still represent an important input into increasing agricultural productivity and reducing poverty, but that new approaches are required to (a) effectively manage and use the existing collection of genetic resources, (b) incorporate modern biotechnology tools and methods into CGIAR research, (c) engage the private sector and other actors in the global agricultural research community, and (d) establish an effective policy that addresses the related issues of proprietary knowledge and intellectual property.

GENETIC RESOURCE MANAGEMENT AND USE: ISSUES FOR THE CGIAR

4.4 The genius of the CGIAR was to crossbreed indigenous genetic material resistant to pests and diseases with higher-yielding varieties to develop more productive plants and, more recently, animals. Successes led to a collection of valuable material from a wide range of developing countries to support further breeding efforts. Today, the CGIAR holds the single largest collection of plant genetic material, comprising 600,000 accessions, or about 10 percent of the world's collection, in 11 CGIAR Centers.[87] The previous chapter demonstrated that the uses and benefits of this collection are well documented with respect to developing countries and to certain industrial countries.[88] Thus, conservation of agro-biodiversity through establishment of *ex situ* gene banks has already proven its global public goods nature and value.

4.5 However, the CGIAR faces serious internal challenges to effective management and use of its collection of genetic resources. First, the gene banks are severely underfunded, and an unknown amount of the material may have deteriorated and been lost over the years.[89] Second, there are competing demands from Centers for financing genetic resource management for *ex situ* conservation of crops, on the one hand, and conservation of aquatic, livestock, forest, and microbial biodiversity or *in situ* ecosystem management, on the other.[90] Third, donor interest in genetic resource management is limited, notwithstanding the importance placed on genetic resources in the United Nations Conference on Environment and Development in 1992 and the World Summit on Sustainable Development in 2002.

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87. According to Koo, Pardey, and Wright 2002, the CGIAR collection is housed in 11 Centers, but Shands 2001, pp. 139-144 lists 12 Centers.

88. Wheat and rice research conducted by CIMMYT and IRRI has generated spillover benefits to U.S. agriculture that are estimated to exceed USAID contributions to the CGIAR many times over. See Pardey et al. 1996. Moreover, land saving attributed to gross increase in total production from 1960s to 1990s realized by seven CGIAR-mandated commodities (and primarily attributable to germplasm improvement) are estimated at 100–300 million hectares in developing countries and 130–340 million hectares worldwide, indicating that between 12 and 23 percent of the land savings were realized in regions beyond developing countries. See Nelson and Maredia 2001.

89. In responding to the first external program and management review of the CGIAR System-wide Genetic Resources Program in 1999, the Intercenter Working Group on Genetic Resources observed, "Centers are facing severe financial constraints in fully meeting international gene bank standards, as revealed by the gene bank operations review." Given that resources will always be limited for characterization, the CGIAR needs a System-wide prioritization process in the characterization as well, rather than leaving fund-raising for the purpose to individual entrepreneurial scientists and the Centers. This problem is more acute at the national level, where gene banks in developing countries are reported to have greater funding and operational problems. Certainly a significant amount of the accessions in the national gene banks are believed to have perished, but exact data are unavailable. In 2002 the Bank increased its allocation to gene banks, but more is needed.

90. See comments from the Intercenter Working Group on Genetic Resources on the Report of the First External Review of the System-wide Genetic Resources Programme (1999).

4.6 While donors have been willing to fund physical structures for gene banks, they have expected Centers to fund the recurrent costs through unrestricted contributions. But the declining share of unrestricted funds in recent years has made this difficult for the Centers. And as the share of restricted funds has increased, donors have given higher priority to policy and NRM research at the cost of gene bank operations. Donors have also shown a preference for funding final-product technologies such as improved varieties and cropping systems that offer visible, measurable outputs and that are easier to justify to their constituencies, rather than intermediate products such as genetic resource management. Moreover, donors are often unwilling to fund projects such as gene banks whose benefits extend over several countries or regions when the donor is mandated to assist development of a certain region or a country. This dilemma underlying pervasive under-investment in the provision of public goods necessitates greater allocations of unrestricted multilateral funding to the maintenance and management of genetic resources.[91]

4.7 The allocation of responsibility for genetic resource management is an additional issue for the CGIAR. Currently, the management of the genetic resources collections is governed by a standard agreement between FAO and each Center that holds the genetic material. The System-wide Genetic Resource Programme (SGRP) is charged with assisting the Centers in fulfilling their obligations under the FAO agreement. The SGRP is administered through IPGRI as the convening Center. Policy advice is provided by the broadly representative high-level Genetic Resources Policy Committee (GRPC), established in 1994 to monitor and analyze developments in genetic resources policy both internationally and within the System, and to recommend appropriate CGIAR action as necessary. This has included advice regarding the engagement of the CGIAR in the negotiations of the FAO Commission on Genetic Resources for Food and Agriculture that led to the adoption of the International Treaty on Plant Genetic Resources for Food and Agriculture in 2001.[92]

4.8 The SGRP has been an effective System-wide program in part because of the clear authority vested in it to ensure compliance with standardized procedures under FAO auspices. Yet the SGRP, as a System-wide program, has no independent authority. This problem is exacerbated by two System-level problems: (a) the lack of agreement in the System over genetic resource management and the System's inability to determine what should be included or excluded from the SGRP, and (b) the role or position the SGRP should assume when organizational needs emerge outside the scope of the FAO agreement, but are not supported by all the Centers with gene banks.[93] These persistent issues have significant implications for program cohesion and for the strategic objectives of the CGIAR.[94]

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91. Certain European donors are also concerned that supporting genetic resource management in the CGIAR implies support for the use of biotechnology, genetic engineering, and research in transgenic crops and other organisms, a research area that they or their constituents have expressed concern with. In fact, sound management and use of genetic resources in the CGIAR System has, to date, been more closely associated with conventional plant breeding and germplasm enhancement, an area of comparative advantage as explained earlier.

92. In 1994, most of the CGIAR collections were placed under the auspices of the FAO International Undertaking on Plant Genetic Resources to constitute part of the international network of base collections. System needs and procedures were identified in the Global Plan of Action from the Leipzig Conference of 1996. The International Undertaking is a voluntary instrument and precedes the Convention on Biological Diversity. Its re-negotiation to bring it into harmony with the Convention ended with the adoption in 2001 of the new International Treaty on Plant Genetic Resources for Food and Agriculture as a legally binding instrument. When it comes into force (after the 40th ratification), the Treaty will supercede the Undertaking, including in relation to the collections held in trust by the Centers. See Lesser, 2002. For an evaluation of IPGRI's influence over the International Undertaking, see Sauvé and Watts 2002.

93. Lesser 2002.

94. See CGIAR Secretariat 1999c.

4.9 The CGIAR also faces significant external constraints that affect the management and use of its genetic resources. Among them are the increasing complexity of international agreements on genetic resources and the CGIAR's role therein (Box 2.5), the difficulty in mobilizing international support and resources for long-term genetic resources conservation, and the need to ensure access to its collections to the NARS. The Third System Review concluded that the CGIAR's current governing principles — in particular its non-political nature and informal status — constrain its ability to fully set policy on key issues in this area, which are of vital importance to the System's ability to address its mission, and to participate in international forums concerning those issues. The need to be able to influence international debate and policy setting contributed to the TSR's recommendation that the CGIAR become a more formal body with clear legal standing, which could develop and support unified policies related to genetic resources and related matters. The CGIAR board chairs and Center directors recommended a similar approach in their "Federation proposal" for reorganization, which was also rejected.[95]

4.10 Key international agreements governing the control, management, and use of genetic resources include the Convention on Biological Diversity (1992), the International Treaty on Plant Genetic Resources for Food and Agriculture (2001), the International Convention for the Protection of New Varieties of Plants (1961 and subsequent revisions), and the World Trade Organization's Trade-Related Aspects of Intellectual Property Rights (TRIPS), all of which raise important issues both for CGIAR access to genetic resources and for access to CGIAR's own genetic resources by other parties. The CGIAR's effective engagement in the preparation of the International Treaty (discussed below) is an indication of the System's important role in shaping international opinion on key topics in genetic resource management.

4.11 The CGIAR has also made significant efforts to mobilize international support for genetic resources conservation. At ICW 2000, a feasibility study of an endowment campaign for genetic resource conservation was initiated and, with endorsement from the CGIAR, the FAO, and the World Bank, a high-profile campaign was proposed for the creation of the Global Conservation Trust. The trust's feasibility study, completed in April 2001, set an initial target of $260 million to be raised from private foundations, corporations, and governments to develop and sustain a global system of gene banks, including those of the CGIAR Centers. Switzerland confirmed its support to the Trust, while the United States, the U.N. Foundation, and Egypt announced their support at the World Summit on Sustainable Development in Johannesburg in August 2002. So far, commitments of $60 million have been obtained.

4.12 But the long-term prospects for establishing a gene bank, as envisioned by the Global Conservation Trust, are unclear. These have been constrained by the magnitude of resources required to operate the gene bank in perpetuity, and by the donors' unwillingness to pledge funding until the negotiations of the Treaty were concluded and the support of the FAO Commission was assured. The adoption of the Treaty and the FAO Commission's statement in October 2002 of universal appreciation and support to the Trust, are anticipated to make a difference. A detailed IFPRI study for the SGRP of the costs of conserving and distributing the current holdings of the CGIAR's 11 gene banks in perpetuity estimates a required endowment of $149 million, although plausible variations in interest rates and regeneration cycles of genetic materials could cause this estimate to range from $100 to $325 million.[96] Prospects for raising the entire initial target of $260 million are unclear at this stage, as are the priority activities for operations and maintenance of genetic resource conservation including, for example, support to the funding of gene banks in developing countries. Informed

95. See Chapter 9.

96. Koo, Pardey and Wright 2002.

sources argue that $400 million to $500 million may be required to maintain the gene banks.[97] The initial target of $260 million for an endowment for genetic resources conservation was set on the basis of donor prospects at the time of the feasibility study carried out in 2000, when the negotiations of the Treaty were not yet concluded. Moreover, some founders and long-time observers of the CGIAR have raised concerns about the risks of maintaining these gene banks in developing countries, both because of the relatively higher cost of refrigeration in the high-temperature, high-humidity tropics, and the threat posed by conflicts.[98]

4.13 Of additional concern are CGIAR's policies and strategies for meeting the needs of developing country NARS with respect to genetic resources. Studies commissioned by this meta-evaluation cite concerns or tensions between Centers and NARS over the ownership and flow of genetic materials for research and experimental use in several countries.[99] To the extent that these concerns are valid, impediments to the free exchange of genetic resources pose a serious threat to the System's underlying principles and objectives. Another important issue is whether developing country NARS should have their own germplasm collections included in financing schemes for gene bank facilities, operations, maintenance, and training, and how these collections, and the resources necessary to fund them, would be managed to complement the CGIAR collection.

4.14 The World Bank and various bilateral donors have supported the operations of some national-level gene banks, but others have argued that the maintenance of international collections inadvertently reduces the incentive for developing countries to save their own biodiversity and even undertake their own breeding programs, leaving such work to the CGIAR.[100] The proposed campaign to fund the Global Conservation Trust addresses some of these issues by providing for sustainability grants on a long-term basis to holders of national and international *ex situ* plant genetic resource collections meeting international standards, and a capacity-building fund.[101]

4.15 What remains to be determined is how the subsidiarity principle that drives DGF funding will be applied to this program, as well as a determination of what should be funded at the global level, what should be funded through country assistance programs, and how global-level funding can complement investments made by developing countries at the national level, for example, through building their capacity for maintenance, operations, public awareness, policy formulation, and implementation.[102]

THE CHALLENGES OF A RAPIDLY CHANGING ENVIRONMENT

4.16 The need to ensure wide access, sustainable use, and continued protection of the CGIAR's genetic resources for developing countries is challenged by the rapidly changing market, institutional, and technological context in which the CGIAR operates. However, these changes — including breakthroughs in genetics and genetic engineering that have led to a new round of biological innovation in agriculture, the increasing importance of proprietary knowledge and intellectual property rights

97. See, for example, Shands, in Gerrard, Ferroni, and Mody 2001. Also, an interview with Alex McCalla, January 2002.

98. Interview with David Hopper, January 17, 2002. Philippines, Nigeria, Colombia, Côte d'Ivoire, Peru, India, Mexico — each a host to a CGIAR Center — have all experienced armed conflicts or other intrusions.

99. See Romano 2002; Katyal and Mruthyunjaya 2002. For instance, discussions with Indian and Brazilian scientists reveal developing country concerns that Centers find bureaucratic ways of constraining access as a means of reducing competition among the Centers or between Centers and NARS in the generation of improved material.

100. Shands in Gerrard, Ferroni, and Mody 2001.

101. As currently set forth, more funding is expected to go toward a sustainability fund.

102. CGIAR's gene banks qualify for support from the Bank's unrestricted funding to the CGIAR.

(IPRs) in agricultural research, and the rapid growth of the private sector in agricultural input markets and agricultural R&D — also represent a critical opportunity for the CGIAR.

4.17 Possibly the most significant trend in the rapidly changing environment is the growth of the private sector in agricultural input markets and agricultural research. Growth in market infrastructure and private firm participation in markets can potentially reduce costly state interventions in the provision and pricing of agricultural inputs and commodities, interventions that have had serious effects on agricultural growth throughout the developing world.

4.18 Consider, for instance, the process by which new seed technologies were disseminated during the Green Revolution in India. The Rockefeller Foundation and CGIAR scientists recommended that USAID and the World Bank support public sector seed companies in India during the early 1970s because of the limited farmer demand for improved seed and a lack of institutional infrastructure for delivering productivity-enhancing technologies to farmers. At the time, there was little understanding of new technologies among farmers, limited regulatory capacity in the government to ensure seed quality, and a lack of interest and incentives for private sector investment in improved seed. The public sector interventions in seed production and distribution played a crucial role in exposing farmers to the new technology and creating a market.

4.19 Since that time, India and many other Asian countries have developed a thriving seed market.[103] Privatization of state-owned seed companies and expansion of market infrastructure has allowed private firms to enter domestic seed markets, often starting with hybrid maize seed, and helped to increase the introduction of improved seed and complementary technologies. Despite the limited number of studies on private sector seed production and marketing, some evidence suggests rapid growth in this sector. For instance, maize seed supplied by the private sector constituted 89 percent of the total in 7 Asian countries as of 1997, compared to only 30 percent a decade ago.[104]

4.20 Growth in applied and adaptive research conducted by private firms also has the potential to contribute to agricultural productivity improvement by complementing upstream public sector research at both the international and national level. Worldwide, the private sector currently accounts for approximately 70 percent of total investment in research for genetically modified organisms (GMOs). As a result, nearly 80 percent of agricultural biotechnology-related patents are owned by the private sector.[105]

4.21 What remains to be detailed is the CGIAR's potentially complementary role to private sector growth in agricultural development. Private sector investment in agricultural R&D is often determined by a very specific set of factors that has potential ramifications for dissemination and adoption of new technologies, including overall market size, crop value, farmers' purchasing power,

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103. World Bank 1995; World Bank 1996. U.S. advice was instrumental in convincing India to undertake a variety of public interventions in agriculture to address market failures. This included the establishment of the Food Corporation of India to provide price supports, to expand public sector fertilizer imports and distribution, and greatly accelerate the supply of agricultural credit to the farming communities. Some of these were conditions of the Bank's lending in support of the Green Revolution. The support India received from the Bank — investments in irrigation, balance of payments support for fertilizer imports, and other assistance — was greatly accelerated by having a TAC chair who was the advisor to the President of the Bank, close ties with the founders of the CGIAR and the Rockefeller Foundation, and a background in agricultural development. Interviews with David Hopper, Robert Picciotto; U. Lele 1994.

104. A CIMMYT study of maize seed markets examined seven Asian countries: China, India, Indonesia, Nepal, Philippines, Thailand, and Vietnam. The figures given above exclude China given the dominant role played by state-owned enterprises in China's agricultural input sector. If China is included in this figure, the private sector share of maize seed sales (in terms of metric tons) falls to 41 percent. See, among others, R. Gerpacio 2002.

105. See Lesser 2002; Spielman 2002.

farmers' repayment capacity on input loans, farmer knowledge of new technologies, responsiveness of the crop to inputs, relative proportions of purchased versus saved seed used by farmers, crop processing and storage qualities, and consumer preferences. Moreover, access to technologies emerging from the private sector depends critically on the ways in which proprietary rights are allocated to innovators and farmers; the ways in which benefits are distributed among private firms, rural producers, consumers, and government; and the nature of institutions formed at the national and international levels to address these issues.

4.22 The complexity of these factors sheds light on the relatively unexplored implications of the investment choices made by the private sector over specific technologies, crops, and regions; the types of farmers that are likely to benefit from private sector technologies; the regulatory regimes that will make available such technologies; the intellectual property that they embody; and the forums that exist to make voices heard from stakeholders.

4.23 These issues are critical to the CGIAR insofar as its collection of genetic resources represent the raw materials with which biotechnology is able to produce new processes and products to improve agricultural productivity and reduce poverty. The control, management, and use of genetic resources are major issues both within the System and in the international arena. Both internal systems and international agreements raise important questions relating to the social, economic, and ecological impacts of genetic resource management, modern biotechnology, intellectual property, biosafety and field testing regulations, and the CGIAR's role in addressing these questions.

4.24 In this context, the role of CGIAR research is more important than ever, especially in regions such as Sub-Saharan Africa, where the CGIAR, the World Bank, and the donor community can assist in developing programs that support research and concurrently promote markets and commercialization of new technologies. The changing environment and the rapid pace of innovation in the private sector requires that the CGIAR (a) develop a more sophisticated and timely response to issues such as IPRs, (b) expand its engagement with private firms, both multinational and domestic, and with the NGO community on issues of technology choices and institutional arrangements, and (c) remain a key actor with respect to international agreements on genetic resources, intellectual property, biosafety and field testing, and other key issues. These issues have important implications for CGIAR priorities and strategies, and require detailed and integrated consideration by the CGIAR and its stakeholders.

4.25 Also worth mentioning is the role of the CGIAR's genetic resources in the noisy debate over GMOs and transgenic crops. Controversy over GMOs has led to concerns about food safety and trade, famine relief supplied to southern African countries, and NGO and civil society movements in industrial and developing countries. The World Bank announced a new global initiative at the Johannesburg Summit to assess the potential of agricultural science and technology in boosting agricultural productivity in developing countries with a view to generating the same kind of consensus as was developed on climate change. It will be difficult to achieve such consensus without conclusive scientific evidence either for or against GMOs, and even if achieved, the consensus will need to be followed by concrete actions by the CGIAR System as a whole to achieve poverty reducing outcomes on the ground.

4.26 Thus, the CGIAR faces a number of complex issues raised by the intricate relationships between genetic resources, biotechnology, and IPRs. The CGIAR is in an enviable position to help developing countries impartially evaluate risks and advise them in selecting biotechnologies, especially given that some governments in industrialized countries are themselves embroiled in controversies over biotechnology and unable to provide objective leadership or direction on these issues.[106] On the other

106. For example, many crops require monitoring to delay resistance development and possible gene transfer. There is no evidence that the Centers have systematically considered the issue or their role.

hand, at least some developing countries are proceeding with field tests of transgenic crops, while others get left behind. The TSR recommendations on IPRs provide evidence of the urgent need for an effective IPR strategy in the CGIAR, and the CGIAR's endorsement of the use of an integrated gene management approach at the Centers further illustrates the support for such an approach.

CAN THE CGIAR MEET THIS CHALLENGE?

4.27 Given the challenges posed by a rapidly changing environment, is the CGIAR prepared to (a) ensure sound management of use of its genetic resources, (b) invest in new biological technologies, (c) collaborate with the private sector and other actors in research and development, and (d) address critical issues pertaining to proprietary knowledge and intellectual property? To be sure, the CGIAR has proved its ability in using conventional plant breeding tools to develop new varieties of many types of crops. The System-wide Review of Plant Breeding Methodologies in the CGIAR (2001) recommends, and the meta-evaluation team concurs, that conventional breeding be maintained at or above its present level in the CGIAR, even if biotechnology advances are also to be used to advance plant breeding. But beyond this, the meta-evaluation concludes that the CGIAR must undertake urgent discussion and analysis of these issues to develop an appropriate and effective set of policies and programs for action.

Managing Genetic Resources

4.28 The primary concern for the CGIAR is developing options that address the issue of managing its collection of genetic resources. The CGIAR has posed a number of solutions: the Global Conservation Trust discussed earlier, and the contributions of IPGRI and the GRPC to maintaining open access to genetic resources for developing country research in the FAO's International Treaty on Plant Genetic Resources for Food and Agriculture. Moreover, the CGIAR has made information on its genetic resources available to researchers through its System-wide Information Network for Genetic Resources (SINGER), an important contribution to improved management of genetic resources.

4.29 The TSR attempted to address the internal challenges to integrated genetic resource management in part by recommending the establishment of a centralized governance mechanism for the CGIAR. However, the idea was rejected by the CGIAR membership. The board chairman and director general of IPGRI, the focal Center of the CGIAR's plant genetic resource management efforts, have had similar reactions to the recommendations. In arguing that the recommendations were not consistent with the principle of Center autonomy and would not have Center ownership, the Chairman and Director suggested instead that the Intercenter Working Group on Genetic Resources (ICWG-GR) be granted greater authority to make decisions relating to the System's genetic resources.[107] Moreover, the chair of the SGRP Review Panel argued that the totality of international agreements relating to genetic resources provides for a policy environment that requires quick and appropriate responses by individual Centers and the CGIAR as a whole, responses that could not be achieved in the current structure.[108] But the CGIAR still lacks a person with the authority and responsibility to address issues beyond the International Treaty on Plant Genetic Resources for Food

107. Letter to the TAC Chairman, September 1998.

108. "Consistent policies are needed if the CGIAR is to function as a unified System. As it is, the CGIAR currently offers, in the view of the Panel, a bewildering array of policy-making and policy influencing forums and personalities. These need to be streamlined. The CGIAR is faced with the need for the Centers to move away from a history of autonomy and independent management to a System-wide culture with its attendant structures and partners and changing philosophy that recognizes the value of working together to address common goals. The panel is convinced that for the CGIAR to play its full role in the genetic resources arena, a System-wide program is needed… and that the existing SGRP needs to be changed, and while there are several options from an organizational standpoint, the status quo is not one of them." System-wide Review, page xi, around recommendation 18.

and Agriculture. In other words, substantial reconfiguration of the System is necessary to ensure sound management and use of the CGIAR's genetic resources.

Investing in Biotechnology

4.30 The issue of how much the CGIAR should invest in new biotechnologies is unclear from the CGIAR's own reviews. Currently, there is great variation in the degree to which Centers use new biotechnology tools and methods and the degree to which these tools are integrated into conventional plant breeding (Box 4.1). Several Centers have used genetic transformation to create transgenic cultivars and introduce pest and disease control where no satisfactory genetic resistance can be found.[109] But Centers responsible for several "orphan" crops such as cassava and yams have enjoyed fewer opportunities to apply biotechnology, despite the highly advanced state of their work with tissue cultures from some of these crops. The allocation and distribution of these new technologies within the CGIAR suggests that there is scope for further study and improvement. Moreover, the CGIAR has annually invested only an estimated $25 million, or about 25 percent, of its plant breeding budget in biotechnology research, a fraction of the amount invested by the private sector globally and a figure widely considered inadequate to meet the challenges of the future.[110] Yet the costs associated with biotechnology research — modern equipment, genome data and bio-infomatics, skills training for scientists, biosafety and field testing compliance, expertise on regulatory regimes that vary from country to country, and so on — are substantial.[111] The System-wide Review of Plant Breeding Methodologies in the CGIAR (2001) observed that (a) breeding programs are understaffed because of recurrent budget cuts, (b) vital breeding programs in some Centers have been de-emphasized in favor of new and different (non-plant breeding) programs, often due to donor preferences, (c) Centers are

Box 4.1: Current CGIAR Biotechnology Research by Center and Activity

The interpretation of the scope of activities that can be classified as biotechnology research can be quite broad. For the purposes of this meta-evaluation, biotechnology research is classified into the categories shown below, based on generally accepted terminology and applied to current CGIAR research. Note that tissue culture is *not* included under biotechnology procedures. The information on current CGIAR biotechnology research is drawn from individual Center Web site lists of current projects and work plans. Due to the difficulty of determining what is and is not biotechnology-related based on a brief program description, as well as interim changes in projects and delays in posting updates, the list is not exhaustive.

Germplasm enhancement, including genetic diversity (for example, Marker Assisted Selection, gene identification and characterization): CIMMYT, maize, wheat; IRRI, rice; CIAT, cassava, rice, beans; CIP, potato and sweet potato viruses, ICRISAT

Molecular-level analysis (for example, mapping, DNA sequencing, fingerprinting): IRRI, rice; ILRI, livestock and crop stover, including sorghum; ICARDA, lentil and barley

Transformation (for example, *Bacillus thuringiensis,* or *Bt,* herbicide resistance, drought tolerance): CIMMYT, IRRI, rice; CIAT, cassava; IITA and ICARDA, cowpea; ILRI, livestock vaccines, ICRISAT

Functional foods (for example, starch and nutritional quality): CIAT, cassava; IITA, cowpea; ICRISAT, stover nutrition

Research methods (for example, new marker types, transformation techniques): IITA, cowpea; CIMMYT

109. Centers working with rice and maize have progressed in the use of biotechnology applications, partly because of the greater availability of genetically advanced technologies for these crops worldwide and relatively better funding for breeding activities for these crops in the CGIAR. CIMMYT is testing new varieties, but to date no products are ready for the market. CIP is also working with biotechnology, although potato breeding has also experienced significant private sector investment.

110. Lesser 2002.

111. See Petit et al. 1996.

handicapped in the use of new biotechnology tools by the lack of a global base for information and expertise to draw on, particularly for the orphan crops, (d) field breeders and biotechnology experts have insufficient communication linkages, and (e) utilization and competence in the new field of biotechnology are less than in the older conventional plant breeding field.[112]

4.31 Adding to the challenges facing the CGIAR is the uncertainty in the future of both conventional plant breeding and modern biotechnology, and many commodity Centers are downsizing due to budget constraints. The short-term and unpredictable nature of donor funding makes it difficult to develop long-term strategies for retooling the Centers, even if they engage in partnerships and contract out most research to research agencies in industrial countries.

4.32 In short, the CGIAR may be threatened with technological obsolescence should it fail to invest significantly in developing its capacity to engage in partnerships promoting biotechnology research and its use. Conversely, according to the CGIAR's own System-wide reviews, the additional research costs associated with biotechnology are unlikely to lead to any savings in the short and the medium term.

Engaging the Private Sector

4.33 Public-private partnerships represent a potentially cost-effective means of transferring technology and capturing technological spillovers from private sector R&D that may benefit agriculture in developing countries. According to private sector representatives in the CGIAR, more public-private partnerships in the CGIAR would facilitate the dissemination of CGIAR technologies at a much faster rate than at present. For such arrangements to be forged, the CGIAR will have to develop flexible and responsive methods of engagement with private sector firms. It may also have to consider reallocating some of its own research efforts where private sector investment is large enough to warrant CGIAR withdrawal and where access by developing countries to the fruits of such research can be ensured.[113]

4.34 Surprisingly, there is little concrete, documented, Center-by-Center, up-to-date information on private sector investment in agricultural R&D, or on the potential or actual benefits and costs of public-private partnerships. At the System level, very limited information is available from the CGIAR on its relationship with, or the role of, the private sector in agricultural research and development on activities in which the Centers are engaged, except in the reports of the Private Sector Committee (PSC).[114] Minutes of the PSC reflect high-level, exploratory dialogues on issues including, but not limited to, potential areas for partnership, IPRs and regulatory issues in developing countries, CGIAR governance and management, and the need to improve public awareness on biotechnology. However, the PSC itself provides little evidence of tangible, System-level progress toward supporting collaboration or partnership between the CGIAR, the private sector, NARS, and other stakeholders, notwithstanding the fact that the CGIAR has been financing the activities of the PSC in much the same way it has financed the activities of the NGO Committee.

4.35 At the Center level, there is similarly limited information that is systematic or transparent, and that considers accountability expectations on public-private partnerships. The CGIAR's recent conference on impact assessment, held in Costa Rica, did not highlight this issue: few panels or

112. TAC Secretariat 2001a, p. 5.

113. For example, in view of the thriving private sector seed activity in the hybrid maize market in Asia, should the CGIAR reduce its varietal development of hybrid maize or rely on the private sector to commercialize its research, thereby allowing the System to focus more on the open-pollinated varieties used by poor farmers?

114. See, among others, CGIAR Secretariat 2000d; CGIAR Secretariat 2001c; CGIAR Secretariat 2001d.

papers directly addressed private sector R&D or its impacts.[115] Several Centers have informed the meta-evaluation team that they have forged extensive linkages with the private sector. Yet insufficient information exists as to the larger, System-wide implications of these linkages for the meta-evaluation team to make a useful assessment of their contribution to the CGIAR or its objectives.

4.36 The World Bank itself is hoping to contribute to the issue of public-private partnerships. Papers from the Bank's Agriculture and Rural Development Department (ARD) provide direction for future consultations and research through activities such as the Agricultural Knowledge and Information Systems (AKIS) Thematic Team or the roundtable discussions held with CEOs of major agribusiness companies and with leaders of civil society in 2000-2001.[116] The global initiative on agricultural science and technology launched by the World Bank in Johannesburg is expected to address many of the issues relevant to the private sector, but its implications for the CGIAR are as yet unclear.

4.37 Public-private partnerships will contribute to the CGIAR's work in biotechnology. But they need to be crafted with care since their results are highly dependent on the objectives of the partnership and the distinct accountabilities and obligations of partners. The most significant partnerships to date are concentrated in Brazil, China, and India, and fall into one of five categories: basic and applied research initiatives led by the public sector; outsourcing of private sector research to public institutions; joint public-private ventures in applied research; public partnerships with research foundations established by the private sector; and technology transfer systems between the public and private sectors. Collaborative successes depend critically on (a) strong research programs and financial resources in both the public and private sector, (b) political support for public-private collaboration with domestic *and* foreign firms, and (c) an IPR regime that provides for commercial incentives within public-private research initiatives.[117]

4.38 More analysis is needed of the alternative arrangements for sharing the benefits of research between and among parties to public-private partnerships. The few analyses of public-private partnerships that do exist make little distinction between *research for development purposes* — a strategy consistent with the CGIAR's mandate to serve the poor and potentially served by some types of co-financing, joint venture, non-profit partnerships and technology transfer arrangements — and *research for commercial purposes* — a strategy more consistent with contracting arrangements. Indeed, R&D for social and economic development is increasingly giving way to a more complex and fashionable terminology. Today, development R&D is more appropriately referred to in terms of (a) research for development, (b) development of research for commercial purposes, (c) dissemination of technology and information, and (d) development occurring as a result of technological dissemination and adoption.

4.39 In sum, the overarching question is whether the CGIAR System has an overall vision, strategy, and management system through which it is addressing the biotechnology agenda through public-private partnerships as a way of implementing its mission. The meta-evaluation's review of previous studies on this issue finds the CGIAR severely wanting.

115. One exception is Gerpacio 2002.

116. See Byerlee and Fischer 2000.

117. See Spielman 2002 and Pray 2001.

Addressing Intellectual Property Rights Issues

4.40 The CGIAR is similarly inadequately equipped to address IPR issues to benefit the System and its developing country stakeholders. Progress toward remedying this problem has been slow. In its review of the TSR recommendations on IPRs, the CGIAR decided against a single entity to hold patents, reportedly based on legal advice.[118]

4.41 How then will the CGIAR pursue a comprehensive IPR strategy given the articulated need and support for one? Consider the CGIAR in a context similar to that of research institutions in industrial countries, such as agricultural universities or public research agencies. Many such institutions have annual budgets for germplasm improvement work similar to that of the CGIAR, and complement this research with consistent, centralized (for example, university-wide) policies and offices for managing intellectual property assets. Such an approach is necessitated by the need to cope with the growing complexity of IPR issues, ensure transparency and accountability in the use of public funds, facilitate the introduction of new scientific information into the public domain for eventual or downstream use by private firms, and generate income. These needs parallel those faced by the CGIAR.

4.42 A recent British commission on IPRs headed by John Barton and staffed by some of the most knowledgeable experts on IPRs globally119 argues, "concerns about the operation of the intellectual property system and the extension of IPRs are not confined to their application to developing countries."120 The commission advises global programs such as the CGIAR, international organizations, and developing countries to confront the full implications of IPRs with the knowledge and sophistication that it calls for. The CGIAR needs to confront five major issues: (a) areas in which the System should partner with the private sector to conduct research, (b) areas in which costs make it most efficient to simply access private sector technologies for the benefit of the poor, (c) development of benefit-sharing arrangements to ensure such access, (d) areas in which the CGIAR's own research should be actively commercialized by the private sector, and (e) the implications of membership of actors with specific interests in influencing the choices the CGIAR will make in these new complex areas. The British commission on IPRs makes a variety of recommendations to deal with what they term "the fundamental asymmetry in relations between developed and developing countries" including:

- international negotiations of the IPR policies and their implementation to ensure global IP systems "evolve so that they may contribute to the development of developing countries by stimulating innovation and technology transfer relevant to them while also making products of technology available to them at competitive prices"[121]

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118. CGIAR Secretariat 2002j. According to the CGIAR Secretariat at ICW 1998, decisions on implementing the TSR recommendations were delegated to the Consultative Council, with the chairman requesting a number of committees to come up with proposals for implementation. (The committees asked to work on implementation included the CBC, CDC, the Finance Committee, GFAR, the Oversight Committee, the CG Secretariat, and TAC.) The NGO Committee and the PSC held special sessions for participation by their chairs in the Consultative Council. The Chair of the CDC indicated, "decision not to pursue a separate legal entity for IP followed a series of consultations in which the Centers which were generating IP that might be patented considered different options and received counsel from many sources. The Centers decided to continue their IP audits and complete them as soon as possible, and to set up a an advisory service (at ISNAR) to assist Centers on IP issues and provide referrals, as required, to qualified legal counsel and other specialists. In this process, each of the Centers involved carried out its own soundings, and the total effort was kept under review by CDC which did not maintain a record of Center-by-Center consultations."

119. John Barton is George E. Osborne Professor of Law at Stanford University. Other members of the commission include Daniel Alexander, Carlos Correa, Ramesh Mashelkar, Gill Samuels, and Sandy Thomas.

120. Commission on Intellectual Property Rights 2002, pp. 2, 4.

121. Ibid, p. 8.

- learning from the international experience including understanding the rapidly evolving nature of international public-private partnerships (Box 4.2)
- assessing the implications of IPRs for and of the Convention on Biological Diversity
- strengthening the capacity of international and national institutions involved in IPRs
- supporting the international architecture.

They point out, for instance, that implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture (2001) requires vigilance because of the compromise wording and the scope for patents on the genes isolated from the plant genetic material under the aegis of the CGIAR and its implications for developing countries — hence the broad-based need for education and information on IPRs in global programs, international agencies and developing countries.

4.43 Only recently has the CGIAR recognized the importance of IPRs and the need for the Centers to accommodate IPRs as part of their overall activities. The CGIAR now has System-wide IPR guidelines, and several Centers have IPR policies. A Central Advisory Service was established at ISNAR in 1999 to assist Centers in understanding the effects of IPRs, to develop training for scientists, and to establish policies and procedures. Subsequently, several Centers have hired their own IPR specialists and the CGIAR has also conducted an audit of IPRs and IPR issues in each Center. The unit has suffered from funding shortages and ISNAR itself is being restructured, leaving the unit's future uncertain. This response is inadequate to deal with the current challenges facing the CGIAR, a concern shared by many respondents to the survey conducted by the meta-evaluation team. Results from the survey show that 79 percent of the respondents recognized the need for a System-wide policy on IPRs, particularly in light of the growing importance of IPRs in agricultural research.[122]

Box 4.2. "Golden Rice" Demonstrates the Challenges of Public-Private Sector Partnerships

Golden rice is a well-known result of a public-private partnership in which private companies have granted royalty-free licenses to public sector research institutions to work with their patented technologies on behalf of poor farmers in developing countries.

In August 1999, Swiss researchers collaborating on a Rockefeller Foundation-funded project succeeded in genetically modifying the rice genome to express beta-carotene, a precursor of vitamin A. With its "golden" tint, the rice is a potential solution to Vitamin A deficiency (a condition causing blindness) for over 100 million people in the developing world, most of whom are children.

However, some 70 process and product patents are associated with the technology, and the genes and methods used are the intellectual property of 32 companies and universities. To navigate these legal complexities, the scientists negotiated a deal in which Syngenta acquired the rights to golden rice, allowing the company to exploit the commercial potential of the technology, in exchange for allowing royalty-free distribution of the technology to poor farmers in developing countries. They are negotiating similar deals with other firms, such as Monsanto and Bayer, who hold rights over key technologies used in golden rice.

The CGIAR needs to be empowered and equipped to undertake such partnerships with full understanding of their implications for its mission.

Sources: Interview with Robert Herdt; R. Herdt, "Thoughts on the CGIAR," Dresden, Germany, May 24, 2000, revised August 17, 2000; Commission on Intellectual Property Rights 2002, p. 129.

4.44 But if the CGIAR is to develop a common IPR policy for the System, three substantive issues must be addressed immediately. First, the CGIAR must analyze the commonalities and differences in existing IPR agreements signed by various Centers, and determine whether such an analysis, along with

122. A similar proportion of respondents supported a routine System-level monitoring and oversight system, along with a process of annual reporting to CGIAR membership on the implementation of a System-level IPR policy by Centers. In comments to the meta-evaluation team, respondents also expressed the need for a flexible IPR policy regime that permits Centers to address IPR issues in a manner appropriate and specific to individual products, countries, and clients. See Annex Q.

input from other sources, can contribute to forming an appropriate IPR policy. Second, the CGIAR must provide a definition of "appropriate" that strikes a balance between raising agricultural productivity, reducing poverty, and incorporating the demands of smallholders and other types of agricultural producers. Third, the CGIAR must determine what structure of governance and management is most conducive to supporting a common IPR policy, and whether it is prepared to accept the greater degree of centralization necessitated by such a policy.

4.45 In addition to its own internal concerns over IPRs, the CGIAR faces significant demand from developing country NARS for technical input on how to address their own IPR issues, a demand that the CGIAR has not effectively met. Papers commissioned by the meta-evaluation to capture perspectives from developing countries indicate an urgent need for assistance in developing countries in the interrelated areas of biotechnology, IPRs, and management of genetic resources. They consider such help essential not simply to meet the needs of their poor but as a way of maintaining their competitiveness in the world markets even while being aware of the urgent need to manage the biosafety aspects of the new technology.[123]

4.46 Thus, while the CGIAR has taken steps necessary to keep the System's options open with respect to IPRs and biotechnology, the meta-evaluation team does not consider this response sufficient and cohesive at the System level, nor adequate in terms of the CGIAR's commitment to developing country NARS.

RECONFIGURING THE CGIAR TO MEET THE CHALLENGE

4.47 The present principles of governance in the CGIAR have prevented the System from making a variety of key decisions on the organization, management, and financing of a long-term genetic resources strategy. The CGIAR does not have a structure that is designed to address complex and controversial issues of global public policy and scientific considerations, an issue raised by a restructuring proposal from the CGIAR Committee of Board Chairs and Center Directors' Committee in 2000 (discussed further in Chapter 9). The challenging combination of freedom and collective action that characterizes the System is described by one reviewer as "the tragedy of the commons" of the CGIAR. Although TAC has commissioned System-wide reviews to examine many of these contemporary issues, the committee has been toothless in that it has no authority or ability to mobilize and promise support to the CGIAR on the key issues of science policy. This paralysis has critical implications for how the CGIAR addresses related issues of plant breeding research, gene banks, biotechnology, and IPRs.

4.48 One possible way of examining this issue is to discuss the need for reconfiguration within the CGIAR System, a topic treated in detail in Chapter 9. While many reviews of the CGIAR discuss System reconfiguration, the System-wide Review of Plant Breeding Methodologies (2001) put the necessity of such a process in stark perspective with respect to the CGIAR's research in plant breeding, genetic resource management, and biotechnology. The review observed the need for a greater interaction among and within Centers or among researchers — within and beyond the System — working on similar crop types or similar research tasks, to generate beneficial synergies. It also makes a case for centralization of key operations or even consolidation of Centers to improve current research methodologies, realize economies of scale and scope, and improve access to key inputs for research on orphan crops that would benefit most from improved access to bioinformatics services.

123. Romano 2002; Eicher and Ndiritu 2002; Macedo, Porto, Contini, and Avila 2002.

4.49 Another implication is the need to improve the System's approach to long-term priority-setting and financing. At the System level, the CGIAR has yet to determine what types of technologies it will invest in over the long-term, what types of collaborations it is willing to enter into with the private sector or other actors in agricultural research, and how it will distribute its resources between integrated genetic resources and natural resource management. Moreover, the CGIAR must contend with limited, restricted or year-to-year donor funding that is ultimately detrimental to planning and executing long-term research.[124]

4.50 In sum, the CGIAR's strategy, policy, organizational structure, and financing mechanisms for genetic resources are currently inconsistent with the challenges it faces. The CGIAR urgently needs an integrated strategy that incorporates plant breeding, genetic resource conservation, modern biotechnology, and IPR policy, backed up by a long-term investment and funding and a supportive organizational structure that brings the most appropriate science to bear on the provision of global public goods to meet the needs of its poorest clients. It must also have a credible process for priority-setting with a results orientation that is independent of specific interests within the System and is held accountable to the CGIAR membership at large on a regular basis, and so is able to explain the different options open to the System and the paths recommended and adopted. Both the strategy and the organizational structure must have the legitimacy provided by the authorizing environment and sufficient authority vested in it to best serve the interest of its ultimate clients.

5. Policy Research in the CGIAR

5.1 Policy research has grown more rapidly than any other research area in the CGIAR in recent years. At the same time, the lack of a conducive agricultural policy environment at both the global level and in developing countries, and a shortage of needed social science research and research capacity, are frequently identified as major constraints to the adoption of new technologies and rapid, broad-based agricultural growth. Hence, the meta-evaluation team paid special attention to the scope, quality, and impact of this research.[125]

5.2 Policy and social science research are critical to ensuring the development, dissemination, and adoption of new technologies that are beneficial to poor households. The CGIAR is not obligated to undertake such research simply because of its international status and mandate. Rather, global research on policy and social science issues should be carried out where it (a) is relevant to agricultural productivity and poverty reduction, (b) is high quality and cost-effective, and (c) contributes to building long-term, high quality research capacity in developing countries.

5.3 Policy research has been carried out at many CGIAR Centers, but nearly half of the CGIAR policy work is carried out in IFPRI and the rest is spread throughout the other 15 CGIAR Centers. The predominant body of work, in both scope and depth, is that of IFPRI. Moreover, only IFPRI's policy research has been the subject of previous evaluation through EPMRs and other systematic assessments. Thus, while the meta-evaluation has been directed at the System level, in the arena of policy research it has had to focus on a specific Center, IFPRI, to a degree not found with respect to

124. Indeed, scientists from advanced countries interviewed by the meta-evaluation team assert that researchers in their countries will only enter risky areas of enquiry with potentially high returns provided long-term funding is assured.

125. For a detailed discussion of policy research in the CGIAR, see Gardner 2002.

other issues.[126] Some of the forest policy research being related to NRM is discussed in Chapter 6.

5.4 The role of policy research in a science-driven CGIAR was a matter of debate when IFPRI was formed in 1973 and brought into the CGIAR in 1977. The primary objective of establishing IFPRI was to improve the policy framework in developing countries, a national public good, which can constrain broad-based agricultural development.[127] Some feared that IFPRI would duplicate analyses of trends and international food trade carried out by the FAO. TAC stressed that IFPRI should emphasize the problems of developing countries and the then TAC chairman stressed the importance of engaging and developing capacity of nationals of developing countries to undertake policy work so that they would influence policies and their fine tuning in developing countries. TAC also suggested that IFPRI's in-house research function should not compete in the provision of policy analysis services to donors, particularly the World Bank, and to other CGIAR Centers. Finally, there was concern that locating IFPRI in Washington, D.C., would give it a privileged position and expose it to undue donor influence.[128]

5.5 Policy research can use one of two main approaches: methodological and applied. IFPRI's methodological research, for example, has focused on ways to adapt and extend standard welfare economics to agricultural and rural development policy work. Its applied research has assessed existing and proposed policy alternatives to estimate their benefits and costs. The applications fall into two main categories: policies of national governments and international policy issues which, since the formation of IFPRI, have emerged as important constraints to incentives for investment in agriculture in developing countries. IFPRI's publications in both areas are widely read and respected.

5.6 Closely related to the quality and relevance of the research products is building policy research capacity in developing countries. Officials in developing country governments and national agriculture research systems told the evaluators that one of their primary needs is for more country-specific empirical work of the kind IFPRI has conducted, for example, on the reforms of the food price subsidy regimes. Even more important, they said, is assistance with improving their long-term capability to develop policy analysis and advice on their own. Both priorities follow from the original TAC guidance that IFPRI's research should emphasize the problems of developing countries.

5.7 An issue in the current CGIAR policy research program is the extent to which the program is giving sufficient priority to the areas of policy research where its comparative advantage is greatest relative to the FAO, the World Bank, and universities in advanced countries.[129] This includes both the generation of research products and building capacity for policy analysis in developing countries.

5.8 Policy research in the CGIAR is distinct from social science research. Policy research is largely perceived as the province of economists and addresses mostly sector, macroeconomic, and international issues. Social science research (research by sociologists, anthropologists, etc.) is considered to focus on household and community-level issues and is to help plant breeders and others

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126. Recognition of the centrality of IFPRI is evident, for example, in ISNAR's 4th EPMR, which recommended that its policy research be transferred to IFPRI.

127. Interview with David Hopper.

128. A special team under the chairmanship of a TAC member felt strongly that IFPRI should move from its location in Washington, D.C., to a developing country to "place its research staff in an environment which would be more relevant to the objectives of the institute, avoid the perception of IFPRI having a somewhat privileged status in the CGIAR and could also protect IFPRI from undue donor influences and demands in its analysis of the world food problems" Baum 1986, p. 139.

129. CIFOR's policy research was covered in the OED Evaluation of the World Bank's implementation of the 1991 forest strategy and is not covered here. See Lele et al. 2001.

to improve the relevance of their work. The distinction is important, but not without problems. For example, in the past, at IRRI and ICRISAT, economists carried out some of the best CGIAR household research. Increasingly, social science research, broadly defined, has become more multidisciplinary and quantitative in the universities of advanced countries. But there has been relatively little evaluation of the CGIAR social science research. Before turning to the discussion of the impact of the CGIAR policy research, it is worth reporting the findings of the social research conference organized at CIAT in mid-September 2002 involving participants (sociologists, anthropologists, and economists) from 13 CGIAR Centers, as well as representatives of donors and reputable social scientists from the universities of developed and developing countries and several national programs on all continents.

5.9 The meeting endorsed the role of social science research, particularly upstream strategic research, in the CGIAR, and stressed the strong contribution such research makes when it is of the highest quality. But the meeting also concluded that social science research has declined in several CGIAR Centers over the past three to five years, including in Centers that had a strong tradition of social science research. It particularly noted the loss of critical mass and skill mix "impoverishment" among non-economists, a 24 percent drop compared to a 2.2 percent increase in all scientists since 1995/96. The report on the meeting concluded that the research has been "pushed too much downstream at the expense of upstream knowledge generation for inclusion in and guidance of integrated research programs [and that] service research often takes precedence over strategic research." It also noted that, while research on participation has grown, "genuine participatory research is often replaced with rhetorical/broad brush 'participatory painting' at the surface of the research programs, in the absence of specialized socio-cultural skills for substantive research."[130] One notable exception to these observations is the research on Common Property Resources (CAPRI), recognized for its outstanding quality both in its EPMR and at AGM 2002. Even then the meta-evaluation team has concluded that the best, most advanced research on common property resources in developing countries is not being carried out in the CGIAR Centers but rather in several U.S. universities. CAPRI is also much better funded relative to other social science research in the CGIAR Centers.

5.10 The recommendations set forth in the report of the social science conference are thus a step in the right direction. They emphasize strengthening capacity, institutional support, and partnerships. Still, there is critical need for an independent external review of social science and policy research in the CGIAR, not only to examine the System's comparative advantage, but also to examine the allocation of resources among various System-wide programs.

5.11 The meta-evaluation team has concluded that one potential means of improving social science research (and policy research, discussed below) on a global basis is the use of genuinely competitive approaches to research — unlike that being used currently in the Challenge Programs and discussed in Chapter 10 in which the best proposals are funded by the international donor community provided they are relevant to the long-term vision and strategy for the CGIAR. Ideally, unrestricted funds mobilized under an international umbrella organization such as the CGIAR could be allocated to such proposals. Centers with competitive capacity in policy and social science research could engage in this process, while those without would ultimately reduce their burden on the System and permit resources to be allocated to those with greater capacity, e.g., other Centers, NARS, ARIs, universities, etc. As designed, the first two Challenge Programs did not entail such competition. The CGIAR Centers are in the lead both in managing and running the competitive grants. While this concept comes close to that envisioned by the CDMT for the Challenge Programs (discussed in Chapter 10), there are early indications that the selection of proposals is not consistent with this spirit.

130. Cernea and Kassam 2002.

IFPRI'S POLICY RESEARCH: 1998 EXTERNAL PROGRAM AND MANAGEMENT REVIEW

5.12 IFPRI's third EPMR reviewed the programs of IFPRI's four research and one outreach division separately, with generally positive assessments of the quality and quantity of work done. The EPMR made four main recommendations. First, it encouraged continuing effort to document impacts. Second, it recommended adjusting the research agenda to re-emphasize water issues and take into account developing countries' interactions with the world economy. Third, it recommended that relevance be increased by taking developing country concerns more fully into account and by diversifying the staff to include more staff with policy experience as well as research experience. Fourth, it recommended improving outreach by better integration and mutual reinforcement of research and outreach activities. The latter two recommendations are supported by TAC, which suggested that there should be more country-specific, focused research (as opposed to large-scale, multi-country efforts) and that IFPRI should become more actively involved in "emerging policy debates."[131] The EPMR also recommended higher priority, even at the expense of work in other areas, on "a more in-depth involvement with policy research and advice on low-income transitional economies about how to institute a functioning market economy." While this may seem counter-intuitive for a system oriented toward global and regional public goods, so much of the donor conditionality in small and least-developed countries, such as those in Africa, has lacked an empirical base. Informed debate on policy improvements would be enhanced, for example, with a better understanding of the functioning of the markets and institutions involved, or of the impacts of policy reforms. Such research could best be conducted with the active participation of nationals across several countries.

5.13 These issues temper the reception of IFPRI's generally well-regarded 2020 initiative as well as other research that has focused on professional audiences. The IFPRI response to the EPMR agrees with the need to become more proactive on outreach. But the response suggests a structural problem. It states: "While most of IFPRI's outreach activities have been and will continue to be undertaken within the research divisions as integral parts of research projects, we visualize that the Outreach Division will play the dual role of supporting such outreach activities while undertaking other outreach activities that are more appropriately done outside the research divisions, such as capacity strengthening and information dissemination that cut across divisions."[132] The structural issue is whether the kind of outreach that would best serve CGIAR purposes can be done with this division of labor.

5.14 IFPRI's response to the recommendation on relevance says that the institute's priorities already are "heavily influenced by developing countries' needs," and IFPRI already has senior researchers with significant policy experience. The response goes on to agree to take steps in these directions, but evidently IFPRI does not see a problem where the EPMR does, although developing country nationals with experience in policy analysis remain few in number on IFPRI staff.

5.15 Comments received by the meta-evaluation team suggest that outreach in developing countries (and genuine participation of developing country institutions), could be enhanced in ways that would make IFPRI's research more pivotal in strengthening policy analysis capacity in developing countries. Internally, this would require better integration between the outreach division and the research division. Externally, it would have implied stronger linkages with organizations dedicated to research capacity building in developing countries.

131. TAC Secretariat and CGIAR Secretariat 1998a, p. vi.

132. Ibid, p. xiii.

OTHER REVIEWS OF IFPRI IMPACTS

5.16 In evaluating the impact of policy research and outreach in developing countries, case studies of IFPRI impacts on policy decisions in developing countries are helpful. Ryan (1999a) investigated the returns to IFPRI's rice market and policy research in Vietnam. The work was well integrated with Vietnam's Ministry of Agriculture and Rural Development, thus minimizing the outreach problem of getting an audience for the findings. IFPRI made a large number of generic and specific policy recommendations, among them recommendations to liberalize rice trade both internally and externally. Vietnam did in fact relax rice export quotas and internal restrictions on rice trade. Increased rice exports under these policy changes were estimated by Ryan to benefit Vietnam by about $60 million per year during 1996-2001. A "conservative" view of IFPRI's causal role in the policy change — which attributes to IFPRI an acceleration of policy change that resulted in $45 million in gains during 1996/97 — obtains a benefit-cost ratio of at least 45 based on policy research that cost just under $1 million.

5.17 A quite different picture emerges from a review of IFPRI's 10-year program of work in Malawi.[133] The review cites "the adverse perception that IFPRI is an expensive organization, which is too close to donors, too Washington-centric, and too possessive of the data bases it generates." It concludes by quoting with approval an interviewee, "it seems IFPRI may have concentrated too much on data collection and too little on building solid linkages with the policy environment in Malawi. Links with the donor community are not a substitute for this, as staff turnover and changing priorities are not conducive to sustainability."[134]

5.18 Similarly, the 2020 Vision Project's efforts in regions of Africa have received both praise as innovative initiatives and blame as activities peripheral to and largely divorced from IFPRI's core research program "as an afterthought or to placate the critics amongst its donors," as one person put it. Experts consulted for this review disagreed about some aspects of IFPRI's support for capacity building in policy analysis and social science research to support such analysis. Some give high marks to what IFPRI has done in improving the capacity of government analysts and others involved in policy in Africa, especially in the period up to the early 1990s.

5.19 Others point to what has been described as a Washington-centric or stop-and-go characteristic of IFPRI's involvement in African policy issues and education as evidence of a lack of commitment by IFPRI. At the same time, proponents point to IFPRI's ongoing research on the economics of African agriculture, reasonable advice, and training of personnel from African governments, and note that no other outside government, international agency, or NGO can claim even that much influence or effect. Yet without question, capacity for policy research in developing countries and the CGIAR's role in stimulating such capacity through collaborative research with nationals of developing countries needs more attention through independent evaluation of the CGIAR's policy research. Several CGIAR Centers have indicated to the meta-evaluation team that the Centers located in developing countries are more able to be effective in this regard than those such as IFPRI and ISNAR located in the capitals of industrial countries — a hypothesis worth investigating in a System-wide review of policy research.

5.20 Overall, the most important issues concerning IFPRI, and policy research in the CGIAR more broadly, are not the quality or quantity of work but rather, priorities in research topics and genuine outreach to developing countries through closer involvement of local institutions and capacity

133. Ryan 1999b. Despite very substantial efforts in capacity building, with many tangible products in papers, training, and advice, the measurable impacts of the kind estimated for Vietnam were essentially nil in Malawi. Credit is given for engagement in the food policy process at the beginning of the 1990s, but IFPRI's presence was not apparent in more recent important policy debates.

134. Ryan 1999b, pp. 35-36.

building partnerships. IFPRI has generated good research in many areas, such as developing methods of impact assessment; policy analysis of market-distorting policies in developing countries; and analysis of the relationships between economic growth, environmental improvement, institutional design, and poverty reduction, including issues in nutrition and health. As an example of a positive assessment along these lines, Farrar (2000) in his broad review of IFPRI's food subsidy work does not estimate quantitative impacts but makes the case well that IFPRI's long series of work on food subsidies made it the recognized world source of expertise on the subject.

5.21 But in other areas the priorities are questionable. It is arguable that IFPRI gives too high a priority to world supply-demand projections and technical pursuits such as developments in CGE modeling and simulations, relative to applied policy analysis of developing countries (carried out in those countries with IFPRI participation in collaborative research and guidance), analysis of political economy issues, country-by-country analysis of the damage being done to developing countries by industrial countries' agricultural subsidy policies, and transparent assessment of the impact of developed country policies on both the rural poor and incentives to investment in agricultural research and development in developing countries. IFPRI has carried out several valuable studies on these subjects. CGIAR research thus provides a welcome strengthening of the World Bank and others on OECD subsidies to agriculture and barriers to agricultural exports from developing countries in forums such as the 2002 World Summit on Sustainable Development in Johannesburg. The issue is one of further work and dissemination effort to deliver possibly unwelcome messages to developed countries. A need has also been expressed for research on the short-term impacts of liberalization, if and when it occurs, in developing countries; specifically, for research that recognizes the complex interactions and responses of private entrepreneurs, farmers, government agencies, and consumers to liberalization, and provides advice on minimizing the adjustment costs to more vulnerable sectors of society.

5.22 A research agenda of special interest to the CGIAR as well as donors is IFPRI's efforts to develop and carry out impact assessments of individual Centers and of the whole CGIAR System. Especially notable are the assessment of impacts on poverty and the spillover gains developing countries have received as a result of germplasm research in Centers. IFPRI has also carried out helpful meta-reviews of various Centers' impact assessments.[135] In addition, IFPRI has done some notable analytical work on how to evaluate its own products.[136] Based on its self-evaluations, the areas of policy research that appear most promising in generating net social gains are those that influence policy decisions by national governments or international institutions. Increases in incomes or other social indicators that result from appropriate policy decisions can then be credited in part to the findings and influence of that research.

5.23 A more concentrated focus on policy advice for developing countries has both pluses and minuses. On the plus side, this is where the likely net social benefits of policy research have been and are expected to be highest. Some members of the meta-evaluation's advisory committee and others believe the opportunities here are so promising that IFPRI should be largely devolved to developing countries so as to be in a better position to conduct research in collaboration with developing country NARS and to formulate and deliver such advice in active partnership with the countries concerned. On the minus side, country-specific advice is by definition not a global public good unless it

135. For example, Anderson, Moscardi, and Pardey 1994 evaluated the CIMMYT Economic Program (CEP), criticizing adoption studies done in the CEP as not contributing beyond the findings already available in the literature on wheat and maize (p. 3), finding their farm-level adoption studies questionable, and recommending that CIMMYT cease doing adoption studies — while at the same time commending CIMMYT's global impact assessments, e.g., Byerlee and Moya 1993.

136. In 1997 and 2001, IFPRI held conferences in which ideas from a broad range of social scientists were solicited on the question of how to measure the benefits of policy-related social science research. Some of these papers contained estimates of impact as well as discussion of ways to measure such impacts.

influences poverty reduction on a global scale, and IFPRI's efforts could become too diffuse if it attempted to provide, in effect, host-country advice on a quasi-global basis without a strategic approach to ensuring spillovers from its research.

5.24 The questions raised by the meta-evaluation regarding policy research parallel those about the role of the CGIAR that occurred at its inception. According to one of the participants interviewed by the meta-evaluation team, one proposed objective of the CGIAR was to make the Centers the focus of world research on crop science; the alternative was the more homely objective of having the Centers add as much as possible to the developing world's "pile of grain." The two are related, of course, but the claim of the interviewee is that had the crop-science objective prevailed, the Centers might have become great sources of articles in scientific journals but would not have produced the series of yield-increasing varieties that cemented the reputation of the CGIAR as a solver of the world food problem. The point for IFPRI is that its main objective should be the simpler one of adding to the world's pile of good policy choices, which in turn can result in journal articles of missions accomplished and reasons why. More generally, the CGIAR faces a growing challenge between the scale of impact on the ground, on one hand, and international visibility to maintain donor support on the other. And in the view of the meta-evaluation team, the System balance has lately tilted too much in favor of meeting donor and industrialized country expectations rather than achieving results.

6. Natural Resources Management Research in the CGIAR

6.1 Research on natural resource management and its links to productivity growth have been a matter of considerable and continuing debate in the CGIAR, raising issues of strategic focus in the System.[137] The meta-evaluation team identified natural resource management (NRM) research as a topic for focused treatment because its position in the CGIAR research portfolio has become increasingly prominent over the past decade or so. This chapter assesses the quality, coverage, and impact of the CGIAR's NRM research and extracts implications for the System's science strategy, organizational structure, and financing mechanisms. The meta-evaluation team also sought to establish the global public goods nature of research on NRM — a difficult task since resource degradation has local, national, regional, and global consequences.

6.2 The difficulty arises because, in contrast to germplasm research, NRM research is not performed in laboratories, it addresses less homogeneous issues, and its benefits are spread over several timeframes and across different scales and can have broad spillover effects. Scalability, time horizons, externalities, and measurement — issues common to NRM research — are far more complex than those encountered in other kinds of research. Furthermore, the scope of NRM research is potentially so broad that establishing priorities requires the use of clear criteria, based on comparative advantage, core competencies, or scope for beneficial spillovers, that are closely tied to the CGIAR mission.

6.3 Other evaluation difficulties arise because primary source material for an evaluation of NRM research is thin, despite the rapid growth of this research area. The CGIAR has produced few impact assessments on NRM research, so it is difficult to say whether NRM research has been effective within the CGIAR. Of course, the absence of such evidence does not imply an absence of impact, rather that an established set of methodologies for NRM impact assessment does not currently exist. Yet, there is enough information about NRM activities worldwide and within the CGIAR to draw some plausible conclusions.

137. For a detailed discussion of natural resource management research in the CGIAR, see Barrett 2002.

6.4 First, NRM research is central to sustainable productivity increases in agriculture and to improvements to rural livelihoods worldwide. The CGIAR is correct to emphasize integrated natural resource management, along with integrated genetic resource management as its twin pillars supporting agricultural productivity enhancement.

6.5 Second, NRM research has the potential to generate global public goods in the form of new knowledge, especially on core processes and on methods of analysis and measurement, as well as in meta-data sets with global coverage. NRM research has made important intellectual contributions to water management, tropical deforestation, characterization of agro-ecosystems, and sustainable resource management on marginal lands. But these accomplishments notwithstanding, the CGIAR currently falls short of realizing its considerable potential to generate global public goods, primarily due to System-level issues of focus and framework (discussed below). Satisfactory resolution of these issues would do much to push the CGIAR to its possibilities frontier.

6.6 Third, and related to the preceding point, the CGIAR's NRM research programs sometimes venture beyond the System's core competencies without providing a compelling case for the strategic importance of the research. The expansion of the System in the early 1990s added scope without commensurate growth in funding, thereby increasing the pressure to leverage donor resources and leading to a drift in the research program. This has undermined the traditional excellence of CGIAR science, including its NRM research.

6.7 Fourth, the CGIAR has made significant, productive investments in training individual scientists from developing country NARS and, in a few cases, in helping develop NARS institutional capacity, regional networks, and subregional organizations relating to NRM.[138] This capacity building has declined in recent years, although the need remains acute. Given the funding and personnel challenges many NARS face, NRM-related capacity building is a serious challenge that demands System-wide attention and donor finance.[139]

6.8 Fifth, the resources-oriented Centers may be doing more and better work in integrated NRM than are the more established, commodity-oriented Centers, with the ecoregional Centers falling somewhere in between. Although a few System-wide programs are making significant advances toward addressing global problems, their objectives generally far outreach their resources or authority, thereby limiting their effectiveness.[140]

6.9 Sixth, legitimate concerns have been raised about the NRM research portfolio. Some of these concerns appear in Center or System-wide program reviews, others are apparent more at the System level than at the Center or program level. These concerns can be usefully sorted into two sets of issues — focus and framework — and have been identified by TAC.[141]

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138. In this chapter, national agricultural research systems (NARS) may also be referred to as national agricultural research and extension systems (NARES). The inclusion of the "E" for extension in NARS is not meant to imply a broadening of the mandate of the CGIAR beyond the research domain. The inclusion of the "E" is meant to reflect both that there have been some successful Center partnerships with national extension services that could prove instructive (notably by WARDA and IITA in West Africa) and that the model of research-extension interaction is evolving, perhaps especially in NRM, where the development and dissemination cycle for best practices increasingly requires close interaction between both functions (Barrett, Place, and Aboud 2002).

139. Ndiritu 2002 stresses the importance of such finance in Africa, but the reluctance of donors to finance regional and subregional research organizations, despite efforts on financing, in part due to the mixed records of the ROs and SROs.

140. In 2002, System-wide initiatives received only 35 percent of the funding they indicated they required.

141. See Barrett 2002.

6.10 Seventh, and most important, NRM research has attracted increasing interest and resources over the past decade, though these may not have focused on the topics and functions where the CGIAR can make tangible, high-return contributions to global public goods, that is, in contributing to sustainable agricultural productivity increases and improving the livelihoods and reducing the vulnerability of the rural poor.

6.11 In sum, the CGIAR's NRM research can be justified by the System's impressive, well-established agricultural impacts, *but only so long as the NRM research portfolio stays true to the System's core agricultural productivity agenda*. It is understandable why impact assessment of the NRM portfolio becomes a reasonable demand of donors bearing a fiduciary responsibility for wise use of their resources.

THEMATIC PRIORITIES IN NRM RESEARCH

6.12 Since pushing more heavily into NRM about a decade ago, the CGIAR has been experimenting with a variety of approaches to NRM research, using different, evolving terms and modalities — such as "sustainability research," "ecoregional approach," "integrated natural resources management" (INRM) — as it has thought through a coherent NRM research strategy. There is now essentially universal recognition in the CGIAR of the need for NRM research to address not only current poverty and food insecurity but, at least as importantly, to prevent future poverty and food insecurity by protecting the natural resource base on which future productivity improvements depend. Yet, as a recent TAC report notes, "In the past, research on natural resources has been too often conducted in a disjointed, fragmented fashion" and "[n]otably absent...is a coherent System-wide strategy for INRM priority setting and for operationalizing a more effective set of strategic INRM activities within the CGIAR."[142] In hindsight, it is clear that the CGIAR joined the early-1990s, "sustainable development" bandwagon and is now recognizing that the resulting NRM research portfolio did not necessarily match either the core competencies or the strategic objectives of the CGIAR, nor did it necessarily fill gaps left by the rest of the scientific community with related research interests — issues that are beginning to receive greater attention in the CGIAR.

6.13 The thematic priorities within the CGIAR's NRM research can be roughly summarized as (1) management of terrestrial resources (soils, flora, fauna) to enhance sustainable agricultural productivity, (2) integrated water management for both quality and quantity as an input to agriculture and as a habitat for living aquatic resources, (3) management of forests for enhancing rural livelihoods and providing sustainable sources of fuelwood and non-timber forest products, (4) incentives and policies for improved NRM management.[143]

6.14 The CGIAR's successes in research on terrestrial resources cover several areas and underscore the complementarity between NRM and germplasm improvement research. Among the most well known examples are the achievements in integrated pest management (IPM), especially by IRRI and the FAO in Southeast Asian rice. The CGIAR played a pioneering role in the emergence of IPM, now a global staple for effective management of pests while minimizing the necessary use of potentially dangerous agro-chemicals. The CGIAR's IPM work has had an impact upon many different systems using the basic principles it helped pioneer. IITA, for example, developed successful biological control for cassava mealy bug throughout Africa. ICRISAT has similarly

142. TAC Secretariat 2001d, pp. 1, 4.

143. Ibid.

enjoyed great success in developing and promoting effective IPM for pigeon pea in South Asia.[144]

6.15 What IPM means in concrete terms has been a matter of debate.[145] A recent World Bank working paper observed that the CGIAR's System-wide program on IPM "is still struggling to deliver on its promises to increase the impact of IPM research on pest management practices. A recent review has suggested elevating the SP-IPM to a Global Challenge Program with improved links to other players in IPM research and outreach activities (Guitierrez and Waibel 2002). Major constraints to a more significant role for SP-IPM are the lack of incentives for participatory multidisciplinary research, gap between scientific IPM information and user-friendly outreach, and limited impact on national policies."[146] The World Bank working paper also emphasizes "the lack of documented experiences from scaling up pilot project approaches . . . [and] the lack of standards of impact assessment, especially regarding the social and environmental benefits of IPM."[147]

6.16 Similar yield-enhancing achievements have been made through research on land management practices. The conservation technique, or minimum tillage, that originated in the NARES and spontaneously among farmers in South America, has been effectively analyzed and is being promoted by the CGIAR Centers. But the extent of adoption and spread are not known, nor the extent to which the impacts can be attributed to the CGIAR's effort since there are a variety of other actors promoting similar practices. Improved crop varieties have in many cases encouraged monoculture that can leave farmers vulnerable to pests and disease on a catastrophic scale. Work on farm-level biodiversity and effective mixed systems and crop rotations, for example, by CIAT and ICRISAT in rain-fed smallholder agriculture, has been central to combating these prospective problems and enabling some considerable yield gains. Various Centers have likewise been at the forefront of research to improve soil conservation methods, and to establish their relative benefits, such as tied ridges, vegetative and stone bunds, and terracing — techniques that have been shown to increase yields and profitability for small farmers.[148]

6.17 The CGIAR significantly revised its research program with respect to terrestrial resources after TAC's 1996 study, *Priorities for Soil and Water Aspects of Natural Resources Management Research in the CGIAR*. This advanced a research vision, also anticipated in the INRM System-wide program, focused on broad-based management of land and biological resources, including genetic material, to meet productivity, poverty, and sustainability goals. In response, several Centers, notably CIAT, through Tropical Soil Biology and Fertility (TSBF), and ICRAF have advanced a paradigm of integrated soil fertility management (ISFM) that is currently attracting considerable attention. Research on soil fertility management previously focused on the use of mineral inputs to sustain crop production, and showed substantial crop yield and profitability increases from fertilizer use. ISFM addresses small farmers' low mineral fertilizer application rates in Africa and environmental degradation problems associated with high application rates in Asia and Latin America since the Green Revolution. The ISFM paradigm has further broadened the scope for potential yield-increasing interventions in a number of

144. ICRISAT indicated to the meta-evaluation team that even despite such successes, recognized in part with three King Baudouin awards in the past eight years, and despite a mandated region with one of the highest incidences of poverty, the Center has faced the largest annual reduction in its budget (8.5 percent) relative to other Centers.

145. Definitions used by international and bilateral development agencies and other stakeholders vary, but have converged to include a holistic approach toward sustainable development. Approaches range from methods based on rational management of chemical pesticides to systems based on ecosystem management that include health issues and human capital development. The remaining disagreements are with regard to the use of chemical pesticides in IPM approaches and the role of GMOs in breeding for pesticide resistance. See Sorby, Fleischer, and Pehu 2002, p. ix.

146. Ibid, p. 28.

147. Ibid, p. ix.

148. Sanders et al. 1990; Barrett, Place and Aboud 2002.

ways, helping direct and use germplasm improvements. ISFM has established the importance of and promoted research on soil biology as central to making nutrients available to plants and forages and to creating and maintaining productive soil structure. ISFM also highlights the need for improved germplasm. Improved crop germplasm has a major role to play not only in improving nutrient acquisition but also in providing more organic inputs, prompting efforts by several Centers to develop dual-purpose or multipurpose grain legume varieties.

6.18 The CGIAR has done some pioneering work in process research. ICRAF, CIP, IFPRI, and ILRI have been actively pushing the frontiers of process modeling of complex agro-ecosystems, especially in capturing the interaction of naturally occurring biophysical processes (nutrient cycling, soil erosion, biomass regeneration) and those managed by farmers. These efforts often heavily leveraged ARI resources to address Center objectives. Examples include CIP's work with Montana State University in modeling tradeoffs between pasture-potato systems productivity, human health, and soils sustainability in the Andes, and IITA's work with Texas A&M University in developing useful Spatial Characterization Tools. Unfortunately, such examples remain more the exception than the rule, and their impacts or relevance to developing country needs are not known.

6.19 Water is central to agriculture. Water is also, according to the Bank's *World Development Report 1992* (and subsequent editions of the WDR), the single biggest environmental challenge facing the poor. Many of the original CGIAR Centers helped foster great improvements in water control across Asia, and to a lesser degree, Latin America, during the Green Revolution. More recently, IFPRI, IRRI, and CIMMYT research has reconfirmed what has been recognized by agencies like the World Bank for some time, that poor water pricing policy in the wake of rapid expansion of irrigation has contributed significantly to emergent, widespread water shortages, salinization, and waterlogging of lands. The World Bank's WDRs and other reports have stressed that urbanization and rising incomes and population are also rapidly increasing competition for water between agricultural and non-agricultural uses. The water research challenge has thus shifted in parts of the world to require far more policy research than previously seemed necessary. Although the global problem remains acute, IFPRI and IWMI have been doing useful modeling work on these problems. These various efforts by many agencies have heightened awareness of the water issue among donors, as emphasized at the World Summit on Sustainable Development in Johannesburg. Pressing problems developing countries face are increasing water use efficiency (that is, the proportion of surface and groundwater that reaches crops' root zones) and land reclamation in response to salinization and waterlogging.

6.20 An important strategic question for the CGIAR in its policy research is whether its comparative advantage lies in addressing the science related to the agricultural uses of water or in downstream institutional issues such as conflict resolution. To date, the CGIAR has not demonstrated a significant comparative advantage in these areas, and has no demonstrated record.

6.21 Elsewhere, particularly in Africa, water conservation remains a serious challenge, as does increased water use efficiency. Less than 11 percent of agricultural lands in Africa were irrigated in 1999, the latest year for which data are available. Germplasm improvements will likely prove difficult absent better water management in drier areas still lacking good water control and efficient use. The CGIAR does not seem to have tackled this challenge adequately yet and it is likely to require new science to attend to basic issues of water production and distribution, not just improved management of existing water resources. Improved water science and technology appear to be vital if Africa is to enjoy significant, sustainable gains in agricultural productivity.

6.22 IWMI has been a leader in advancing the holistic approach of whole catchment/basin analysis in water management; has produced key, global-scale strategic analyses of water resources, valuable new methodologies for water accounting, and the most authoritative data reference on world water

(the World Water and Climate Atlas); has developed methodologies for the measurement of water productivity; and has done quality research on organizational design for irrigation systems. But the impact of this research is not known. ICLARM has developed key global databases on fish and reef systems that are an important global public good and its tilapia programs have brought sharp productivity gains in inland aquatic systems.

6.23 These successes notwithstanding, TAC has expressed worries that "[f]or too long, research on water issues has been disjointed, based on traditional disciplinary sciences without crossing boundaries, focused on short-term issues, and lacking coordination and cooperation among potential partners. Surface waters were treated separately from ground waters; water quality, independently from water quantity and each sector of users (i.e., agriculture) was ignorant of all the others. This approach to research often led, not surprisingly, to inadequate policies that were not well suited to solve problems addressed."[149] Research on integrated water management appears to have underperformed its potential within the CGIAR, largely for organizational reasons related to insufficient multidisciplinarity, especially weak incorporation of social science research, inadequate incorporation of water productivity research into crop productivity research, degraded international hydrological data collection infrastructure, and perhaps excessive concentration of CGIAR water research capacity in a single Center, without the involvement of key commodity Centers. Given the massive amount of research on water management done within ARIs and with the advanced NARS in developing countries, there also exist crucial questions as to the CGIAR's niche in integrated water management research.

6.24 One major question surrounds the future of the System-wide Initiative on Water Management (SWIM). The objectives of SWIM and IWMI, SWIM's convening Center, are essentially indistinguishable. SWIM lacks the focus of most of the CGIAR's other System-wide programs and has become largely a vehicle for IWMI to obtain additional funding to extend its partnerships with other Centers. Moreover, most of these partnerships are bilateral, limiting effective System-wide collaboration on issues germane to multiple Centers. For these reasons, SWIM's external review panel questioned whether SWIM really functions effectively as a System-wide program and recommended that TAC consider phasing it out. TAC rejected this suggestion, but the core design questions clearly remain, including such issues as the relationship between and among SWIM, the recently approved Challenge Program on water and food, and IWMI's work program.[150]

6.25 The two lead Centers on forest resources research, CIFOR and ICRAF, and the System-wide Alternatives to Slash and Burn (ASB) Program have all received highly laudatory external reviews, and justly so. Given the global importance of the tropical deforestation problems and the previous dearth of high-quality research linking agricultural technology development, sustainable intensification, and tropical forests, this area of work seems a wise investment by the CGIAR. Nonetheless, there are tendencies, perhaps most evident at CIFOR, for NRM research to drift from research squarely focused on improving agricultural productivity and rural livelihoods in the low- and middle-income countries toward topics such as the tropical moist forests, that are of more interest to environmental interest groups in the high-income countries. For example, although some CGIAR research on carbon sequestration and climate change mitigation has been at the forefront of scientific efforts to develop good estimates of carbon stocks — some of the ASB work has been used as an input into recent IPCC guidelines — it is not clear whether the CGIAR's work on climate change mitigation, regardless of its high quality, fills a significant void in the broader scientific community.

149. TAC Secretariat 2001d, p. 6.

150. See Chapter 10 for further discussion of System-wide priorities, consolidation and the Challenge Programs.

6.26 CIFOR's work on the relationship between agricultural technologies and deforestation have established the intellectual frontier in this area,[151] and its work in developing biodiversity assessment tools and on sustainable exploitation of forest resources and forest recovery after fire have generated high-quality publications and filled voids in the global scientific community. ICRAF has evolved rapidly from an institution focused narrowly on agroforestry into a leading Center for integrated nutrient management research, with an emphasis on improved fallows, biomass transfer systems, green manure cover crops, and mixed sylvicultural systems. ASB has been applauded in its most recent external review for innovative field research, strong science, and for going furthest within the CGIAR toward effectively implementing a holistic, ecoregional approach founded on in-depth local research linked methodologically across long-term benchmark sites around the world to permit effective scaling up to global level. It forms the backbone of the Rainforest Challenge Program now before the iSC. The intellectual value of this work has derived from the synthesis afforded by careful methodological coordination across sites on different continents, and close working relationships with ARIs and NARS.[152] ASB has also contributed to methodological research into indicators of above-ground biodiversity and carbon stocks and spatially explicit land use modeling, as well as to policy research on quantifying tradeoffs among agronomic, conservation, and socioeconomic objectives and on the opportunities conservation credits potentially afford for small farmers in the tropics. It would be useful to assess the impact of this research on developing countries' own capacity to address issues of poverty alleviation and sustainable environmental management.

6.27 In sum, some of the CGIAR's NRM research is well-regarded science, as reflected by peer-reviewed publication. More important, there is evidence of impact through significant improvements in the portfolio of NRM practices and technologies available to small farmers, as in the cases of IPM and the development and promotion of improved nitrogen-fixing fallows. Documenting the adoption of these practices and the global returns to NRM research remains elusive, however, in large measure due to serious methodological challenges and the limitations posed by location-specific circumstances.[153] The agricultural sciences community appreciates that researchers cannot breed for soil nutrient deficiencies or drought tolerance endlessly. At some point, soils become exhausted and water scarcity sharply limits productivity improvements. Improved resources management is, in most cases and over the longer term, a complement to development of improved germplasm. But since these two research foci compete for scarce resources within the CGIAR, significant effort needs to be made to establish more precisely how NRM research contributes to agricultural productivity improvements and poverty reduction, where these investments are most likely to generate acceptable rates of return in the future, and how the research contributes to the supply of global or regional public goods that cannot be, or are not already being, provided at the national level.

FOCUS

6.28 The focus of the CGIAR derives from its core competencies and the justification for the System. The CGIAR's core competencies lie in agricultural issues, not in environmental and natural resource issues, so the System should not be expected to or assigned to make fundamental scientific contributions in NRM that do not directly support agriculture. NRM research, like germplasm research, is indispensable to the CGIAR's agricultural research program, but it must not proceed independent of that focus. The issue is not whether NRM research comes second to work on varietal improvement: there are places where improved NRM likely would have a greater impact on

151. Angelsen and Kaimowitz 2001.

152. Angelsen and Kaimowitz 2001; Lee and Barrett 2001.

153. Barrett 2002.

agricultural productivity than would germplasm research, and vice versa.[154] Rather, the System needs to "walk on both legs," without one drifting too far from the other. There is some potentially valuable NRM research being conducted that is nonetheless tangential to the CGIAR's core mission, perhaps because donor funding available to skilled scientists sometimes diverts the research agenda in Centers suffering budgetary stress. This is occurring at multiple levels as manifest by EPMR concerns about focus in multiple Centers (CIFOR, CIP, ICARDA, ICRISAT, and others).

6.29 The justification for a system of international agricultural research Centers lies in the CGIAR's role as a producer of global public goods. This poses a challenge for much NRM research because most of the current empirical and applied or adaptive research is inherently site-specific and therefore does not generally produce global public goods.[155] Several external reviews indicate that there is some apprehension and misunderstanding within Centers as to how the local-global research link needs to be made. This is most clearly captured in the 1998 report of the CIFOR review panel.[156] Although not explicitly highlighted in other reviews, the CGIAR leadership faces significant challenges in financing, priority setting, and scientific criteria for approval when applying the global public goods criterion while at the same time seeking in-depth research in specific, carefully chosen sites, which emphasizes the importance of strong scientific review capacity within the System, albeit in a smallholder development context.

6.30 The CGIAR foci that satisfy both the above points are process and methodological research and the compilation and distribution of meta-data. The CGIAR is generally doing well in the first and second of these, contributing important, fundamental research on systems modeling, appropriate sustainability indicators, methods of establishing and quantifying tradeoffs between biophysical and socioeconomic objectives, nutrient cycling and soil microbiological processes, and impact assessment and evaluation methods. The global public good value added from the knowledge produced could nonetheless be enhanced in many Centers and System-wide programs. This could be accomplished by an increased commitment to peer-reviewed publication and to ensuring the accessibility of scientists' research, particularly for the NARS of developing countries, through journals, books, and working papers readily available on the Internet. Some Centers have outstanding publications records (such as CIMMYT, ICRAF, IFPRI), but many important CGIAR NRM research findings are not distributed broadly or quickly enough to have full impact, particularly for potential users in developing countries.

6.31 Meta-data sets offering truly global coverage, such as the recent IFPRI-WRI agro-ecosystems mapping and IWMI's World Water and Climate Atlas, offer opportunities to improve the targeting of

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154. It is perhaps instructive that recent research using WARDA data (Sherlund et al. forthcoming) finds that when one accounts for natural resource conditions in estimating the technical efficiency of rice farmers in Côte d'Ivoire, the median farmer appears to operate on or quite near the production possibilities frontier, achieving maximal output given inputs. By contrast, if one fails to control for environmental production conditions appropriately, technical inefficiency estimates rise sharply, suggesting significant forgone output. Management of latent variability in natural resource conditions matters fundamentally to agricultural productivity.

155. TAC Secretariat 1999c.

156. "The Panel found that some CIFOR researchers are frustrated with the IPG [International Public Goods] criterion because they view it as being associated with shallowness of research at the specific site level. The Panel wishes to point out that this is (or should be) a false assumption. The IPG nature of CIFOR's work should not make it incompatible with in-depth research on particular sites. In fact, significant generalizations based upon a profound understanding of the nature of crucial variables at multiple sites is what CIFOR projects should, and in most cases do, seek to achieve. A misunderstanding of this basic concept will, axiomatically, lead to research that is neither cost-effective nor IPG related. The need for cost-effectiveness of CIFOR research must not deter in-depth research. When expensive senior staff cannot engage in time-consuming field activities, they should recruit and supervise students in the field and develop mutually beneficial links with other appropriate, lower cost and locality focused partners who can carry out the in-depth field work in the overall IPG context of the research" (TAC Secretariat and CGIAR Secretariat 1998d).

research and technology development, as well as crucial baseline information on which to found ongoing agro-ecological monitoring activities.[157] When well documented and readily accessible to prospective collaborators worldwide, such data sets can generate important knowledge spillovers globally. But such meta-data sets, including those that interface with poverty incidence data, are under-produced, even though this was an explicit objective of the CGIAR's ecoregional initiative.

6.32 Like too many publicly funded ARIs, some Centers and System-wide programs seem to treat data as proprietary. Even NARS and ARI partners can have difficulty accessing relevant data necessary to do their own analyses, although some of these data originate in developing countries. This may reflect insufficient recognition of the global public good value of producing and disseminating high-quality, well-documented data. When only publications resulting from such data count in personnel management, scientists and Centers face strong disincentives to the timely, public release of data they collect. Access to such data by developing countries' NARS is an even more serious issue. There are good examples within the CGIAR, such as the System-wide Information Network for Genetic Resources (SINGER), that have already increased access and offer useful examples of how to remedy this deficiency, although several reviewers of this report have noted data sharing and data loss problems within SINGER and many other studies the Centers have conducted.

6.33 Institutional capacity building at the national and subregional levels is fundamental to doing effective NRM research. In the CGIAR, however, although considerable individual-level training is being done, there is scant evidence of systematic capacity building or maintenance at the institutional level within NARS that can be directly linked to CGIAR NRM research. ISNAR has thus far proved unable to fulfill this crucial mission. If the CGIAR is to increase its emphasis on strategic partnerships, then institutional capacity development — not just individual professional development for the best NARS scientists — seems essential.[158] This is especially challenging in low-income countries with weak NARS. Some nascent efforts at building subregional organizations (SROs) among NARS and other stakeholders to achieve critical mass across countries facing similar challenges show promise, such as CIMMYT's Soil Fertility Network in southern Africa. The interim Science Council has proposed a System-wide training review, and although this is a high-priority issue for developing countries, funding has been difficult to mobilize from donors.

FRAMEWORK

6.34 The framework within which NRM research is conducted in the CGIAR System encompasses a variety of organizational and financial issues. The CGIAR has special skills and a unique mandate, but as noted in the case of social science research (discussed earlier), these do not endow it with comparative advantage for all areas of NRM research. In a few areas it is best suited to be the direct producer of NRM research, such as NRM that helps improve production practices in connection with germplasm improvement and in areas such as tropical deforestation, where ARI and NARS research has been deficient. Yet the research model pioneered within Centers with global commodity mandates may not be well suited to NRM research. One indicator is that the Centers widely evaluated as doing the best work in NRM have either had ecoregional mandates (CIAT and ICRISAT in the past) or have an explicit NRM emphasis that enables them to attain the scale and scope needed to make significant

157. Wood, Sebastian, and Scherr 2001.

158. A draft Professional Development Partnership Program is currently under review in the CGIAR Secretariat. However, the note suggests that this program would be heavily focused on developing individual scientists, to "enlarge the network of 'friends of the CGIAR'" and "widen and deepen the pool of NARS candidates who may be considered for scientist and management positions in the Centers."

advances (CIFOR and ICRAF). But this raises issues of the relationship and integration of their research with cropping and livestock research.

6.35 Given the importance of both hierarchical and disciplinary connectivity to NRM research, there is a strong argument for organizing more of the CGIAR's NRM research following the collaborative or facilitative models. The new Challenge Programs are clearly oriented toward the collaborative model. But given the site-specificity of much NRM research and the lack of critical mass to do good NRM work in many NARS, more attention needs to be given to the facilitative model, in which the CGIAR serves more as a broker between NARS and ARIs and among NARS — in line with the subsidiarity principle promulgated by the DGF, and develops methodologies, tools, data, information, and results that have broader spillovers.

6.36 The collaborative model offers an opportunity for the CGIAR to overcome its capacity limitations in the social sciences and to raise the quality of the science in the Centers that lag in this area. The CGIAR can leverage its resources better by partnering with ARIs and leading NARS doing related work in which they have independent interest. While there have been some good examples of such partnerships on an informal basis, what have been lacking to date are strategic collaborative and facilitative partnerships with more secure, longer-term funding with which to pursue innovative, longer-term strategic research. Even inter-Center strategic cooperation has been scant, with successful System-wide programs like ASB the exception rather than the rule. Hence, how the Challenge Programs are being developed is an issue of particular interest, which is discussed in Chapter 10.

6.37 The number and organization of Centers was also addressed by the CDMT (2001). In NRM research, just as in agricultural research more broadly, there is a nontrivial issue of the critical mass of skilled scientists and research infrastructure needed to undertake world-class research. The critical mass needed for multi-disciplinary NRM research is even larger. Henzell et al. (1999) recommended that "frequently observed imbalances between biophysical and social science research must be redressed" as must capacity development in the NARS, where "social science capacity in NRM is one of the weakest disciplines." The review noted that increased social science research has the unique potential to shed light on what might be done about the apparently large stock of unused and under-used CGIAR research results in NRM and needs to be expanded in almost all Centers undertaking significant NRM research. Moreover, ensuring quality in social science research is as important as ensuring the same in the biological and physical sciences. In addition, as the number of donors increases, and each requires its own independent reporting, this further increases the critical mass needed to conduct the research. The fixed costs of high-quality science for global public goods production must not be underestimated. These fixed costs argue for concentrating restricted project funding in multifunctional Centers where the average fixed cost becomes relatively low, and probably also for moving toward clusters of the sort suggested by the CDMT.

6.38 A decision to reduce the number of Centers through consolidation or closure, which seems advisable given that System resources are spread excessively thinly today, should probably include serious consideration of the option to divest to NARS social science and water research of an applied and adaptive nature — two of the less effective threads within the CGIAR in the NRM domain. The System has so far concentrated most of its social science research capacity in IFPRI and ISNAR and most of its water research capacity in IWMI. Most other Centers lack critical mass in either of these areas, and several EPMRs suggest that this limits the efficacy of the broader NRM research portfolio in the Centers. Key commodity Centers do not seem currently to be participants in the new Water Challenge Program. System-wide programs have thus far proved ineffective in remedying this problem, not least because they are generally too reliant on short-term project funding and have insufficient autonomy and core resources to embark on significant collaborative research ventures within the System. The quality of the science and relevance to problem solving on the ground have also been issues.

6.39 At least in the NRM domain, it appears worth exploring whether the System-wide programs have sufficient focus (a weakness of SWIM), successfully avoid duplication of ARI research (an apparent weakness of CAPRI), and should be separated as a System-wide program rather than mainstreamed within all the Centers (an issue with INRM). The independence of the programs, in terms of priority setting and resource allocation proposed under the Change Design and Management Process though Challenge Programs, also needs to be reviewed.

6.40 System-wide programs play an important role in coordinating among Centers and between the CGIAR and external collaborators and stakeholders. Yet they are universally hosted by a Center, have relatively meager budgets and support staffs, and therefore have little authority or flexibility to deviate from the prevailing wishes of the host Centers, a weakness continued in the two recently approved Challenge Programs. Henzell et al. (1999) recommends the discontinuation of System-wide programs where they cannot be more tightly focused. Are the System-wide programs to continue with the emergence of Challenge Programs? Might or ought they be placed directly under the control of the new Science Council as a manifestation of the programs' roles in addressing System-wide scientific priorities? Or will they have independent governance structures, similar to those currently proposed for Challenge Programs, thereby further fragmenting the oversight for science quality of the System?

6.41 Finally, the CDMT made a number of reasonably conservative suggestions regarding the provision of Center support services. Unlike the reviews related to genetic resources and plant breeding, the NRM-related reviews do not really speak to the System-wide question of centralization of certain functions, including impact assessment, much external communications, and legal, financial, and management services. Clearly, some efforts are duplicated across Centers and, as TAC's 1994 restructuring report notes, this drains staff time and resources at the Center level, so there seems to be merit in the CDMT suggestion. But this would require more detailed scrutiny than can be undertaken in this meta-evaluation in order to ensure that the sustainable operating costs savings would be sufficient to justify the transaction and transition costs of the changes. Similarly, it would seem prudent to explore greater outsourcing of support services at the Center level. Many such functions continue to be organic to the institutions, but in many host countries, rapid recent changes in private services availability, quality, and cost may make it worthwhile to look into a switch to increased outsourcing.

7. National Agricultural Research Systems and the CGIAR

7.1 CGIAR Centers have worked closely with the national research systems of developing countries in several strategic areas, and some of the CGIAR's most spectacular successes are a result of these relationships. The Third System Review and other reviews of the CGIAR acknowledge that CGIAR-NARS partnerships are one of the System's great strengths.[159] But as the CGIAR adopts an explicit dual focus on research in integrated germplasm and natural resource management, the increased complexity of research questions places increasing demands on the CGIAR-NARS relationship.

7.2 The CGIAR's contributions to NARS capacity building, much of which has occurred through research collaborations or networks, have rarely been systematically evaluated. Capacity building through training — the activity many NARS consider the most important contribution of the CGIAR after its germplasm research — has suffered. Expenditures on training declined by 0.2 percent annually in real terms between 1992 and 2001. Yet training is a particularly important component of a

159. CGIAR Secretariat 1998a; also, see Baum 1986, p. 315-316.

network-based organization such as the one the CGIAR is evolving toward, both in accessing and contributing to global knowledge.

7.3 To begin to understand the needs of the NARS and their capacities in agricultural research, the meta-evaluation commissioned a series of four papers by developing country authors in Brazil, Colombia, India, and Kenya.[160] This exercise is an illustration of the type of "demand survey" that some observers of the CGIAR have said should be commissioned systematically to identify more clearly client demand for CGIAR services.[161] These studies are also an important contribution to the meta-evaluation as they capture the issues facing the NARS at different stages of development as CGIAR partners and clients, and as research systems in their own right. More important, the studies contribute to the meta-evaluation's efforts to understand the needs of the NARS at the System level.

7.4 These studies, along with input from other sources, highlight several issues. First, despite the major contributions of the CGIAR-NARS partnerships to the CGIAR's success, the limited credit awarded to the NARS weakens the mutual trust needed to sustain that outcome and detracts from identification and prioritization of NARS needs. Second, the CGIAR is not keeping pace with the global challenges facing NARS, such as modern biotechnology, intellectual property rights, private sector growth, trade liberalization, and the impact of non-tariff barriers and agricultural subsidies in industrial economies. Third, the donor community has become increasingly unwilling to fund activities that address these global challenges, instead allocating its resources to more regional, national, or local challenges that appeal to their domestic constituencies, and causing the CGIAR System to pursue research and activities that may be more appropriately carried out by the NARS. Fourth, the CGIAR Centers report that they have also become a conduit for donor funding to NARS as a means to minimize the uncertainty, risk, and accountability issues that plague many NARS, further complicating the bureaucratic and financial processes facing NARS and exacerbating the historic teacher-student relationship between the CGIAR and NARS, which many NARS argue they have outgrown.

7.5 These four issues represent a fundamental challenge to the international agricultural research system: without a strategic approach to the NARS, it is likely that the CGIAR, the donor community, and governments of both developing and industrial countries will prevent advanced NARS from realizing their full potential, limit the maturation of smaller NARS, and render the CGIAR's contributions to these processes moot. Yet the approach to the NARS pursued by the CGIAR must be balanced against the research criteria identified by the CGIAR's scientific advisory body (formerly TAC, currently the interim Science Council), specifically that research focus on the production of global and regional public goods, offer good probabilities of success, be cost-effective, and consider alternative sources of supply and comparative advantage.

7.6 Both the meta-evaluation and input from the NARS suggest that, in reality, these criteria are not applied vigorously. Both the the meta-evaluation team and NARS have concerns about the extent to which global and regional public goods are being produced, whether the research that is actually being conducted is cost-effective in comparison with what many NARS can now conduct, and whether alternative sources of supply have been sufficiently explored. Unfortunately, it appears that TAC/iSC has been unable to examine the actual research agenda with respect to NARS due to the

160. Macedo, Porto, Contini, and Avila 2002; Romano, 2002; Katyal and Mruthyanjaya 2002; Ndiritu 2002.

161. Demand surveys are discussed by Shands, in Gerrard, Ferroni, and Mody 2001. A strong argument can be made that well-organized, System-wide demand surveys should be commissioned regularly by the CGIAR to more clearly identify client demand for CGIAR services and to increase the interest of NARS in identifying their own needs, strengths, and weaknesses.

restricted nature of donor funding that is increasingly tied to downstream activities.[162]

7.7 The CGIAR could do more to meet the needs of the NARS not only through Center-level collaborations but also through greater partnership at the System level. Clearly, the CGIAR cannot undertake the task of developing capacity through greater collaboration and partnership in the NARS of 180 countries across the globe: donors and developing country governments must also provide resources for such capacity building. What the CGIAR can do, however, is pursue its comparative advantage relative to donors, advanced research institutes (ARIs), and others in conducting mission-oriented comparative collaborative research across many countries in issues of interest to developing countries.

7.8 In this context, the meta-evaluation team examined the following issues with respect to NARS from the viewpoint of their lessons and implications for System-level reforms: (a) the importance of recognizing NARS contributions to agricultural research outputs, (b) the need for new and meaningful partnerships between the CGIAR and advanced NARS, and (c) the need for continued CGIAR support for small-country NARS. The chapter concludes with a discussion of the global challenges facing the NARS and recommendations for the role the CGIAR can play in assisting NARS to address these challenges.

THE BLACK BOX OF HIGH RETURNS: THE PARTNERSHIP ROLE OF THE NARS

7.9 The contribution of the NARS to CGIAR research is of great importance to international agricultural research. Although many NARS are weak in adapting CGIAR research outputs to the national level, thus constraining the CGIAR's potential impact, their contributions to CGIAR research are sometimes overlooked. Specifically, NARS scientists believe that their role is not sufficiently recognized in rate-of-return studies or in successes attributed to the Centers. Indeed, many System-wide studies make little distinction between NARS and Center research contributions in basic science, hybrid development, farming methods innovation, training of scientists, or institutional development, all of which contribute to yield increases.[163] Typically, these studies take the view that research systems are a "black box" that transforms research funds into new crop varieties in farmers' fields.

7.10 Although disaggregating the contribution of the NARS would not change the high returns to the collaboration, it would help show that (a) strategic research must be conducted at the international level owing to scale economies, the need for state-of-the-art methodologies and science, and the desirability of likely spillovers, and (b) other research, including applied and adaptive research, must be primarily conducted by national systems to address issues such as local natural resources and agro-ecology, institutions, and policies.

7.11 Moreover, disaggregating NARS contributions would have important policy and financing implications beyond the CGIAR itself that have not been adequately addressed by the CGIAR to date. Reforms in the CGIAR alone cannot ensure its impact. Investment in agricultural R&D by developing country governments and donors must be addressed simultaneously. First, the CGIAR is not effectively using its "bully pulpit" to persuade developing country policymakers and donors of the necessity for investment in national research systems as an essential complement to international research. This is particularly important given that investments in agricultural and rural development have declined substantially, as shown in Chapter 2. Second, an aggregated approach to estimating returns and assessing impact makes it difficult for the CGIAR to divest itself of activities that some

162. IFAD 2001.

163. Baur et al. 2001.

large country NARS indicate they are now perfectly capable of performing more cost-effectively than the CGIAR, and that some smaller, weaker NARS are keen to undertake as a way of strengthening their own capacity. And the continued participation of the CGIAR in national or local-level research diverts the CGIAR from the provision of global public goods and impedes the growth of supportive and complementary relationships between advanced and small-country NARS. Third, the failure to adequately recognize the NARS' contribution impedes the development of a cohesive global strategy by the CGIAR, its donors, and its developing country members that plays up to the catalytic role the CGIAR must play in agricultural research, given that the CGIAR constitutes only 4 percent of the global research expenditures. This leads donors to expect the CGIAR to fill a gap that cannot be filled by the NARS, thereby diverting attention and reducing the System's effectiveness in providing global and regional public goods that contribute to increasing agricultural productivity and reducing poverty.

7.12 The challenge of building genuine partnerships with developing country NARS will make or break the future CGIAR, according to former CGIAR Chairman Ismail Serageldin. In the same spirit, the TSR recommended that the expanded mission of the CGIAR be achieved through partnerships, capacity building, and policy dialogue that includes the NARS. NARS scientists consulted by the meta-evaluation provide similar comments.[164] Unless incentives to investment in agricultural R&D in developing countries are fundamentally changed, partnerships with NARS will not improve.

PURSUING PARTNERSHIPS WITH ADVANCED NARS

7.13 China has approximately 50,000 agricultural research scientists, while India boasts 26,000, and Brazil 7,500. In the United States, about 25,000 scientists work on agricultural research topics, 45,000 scientists if related disciplines such as biomedical research are included. The CGIAR Centers, on the other hand, have just 8,500 scientists and staff working in more than 100 countries. The issue of CGIAR-NARS partnership therefore has special meaning with respect to the advanced NARS in countries such as Brazil, China, and India. It raises the questions of (a) whether the CGIAR is advancing rapidly enough to keep up with the scientific needs of advanced NARS, (b) whether the CGIAR is facilitating meaningful and constructive partnerships between advanced NARS and other smaller-country NARS, and (c) whether the CGIAR and advanced NARS are pursuing activities in which they have a comparative advantage. The more advanced NARS stress that the CGIAR has not kept pace with rapid changes in the external environment — in areas such as biotechnology, intellectual property rights, near-frontier science, information management, public-private partnerships, and social science and policy research. This has limited the Centers' ability to contribute to the changing needs of advanced NARS. Moreover, the CGIAR has contributed minimally to the inclusion of the NARS of advanced developing countries in the global research system, despite the fact that these NARS now possess the human talent and experience necessary to constructively contribute to the research and capacity building in other, small-country and weaker NARS.[165]

7.14 A useful example of these concerns is the ongoing collaboration between the CGIAR and EMBRAPA, the Brazilian Agricultural Research Corporation. Given that Brazil is a country with continental dimensions, and hosts a broad diversity of climate, soil, agricultural production systems, and cultural values, its NARS argues that it should be considered a unique partner by the CGIAR,

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164. Several NARS scientists commented to the meta-evaluation team that while a demand survey approach to understanding the NARS issues was an excellent initiative, very few NARS have considered their comparative advantage in relation to other NARS or the CGIAR Centers and are perhaps unlikely to do so unless they believe there is a serious effort by their governments, the donor community, and the CGIAR to address this question at the System level, and unless the results of such analysis are likely to have concrete impacts on the financing of activities at different levels. Several NARS scientists appreciated the meta-evaluation team's effort to incorporate a demand survey approach into its analysis of NARS issues.

165. See Katyal and Mruthyanjaya 2002; Macedo, Porto, Contini, and Avila 2002.

requiring a flexible and multifaceted approach to cooperation. CGIAR collaboration with EMBRAPA and other Brazilian institutions represents an opportunity to generate synergies with and facilitate technology transfers to Brazil and other developing countries, ultimately generating numerous direct and spillover benefits.

7.15 Collaboration with the CGIAR entered a new phase when EMBRAPA recently became an active stakeholder in the CGIAR System, and this new status reflects both EMBRAPA's progress over the past three decades and the CGIAR's recognition of EMBRAPA's potential to be an equal partner in agricultural research. Yet despite this emerging relationship between the CGIAR and EMBRAPA, joint activities in research, capacity building, and institutional strengthening have actually declined. Scientific cooperation and training of scientists decreased considerably in the 1990s, as did the contribution of genetic materials from the CGIAR to the Brazilian seed market during the same period.[166]

7.16 An equally relevant example is India's national research system. The CGIAR has played a significant role in supporting the growth and evolution of this NARS, and today, India's NARS is a highly complex system led by the Indian Council on Agricultural Research (ICAR). With persistent food and nutrition security, poverty, equity, and deterioration of natural resources, as well as the myriad problems associated with managing an intricate and diversified research system, India argues that its NARS requires research in the areas of germplasm improvement, genetic resource management, and modern biotechnology from the CGIAR, thereby allowing the NARS to focus on national and local issues such as environment and equity, or on internationalizing its perceived comparative advantages in management training and capacity strengthening. Efforts in these directions will require that ICAR and India's national research system expand the breadth and depth of their linkages nationally and internationally, and raises questions about whether the CGIAR can constructively contribute to meeting these needs. The task ahead is for the CGIAR to collaborate with India's NARS as a valued partner not only for research purposes but also to support other developing country NARS, particularly in semi-arid regions.[167] It is likely that the same argument will be made by China were it to be consulted.

7.17 However, the role of advanced NARS in collaborating with smaller, weaker NARS remains a complex issue. Donors argue that small NARS from developing countries typically are reluctant to work with larger NARS from developing countries and to involve them in research. Donors also indicated to the meta-evaluation team in response to this offer by the NARS of advanced developing countries that advanced NARS tend to be reluctant to involve smaller NARS when such collaborations open access to the valuable technologies and intellectual property of the advanced NARS. Yet there remains ample scope for partnership and collaboration between NARS of developing countries, and an important role for the CGIAR and the donors to contribute to such partnerships both in areas of mutual research interest and on more controversial issues such as intellectual property rights.

7.18 In sum, evidence suggests that future cooperation between the CGIAR and advanced NARS should (a) focus on the generation of new technologies and on the applicability of such technologies to agricultural development, (b) include the participation of diverse research institutions that comprise or complement the systems, including universities, state research organizations, and the private sector, (c) use CGIAR resources to leverage NARS activities in both research and scientific training in countries that need help to reach the same stage as those with advanced NARS by actively planning for large spillovers, and (d) evolve toward collaboration with the NARS of other countries as equal partners.

166. Macedo, Porto, Contini, and Avila 2002, Table 1, p. 14 and Fig. 2, p. 19.

167. Katyal and Mruthyanjaya 2002.

ENSURING CONTINUED SUPPORT TO SMALL-COUNTRY NARS

7.19 The CGIAR plays a different but crucial role with respect to small-country NARS. Centers facilitate linkages between the international scientific community and small-country NARS, provide access to germplasm for crop improvement programs, offer invaluable research inputs and expertise, and provide a means of circumventing the arcane national bureaucratic rules and regulations that otherwise slow down research activities.

7.20 However, small-country NARS face significant issues and impediments to growth, a problem that involves the CGIAR. First, many weaker small-country NARS believe that the CGIAR is being used to compensate for the failures of their national systems, forcing the CGIAR to bring its resources to bear on national-level agricultural research issues. This diverts the CGIAR's efforts to build small-country NARS. In Colombia, for example, Romano (2002) points out that the CGIAR has compensated for the general decline of Colombia's NARS through CIAT research in cassava, bean, grasses, soils, fruit trees, and maize in areas that are not being addressed by Colombian institutions. It raises the larger issue of whether the CGIAR has a role in taking over functions of a national research system in times of conflict or upheaval. The recent examples of WARDA and Côte d'Ivoire and CIAT in Colombia demonstrate the difficulty in operating in countries experiencing internal conflict.

7.21 Second, as during the "meeting of the minds" consultations organized by ILRI in Kenya that brought together NARS and other CGIAR Centers, there is potential to overcome the persistent teacher/student relationship between the CGIAR and small-country NARS.[168] The lack of trust and cooperation between individual Centers and NARS, including controversies over NARS appropriating plant breeding research conducted in collaboration with the CGIAR, challenges these valuable partnerships.[169] Third, small-country NARS are particularly subject to inadequate financing, restrictive bureaucratic rules and regulations on employment and procurement (especially of imported equipment and chemicals). Donors conveyed an overwhelming concern over fiduciary management of funding and delivery of quality output, an issue that they and the CGIAR Centers indicated leads donors to turn to the Centers even when the tasks are mostly of a national nature.[170]

7.22 The search for solutions to these issues is partly constrained by the limited forums through which small-country NARS are able to voice their concerns to the larger agricultural research community. Recent attempts to establish global forums, regional forums, and subregional organizations in the developing world are a step in the right direction, but discussion alone is not enough. Given the critical importance of NARS to determining impacts on the ground, the Bank, the CGIAR, and donors must consider concrete actions to strengthen such organizations to address concrete issues that seem to come in the way of enhancing partnerships, participation, and interaction between NARS, regional and subregional organizations, the CGIAR, and other actors in agricultural research. This in turn must be balanced with concerns among the NARS that these emerging global and regional forums will simply contribute to the duplication of research administration tasks without adding value or they will be overwhelmed by large sums of donor support without clear and shared objectives and performance indicators to assess progress in achieving them.

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168. Ndritu 2002.

169. Katyal and Mruthyanjaya 2002. At the same time, many Centers and donors have indicated that NARS are neither willing nor able to share their technologies with other actors in agricultural research. To what extent this is a constraint to collaboration is not known and needs to be investigated by the CGIAR at the System level through empirical investigation, identifying issues and developing possible solutions that are widely discussed among members.

170. In interviews, Center directors indicated that a significant portion of their resources are intended for the NARS, whereas case studies by NARS underscore their lack of financial resources and the unwillingness of the Centers to share in the finance.

7.23 The more essential solution — building capable and effective national agricultural research systems — is an undertaking that may extend far beyond the CGIAR's mandate or capacity, even despite the existence of ISNAR, discussed below.[171] The need for developing countries to place a high priority on fortifying their NARS partners with financial and institutional support is a point raised by former Chairman Serageldin and again emphasized by the TSR.[172] If the Centers are expected to contribute to NARS capacity building and strengthening as a means of improving the potential for appropriation and local adoption of international research, then national governments must be responsible for improving the operation and the organization of the NARS.[173] At the same time, donors and the CGIAR must help devise concrete, workable solutions that are routinely monitored and evaluated independently for effectiveness.

7.24 System-wide coordination and provision of technical assistance and training have become principally the purview of ISNAR. As discussed in TAC's review of policy and management research in the CGIAR, ISNAR's dual role — as a provider of management and institutional development services and the Center for research on improved management methods — needs strengthening on the research side, and on the services side, needs expanding from services to public research institutes (NARIs) to private institutions (NGOs, universities, and commercial enterprises).[174] Accordingly, ISNAR described its role as a focal point for both research and provision of services in the organization and management of "new innovation systems" for NARS and other public and private entities.

7.25 However, the Fourth External Programme and Management Review concluded that ISNAR has been only a modest contributor to research, and its performance has been below required standards. The EPMR concluded that ISNAR did not follow recommendations of the Third EPMR to improve its performance by revitalizing its staff competencies and skill mix, or to develop strategic partnerships needed to maximize the global and regional public good dimensions of its research and service work. The EPMR panel made three alternative recommendations for ISNAR's future: (1) to rejuvenate ISNAR as a research and service-oriented Center by re-tooling and re-staffing, (2) to reconfigure ISNAR as a decentralized, service oriented Center, or (3) to phase ISNAR out and pass its relevant activities on to other Centers. Following discussion at AGM 2002, efforts are underway to pursue the second option under the guidance of a restructuring team.

7.26 In sum, though the CGIAR believes that capacity building is an important objective and claims substantial achievements in this area, and though the small-country NARS attach great importance to such inputs, relatively little effort is devoted to assessing the value of these activities by the CGIAR or the donors, and the assessment that has been carried out is not encouraging.[175] The need to address the

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171. The CGIAR/NARS partnership in Kenya, as described by Ndiritu 2002, illustrates the CGIAR's substantive contribution to gains in agricultural research through capacity building, as well as the issues raised by an evolving, small-country NARS. Kenya's NARS has sought to interact with the CGIAR on a more equal footing and encouraging steps to this end were observed as some of the CGIAR's Africa-based Centers, most notably ILRI, coordinated efforts in areas such as training and collaborative research to close the distance between NARS and the Centers. Kenya's NARS has also benefited from positive experiences with ISNAR in formulating its approach to mobilizing donor funding. Ndiritu (2002) notes that between 1991 and 2000, international funding sources of the Kenyan NARS grew from 19 percent to 61 percent of total funding (and World Bank credit grew to 63 percent of outside funding). Ndiritu also notes that while the CGIAR argues that they spend 40 percent of their budget in Africa, the NARS believe that the majority of this funding goes to CGIAR scientists' salaries and not to support of NARS.

172. Serageldin 1996, pp. 7-9.

173. See Romano 2002 for a discussion of this issue in the context of Colombia.

174. See TAC Secretariat 1996b, esp. p. 52, and TAC Secretariat 1996c.

175. See Gardner 2002. An exception may be ISNAR's work in developing a methodological framework for evaluating institutional capacity building of NARS through training, networks, and spillovers, and applying this framework to several

CGIAR's role and comparative advantage is overdue, and greater effort to measure the impacts of training and its comparative advantage in developing the essential methodologies in this field is urgently needed. Hence, the evaluation of training and capacity building getting underway is welcome.

8. The CGIAR and Sub-Saharan Africa

8.1 After 40 years of development programs and billions of dollars of foreign aid, Africa still faces rising poverty rates and remains the only region of the world where per capita food production has stagnated over the past 40 years.[176] The World Bank, the CGIAR, Canada, and the EU have once again expressed interest in considerably increasing their support to African agriculture, but it is not clear how well coordinated these efforts will be. Of the 29 countries facing food emergencies in 2001/2002, 16 were in Africa.[177] Food security in the region is compromised by droughts, internal conflicts, and the grim impact of HIV/AIDS, which to date has taken the lives of 7 million agricultural workers and threatens to take another 20 million before 2020. Agricultural labor shortages, rather than labor surpluses, are a problem in many HIV/AIDS-ravaged countries, and have tremendous implications for the kind of agricultural technologies that are promoted to alleviate hunger.

8.2 Because agriculture is the primary source of livelihood for two-thirds of its people, Africa's quest for poverty alleviation, food security, and balanced regional growth depends critically on broad-based agricultural growth. Africa's food insecurity is directly related to insufficient food and agricultural production, appropriate science and technology gaps, extreme urban biases in national resource allocations, OECD agricultural policies that militate against Africa's agricultural trade, and poor policy and coordination in development assistance. These factors are more acute in Africa than in South Asia. In the latter, the poor distribution of massive surpluses and the lack of purchasing power in the hands of the poor lie at the heart of the problem, although population growth and land pressure will call for continued emphasis on productivity enhancement such that the poor directly participate in the growth process and many move out of agriculture. But in Africa, increasing the supply of food and agricultural products through productivity growth is a far more urgent challenge. It is key to increasing incomes and employment. Low productivity has eroded the competitiveness of African agriculture on world markets. Export crop production has shifted to meet subsistence food needs. Despite devaluations, which have increased competitiveness, Africa's share in world agricultural trade has fallen from 8 percent in 1965 to 3 percent in 1996, mainly due to low volumes resulting from low productivity and supply.[178] There is enormous potential for improving agriculture and rural livelihoods for the poorest farmers in Africa. Doing so requires that African governments assign top priority to agriculture and rural development, including agricultural research, and the CGIAR to productivity growth.

8.3 While the CGIAR has made many useful contributions to African agriculture, there is far greater potential in the region yet to be realized. Every African consulted for this review agrees that the pipeline of new technologies produced by the CGIAR has been important and must continue. However, from Africa's perspective, the current configuration of CGIAR Centers in Africa compound Africa's technology problems. African countries incur high transaction costs in dealing with multiple CGIAR Centers, a cost that could be reduced under a service provision arrangement set

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Latin American and Caribbean case studies. Romano 2002 recommends implementing ISNAR's method for this type of evaluation in other Centers. See Horton et al. 2000.

176. For detailed discussions of the CGIAR and Sub-Saharan Africa, see Eicher and Rukuni 2002 and Ndiritu 2002.

177. Sanchez 2002; FAO 2002.

178. The World Bank 2002d.

up regionally to exploit economies of scale and scope.[179] The Centers are currently underfunded and overstretched. To have an impact in the region, the CGIAR needs to play a greater role in addressing science and technology gaps, and needs to structure its engagement in the region in a way that is more conducive to forming an effective strategy to this end.

8.4 In an effort to examine the CGIAR's challenges in Sub-Saharan Africa, the meta-evaluation carefully considered the TSR. The TSR has been criticized for not adding value to the CGIAR's activities in Africa since it devoted only one of its 29 recommendations to the region.

ACTIVITIES, IMPACTS, AND CONSTRAINTS

8.5 Today, all 16 of the CGIAR Centers have programs in Africa, although the continent physically headquarters only four Centers: WARDA, ILRI, ICRAF, and IITA. Performance of the CGIAR Centers operating in Africa is of central importance to this meta-evaluation because Africa receives 43 percent of the CGIAR's $350 million annual research expenditures.[180] Yet, unlike in Asia, rates of return studies are more limited in Africa.[181]

8.6 Many of these studies highlight successes such as the high-yielding TMX cassava varieties, improved hybrids and open-pollinated varieties of maize in eastern and southern Africa, higher-yielding wheat in eastern and southern Africa, hybrid sorghum in Sudan, semi-dwarf rice for irrigated regions in West Africa, early maturing cowpeas in West Africa, and disease-resistant potatoes in the eastern and central African highlands.[182] CGIAR Centers, including IITA, CIAT, WARDA, and CIMMYT, have played a significant role in leading the research and collaborating with NARS to disseminate new technologies.

8.7 Other studies cite concerns such as low yield increases in other crops, limited adoption, and institutional constraints. Centers face a complex set of problems: the large number of mandated commodities, problems of technological transferability, lack of research priorities appropriate to Africa's needs, inter-Center competition, donor conflicts over research priorities, and complex relationships with NARS and SROs.[183] Also, Centers have been buffeted by unexpected political disasters including civil wars and civil strife. Yet perhaps the most inhibiting factor the Centers have

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179. In response to the ongoing discussions on the structure, organization and governance of the CGIAR System, representatives of African NARS leaders met in Entebbe, Uganda on 16-17 October 2000 where they relayed an African perspective on this issue. They believed the current System of 16 global Centers each working on a specific commodity or problem was inappropriate to meet the needs of NARS and farmers at the subregional level. The Centers, they argued, should enable subregional institutions to become efficient and effective in meeting farmers' needs and to promote increased production of food and export crops. They recommended that CGIAR establish two integrated regional centers for Sub-Saharan Africa in lieu of the current structure.

180. Based on regional analyses provided by the CGIAR for 1993–2001. This figure includes agreed agenda funding only, since the CGIAR only classifies agreed agenda funding by region. See Annex E.

181. There are several reasons why the impact of the CGIAR research in Africa is an underdeveloped area of study. First, the African database is weak and unreliable. Second, rate of return studies are biased on win-win cases such as hybrid maize in eastern and southern Africa, where commercial farmers helped develop the institutional foundation (e.g., seed, credit) for subsequent adoption by smallholders. There are few, if any, rate of return studies carried out in countries such as Chad, Eritrea, Angola, and Zaire. Third, the newness of the CGIAR's natural resources Centers in Africa make it difficult to evaluate the NRM impacts in Africa. Finally, there is a lack of methodological work on the impact of alternative institutions on capacity building, human capital formation, and performances of NARS (Goldsmith 1993).

182. Maredia, Byerlee, and Pee 2000, p. 554; Oehmke and Crawford 1996.

183. The large number of mandate crops endorsed early by IITA partly reflected the inexperience of the early IITA managers and scientists.

had to overcome has been the limited scientific knowledge base about African agriculture and an insufficient agricultural science base in terms of human and institutional capacity. While the Centers and other development practitioners in Africa have built a body of knowledge over the past half century, inappropriate donor and national expectations regarding the time needed to join the ranks of industrial nations, the emphasis on agricultural extension and integrated rural development in boosting food output, and wholesale importation of rural institutions and technologies were all part of the problem.

8.8 And even where Centers have produced adoptable technologies, the technologies are not translating into increased productivity because yields on research tend to be lower due to extraordinarily complex patterns of pests, diseases, and soils. Low farm yields are primarily due to massive constraints in delivery of inputs and lack of value-adding infrastructure and marketing services, including prices and information. A recent study shows that while adoption of improved crop varieties have been similar in Asia, Latin America, the Middle East, and Sub-Saharan Africa during the past 38 years, such varieties are responsible for 66 to 88 percent of the crop yield increases in the first three regions, but only 28 percent in Africa. The region shows not only a crop-mix less oriented to the main high-yield variety (HYV) crops, but also a lower share of crops in HYVs for each main specific staple, and lower yields for HYVs and non-HYVs for each main staple separately.[184] The reasons include a flagging government and donor commitment to agricultural development, poor policy planning, lack of rural infrastructure, poorly functioning commodity and input markets, human capital constraints, and poor strategic advice and support from all sides.[185]

8.9 Commodity and input markets, and the policies needed to facilitate them, have been a critical issue in Sub-Saharan Africa. In the 1970s and 1980s, assistance from the donor community greatly increased government employment in agricultural services — especially extension — at the cost of investment in agricultural infrastructure, input supply, or in the development of commodity markets (to say nothing of research). But doubling the number of extension agents failed to increase the agricultural growth rate: extension raises the speed of research diffusion, yield increases, and agricultural growth, but only where there are new, profitable technologies to extend to the farm level.[186] In Africa, the lack of useful technologies has severely limited the success of the "extension first" model in which the Bank alone invested about $4 billion to promote the training and visit (T&V) system which, like the earlier integrated rural development bandwagon, it later abandoned.[187] In the meantime, complementary initiatives, such as research, were eroded by a combination of political strife, lack of recurrent public finances, and unpredictable and fragmented donor assistance.

8.10 Poorly functioning input markets are a major constraint on the contribution that CGIAR Centers can make to the performance of African agriculture. Although there has been a substantial introduction of new sorghum and millet cultivars in semi-arid Sub-Saharan Africa, there has been minimum impact on yields because of the lack of fertilizer, improved seeds, irrigation, or improved water retention.[188] In Nigeria, for example, fertilizer use fell from 450,000 tons in 1993/94 to 100,000 tons in 1999/2000, a

184. Lipton 1994, pp. 131-156.

185. The litany of constraints to productivity growth is long including political instability, lack of stable and predictable agricultural policies, dysfunctional markets and prices for farm produce, lack of agricultural credit, poor access roads and extension services, and the dearth of effective systems of supply of inputs such as fertilizers and other agrochemicals. Underlying biophysical constraints include depletion of soil fertility, weeds, pests, and diseases.

186. Judd et al., 1987. Nations in Sub-Saharan Africa collectively hired an additional 36,000 extension agents from 1959 to 1980.

187. See Gautam 2000.

188. Ahmed, Sanders and Nell 2000.

decline of 80 percent.[189] In some countries, the precipitous drop in fertilizer use stems from high prices for inputs — the result of lower input subsidies and market liberalization — combined with lower output prices — the result, many will argue, of agricultural policy liberalization in Africa combined with continued OECD subsidies to their domestic agricultural sectors. But in other countries, the problem stems simply from incomplete or weak markets and supporting institutions.

8.11 Human capital constraints contribute further to the limited productivity gains in Sub-Saharan African agriculture. African research systems are at an unnecessarily premature stage of scientific and institutional development given the strengths of the colonial research and extension systems.[190] This situation might not have developed had the subsequent institutional development been built on both the positive and negative lessons offered by the colonial experience, rather than allowing the institutions to be replaced completely by new institutions, driven more by political imperatives than by scientific and development imperatives.[191]

8.12 Eicher and Rukuni (2002) argue that the colonial experience in African agricultural development offers some useful lessons for research strategies in the region, despite the many shortcomings of colonial policy.[192] Colonial decision makers introduced a number of innovations in research — largely using internal African financing through export taxes — to develop lean and self-financed regional research institutes to serve a large number of small countries. Since the colonies were expected to rely fully on their own financing, at relatively low cost, the colonial governments generated substantial increases in agricultural productivity by investing in regional research stations placed strategically at locations selected for specific commodities to maximize spillovers of research findings. Research also made effective use of the basic science and technological research produced by institutions within the imperial countries. The colonial governments built infrastructure and assured input supply and export markets for products. But the fatal flaw in this system was the failure to (1) encompass food commodities and natural resource management concerns, (2) build African institutions, and (3) train and retain a competent cadre of African scientists. Thus, the shortage of human capital in the post-colonial period slowed the development of African scientific leadership and continues to arrest the performance and impact of the CGIAR in the region.[193]

8.13 The problem has been compounded by a decline over the past decade and a half in external aid for agriculture in general and training in particular. In 1998, only 20 USAID scholarships were available to Africans for studying agriculture in the United States, down from 250 in l985.[194] This poses two questions: who will train the next generation of African agricultural scientists, and will they be competitive with scientists in the traditional and emerging industrial world particularly in fields such as biotechnology? One solution is to develop more relevant and cost-effective training programs in the region itself, focusing on agricultural science and technology, data gathering and statistical analysis, and

189. International Fertilizer Development Center 2001, p. 5.

190. Eicher and Rukuni 2002.

191. While only 10 percent of the agricultural researchers in Africa were local nationals at the time of independence (as opposed to 100 percent of the scientists in India (Lele and Goldsmith 1989), massive overseas training programs reversed this figure to 90 percent by the early 1990s. This capacity building effort is an important success story. Yet agricultural research in Africa today is weaker than it should be after the initial gains made in human capital development. This is partly because of emigration: today, 45,000 African scientists are working outside the continent. See Eicher and Rukuni 2002.

192. Eicher and Rukuni 2002

193. However, without question, CGIAR Centers played a major role in short-term training from 1970 to 1990.

194. Eicher 1999.

other relevant topics. The 2020 Vision Initiative Network on East Africa is a useful example of the CGIAR engaging NARS in the region to conduct policy research and build capacity.

8.14 Another solution is to use expertise in advanced NARS to train African scientists. Currently, only about 100 African agricultural scientists (mainly from Mozambique and Angola) are enrolled in training programs in Brazil.[195] Moreover, several African countries have requested Brazil's EMBRAPA to help them build scientific capacity to plan and execute agricultural research programs, although resources for such initiatives remain scarce. Turning this situation around should, at any rate, be the primary responsibility of African governments. Thus, the lack of African scientific capacity is impeding the transition from the current, what Eicher and Rukuni (2002) term, the "CGIAR-first" model to African-led research partnerships, networks, and alliances with public and private research organizations. Unfortunately, the stagnation or decline in domestic public spending on African agricultural research systems suggests that there is very limited hope for this model.

8.15 An additional constraint is the small size of many NARS with lack of a critical minimum number of scientists. Currently, 80 percent (4,800) of Africa's agricultural researchers are concentrated in 13 large countries, while the remaining 20 percent (1,200) of the scientists are dispersed across 35 smaller countries, a distribution not necessarily reflecting the relative size of population or agricultural GDP.[196] The 80/20 ratio highlights the diseconomies of scale of small NARS and the fundamental importance of building subregional and regional research organizations to take advantage of scale economies in research as well as to ensure effective intermediation between the CGIAR Centers and the national systems. In contrast, there are currently 16 Centers operating in 17 countries in the eastern and southern Africa, with 13 Centers operating in Kenya alone. This concentration of CGIAR personnel and resources in eastern and southern Africa raises issues of strategic location of research in Africa from an agroecological perspective.[197]

8.16 Several African scholars have stressed to the meta-evaluation team that managing CGIAR networks has high opportunity and transaction costs. The networks risk diverting research away from country needs unless international institutions keep their research programs closely aligned with those needs (through their subregional collaborating mechanism). They use scarce talent that might otherwise be used to manage the NARS.[198] Additionally, a network is only effective if its members are strong. There is always a risk that strong members of a network benefit disproportionately out of the arrangement, especially if it entails access to resources, financial or technical, from outside. The CGIAR will not achieve its full potential until the African NARS, like their counterparts in Brazil and India, are productive and their regional and subregional organizations are effective and financially sustainable. And effective, sustainable NARS at the national level, combined with constructive networking at the regional level, can only be achieved through investment in capacity building for individual NARS.

8.17 The Kenyan and South African NARS are among the strongest systems in Africa, with the potential to significantly contribute to emerging networks of agricultural research systems in the region. However, experts observe that these NARS also face increasing pressures to privatize agricultural research to the benefit of middle- or large-size farmers. This has the effect of leaving agricultural research for small farmers as an increasingly under-resourced residual, increasingly unable to retain good scientists or conduct strategic research relevant not only to small farmers in the

195. Macedo, Porto, Contini and Avila 2002.

196. Mrema 2001.

197. In fact, this concentration of status and privilege may have stimulated the stinging critique of the CGIAR in the FARA/SPAAR reports (SPAAR/FARA 1999; CGIAR Secretariat 2001d).

198. Comments provided by Harris Mule, March 2002.

domestic agricultural sectors, but across the region. Public sectors must play an important role in addressing problems of small, poor farmers.

8.18 Nevertheless, after nearly two decades of tension between the CGIAR Centers and the African NARS, in which the donors and the CGIAR dominated the dialogue, the voice of Africans is increasingly being heard.[199] The contribution of the Forum for Agricultural Research in Africa (FARA) to the CDMT exercise flagged the lack of congruence of priorities between CGIAR Centers, NARS, and the SROs. The FARA report has been well received within the CGIAR and the donor community. This may be a barometer of the growing countervailing power of the African scientific community. But further dialogue is needed at the subregional level in order to determine the services needed by the SROs, gaps in CGIAR programs, coordination issues relating to Center mandates, the appropriateness of CGIAR structures, and the key issue of retention of CGIAR and NARS scientists in the region.

8.19 The CGIAR has a sizable comparative advantage in training through collaborative research with M.Sc.-level and Ph.D.-level scientists if undertaken jointly with universities of industrial and developing countries. The proposal of the current CGIAR management to regularize and institutionalize such training is worthy of urgent support by donors provided African higher educational institutions are also concurrently supported.[200] The evaluation of the training activities of the CGIAR being undertaken by SPIA should pay particular attention to these training issues.

8.20 In this context, the CGIAR and the NARS need effective collaborations with the African academic system, the private sector, and civil society. One of the key shortcomings of both the region's agricultural research systems is their inability to build strong partnerships with indigenous political, social, and economic forces in the region. To date, the region's research systems seem to be more accountable to donors and select administrators in the ministries of agriculture than to finance ministries, the market, and civil society actors in their own countries. The challenges facing the CGIAR and NARS in Sub-Saharan Africa, as well as the donors, require greater levels of partnership with development actors within the region to help create strong long-term constituencies for agricultural R&D.

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199. The first review of the CGIAR in 1977 noted, "The central thrust of each Center should be….to cooperate with national research and production programs to the extent necessary to further the Center's own research activities." (CGIAR Secretariat 1989). Yet, it was only in the CGIAR Priorities paper in l987 that "the need to accommodate national priorities when working in a particular country" was explicitly recognized (TAC Secretariat 1986). The logjam was broken when a CGIAR African Task Force, headed by Guy Camus, met eight times from 1986 to 1989 and laid out a pragmatic and politically realistic devolution strategy. The Camus Task Force reported in 1989, "the concept of regional research, particularly where there are many small countries, is an extremely powerful one." The task force recommended regional interfaces driven by the national systems, supported by donors, and assisted by the CGIAR, for improving the collaborative process between national and international systems" (CGIAR Secretariat 1989, p. 14). The operative words in the recommendation, "assisted by the CGIAR," furthered the devolution in the 1990s, culminating in the preparation of the African Vision for Agricultural Research, the Durban Statement, and the establishment of FARA as the apex organization for the SROs. To further the devolution, the Centers have held a number of useful discussions with SROs and NARS. The report of the inter-Center preparatory meeting held at ILRI in Kenya alludes to the challenges and realities stating, "The recognition that the CGIAR System on its own cannot make a difference, but can only fulfill its goals through collaborative alliances and based on genuine collaborative advantage, was central to all discussions" (CGIAR Secretariat 2001h, p. 1). At the AGM 2001, ICRAF was assigned the responsibility by the Committee of Center Directors to facilitate in this regard with respect to eastern and southern Africa, the region that has the highest concentration of Centers in Africa.

200. Currently, IFPRI's network on agricultural policy analysis in eastern and southern Africa is supporting policy research and capacity building in Kenya, Uganda, Tanzania, Malawi, Mozambique, and Ethiopia.

PRIORITY SETTING AND THE ROLES OF REGIONS

8.21 A regional approach to research is necessitated because Sub-Saharan Africa consists of many small countries with diverse agro-climatic conditions, thereby limiting opportunities for continent-wide economies of scale in research, and because most of the region's NARS lack the resources and capacity to contribute to research effectively. The Special Program for African Agricultural Research (SPAAR), initiated at MTM 1985, was designed to facilitate agricultural research in the region and has helped to establish three SROs and FARA as an apex organization.[201]

8.22 Subregional organizations such as the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), the Southern African Centre for Cooperation in Agricultural and Natural Resources Research and Training (SACCAR), and the Conférence des Responsables de Recherche Agronomique en Afrique de l'Ouest et du Centre (CORAF) are playing an increasingly important role in the region.[202] SROs have the potential to provide leadership on critical agricultural research policy issues facing the NARS in Africa today, and can offer an "African voice" in such key organizations as GFAR, the World Bank, and the CGIAR System. SROs also have the potential to help some countries reduce their research outlays on certain crops and increase their capacity to access technology through SRO networks, and from the CGIAR System.

8.23 Moreover, there is a strong, and as yet unrealized, potential for advanced NARS in countries such as Brazil, India, and China to play a more active role in building African research capacity through SROs, a topic the TSR and other reviews of the CGIAR have commented on extensively, but that remains unattended due to the nature of CGIAR funding. Strong, African-led national and regional research organizations are needed to set appropriate CGIAR priorities in the region. Although the move toward regional and subregional collaboration and integration has been strong in Africa, funding of regional research activities still amounts to less than 2 percent of total spending on agricultural research. Without greater priority to research and investment by Africans in their NARS, along with universities, policy think tanks, farmers' organizations, and the private sector, partnerships in the region will not improve.

8.24 Yet some experts, including members of the meta-evaluation's advisory committee, express concern over the greater focus by donors on the regional and subregional organizations in Africa, which they fear will come at the cost of building the strong foundation of the national research systems. They argue that as long as many African NARS remain weak, these constitute an unstable foundation upon which to build regional and subregional collaborations. Therefore, without strengthening the NARS the probability of success is low. More important, they argue that the research challenges, the lesson learning, and the economies of scale and scope do not neatly coincide with the political and administrative regional borders in Africa. Thus, a regional concentration might detract from the need for research links and networks on specific commodities or themes that would otherwise be lost in a more regional approach to research in Africa. Finally, experts point out that greater regional and subregional integration runs the risk of simply generating costs associated with creating new institutions and building systems for governance, management, and finance, without addressing the key scientific, technological, and policy issues in African agriculture.

8.25 Ultimately, there is a question of what the priorities should be for CGIAR work in Africa and

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201. Three Subregional Research Organizations (SROs) were established in Africa in the 1980s and 1990s: SACCAR (southern Africa), ASARECA (eastern and central Africa), and CORAF/WECARD (western and central Africa).

202. Under the umbrella of these SROs are initiatives such as the East and Central Africa Programme on Agricultural Policy Analysis (ECAPAPA), a program of ASARECA that is working directly with the NARS to strengthen their capacity to conduct economic, social, and policy analysis in collaboration with IFPRI.

who should set them. There is increasing sentiment that the subregional organizations should guide subregional priorities, but this is a challenging problem since subregional capacities for articulating priorities are both diverse and limited.

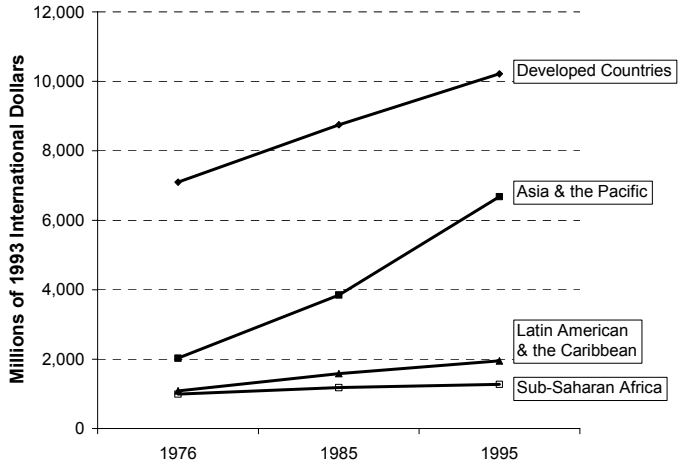
CONFRONTING SHORTFALLS IN PUBLIC AGRICULTURAL SPENDING

8.26 What can the CGIAR do, given that Africans and donors, including the World Bank, have failed to strengthen research and research capacity building efforts in Africa, thereby pressuring the CGIAR to move downstream? *Public spending for agricultural research in Africa stagnated in the 1980s and 1990s* at about $1,200 million per year, only slightly higher than 1976 levels (Figure 8.1). After 40 years of independence, many NARS in Africa are scientifically weak, oversized, financially unstable, and heavily dependent on unpredictable and fragmented donor assistance. Donors fund an average of 40 percent of all NARS expenditures on research in Africa and around 60 percent in some countries.[203] Only five African countries — Nigeria, South Africa, Botswana, Ethiopia, and Mauritius — are paying the recurrent budget of their NARS from national sources. This, compounded by waning donor interest in agriculture, has led to severe financing shortfalls and disincentives to continued investment in agricultural research by African governments. The meta-evaluation has found that most of the African NARS attempted to adjust to the shortfall in an uncoordinated fashion, for instance, by independently approaching donors with individual funding requests.[204] Ways must be found for Africa's leaders to provide leadership, coordination, ownership, and responsibility for public financing of its NARS and SROs.

THE ROLE OF DONORS AND THE BANK

8.27 The CGIAR must assist in generating African political will and commitment for science and technology and sustained funding of agricultural research. There is an urgent need for African political leaders to elevate agricultural research to a national priority and move aggressively to pay the recurrent budget of research on a timely basis for decades to come. In order for the CGIAR to fulfill such a role, the Bank and donors must adhere to a proactive well-coordinated strategy for agricultural research and development. Much of the CGIAR's future in Africa will be determined by the ability of donors to mount and sustain massive institution-building programs over the next 30 years. Donor coordination has the potential to facilitate improved collaboration between the African NARS and CGIAR Centers.

Figure 8.1. Public agricultural research expenditures, 1976–1995



Source: Pardey and Beintema 2001.

8.28 The Bank's revised strategy for Sub-Saharan Africa, *African Agricultural Research and*

203. Pardey, Roseboom, and Beintema 1997.

204. Ndiritu 2002.

Development: Addressing Effectiveness and Sustainability, effectively argues that increased public financing of agricultural research is important given its public goods nature and its crucial role in poverty reduction, and because of the modest role of private sector research in Africa. The Bank recognizes the need for building regional and subregional cooperation and for NARS specialization, but how can the Bank and other donors collectively and strategically support this initiative with a combination of support for regional and national agricultural research systems when donor aid to agricultural research is highly fragmented? The implications for how Bank grant financing can support regional and subregional organizations and how the Bank's lending activities could support research have not been fully articulated.[205]

8.29 The Bank's Sub-Saharan Africa proposal adopts a realistic 20- to 25-year timeframe and it calls for the Bank to lead the preparation of a Multi-country Agricultural Research Program for Africa (MARP). But the country focus of the Bank's organization is hindering the development of a long-term agricultural research lending strategy for Africa. Strategic decision-making is required to target which NARS should be supported now, and it would be especially useful to explore the use of IDA grants for regional programs for agricultural research, education, and training. The Bank would be better off using part of its resources to develop regional research organizations jointly with other donors. In turn, this would help develop research investments in strategically located countries whose development should be supported on a long-term basis. This will take time and perseverance, but in the long run, it will be more rewarding than dotting Africa with unsustainable research projects on a country-by-country and multi-country basis using grant funds. It is neither CGIAR's mandate nor an appropriate use of DGF grant funds to help the Bank develop its lending program. This should take place using the Bank's own budgetary resources.

8.30 Furthermore, while the Bank proposal is timely and makes repeated reference to the need to coordinate the proposal for MARP with the ongoing reform of the CGIAR System, the multi-country approach the Bank has been using with respect to HIV/AIDS, and proposes to use in the case of agricultural research, is not suited to the formation of a strategic approach to the development of research programs without considerable adaptation. Regional research centers should be used as research foci, and a strategic re-alignment based on regional agreements should be encouraged by grant funding from external sources. This approach would help promote the kind of research that will have spillover effects for smaller countries with similar agro-ecological conditions.

8.31 The New Partnership for Africa's Development (NEPAD) is crucial in this regard. The Bank's cooperation with NEPAD includes a program for agriculture, emphasizing accelerated growth in productivity, improved food security, better management of natural resources, and improved market access, and restructuring of agricultural research and development. Though NEPAD does not hold all the solutions to reducing poverty and increasing growth in Africa, it offers a mechanism to draw attention to the underlying problems identified in this report and provides African governments and other institutions a leadership role in seeking solutions to these problems.

8.32 In conclusion, three questions must be addressed in order to tackle the CGIAR's dilemma in Sub-Saharan Africa. First, what can be done to persuade African governments to elevate agricultural research to a national and continental political priority? Second, can the Bank and other major donors collectively and strategically support regional and national agricultural research systems at a time when donor aid to agricultural research is highly fragmented? Third, can the CGIAR develop a well-coordinated and integrated strategy for agricultural research in Africa that increases coherence and reduces transaction costs for African NARS and SROs?

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205. Regrettably, even though IDA 13 recognized the need for IDA grant funding to certain regional activities, it does not specify agricultural research as one of these activities.

PART III. The Organizational Effectiveness of the CGIAR

As noted in part II, the CGIAR is a unique instrument of international cooperation that has demonstrated the genius of its framers and made its mark in the agricultural research and development continuum spanning basic, strategic, applied, and adaptive research, and technology transfer. It has succeeded mostly because of its emphasis on strategic research of a global or regional public goods nature, the benefits of which spill across national boundaries and cannot easily be obtained through private or national research, and because of its practical, problem-solving focus on bringing the best of known science to address the problem of food security. But the CGIAR also displays symptoms of "mission creep" under pressure from various interests, and has diluted its original science-based character. It has failed to keep pace with the evolving technological and institutional environment. While each of its Centers report a number of partnerships, due to the small-scale and short-term nature of its funding, the System as a whole lacks robust, sustainable links to the private sector and the universities of advanced and developing country institutions needed for a global research network. It has yet to fully tap the opportunities opened up by the new information technologies and the improved skills available in some developing countries.

Notwithstanding recent changes instituted under the Change Design and Management Process (CDMP), OED concludes that the governance, management, and financing of the CGIAR have become increasingly cumbersome, and require fundamental changes. However, successfully restructuring the CGIAR to meet current challenges and assessing how well the current reform process is addressing issues raised in previous evaluations requires an understanding of the evolution of the CGIAR governance, management, and financial systems over the past decade. Chapter 9 reviews reforms since the mid-1990s, starting with the financial crisis in 1993-94, followed by the "Renewal" of the mid-1990s, the Third System Review in 1998, and the Federation Proposal of the Committee of Board Chairs (CBC) and Center Directors' Committee (CDC) in 2000, and concludes with an assessment of the continuing relevance of the CGIAR's founding principles. Chapter 10 reviews the current reform process that started in 2000 in the light of these experiences. Chapter 11 concludes Part III with a review and assessment of the multiple roles that the World Bank has played in the CGIAR.

9. Restructuring the CGIAR: Lessons of Past Attempts

FINANCIAL CRISIS

9.1 The growth in the number of Centers and the growth of System-wide and ecoregional programs in the early 1990s strained the CGIAR strategically and financially. While asking the CGIAR to do more and causing it to expand its agenda to include, among other things, concerns for farming systems, farmer participation in priority setting, and sensitivity to the needs of women farmers, donors were simultaneously cutting resources. Then, when the United States and Canada, primarily for domestic reasons, cut their funding to the CGIAR by $24 million and $6 million, respectively, between 1992 and 1994, this precipitated a financial crisis. While this was offset to some extent by increasing contributions from Japan, Denmark, and the Netherlands, these were not enough to fill the gap.

9.2 The two Chairmen whose terms coincided with the financial crisis responded in different ways. First, CGIAR Chairman V. Rajgopalan opted to consolidate the two livestock Centers located in Africa, and commissioned TAC to explore consolidation and restructuring options throughout the System. The TAC Restructuring Review (1994) called for centralization of a variety of functions carried out by the Centers; rationalization of central services such as reviews, assessments, and evaluations; and reorganization of research on cereals, roots and tubers, forestry and agroforestry, policy, and NRM to increase integration within each research area.

9.3 Ismail Serageldin, who assumed the chairmanship in 1994, strongly believed that consolidating Centers in a period of weakness would convey the wrong message to the development community at a time when more resources were needed for research.[206] Serageldin confirmed in an interview with the meta-evaluation team his desire for the CGIAR's programs to drive its budget, and not the other way around. Knowing that this would require a redoubled financial commitment to the CGIAR by traditional and new contributors, he embarked in May 1994 on a program of political and financial mobilization that he called "Renewal."

THE RENEWAL PROCESS

9.4 A ministerial-level meeting in Lucerne, Switzerland, in February 1995 endorsed the Renewal process and reaffirmed donor support for the CGIAR. Renewal represents an important example of how the Bank's leadership has made it possible for the CGIAR to open doors at the highest levels of governments in both developed and developing countries to ensure continued political and financial support.[207] The meeting resulted in some key decisions regarding changes in programmatic, management, governance, and financial allocation rules. But, while "Renewal" was adopted by the membership, largely because they viewed this as a way of mobilizing additional funds, it had no formal status and it lacked an enforcement mechanism beyond the Bank's own contributions to Renewal, moral suasion, and selected incentives.

9.5 Under Renewal, the Chairman actively solicited and expanded developing country membership and increased their ownership of the System. He also established committees that reflected diverse viewpoints, including those of the private sector and the NGO community. He successfully persuaded the Bank and others to sustain and even increase their levels of funding, while also introducing important policy changes, such as redefining the "agreed research agenda" to create incentives for Centers to mobilize additional funding and to accommodate the donors.

9.6 In great part due to the tireless efforts of Ismail Serageldin, Renewal stabilized contributions to the CGIAR. Renewal likewise brought a heightened acknowledgement of the need for partnerships and paved the way for more direct interaction with the private sector and civil society.[208] While neither the private sector nor the NGO community became full members of the CGIAR, they did acquire a seat at the table, and the CGIAR began to contribute financially to the operations of the resultant NGO and Private Sector Committees. These changes fundamentally altered the character of the System — from that of a technical organization of scientists and donors interested in funding science for the benefit of the poor, to pursuing a broader agenda involving the views of diverse stakeholders. Simultaneously, the CGIAR — with the initiative of IFAD in 1994, and with the active support of bilateral donors and the World Bank and FAO — established the Global Forum for Agricultural Research (GFAR) to better reflect the views of NARS and the other components of the global research system.

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206. Interview with Ismail Serageldin. The need for more resources for the System is a point that Jeffrey Sachs and others have made for both health and agricultural research.

207. Every chairman of the CGIAR whom OED has interviewed has stressed the complexity and onerous responsibility of chairing the CGIAR while also conducting Bank business as Vice President, which appears not to be sufficiently understood and appreciated in other parts of the Bank, including senior managers. The meta-evaluation team concurs with this assessment.

208. While increased developing country membership and ownership is a favorable aspect of the System's growth, it has yet to result in increased overall contributions to the CGIAR or even increased financing of overheads for regional research programs, as Serageldin and the CGIAR's Future Harvest Foundation had hoped. A notable exception is Colombia's accession to the CGIAR in 1994, which increased the quantity of research contracted to CGIAR Centers due to the weaknesses of Columbia's national research system. See Romano 2002.

9.7 Renewal also brought fundamental, inter-related changes in resource allocation practices. First, the CGIAR instituted a resource allocation matrix as a tool to increase budgetary transparency, accountability, and predictability.[209] Second, in order to create incentives for Centers to mobilize additional funding and to accommodate donors, the "agreed research agenda" of the System was broadened to include both "core" and "complementary" activities. Previously, Centers' research was termed either core or complementary — "core" being largely the high-return global and regional public goods research, and "complementary" or "non-core" being the donor-funded, mostly downstream activities that TAC did not consider as high a priority — and within the complementary category, no formal distinction was made between activities outside the CGIAR's mandate and activities within the mandate but outside the core funding envelope. Now, this distinction between core and complementary activities has essentially disappeared.

9.8 Third, the mechanism for allocating the World Bank's annual contribution was changed from from a "donor of last resort" model to a "matching grant" model. Under the former, the Bank's contribution had been used to fill gaps between the System's research priorities as articulated by TAC and the financial contributions to those priorities by other donors. Under the matching grant model, the Bank's contribution indiscriminately matched funding from other donors, whether in support of System-wide priorities or not. This step was taken to address perceived downsides in the donor of last resort model, including:

- An incentive for Centers to classify activities as "complementary," so as to maximize Bank funds for budgetary shortfalls in their "core" budget[210]
- A stifling of Center initiatives in raising funds
- An insulation of some Centers from economic realities
- An over-reliance on Bank funds by some Centers, making "internal exit" by the Bank from some Centers or programs difficult.[211]

9.9 But this change in the allocation formula to address these concerns has had significant consequences. It is widely acknowledged by CGIAR stakeholders that the shift away from the donor of last resort model effectively eliminated the only mechanism to ensure adherence to TAC's priorities and resource allocation recommendations. As a result, TAC's influence and the role of independent scientific advice in the System have diminished. Second, the Bank's financial contribution is now indiscriminately matching funding by other donors, whether in support of global and regional public goods or not, unwittingly reinforcing a tendency for "funding to drive programs" rather than "priority programming to drive funding." Largely determined by the pattern of funding of other donors, the Bank's financial contribution is no longer necessarily supporting the long-term, strategic elements of the System.

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209. At the Mid-Term Meeting in 1994, Chairman Serageldin stated: "When the System had to cope with reducing budgets, it became clear that the unpredictability of funding undermined effective management of the Centers and undercut the effective funding of the core research agenda collectively agreed at International Centers Week (ICW). The duplications and overlaps in the System resulting from a lack of clarity as to whether we are funding programs of work or funding individual Centers has become intolerable. Change must come… These changes must be directed at introducing predictability in funding and resource management, coupled with transparency and accountability. They must create a system of governance capable of making choices between well-articulated options and ensuring that the core research agenda, once arrived at and endorsed, is adequately funded before resources are diverted to other projects." But the reality turned out to be quite different.

210. This concern is underscored in the 1995 audit of CGIAR reporting arrangements.

211. Anderson and Dalrymple 1999 provide a detailed discussion of the two models. This matching grant mechanism is still partially in place today, but is being modified under the CDMP. Technically, only those projects that were deemed by TAC to meet the criteria of the agreed agenda qualified for World Bank matching funds.

9.10 In addition to these policy changes, the Bank forgave the CGIAR's $5.6 million debt to the Bank that had resulted from advances on its annual allocations, and Serageldin persuaded Bank President Lewis Preston to provide an additional one-time contribution of $20 million to make up for the overall financial shortfall.[212] All these measures served as a sufficient incentive to other donors to increase their contributions. But they also greatly increased the Bank's role in System governance and management.

9.11 As a further indication of the Bank's commitment to agricultural research, Serageldin offered up to $2.5 billion of combined IBRD and IDA resources over five years to support developing countries' agricultural research and extension systems.[213] But with a few exceptions and for the reasons discussed more extensively in Chapter 11 — which relate to the increased decentralization of the Bank's lending operations — demand from developing countries for investment in agricultural research did not materialize as expected. A significant opportunity to improve the capacity of developing country NARS was lost.

THE MIXED IMPACTS OF RENEWAL

9.12 Renewal had a variety of unanticipated consequences on the System. The results of the Bank's matching the funding of other donors vary among the different stakeholders.

From the perspective of the Centers the matching grant formula:

- increased incentives for Centers and donors to negotiate directly for funding, leading to a balkanization of fundraising
- increased financing and accounting requirements that donors imposed on Centers
- pulled Centers downstream and shifted research into short-term or non-strategic areas
- increased micro-management of research portfolios by donors
- led Centers to conduct some research inappropriate for a global or regional research system, despite its worthwhile value to specific donors or civil society
- caused Centers to spend more time and resources preparing and reporting on specific projects and meeting individual donor requirements, thus reducing time devoted to research.

From the perspective of the donors it:

- maintained the CGIAR's attraction in their countries, relative to other programs
- increased a sense of ownership among individuals in those agencies who worked hard to secure CGIAR funds
- created a vested interest in donor agencies that supported the arrangement.

From the perspective of the System it:

- reduced funding for the five commodity-oriented research Centers by an average of 3.3 percent annually (in real terms) from 1992
- diminished the voice of TAC in priority setting and quality control
- reduced the strategic use of World Bank financing in ensuring the provision of global and regional public goods research
- increased the fragmentation of the CGIAR research portfolio

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212. Before 1994, the Bank had provided $40 million in annual research funding to the Centers (not including the Bank's financial support to the CGIAR Secretariat and TAC). In both 1994 and 1995, with the additional $20 million grant, the Bank's contribution increased to $50 million. Although this additional grant was supposed to be one-time in nature, the Bank's support to the research activities of the Centers dropped back to only $45 million after 1995.

213. Serageldin 1996.

- increased dependence on three donors (World Bank, United States, and Japan) for about 60 percent of the unrestricted funds that finance System overheads.

From the perspectives of the CGIAR Chairman it:

- required presenting to donors a menu of options for them to finance, in order to mobilize the additional resources that the stakeholders expect the Chairman to deliver — a consequence of the current political realities of agenda-based, small-scale decentralized funding
- increased the number of committees needed to achieve consensus on the System issues without a decision-making mechanism to follow through on committee suggestions.

9.13 One major result of these changes in the mid-1990s has been that CGIAR expenditures on *increasing productivity* declined by 6.5 percent annually in real terms between 1994 and 2001, while those for *improving policies* and *protecting the environment* have grown.[214] The result is an inefficient System with a fragmented research agenda that lacks long-term, strategic focus — a trend that has been reinforced by the acceleration in the growth of restricted funding since 1998.[215]

THE THIRD SYSTEM REVIEW (1998)

9.14 A major finding of the TSR was that the CGIAR's governance structure no longer allowed it to make timely, responsive, and effective decisions. In order to improve System-level decision-making, the TSR recommended, among other things, that the CGIAR restructure itself as a legal entity built along the lines of a corporate model.

9.15 Yet the TSR engendered little ownership from the membership, and hence had little impact on the organization of the System. CGIAR stakeholders criticized the review process for being too costly and for not involving them adequately — even though the review had involved substantial consultations with the Center directors, boards, donors, and members — and criticized the end product.[216] The TSR's recommendations on governance and management clashed with the System's culture of consensus decision-making and with vested interests resistant to change. Based in part upon members' apprehension about the declining influence and opportunities for consultation, particularly given the accompanying recommendation to eliminate the Mid-Term Meeting, the Group decided not to reform its governance based on a centralized board as recommended by the TSR.[217]

9.16 Ultimately, the recommended reforms made slow progress, among other reasons, because the Bank and other donors lacked a systematic mechanism to consider and follow-up on the TSR findings and recommendations. Moreover, the TSR made a very large number of recommendations — 29 recommendations and 104 sub-recommendations — many of which were not actionable. With a few minor exceptions, the Group rejected the recommendations concerning governance and most stakeholders perceive the TSR as having had minimal impact.

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214. See Chapter 2 and Annex E. Whether measured from 1992 to 2001 or 1994 to 2001, expenditures on increasing productivity declined by 6.5 percent annually in real terms during both time periods.

215. The Chairman and the CGIAR Secretariat have stressed that the nature of restrictions and hence the degree of flexibility to address strategic issues, vary depending on the nature of the restricted funding. OED agrees. What the CGIAR has been lacking, however, is a systematic and consistent analysis across Centers and programs on the nature of restrictions and their effect on the ability of the System to carry out its strategic mission.

216. Since other donors were unwilling to share the $1.2 million cost of the TSR, which the CGIAR donors considered excessive, the Bank ended up paying the full cost out of its DGF grant. The meta-review considers the cost of TSR in line with similar reviews of major programs, particularly one undertaken after 17 years, although it could have benefited from a stronger analytical basis.

217. CGIAR Secretariat 2000a.

9.17 In retrospect, however, the TSR did have a significant effect on the CGIAR by exposing the System to a new set of high-level science managers and private sector actors in industrial countries, by reaffirming donor support for the System, by formally broadening the CGIAR mission to include integrated natural resource management research, and by offering process lessons that guided the consensus-building approach adopted during the current CDMP.

THE FEDERATION PROPOSAL (2000)

9.18 After the TSR's recommendation of a corporate model was rejected by the membership in 1999, the Committee of Board Chairs (CBC) and the Center Directors' Committee (CDC) offered an alternative configuration for the CGIAR in 2000 — a decentralized model of a Federation of Centers. Despite the differences between the TSR and the Federation proposal with respect to the degree of centralization, their common threads were an acknowledgment of (a) the need for the formation of a legal entity with a centralized board to address System-level issues and (b) the need for a more effective network-based approach to developing technologies.[218]

9.19 Discussion of Herdt's paper (2000) on restructuring options for the CGIAR and other ideas discussed at MTM 2000 in Dresden, Germany, and an electronic conference held by TAC to collect ideas for reforms, led to a proposal for the unified management of certain CGIAR functions relating to germplasm, intellectual property, and public awareness. The virtual conference was followed by a more ambitious proposal by the CBC/CDC for a "Federation of Centers" as a legal entity comprising the 16 Centers, a Federation office, and a centralized board. The proposed Federation would perform six functions: (1) strategic planning and scientific quality enhancement, (2) resource mobilization (3) public awareness, (4) science advocacy, (5) Federation undertakings, and (6) providing common services to Centers, donors, and the CGIAR Chairman. The Centers generally viewed the Federation proposal as "devolving" certain powers from the Centers to the Federation, moving some of TAC's strategic planning functions, increasing the voice of NARS and the developing regions in the priority-setting process, and unifying the CGIAR Secretariat with the Federation on grounds that the CGIAR Secretariat had not served the Centers well. But a few key donors opposed the Federation proposal as being "bottom-up" and as an attempt to take away the donors' prerogatives on the issues of strategic planning and System-level accountability. Reportedly, some developing countries also objected to the Federation idea.[219]

9.20 Once again, in the absence of a Group consensus, the Federation Proposal was dropped. This remains the closest that an internal set of actors has come to acknowledging the need for a legal entity with a centralized board much like the TSR had earlier recommended. But it envisaged the Centers to be in the driver's seat instead of the donors and the existing CGIAR organizational units.

THE CGIAR'S FOUNDING PRINCIPLES NEED REVISITING

9.21 The six founding principles that underlie the CGIAR governance structure (donor sovereignty, Center autonomy, consensus decision-making, independent technical advice, informal

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218. These debates are consistent with the trends in the business world. Cultivation of competence, its diffusion, aggregation, leverage, and renewal are key processes in the management of core competencies in the business world (Doz 1996). In many businesses there is currently a simultaneous shift toward core competencies and a close cooperation with partners in new product development. Experience of multinationals adjusting to globalization suggests that innovations that depend on tacit knowledge tend to be more agglomerated, whereas highly localized technologies entail either locally imbedded specialization that cannot be accessed elsewhere or that involve *company specific global strategies that use the development of an organizationally complex international network for technological learning* (Cantwell and Santangelo 1999).

219. Another view is that the Federation proposal was not formally rejected by the Group as a whole, but never given enough time for serious discussion, prior to the beginning of the Change Design and Management Process.

status, and a non-political nature) were adopted when the System consisted of fewer Centers and a less diverse constituency, and setting priorities to achieve impacts on poverty was relatively simple. For a considerable period, when the System was smaller and more focused, the CGIAR could be managed effectively within the framework of these founding principles. Even when the number of members and Centers in the CGIAR grew substantially during the System's first two decades, the basic governing structure did not change. But today, with its wider research agenda, its expanding membership, and its politically driven authorizing environment, the CGIAR's ability to address its mission is constrained by its six founding principles (Box 9.1).

9.22 The System came under chronic pressures in the 1980s and early 1990s to broaden its mission, to become "environmentally more correct and socially more sensitive," and to seek new constituencies to increase funding.[220] The acquisition of four Centers and the establishment of a new one in the early 1990s (after considering 10 existing "non-associated" Centers for possible inclusion)[221] and the concurrent introduction of the System-wide and ecoregional programs represented responses to these

Box 9.1. The CGIAR's Founding Principles Need Revisiting to Maintain Impact on Poverty Reduction

Donor sovereignty — Various interests in donor domestic constituencies have encouraged each member to tie its level and composition of contributions to specific regions of the world, Centers, and programs, and to their own national personnel or institutions. While broadening the CGIAR's political support, this has created a chaotic market place for global public goods research and shifted the composition of the overall program from strategic research to development and dissemination activities tied to short-term donor agendas in which the CGIAR does not have a comparative advantage or core competencies.

Center autonomy — Having 16 research Centers as the only independent legal entities governed by self-nominating boards of trustees has increased fragmentation, inter-Center rivalry, board membership (to 220); diluted board accountability and responsibility for quality; and contributed to collective action problems.

Consensus decision-making — Expanding and diversifying membership, which has broadened ownership to developing countries and provided seats at the table for the private sector and NGOs, have made it difficult to reach consensus among members on the governance, organization, management, and financing issues needed to achieve the CGIAR's mission.

Independent technical advice — Undermining this desirable principle by increasing restricted funding has diminished the authority of the independent technical advise of the TAC (now the interim Science Council) in priority setting and resource allocation.

Informal status of the System — The lack of memoranda of understanding, constitution, legal status, or explicit bylaws at the System level has constrained the ability of the CGIAR to speak with a single voice, and to develop System-wide policies and long-term strategies. Even with the newly established ExCo, its informal status is ill suited to rapid changes in science, to the increasing role of the private sector and intellectual property, and for determining accountabilities and responsibilities.

Non-political (non-partisan, non-ideological) nature — The need to raise resources for a wider mission has made manifest the differing priorities of the constituencies within each of the industrial and developing countries, and undermined the CGIAR's non-political nature.

220. The CGIAR first expanded its mission in the mid-1980s to include the notion of sustainability (TAC Secretariat 1985). Then, in the late 1990s, as a result of the Third System Review, the CGIAR's mission formally incorporated poverty alleviation and environmental sustainability. See Annex B.

221. At the Consultative Group Meeting in May 1988, under the chairmanship of David Hopper, the Group discussed for the first time since 1978 the relationship between the CGIAR and other research centers not under its umbrella ("non-associated centers"). The discussion largely focused on how to address the challenges of achieving environmentally sustainable agricultural production, and how to incorporate forestry/agroforestry into the CGIAR, as the Group had agreed to do in its Canberra Declaration of 1989.

pressures.[222] The pressures were both substantive (concerns about resource degradation) as well as political. The political pressures began in the 1980s and grew during and after the 1992 Earth Summit (UNCED). These included pressure from the forestry community to establish a consultative group for forestry, and then a decision to include forestry in the CGIAR following strong resistance from Canada to merging the forestry agenda into the agroforestry Center, which Canada had been instrumental in establishing.[223] This was reinforced by European support for the establishment of a stand alone forestry Center, by donors' impatience with the old germplasm approach, by their constituencies' demand for the CGIAR to demonstrate more direct and quicker impacts on poverty and to be more environmentally sensitive, and by the Conway report on a vision for the CGIAR.[224]

9.23 Thus, from its relatively straightforward beginnings, the CGIAR System became increasingly complex, especially during the 1990s. It went through several periods of growth in the number of Centers and more recently in inter-Center initiatives. And in an effort to accommodate its expanding agenda and increasingly diverse constituencies, the CGIAR's governance structure grew with the addition of several committees with responsibilities for programmatic oversight, finance, impact assessment, and genetic resources policy.[225] The expansions greatly taxed the System's governance structure.

9.24 By 1998, the TSR panel found that the governance structure had become cumbersome with undefined and overlapping functions, and without clear lines of responsibility and accountability. The TSR concluded that the structure did not serve the CGIAR well in responding effectively to the rapidly evolving external challenges. Although many reviews carried by TAC had previously recommended streamlining individual components of the System, there was neither a consensus nor a clear mechanism to address the broader, System-level reforms.

9.25 The Change Design and Management Process (CDMP) initiated in 2001 is addressing some of the issues related to the diffused decision-making processes, but it is not challenging the six underlying governance principles on which the CGIAR was founded and which the TSR found to be either no longer appropriate or effective. OED concurs. This is particularly true of the relative "informality" of the CGIAR's governance. Unlike more recent global programs, such as the Global Environment Facility or the newly established Global Fund for AIDS, TB, and Malaria, the CGIAR System has no formal or legal persona, written charter, or even a memorandum of understanding. The only legal entities in the CGIAR are the 16 Centers. Responsibilities and accountabilities remain ill-

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222. The major expansion effort began under Chair David Hopper. The CGIAR acquired the International Center for Living Aquatic Resources Management (ICLARM), the International Center for Research in Agroforestry (ICRAF), the International Water Management Institute (IWMI), and the International Network for Improvement in Banana and Plantain (INIBAP) and created the Center for International Forestry Research (CIFOR). INIPBAP was subsequently merged with the International Board on Plant Genetic Resources (IBPGR) and renamed the International Plant Genetic Resources Institute (IPGRI). The two subsequent Chairmen indicated in interviews with OED that they did not agree with the decision to expand given the System's impending financial crisis, but were essentially powerless to stop it. By 2000, the System's research portfolio included 21ecoregional and System-wide programs.

223. In the view of Canadian experts, because foresters had a record of being isolated, if the CGIAR took on the issues of publicly managed forests it would overwhelm research into the implications for farming systems of incorporating trees in farming (interview with David Hopper, January 17, 2002). The effect of this was to consider deforestation — the loss or degradation of the public forest estate — mainly in the tropical moist forests rather than in other, even more endangered forests or on tree cover in general. Although natural forests are being lost, tree cover has been expanding outside the public forest estate in India and China. Taking a more holistic view, the World Bank recently revised its forest strategy to include all types of forests and trees and relate the issues of deforestation more closely to those of poverty alleviation (Lele 2002). The CGIAR, in contrast, continues to have two forest institutes, one for agro-forestry and another for forestry.

224. Conway 1997.

225. See Annex D.

defined as a considerable superstructure of committees has evolved over the years to deal with a complex set of stakeholders. As a result, greater responsibility for managing the overall System has accrued by default over time to the World Bank and the CGIAR Secretariat.

THE CHALLENGE OF RECONFIGURATION

9.26 With the 1994 consolidations, CGIAR Centers now number 16. Consolidation means different things to different people. Stakeholders, scientific committees of TAC, and the CGIAR's own internal reviews have proposed consolidations of various natures from as early as 1994, including mergers of Center boards or management, closure of physical facilities, mergers of programs, mergers along regional or research lines, mergers of commodity Centers, ecoregional or regional consolidation, and consolidation by problem areas (such as common property resources).[226] A large majority (79 percent) of CGIAR stakeholders surveyed by OED agree that consolidation in the number and functions of Centers is advisable (Box 9.2).

9.27 There have been several mergers in the CGIAR since 1994.[227] The System's most comprehensive merger experience, the 1994 ILCA/ILRAD merger, has never been evaluated and is often perceived to have been disruptive and of limited value. The meta-evaluation team's investigation with regard to this merger has led it to conclude that the merger has helped position the CGIAR to address global livestock issues from a position of strength, while its many short-term financial and political costs could have been handled better (Box 9.3). A setback in making ILRI a truly global research institution has been that funding for ILRI declined by about 10 percent after the merger, despite TAC's recommendation for more resources. With the benefit of hindsight and a System-wide strategy, important positive and negative lessons on how — and how not — to achieve mergers could be learned.

9.28 The CGIAR has passed up several opportunities for broad, more systemic consolidation, for example, after the TAC report in 1994, after the Third System Review, after the CGIAR board chairs/Center directors' proposal for a Federation in 2000,[228] and most recently in the context of Change Design and Management Process.[229]

9.29 In 2001, the Group endorsed the CDMT's recommendation for an "evolutionary" approach to restructuring, in which consolidation or other reconfiguration should emerge from the other reforms, including the Challenge Programs.[230] The CGIAR Secretariat has noted, "on the question of consolidating Centers, the CGIAR prefers an evolutionary rather than a top-down approach.… It is expected that the development of Challenge Programs will contribute to consolidation."[231] But there is

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226. It must also be acknowledged that decentralization, rather than consolidation, may in certain circumstances be a more appropriate strategy in reconfiguring the System, as this meta-review suggests with regard to research on policy and NRM. Thus, the devil would be in the detail depending on the priorities of the System. For a review and analysis of previous proposals for reform and reconfiguration in the CGIAR, see Annex I.

227. In 1994, ILCA and ILRAD merged to form ILRI, and INIBAP was folded into IPGRI. More recently, IWMI has absorbed the research programs of the non-CGIAR International Board for Soil and Research Management (IBSRAM), and the non-CGIAR Tropical Biology and Soil Fertility Institute (TBSF) has joined CIAT.

228. One reviewer of this report provides an alternative view that the Federation proposal was in fact an attempt to forestall consolidation.

229. System-level consolidation could also have been considered when eight Center directors were being replaced in 2001. While the CGIAR did agree at AGM 2002 to a restructuring of ISNAR, this does not represent a System-wide restructuring.

230. CDMT 2001.

231. CGIAR Secretariat's comments on an earlier draft of this report, July 31, 2002.

Box 9.2. Stakeholders Report Many Concerns About the System

In support of the meta-evaluation, OED administered a questionnaire to solicit input from 235 CGIAR stakeholders and outside observers in December 2001. Thirty-three percent (mostly insiders) responded to the questionnaire. Among the responses:

- 68 percent believed that "knowledge of germplasm and germplasm research appropriately sensitive to agro-ecological conditions" is the core competency of the CGIAR. Only 38 percent say the CGIAR should primarily focus on this area of research; 55 percent disagree.
- 99 percent agreed that the Centers should pursue meaningful collaborative partnerships with strong developing country NARS in strategic research and help build capacity of the weaker developing country NARS. 70 percent say the Centers are not doing enough in this area.
- 79 percent agreed that there should be a System-wide policy on intellectual property right (IPR) matters.
- 67 percent believed that TAC's role in priority setting has declined in the past decade.
- 51 percent indicated that TAC's scientific quality has declined this past decade; 23 percent disagree; 26 percent don't know.
- 54 percent said that the Science Council should have the lead in System-level priority setting; 30 percent disagree; and 16 percent don't know.
- 79 percent believed that a consolidation in the number and functions of Centers is advisable.
- 33 percent believed that the Challenge Programs are the best approach to achieve consolidation.
- 33 percent agreed that the Challenge Programs will be sufficient to open up the CGIAR to obtain/produce the best science.
- 77 percent indicated that the World Bank and some other donors' financing of overhead costs of Centers has ensured stability of the System and enabled the CGIAR to focus on a longer-term research agenda.
- 22 percent said that the recent changes emerging from the Change Design and Management process go far enough. 53 percent say they do not go far enough; and 25 percent don't know.

Source: See Annex O in *Volume 3: Annexes*.

little agreement among stakeholders on whether the Challenge Programs are an appropriate or a sufficient mechanism for restructuring. The meta-evaluation team sees reconfiguration through the Challenge Programs as an unnecessarily painful process that would not necessarily result in reconfiguration based on the System's long-term strategic interests but, rather, could result in reconfiguration based on Centers' abilities to raise funds and appeal to donors' shorter-term interests. Reflections on the ILCA/ILRAD merger also suggest that once agreement is reached in principle, consolidations should be carried out as quickly and painlessly as possible and they should be based on strategic interests (Box 9.3).

9.30 The integrated natural resources management program and the System's response to the 2001 International Treaty on Plant Genetic Resources are good examples of System-wide collaboration. But in general, consolidations are less popular than expansions. They have never been systematically evaluated. Where consolidations have occurred, these have been perceived as cost-cutting measures that signal weakness rather than as a way to strengthen programs as part of a well-articulated long-term strategy for enhanced productivity of and higher returns from the System in terms of impacts on the poor. Thus, consolidation remains a priority fraught with difficulties.

COLLECTIVE ACTION PROBLEMS ARE DAUNTING

9.31 Resistance to consolidation demonstrates the Olsonian collective action dilemma. "Unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, *rational, self-interested individuals will not act to achieve their common group interest*."[232] There is a broad consensus that the increasingly complex environment in which the CGIAR operates is no longer compatible with 16 fully independent research Centers. African countries as a group have called for consolidation to reduce the transaction costs of dealing with 16 Centers. Box 9.4 lists some of the many other reasons that have been offered to justify consolidation. And OED's investigations suggest that developing countries as a whole might well prefer consolidation to reduce their transactions costs in dealing with Centers. But individual countries that host Centers oppose consolidation. Donors, Center chairs and boards, and Center

Box 9.3 The Unevaluated ILCA/ILRAD Merger Experience

The CGIAR's examination of its strategy toward livestock research culminated in the 1994 merger of the two existing livestock Centers — the International Laboratory for Research on Animal Diseases (ILRAD) and the International Livestock Center for Africa (ILCA) — into the International Livestock Research Institute (ILRI). The merger stemmed from a desire to craft a more effective, visionary, and global strategy for livestock research, a motivation heightened by the CGIAR's 1993-94 financial crisis.

The general consensus within the CGIAR seems to be that the resulting institution is far better positioned to address the huge global challenge of livestock development than were the two unconnected Centers at the two ends of the research and development continuum. The long-term return to this consolidation is believed to be substantially larger than the immediate financial savings in Center administration and management for the merged Center of some $1.2 million in 1998 compare to the combined costs of ILCA and ILRAD in 1994. The end product is better and more comprehensive livestock research and development, leading to improved coherence and effectiveness of science and the prospect of contributing to improved livestock production throughout the developing world. This could result in rates of return similar to those that have been realized in germplasm improvement.

However, the political and psychological costs and the cost of disruption to the research programs could have been better handled. At the time, those costs were under-rated. First, political costs for the host countries could have been better handled if the Centers had been more cooperative in explaining the merger to the hosts. The legal agreements with the hosts were even more intractable than the political costs. Some have estimated financial costs associated with lost research productivity during the transition to be as high as $35 million, but this estimate is disputed. Tension and a loss of staff morale in the short term, while unavoidable due to the uncertainty among research staff about their programs, employment, and management, may have been greater due to the inadequate handling of the different institutional cultures and the appointment of a director general from one of the two merging Centers to lead the new Center.

Several lessons emerge from the ILCA/ILRAD experience. First, consolidation should be undertaken for strategic reasons and long-term positioning, not for short-term cost savings. Second, there must be a clear a priori consensus regarding the long-term benefits of consolidation. Third, consolidation requires strong, high-level leadership with credibility. Fourth, it is important to bring the host countries, Center staff, and other affected parties into the picture at the outset. Fifth, a new director general should be brought in to lead the new, consolidated Center. Sixth, the process should be transparent and accountable, and consolidations should be carried out as expeditiously as possible. Seventh, the policy and operational decisions in carrying out the consolidation should be in the hands of a small, knowledgeable, genuinely concerned and sensitive group of people.

Source: Interviews with V. Rajagopalan, Robert Havener, Hank Fitzhugh, Neville Clarke, Robert Herdt, Alex McCalla, Cees de Haan, and Akke Vanderzijpp.

232. Olson 1965, p. 52.

Box 9.4. Veterans Cite Multiple Reasons for Consolidation

1. Donors seeking to implement special projects behave strategically and "play" Centers against each other.
2. Centers compete against each other for resources from traditional donors.
3. Centers duplicate administrative and other functions.
4. Centers are unable to efficiently exploit scientific advances in molecular biology.
5. Centers cannot individually afford to build or mobilize the capacity necessary to address IPR issues.
6. Centers impose costs on clients by having individual policies toward international regulations on germplasm exchange, and different procedures for that exchange.
7. The CGIAR has inadequate capability to assist countries with international negotiations on germplasm and genetic resources.
8. Formal and informal linkages between Center and NARS scientists are fragmented and duplicative within the System.
9. Outside actors, such as the private sector, seek to collaborate with the CGIAR, but the System does not provide a single contact with the necessary authority or capacity to negotiate.
10. Opportunities to debate issues of interest to Centers and donors are often displaced by CGIAR meetings that consist of large plenary sessions and reports filled with platitudes.
11. Opportunities for exchange between researchers and donors are often displaced by the CGIAR superstructure of secretariats, special interest committees, and others that neither provide funds nor conduct research.

Points 3, 10, and 11 are being addressed by the CDMP with the establishment of ExCo, formation of the System Office, discontinuation of Mid-Term Meetings, and streamlining of the committee structure.

Source: Herdt 2000.

directors, oppose consolidation of "their" Centers or activities that affect their interests, as do Center scientists due to the inevitable uncertainties.

9.32 These examples illustrate that collective action problems are daunting. The short-run financial costs of reduced Center productivity resulting from consolidation can be considerable, particularly if handled poorly, and this, too, is often offered as a reason for maintaining status quo. Yet the long-run benefits of consolidation will undoubtedly be significant. OED believes that fragmentation in the System should be reduced as appropriate through consolidation, streamlining, and absorption of marginally effective Centers.[233] This should be based on a management review of the organization of Centers, programs, and science quality from the viewpoint of generating global and regional public goods.

9.33 Members debate whether a single centralized board for the System, along the lines suggested by the TSR and the Federation proposal, would increase System coherence and effectiveness. The System is being pulled in two opposite directions. On the one hand, the CGIAR Centers are not conducting sufficiently coordinated research on the *highly decentralized nature* of NRM research, which calls for effective partnerships with NARS to produce regional and national public goods in NRM. On the other hand, the System is *not sufficiently centralized* to deal with advances in the biological sciences and IPRs, which call for a more unified approach to research strategies and policies.

233. The CGIAR acknowledges the fragmentation in the System's administration and management, and steps are being taken to address it in certain areas (e.g., in human resources policy and in a coordinated, System-wide approach to information technology). The preparation of rules of procedure for some units in the System is likewise a positive change that should be accelerated. OED commends the CGIAR for taking these steps, including bringing in a management consulting firm to advise on the System Office, and notes that these are steps in the right direction. However, these measures do not address the fragmentation of the CGIAR's research program. Areas where reforms are urgently needed, such as consolidation of research programs, face resistance due to the current organization, management, governance, and financing structure.

9.34 While the financial crisis and Renewal period created additional challenges for the System, it also helped reveal some long-standing problems with the System's governance structure, such as the profound differences of views among CGIAR members and donors on its mission and strategies. The TSR and other System-level analyses recognized many of these problems, yet daunting collective action problems have led the System to avoid the more fundamental reforms in the governance, organization, management, and financing of the System that a wide set of CGIAR stakeholders and analysts acknowledge to be needed. Getting key stakeholders to agree that the time has come for both real reform and organizational change remains a major challenge. OED believes that the Bank needs to use its good will to work with key donors who largely finance the System, together with experienced and knowledgeable representatives of developing countries and the CGIAR System, to address this collective action dilemma.

10. Reform in the CGIAR (2000-Present)

10.1 According to Chairman Ian Johnson the Change Design and Management Process has greater ownership because it has been driven by insiders, unlike the TSR, which was led by eminent outsiders. Furthermore, he considers the current approach part of an evolutionary process for the CGIAR, rather than a revolutionary change as suggested by the TSR or by the CGIAR board chairs and Center directors' Federation proposal.[234] The Change Design and Management Team (CDMT), led by Margaret Catley-Carlson, the former President of CIDA, began with an examination of the process and substance of the TSR recommendations, and drew on the paper prepared by TAC, *A Food Secure World for All: Toward a New Vision and Strategy for the CGIAR* (2000f). The examination of the experience of the TSR was intended to learn lessons on the process needed to achieve internal consensus and reform in the CGIAR. Accordingly, the CDMT consulted widely to cultivate ownership of its work and recommendations within the CGIAR, although like the TSR, which the CGIAR membership had criticized, the CDMT also did not conduct any systematic analysis of the System's problems and challenges.

10.2 The CDMT acknowledged that "although there is general agreement on the goals of change, some of these nevertheless are characterized by unresolved issues, and matters known to be contentious. The CDMT therefore needs guidance on the acceptability of the concepts it is developing, and on the tolerance of the System to absorb the proposed changes."[235] An important outcome of the input it received from its Steering Group (consisting of stakeholders led by Chairman Johnson) was the decision not to directly address the issue of System-wide consolidation of programs and Centers contained in the original terms of reference of the CDMT. The CDMT issued its report in April 2001 for consideration at the Mid-Term Meeting in May 2001.[236] The team's work, as agreed by the Group, was to focus on:

- A restructuring action plan for the entire System with a clear rationale for program integration and/or consolidation of Centers (including analysis of options)
- A governance plan that streamlines CGIAR decision-making and clarifies the roles of all components and brings net efficiency gains
- A business plan for increasing efficiency in the provision of common services; coordinating System-wide programmatic activities; and reducing overheads in order to transfer more resources to research.

234. Interview with Ian Johnson, August 14, 2002.

235. Change Design and Management Team 2001b.

236. The CGIAR chairman frequently stresses the stakeholder ownership of the current reform process. Interviews by the meta-evaluation team indicate that ownership of both the process and the outcomes of the current reform process may be greater compared with the TSR, but the meta-evaluation team is less certain about this after the AGM 2002 meeting.

10.3 Within its broader terms of reference, the Steering Group also asked the CDMT to respond to several specific issues: including how to enhance System-wide synergies, strengthen regional priority setting, adopt new arrangements to deal with patents and intellectual property rights and the private sector, strengthen NARS-CGIAR relationship, address problems of internal inefficiency (overlap, transaction costs, etc.) and improve alignment among strategy, financing, management systems, and organizational structure.

10.4 Notwithstanding these ambitious goals, seeking "internal tolerance" and a desire for "quick wins," the CDMT avoided some of the most contentious issues in its terms of reference, including a restructuring action plan for the entire System based on a clear rationale for integrating programs and/or consolidating Centers. Dropping the idea of merging Centers or creating a "Federation of Centers," suggested by Center directors and Center chairs it opted for an "evolutionary approach" in which restructuring would emerge from other reforms, particularly the Challenge Programs. Given the past difficulty of changing the System, the reforms are significant. Yet many of the CGIAR stakeholders surveyed by OED believe they do not go far enough (Box 9.2).

10.5 At the Mid-Term Meeting in May 2001, the Group adapted the CDMT's proposals into four actionable areas, each of which has become one pillar of the current reform effort. First, the CGIAR established an ***Executive Council*** to improve the efficiency of decision-making and implementation. Second, it initiated a ***System Office*** to bring together the CGIAR's previously uncoordinated and independent administrative and management units. Third, it proposed to transform TAC into a ***Science Council*** in order to improve the quality of science. Fourth, it has established ***Challenge Programs*** to, in the words of the Chairman, "elevate the game to address issues of global and regional significance." The CGIAR also eliminated its Mid-Term Meeting, dissolved many of its committees and then reconstituted some of them,[237] and upgraded the position of CGIAR Director from Executive Secretary, giving it more executive powers.

THE EXECUTIVE COUNCIL

10.6 **The Chairman gets high marks for establishing the long-overdue Executive Council (ExCo).** ExCo members and others interviewed by the meta-evaluation team at the Annual General Meetings in 2001 and 2002 are optimistic that this is a step in the right direction, but they are reserving judgment until they see how ExCo operates. The fundamental challenge is to appropriately balance legitimacy and efficiency. That ExCo is a stakeholder committee enhances its legitimacy. All stakeholders are represented — both developed and developing countries, the three cosponsors, foundations, the Center chairs and directors, TAC/SC, and GFAR, as well as civil society and the commercial private sector.[238] While ExCo members are selected through caucuses of stakeholder groups and can make decisions only on matters delegated to them by the membership, they are not formally accountable to those groups or obliged to solicit the views of their "constituent groups" before decisions are made. In addition, most developed country groups are more organized than developing country groups, and only members "in good standing" (whose annual membership dues of

237. Particularly the important Finance and Program Committees. See Appendix 1 of the Overview Report (Volume 1) for the current organizational chart of the CGIAR, subsequent to these organizational changes.

238. The civil society position is temporarily vacant. NGOs have raised some important issues about benefit-sharing in the use of genetic resources with developing countries. However, they recently indicated they are "stepping back and freezing their membership" because of the "refusal of CIMMYT to acknowledge GM [genetically modified] contamination in the Maize Centre," and the entry of Syngenta as a member of the CGIAR. During their review, they will not accept money from the CGIAR or sit on the Executive Council or any other committee.

$500,000 are paid in full) are eligible for ExCo membership. These factors limit the effectiveness and extent of developing country membership.[239]

10.7 One initial concept for the Executive Council was a committee of investors, with groups such as the Science Council, the NGO committee, and Private Sector committee serving in an *ex officio* capacity. At AGM 2001, however, CGIAR members opted to have these groups represented on ExCo as full members, with the body being a stakeholder committee, rather than a shareholder committee. In the light of a new private foundation (Syngenta Foundation) with commercial interests in new agricultural technologies joining the CGIAR in October 2002 — the issues of potential conflicts of interest need to be addressed. Similar questions have arisen in the case of NGOs since developing countries and farmers' groups have raised questions about whose interests the NGOs represent. Policies need to be designed to minimize potential conflicts of interest within the membership.[240] Furthermore, if ExCo is to remain a stakeholder rather than shareholder committee, and since NGOs have been able to have a seat on the ExCo without being CGIAR members, there is little justification for requiring developing countries to have dues paid in full for eligibility to serve on ExCo. The situation could perhaps be improved by recognizing in-kind contributions from developing country members, since there appears to be little parity between developed and developing countries in reporting of contributions in this regard either.

10.8 A second concern is that ExCo may not be set up to make the best possible decisions. Several stakeholders expressed a concern to the meta-evaluation team that ExCo can make decisions without the benefit of substantive interaction with the Centers particularly with the abolition of the Mid-Term Meeting, and given the continued importance of restricted funding tied to particular programs in particular Centers. The Mid-Term Meeting provided an important opportunity for Centers and donors to exchange information and perspectives, enabling negotiations on financing Centers' research programs. Now, Centers and donors express a concern that discussion of scientific issues has diminished. Besides, few members of ExCo have support structures within their own agencies to provide the necessary analysis underlying decision-making in donor agencies not represented on ExCo, and the body itself lacks independent intellectual analysis on the pros and cons of complex issues. Other than the CGIAR Secretariat which has now been given responsibility for "business planning" under its new and enhanced role, it is not clear who currently plays this role. It is not clear if the situation is being addressed satisfactorily through the regular monthly meeting of the CGIAR Chairman and Director with Center directors and the representation of the Center directors' chair on ExCo. This issue will need to be monitored.

10.9 A third and related concern expressed was that ExCo itself lacks either scientific capacity or the necessary scientific inputs. For well over a year the System has been operating with an interim Science Council in which it has lacked confidence. Ideally, scientific views should be solicited from the Science Council in the form of position papers analyzing various options to help make strategic decisions. But the role of the Science Council, beyond assessing the science quality of individual programs, in such matters as the approval of Challenge Programs and the Centers' medium-term and annual plans, is now in question, as discussed further below. Reliance on the CGIAR Secretariat poses the risk of creating conflicts of interest in resource mobilization, policy and strategy formulation, and resource allocation. Besides, the Secretariat lacks the necessary expertise to perform all these functions and some have shared a view with the meta-evaluation team that it poses the risk of undue concentration of power in that office. Apprehensions about the substantive analysis

239. Only 9 of the CGIAR's 22 developing country members met this criterion when the inaugural ExCo was established.

240. With the increased role of the private sector in global partnerships, most international organizations OED consulted in the course of the global review indicate they face this issue both with different types of private sector foundations — e.g., multinational and national, and those with and those without direct commercial interests associated with the activity of the partnership. Similar questions arise in the case of representation of NGOs, and are being explored further in the OED review of global programs.

underlying ExCo decisions is perhaps compounded by the concern raised by some stakeholders that ExCo meetings are closed to other CGIAR members and stakeholders, although the agendas and the outcomes of the meetings are made available to the membership.

10.10 A related issue is that of the cosponsors. The TSR recommended eliminating cosponsor status and instead giving those institutions permanent seats on its proposed centralized board. The CGIAR did not endorse the recommendation to change the status of its cosponsoring agencies. But in keeping with the TSR recommendation, cosponsors have three seats on the new Executive Committee; this helps to increase the ownership of the CGIAR particularly among developing countries.[241] While they continue to enjoy cosponsor status on ExCo, one cosponsor (FAO) has expressed a concern to the meta-evaluation team that its historical role may be being diminished as the reform process proceeds. The role of cosponsors in a rapidly changed context may have to be addressed more directly.

10.11 In sum, the formation of the ExCo is a reform in the right direction, although understandably at this early stage, with many new challenges with respect to its role, representativeness, quality, functioning, and effectiveness. How these challenges are handled will be central to the future effectiveness of the CGIAR. It is important that the CGIAR reforms be fully vetted by the membership and their advantages and disadvantages systematically understood, for the CDMT concluded that the TSR proposal for a centralized board had been rejected, among other reasons, because its advantages and disadvantages had never been fully debated.[242] Similarly, the Federation proposal of the CGIAR board chairs and Center directors seems to have been rejected because it was never fully discussed.

10.12 OED concurs with the proposal that the TSR had made for an executive committee with decision-making powers and consisting of formally elected members accountable to the particular groups they represented. Currently, ExCo is neither a decision-making body nor fully representative of the membership or formally accountable to it. Both conditions are necessary to increase the legitimacy and effectiveness of ExCo. Representation will avoid some of the problems concerning quality, responsibility, and accountability that the CGIAR's own reviews have detected in their self-nominating Center boards. Given the importance of ExCo, an effort should be made to improve the quality of stakeholder participation, and to monitor its accountability to stakeholders. Without these, the authorizing environment and legitimacy of ExCo will be undermined, and the CGIAR's collective action problem will not be reduced.[243] There is currently a lack of clarity regarding whether ExCo is a decision-making body or a body that proposes decisions to be considered by the membership at the Annual General Meeting.[244]

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241. The World Bank and FAO, which house the System's two secretariats, have permanent seats. The third seat will rotate between UNDP and IFAD.

242. See Annex J for the CDMT assessment.

243. Other steps suggested to increase participation, ownership, responsibility, and accountability in ExCo include: (1) alternating the chairmanship of ExCo beyond the CGIAR chairman, (2) increasing the tenure of ExCo members beyond two years and designating alternative members to ensure participation in ExCo meetings, (3) advanced scheduling of ExCo meetings three or four times a year until ExCo begins to function effectively in place of the current reliance on virtual communication, to link them better to the AGM agenda and decision-making processes, (4) discussing the agendas of ExCo meetings with ExCo members and the Science Council Secretariat before they are finalized, and (5) improving preparation for ExCo and AGM meetings with the necessary time for discussion, including position papers prepared by the Science Council outlining the pros and cons of important decisions to be recommended by the ExCo to the membership.

244. In this context, the elimination at AGM 2002 of the long-standing CGIAR tradition of maintaining a verbatim record of the business meeting is unfortunate. This is an important change for the governance of a System that takes pride in reaching decisions by consensus and an example of how long-established trust among members on consensus building can evaporate relatively quickly with a few stroke-of-the-pen actions. The absence of a verbatim record allows wide scope for

THE SYSTEM OFFICE

10.13 **The System Office has promise, although it is a work in progress.** The System Office links 10 independent units in order to increase their coordination and ability to serve the Centers and membership.[245] Issues of authority, responsibility, and accountability between the CGIAR Secretariat (which is the coordinating unit), the Centers, and other units are still being sorted out. Monitoring is required of the System Office's functions, resources, responsibilities, accountabilities, and performance through routine evaluations to ensure its effectiveness in serving the members and clients. Having lost the momentum on divesting certain Center responsibilities to the System level — as proposed in the Federation proposal — there is a concern that the System Office may be duplicating services already performed at the Center level.

THE SCIENCE COUNCIL

10.14 **The transformation of the Technical Advisory Committee (TAC) into a Science Council (SC) raises many questions.** Historically, TAC played a powerful role in the CGIAR's governance and organizational structure by setting System-level priorities; recommending allocations of resources among Centers, programs, and activities; monitoring budgets; conducting Center-level and System-level reviews; and, more recently, assessing impacts.[246] However, the TAC's influence declined during the 1990s (Box 9.2). In the view of the meta-evaluation team, its advisory committee, and certain key donors, the most significant reasons for this decline have been the rise in restricted funding and the change to a matching grant formula for the allocation of the Bank's resources.[247] Together these have allowed donor preferences to drive programs and decoupled resource allocation from TAC's medium- and longer-term priority setting. Some donors have also acknowledged to the meta-evaluation team that their priorities are influenced by domestic constituency interests, which tend be short-term, while research is a long-term endeavor requiring steady commitments that are not necessarily politically popular.

10.15 Hence, the TSR recommended strengthening TAC, and the CDMT recommended transforming it into a Science Council to "ensure that the science practiced in the System meets world class standards." OED strongly agrees with this objective. The CGIAR needs a strong, qualified, and independent Science Council to set overall System priorities, to support ExCo, and to ensure the

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interpretation as to what was agreed. It does not allow those who take issue with the formal minutes to determine objectively who said what except by going through the notes of individual participants. The CGIAR needs to go back to the idea of maintaining verbatim minutes and to ensure these are widely available to members and observers of the process, so that there is transparency on which member said what. The same should apply to ExCo meetings.

245. The 10 units are the CGIAR Secretariat, the iSC Secretariat, the Future Harvest Foundation, the Association of International Agricultural Research Centers, the Gender and Diversity Program, the Internal Auditing Unit, the Central Advisory Service for Intellectual Property Rights, and the CDC Executive Secretariat, the Chief Information Officer, and the Strategic Advisory Service on Human Resources.

246. In an interview, Robert McNamara indicated that he insisted on endowing the CGIAR with a strong TAC, led by an eminent chair, to guide allocations of donor resources. He felt most donors would lack either the technical knowledge or dedicated support to enable them to make informed decisions on complex issues of global science policy, research priorities, allocations, and impacts. Strong TAC leadership with credibility and independence, he argued, was and must remain the hallmark of the CGIAR. Putting TAC in the FAO was intended to increase legitimacy in the establishment of research priorities by ensuring a voice for developing countries and to balance the voices of donors with those of clients.

247. Stakeholders also point to "political correctness" in TAC representation rather than scientific excellence, and the fact that CGIAR chairmen and donors have grown weary of a strong, assertive TAC, such as existed in the past. But when disputes have arisen on priority setting and have been referred to TAC, its recommendations have generally been consistent with the CGIAR's comparative advantage, e.g., its decisions with regard to AIDS research, its repeated stress on the declining allocations to commodities, and activities (livestock) of importance to the poor but which are less appealing politically and hence are less able to generate donor funds.

quality and impact of all System-level programs, including the Challenge Programs.[248] The decline in independent scientific advice in the CGIAR went hand-in-hand with the decline in the strategic nature of the CGIAR's research during the 1990s. But OED is not convinced that the transformation of TAC into a Science Council will achieve the desired objective for a number of reasons.

Box 10.1. The Science Council Has Less Power Than Did TAC

TAC's Terms of Reference:

- Provide independent advice and judgments on strategic issues and on the quality of the scientific programs supported by the CGIAR
- Recommend research priorities and strategies to the CGIAR
- Ensure the quality of research supported by the Group and its relevance to the CGIAR's goals and objectives
- Recommend the allocation of resources among Centers in the context of CGIAR-approved priorities and strategies.

The Science Council (SC) proposed responsibilities:

- Serve as guardian of the relevance and quality of science in the CGIAR
- Advise the CGIAR on the strategic scientific issues relevant to the Group's goals and mission.

Source: CGIAR Secretariat, July 2000*, Committees and Units of the CGIAR: Roles, Responsibilities and Procedures* and *Interim Executive Council 2001, Draft IEC Recommendations on CGIAR Reform — An Integrated Proposal*.

10.16 First, this transformation is taking place without the TAC having been evaluated while major decisions on resource allocations are being made. Second, relative to TAC, the Science Council's role is greatly diminished (Box 10.1). It is expected to focus mainly on science quality; to have a more limited (if any) role in priority setting, medium-term planning, and monitoring resource allocation; and to play no role in the annual financial planning process.[249] Third, FAO has indicated to the meta-evaluation team that it is not being adequately consulted about the role of the Science Council. Fourth, the roles and responsibilities of the Science Council vis-à-vis the Challenge Programs and the new and emerging Finance and Program Committees are unclear, particularly as the permanent Science Council is not in place while major decisions on Challenge Programs are being made.[250] Fifth, Science Council members need to be independent and objective, and their findings need to be shared with the full membership when they are transmitted to ExCo. Yet the Working Group on the Science Council has not determined the time and financial resources needed, or the remuneration arrangements for the Science Council members and its chairman (Box 10.2)

10.17 In summary, in order for the Science Council to effectively play this role, several requisites seem evident as the SC is brought into full operation:

- The Science Council would need to have a strong chair, with the necessary distinction in the knowledge of smallholder agricultural development, agricultural policy, and the role of science, and who is widely respected for his/her intellect, has a reputation for independence, is willing to speak his/her mind, and enjoys the respect of CGIAR stakeholders.

248. The quality of science must be one consideration, but equally important is the extent to which the CGIAR is engaged in global and regional public goods research with potential for large spillovers and impacts on poverty, and which only the CGIAR can perform. This requires knowledge of both science and the complex policy, institutional, and development environment.

249. According to OED's survey of stakeholder views, there is no agreement on whether the Science Council should have the lead in priority setting — a huge change from the initial years of the CGIAR (see Box 7 in the Overview Report). In general, TAC members (86 percent), NARS (83 percent), and the TSR team (67 percent) favor a lead role for the Science Council, while OECD members (56 percent), director-generals of the Centers (50 percent), and board chairs (45 percent) are more ambivalent.

250. The Challenge Programs are to have their own independent governance mechanism and program-related science quality assessment separate from the Science Council. Meanwhile, there seems to be a consensus that the interim Science Council did a good job in reviewing the Challenge Program proposals in 2002.

Box 10.2. Issues in the Transformation of TAC to the Science Council

The size of the Science Council has been a matter of debate and cannot be fully resolved until the role of the Science Council is determined. According to the Working Group on the Science Council, the SC will consist of six members plus a chair, supported by four Standing Panels, compared to the 10 to 14 members on TAC. TAC had wider responsibilities than did the SC, but was underfunded. Only the TAC chair worked close to full time and the others were remunerated on a needs basis. Funding restricted the kind of members TAC could attract, since young scientists at the cutting edge of research were less able to find the time for TAC work on a dedicated basis.

Funding of the SC and its Secretariat: The time, resources, and payment arrangements for the SC members and chair have not yet been addressed by the SC Working Group. To obtain the inputs of top-quality, cutting-edge scientists on a demanding SC and to enable them to devote the necessary time for managing reviews of major programs will require at least one-third of the time of the four or six core SC members (assuming they have other full-time engagements), and should be reserved by ensuring them appropriate compensation. Provision should also be made to compensate Standing Panel members. Unlike the CGIAR Secretariat, which is fully funded by the Bank, the TAC Secretariat has been funded by all three cosponsors — World Bank, UNDP, and FAO. But the UNDP contribution has declined significantly, and FAO has stressed the risks it foresees in the near future in relying mainly on FAO funds over time. In the future, all donors should share the costs of the CGIAR Secretariat, the SC and its Secretariat, and other central bodies in the CGIAR System.

Reporting Arrangements: To perform its strategic advisory function vis-à-vis ExCo, the CGIAR Chairman, and the System, the SC should report to the CGIAR membership as a whole, like TAC used to do. SC findings should be shared with the full CGIAR membership at the same time as they are transmitted to ExCo. While this remains the principle, in practice, timely reporting to the CGIAR membership broke down in the case of the pilot Challenge Programs prior to AGM 2002.

Independent External Evaluations: These various issues with regard to the role of the Science Council reinforce the need for independent external evaluations of the CGIAR System, including the functioning of all its important units on a periodic basis, and providing for appropriate follow up of the findings of the evaluations by the boards of the cosponsoring and funding agencies and the membership at large.

- The Science Council's views would need to be available not only to the general membership, including the donors, but also discussed at Annual General Meetings.
- The Science Council would have to have a full-time core body with sufficient resources and support.
- A concerted effort at the highest levels would be needed to reverse the trend in restricted funding.
- A separation would be established between resource mobilization and resource allocation functions generally and with regard to the allocation of Bank funds. The allocation of Bank funds would need to be linked to the CGIAR's long-term priorities and strategies established by the Science Council, which should be based on global and regional public goods. In this way the World Bank would assure itself that its resources are leveraging other resources to maximize their impact on poverty.

CHALLENGE PROGRAMS

10.18 **The Challenge Programs (CPs) are not addressing issues of System-level funding, priority setting, science quality, and governance.** The CDMT recommended the creation of CPs as high-visibility, time-bound partnerships addressing complex issues of global or regional significance. These would increase the scope for inter-Center collaboration, facilitate a wider range of partnerships, tap new sources of funding from current and new donors, and improve output accountability. The CDMT and the Chairman also viewed CPs as a way of addressing consolidation indirectly by building new programs and partnerships while, in the words of some interviewees, letting the weak Centers and

programs "die on the vine" rather than face politically unpopular consolidation. Their design was also to address three important shortcomings that have plagued previous thematic and eco-regional System-wide programs: insufficient funding, poorly defined timelines, and a lack of adequate governance and management. In October 2002, after a year-long review process, involving both the interim Science Council and ExCo, the Annual General Meeting approved the implementation of the first two pilot CPs: "Water and Food" and "Biofortified Crops for Improved Human Nutrition."[251] While passing scientific review, these two pilot programs do not address the three shortcomings of thematic and ecoregional programs (funding, timelines, and governance) noted above.

10.19 From among existing proposals for Challenge Program themes, the iSC had recommended that CGIAR members should decide at AGM 2001 which should be accelerated. Candidate themes were to include those "on which there has been significant preparatory work and prior discussion within the CGIAR and among the stakeholders (and which have already identified *or have potential for significant additional funding*)."[252] Due to a lack of agreement in the membership on priorities and funding potential at AGM 2001, the CGIAR leadership then asked the interim Science Council to screen the concept notes and make recommendations for those that should be accelerated. The iSC subsequently recommended that the concept notes on water, biofortification of crops, and genetic resources be pursued, and full proposals were developed. At its April 2002 meeting, ExCo noted, "the CGIAR is not obligated to fund all three proposals that are being developed. Some CGIAR members will face difficulty in supporting CPs focused on genomics"[253] — reflecting the tension between science-based priority setting, on the one hand, and funding potential and political acceptability, on the other.

10.20 Twelve of the 13 concept notes selected for pre-proposal development in the first phase of the program were submitted by CGIAR Centers, and the Executive Council acknowledged that 90 percent of the pre-proposals for the pilot phase "lacked any meaningful NARS participation."[254] The CGIAR Chairman noted that World Bank funds would not be allocated to the Challenge Programs if they proved to be captured by the Centers.[255]

10.21 OED believes that, properly developed, the CPs could enhance CGIAR's effectiveness and impact. One of their strong and positive features is that they are helping to open up the System by promising to allocate substantial resources to advanced research institutions and the NARS of developing countries. Yet, only one-third of stakeholders surveyed by OED believe the CPs are sufficient to open up the CGIAR, to produce the best science, or to achieve consolidation (Box 9.2). OED's interviews with CGIAR members reveal much ambiguity and confusion about the CPs and a range of concerns about their development — concerns articulated by members at the Annual General Meetings in 2001 and 2002 — although some supported moving full speed ahead with CPs.[256]

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251. "Pilot" refers to the CGIAR's decision at AGM 2001 "to accelerate, on a pilot and one-time only basis the preparation of up to three CPs so that the System can explore ways of improving CP design and implementation." Although it was recommended by the interim Science Council, ExCo did not recommend the third pilot Challenge Program, "Unlocking Genetic Diversity in Crops for the Resource-Poor Areas," for approval to AGM because it was insufficiently developed. This program, along with a fourth that received support at AGM 2002 ("Improving Livelihoods and Natural Resources Management in Sub-Saharan Africa") will be developed further and resubmitted under the regular process for CP approval.

252. CGIAR Secretariat 2001g.

253. CGIAR Secretariat 2002b.

254. Ibid.

255. Interview with Ian Johnson, August 14, 2002.

256. At AGM 2002, Austria, France, Norway, and the Netherlands strongly supported moving ahead full speed with the Challenge Programs, while Brazil, Canada, Denmark, Germany, South Africa, the Philippines, the United Kingdom, the

10.22 ***Funding.*** The CGIAR leadership has sought far larger funds for CPs than was originally understood when the idea of CPs was approved — $82 million for Water and Food, $42 million for Biofortification, $69 million for Unlocking Genetic Diversity, and $100 million for Sub-Saharan Africa. Center directors have stressed to OED that each fully funded CP is equivalent to an establishment of an additional new Center. Moreover, the CPs were to be financed with additional funds, but initial pledges for the first two are far below their costs.[257] If additional funds are not forthcoming, then the CPs will either be under-funded or funded from existing programs. Reducing core funding to the Centers has the danger of further undermining the CGIAR's proven germplasm improvement program. The allocation of Bank funds to CPs is a pivotal concern, given that Bank funds are unrestricted and have traditionally provided the System with a seal of approval for science quality and management. Instead of allocating Bank funds to areas other donors are most willing to finance, the Bank should use its funds to achieve strategic reforms in the System as a whole.

10.23 ***Strategic Priorities***. The tension between topics that can generate funds and those that are needed to ensure impacts on the largest number of the poor has been evident from the outset of the CPs. The CP process is becoming time-consuming, and their proposed sequential approval is distracting from System-level priorities and strategies.[258] Past reallocations, based partly on the revealed preferences of donors, have led to reductions in productivity-enhancing strategic activities of a global or regional public goods nature and in research on commodities of importance to the poor.[259] The iSC therefore recommended to ExCo in October 2002 that the introduction of new CPs into the CGIAR research agenda be slowed down to enable the CGIAR to (1) review the evaluation criteria designed by the Taskforce on CPs and endorsed by the Group at AGM 2001, (2) learn lessons from the pilot process, and (3) review the implications of the CPs for System-level resource allocations. OED considers this an important signal that should be acted upon before approval of any additional CPs. Researchers are trying to convert almost every important research theme into a CP as a way of raising its profile and mobilizing funds.

10.24 ***Science Quality.*** The approved CPs do not sufficiently spell out their methodology and lack well-defined end points.[260] Large sums announced by donors for individual programs involving individual Centers in advance of the review process compromises the SC review process for scientific quality. The uncertain role of independent scientific advice vis-à-vis the CPs is exemplified by the limited resources allocated to the interim Science Council for evaluating concepts, pre-proposals, and proposals for the pilot CPs.[261] Related concerns are the current and future roles of the SC, and the roles of ExCo, the Finance Committee, and the Program Committee relative to the SC, and of the CPs

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United States, and the Rockefeller Foundation favored a more cautious learning-by-doing approach that would review the implications of System-wide priorities for the choice of Challenge Programs. As reported in the minutes of AGM 2002, the CGIAR chairman summarized the discussion saying that he "sensed a consensus for support for CPs as a concept, willingness to approve the two pilots endorsed by ExCo, a desire for prudence in going forward in terms of priorities within a strategic framework, and concerns about cannibalizing funding."

257. The Netherlands has announced $25 million of new money to Water and Food, the United States has targeted funding for Biofortication, and Canada, Sweden, and the U.K. have also expressed interest in Challenge Programs.

258. The minutes of the AGM 2002 report that members said "the CGIAR does not have a clear strategic framework for evaluating CPs. The 'seven planks' of the Vision Paper do not constitute a strategy. The CGIAR should not continue appraising the CPs in sequence, without a clear strategic framework."

259. The latest Center medium-term plans and projections project a continuing decline in activities of the commodity Centers, as also highlighted by the iSC in its comments on the 2003–05 Medium Term Plans considered at AGM 2002.

260. In a news release issued at AGM 2002, the Water and Food Challenge Program declared that it seeks $100 million in contributions during the first five-year phase, with even higher contributions expected in a second phase.

261. While in transition, over a 12-month period, the iSC has reviewed 10 pre-proposals in the Pilot process, short-listing three; reviewed and approved the three Challenge Programs; reviewed an additional 41 ideas and short listed 13 pre-proposals in the Regular process; and reviewed and endorsed those 13 pre-proposals for full proposal development.

themselves vis-à-vis the System.[262] Without the Science Council's strong and independent analytical input, ExCo, the CGIAR Secretariat, and the Finance and Program Committees are not equipped to deal with the appropriateness or science quality of proposals or with the CP's role in System-wide priorities. Nor is the membership likely to be able to make informed decisions without timely, widely shared, high-quality input from a strong SC with well-defined, transparent procedures.

10.25 ***Governance and Management.*** The governance and management structures proposed for individual CPs vary, seem ad hoc, and pose concerns about transparency, accountability, likely science quality, and ultimately about science leadership. CPs and their evolving reporting arrangements (as reported at AGM 2002) seem to be autonomous from the System. For example, the Biofortification CP proposal states that its independent Project Advisory Committee will make an annual progress report to the SC and that the two sponsoring Center directors will report to ExCo. Yet guidelines on reporting arrangements have yet to be issued. The ad hoc nature of the governance and management arrangements in the pilot programs are nevertheless establishing precedents in standards and procedures.

10.26 ***Global Public Policy Issues.*** It is unclear how the CPs will address the key global public policy issues associated with intellectual property rights and public-private partnerships identified in this meta-evaluation. The Biofortification CP has only partially addressed this. Avoiding undesirable outcomes will require System-wide priorities, monitoring of individual CPs, and assessing the opportunity cost to developing countries of undertaking one program relative to another. The CDMT's recommendation that one-half of CGIAR research be moved to CPs by 2006, while making those programs responsible for raising their needed funds, seems premature. It seems prudent not to approve any more CPs until a new Science Council is in place, and its roles, responsibilities, accountabilities, independence, reporting arrangements, and supporting resources vis-à-vis the rest of the System are fully established. The Bank should act as a leader in helping to establish high standards for the conduct of the CPs.

10.27 In summary, the CPs have brought into sharper focus the long-standing issues the System has been facing, in particular the classic public finance tension between unrestricted common pool funding to produce a public good and restricted project funding from specific donors to address specific agendas by supporting specific CGIAR Centers. Ideally, the System should raise as much funding with as few restrictions as possible. It should use strict scientific assessments driven by the CGIAR's central mission but largely independent of funding pressures to allocate resources to certain activities. Even if funding is restricted to specific topics, the use of those resources should be based on objective criteria and their transparent application. A better way of handling Challenge Programs would have been to solicit the commitment of donors around the importance of an idea, for example, to address water issues. Proposals could then have been invited on a competitive basis by the iSC, with science quality rather than relevance alone being a screening device. Instead, full proposals were solicited by allocating up to $200,000 to all the three proponents whose pre-proposals were approved and Centers *de facto* were given tied funds putting the approval process of the SC in a jeopardy.[263]

10.28 This point raises the interesting issue of when, by whom, and how the CGIAR System-level priorities and strategies should be established. A permanent Science Council with the necessary qualified members endowed with a mandate and equipped with resources is not in place while major decisions about the System are being made. It also behooves the CGIAR to update its methodology for priorities and strategies, to track expenditures by broad categories, and to require rolling annual and multi-year research priorities, by means of a balanced approach of identifying new scientific

262. Dalrymple 2002a.

263. The United States has indicated interest in funding some of the Biofortification Program, and the Dutch have pledged at least $25 million for the Water and Food Program. Canada has announced a doubling of its overall contribution, with the additional resources largely devoted to Africa. The United Kingdom and Sweden have made similar pledges and commitments.

opportunities based on analysis and a broad consultative process, led by the SC, with scientists, Centers, NARS, stakeholders, and donors. Such a process in turn should result in a call for competitive proposals rather than assigning responsibility to individual Centers to come up with a single specific proposal that is funded, as has been the case with the CPs. Lack of decisions on the role of the new Science Council has held back such an important long-term strategic effort to develop new methodologies for System-level priority setting. The CGIAR's old approach — based on commodities and their correspondence with potential impact on poverty — is clearly no longer sufficient by itself since the CGIAR has diversified in many other directions of research beyond commodities. The old approach is not able to assign budgetary priorities to research themes such as water, NRM, policy, research management, etc. in a scientific fashion. More recently TAC/iSC has followed a new, regionally focused approach in two regions, which is potentially too broad, time-consuming, and onerous. Without sufficient resources to staff a Science Council and without decisions on consolidation of the System, the two key elements of the reform process — namely the role of the Science Council and the Challenge Programs — pose the risk of diverting limited resources and attention away from strategic issues of governance, organization, management, and finance that a truly global research system should address at this time.

REFORMS DO NOT GO FAR ENOUGH

10.29 On the whole, the reforms of the Change Design and Management Process are a meaningful step forward, particularly relative to other attempts at System reform. At the same time, the combination of seeking "internal tolerance" to proposed changes and the desire for "quick wins" resulted in a set of reforms that still do not address some of the System's most unresolved and contentious issues. Indeed, the current reforms might be thought of as picking the low-hanging fruit and reached with a minimum level of strain. Given the historical difficulty of achieving change in the System, it is easy to appreciate the constraints faced by the CDMT and thus the significance of the reforms that have resulted. Nevertheless, few CGIAR stakeholders believe that the recent changes go far enough.[264]

10.30 The reforms are constrained by the lack of a clear vision for the CGIAR. While TAC undertook an effort to update the CGIAR's vision and strategy, which was endorsed by the CGIAR at MTM 2000, this vision still falls short of addressing key questions such as whether the CGIAR will pursue research focusing on improved agricultural productivity and efficient use of natural resources, or whether it must be more opportunistic in its choice of activities.[265]

11. The World Bank and the CGIAR

11.1 The purpose of this chapter is to assess the Bank's performance of its three major roles in the CGIAR partnership:

- As **founder, cosponsor, and convener:** chairing the System, housing the CGIAR Secretariat, and managing the CGIAR trust funds.
- As **donor:** one of the two largest donors to the CGIAR and with the most unrestricted funding.

264. In the meta-evaluation team's survey of stakeholder views, only 22 percent of respondents indicate that the reforms go far enough; another 53 believe they do not; and 25 percent are unsure (see Annex Q).

265. Similarly, it was no doubt difficult for the CDMT to address the issue of intellectual property, which its Steering Group asked it to comment on, without a long-term vision for the kind of research the CGIAR would be doing. Indeed, the CDMT did not address the IPR issue in its report at all.

- As **development partner:** the largest lender to agricultural development, committing $85.6 billion to 1,770 projects since 1971, and to agricultural research and extension, committing $6 billion to 173 projects in 91 countries since 1971.[266]

11.2 How has it performed in these various roles in relation to the three key principles that govern the Bank's grant-giving under the Development Grant Facility (DGF) — an arm's-length relationship, an exit strategy from DGF funding, and financial subsidiarity?[267] For example, **as a convener**, has the Bank provided the necessary intellectual and financial leadership appropriate to changing times? How does the Bank's relationship with the CGIAR work in practice? **As donor**, should the Bank consider an exit strategy? If so, what might such a strategy consist of? And **as a development partner,** does the Bank's annual grant to the CGIAR compete with or complement the Bank's other country assistance instruments, such as agricultural sector analysis, policy dialogue, and lending?

EXERCISING THE BANK'S LEADERSHIP ROLE AS FOUNDER, COSPONSOR, AND CONVENER

11.3 Former Bank President Robert McNamara was a key player in founding the System. Since then, each president has been strongly committed to the CGIAR. All the Chairmen[268] have exercised their role with energy and dedication. While familiarity with the management of science and agricultural policy has been the exception rather than the rule, all CGIAR Chairmen have been strong, committed champions advocating the CGIAR cause and mobilizing resources towards its accomplishment. Bank support has lent legitimacy to the System in various ways — for example, in expanding the System by bringing in new Centers when new social or environmental concerns warranted broadening the agenda, in consolidation of the Centers when economizing, and more recently in reforming governance and management when needed.

11.4 The Bank's chairmanship has made it possible for the CGIAR to enjoy access to governments at the highest levels both in developed and developing countries, ensuring continued political and financial support and expanded membership. Taken together, the Bank has been described to the meta-evaluation team as the indispensable guardian of the CGIAR System, and as the glue that makes the System coherent and larger than the mere collection of 16 international research Centers. Particularly since the 1993-94 funding crisis, the Bank has assumed a far larger role than the founders of the CGIAR, including Robert McNamara, had envisaged.[269] Among the original three cosponsors — FAO, UNDP, and the Bank[270] — the Bank has ended up assuming increased responsibility — some would say an undue burden — for the governance, financing, and management of the System as the roles, responsibilities, and contributions of other cosponsors have declined. The Bank's leadership

266. This comprises the total commitments of those projects that were coded as agricultural research or agricultural extension in the Bank's coding system up to 1989, and the commitments to the agricultural research and extension components of all projects with such components since 1990. This recent change in the Bank's coding system, retroactive to 1990, has been made in order to adequately capture the greater frequency of multi-component loans in recent years.

267. See discussion of these three criteria in Chapter 2.

268. The chair is nominated by the president of the Bank, endorsed by the cosponsors, and approved by the group. All but the first chairman, Richard H. Demuth, who was Director of the Development Services Department, have been a Bank vice president responsible for agriculture and rural development.

269. McNamara did not foresee the World Bank contributing more than 10 percent of the resources to the CGIAR in order to ensure its broad-based ownership and sustainability. See Baum 1986, p. 58.

270. UNEP, which had joined the CGIAR in 1974, was also a cosponsor from 1995 to 2000, but dropped out because of its inability to contribute any funding or fill a role in environment-related matters. IFAD, which joined the CGIAR in 1979, became a cosponsor in 2001. Its cosponsorship is largely intended to enlarge political support for the CGIAR's poverty mission rather than to bring additional resources.

role, its financial contributions, and its operational support are viewed by other donors as a seal of approval, giving them confidence to continue to invest in the System. They also observe that without the Bank, the System likely would not have lasted as an integrated whole, although some of the stronger Centers would no doubt have survived.

11.5 The CGIAR Secretariat is an independent cost center in the Bank. Its Executive Director, who has recently been given substantially increased powers, reports to the Chairman and, working with him, raises funds, serves as secretary to the ExCo, and largely functions as the chief operations officer. The CGIAR leases office space from the Bank, and benefits from conveniences of being housed in the Bank, including access to the Bank's administrative infrastructure and special status as a UN specialized agency (G-4 visas, personnel work, travel support, and management information). The Bank has been the sole financier of the CGIAR Secretariat and contributes to the TAC Secretariat (housed in FAO) — in recent years, providing $4.25 million out of the annual DGF grant of $50 million for the CGIAR Secretariat and $0.75 million for the TAC Secretariat. This historical situation has not yet been brought in line with the new guidelines adopted by the DGF in June 2000, that the Bank should not fund more than 50 percent of in-house secretariat costs in order "to avoid a program's over-reliance on the Bank."[271]

11.6 Several donor representatives to the CGIAR have indicated that, while donors have been interested in the Secretariat's efficacy (that is, whether it serves the System well), they have been less concerned about its efficiency (at what cost) because they have not contributed to its operations. By the same token, if they were to contribute to the Secretariat costs, they would pay more attention to the running of the Secretariat and expect greater accountability in terms of costs and performance. Few donors interviewed by OED indicated resistance to the notion of cost-sharing of Secretariat expenses. However, the CGIAR Chairman has pointed out several potential drawbacks to cost-sharing: (1) difficulty for developing country members and smaller donors from industrialized countries to participate, (2) a concern that any savings to the Bank from such an arrangement would likely be returned to the DGF budget rather than remaining in the CGIAR, (3) unpredictability and instability entailed in relying on donor funding, and (4) likely diminished Bank's influence.[272]

11.7 The performance of the CGIAR Secretariat in conducting its various roles to service the System has not been evaluated since 1987. Several key members indicated in October 2001 that the Secretariat had increasingly begun to serve the needs of the donors, and particularly the Chairman, rather than those of the Centers, a result confirmed by OED's survey of CGIAR stakeholders. It is too early to assess performance of the current director in view of the major changes in CGIAR governance. But interviews with several members of ExCo and the chair of the Center Directors' Committee have since indicated that the Secretariat's service role has become more effective with the appointment of the new director. Vested with more executive powers since the inception of the Change Design and Management Process, the CGIAR Director has taken a leadership role and a number of steps to increase clarity of roles and responsibilities, has identified issues needing decisions, and has accelerated implementation. In 2001,

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271. The Development Grant Facility: FY00 DGF Annual Review and FY01 DGF Budget (R2000-129, June 23, 2000), Annex 4, page 5. The guideline continues, "After no more than three years, a decision should be made to either move the secretariat out of the Bank, keep it in the Bank with strong donor support, or discontinue the effort due to lack of donor interest or other reasons. In exceptional cases, where there is strong donor interest in maintaining an in-house secretariat in the Bank after three years, then this secretariat should be financed 100% by partners." The CGIAR Secretariat points out that when the System's overhead as a whole is taken into account (including the costs of the System Office currently being established), the DGF burden is less than 100 percent. OED acknowledges that DGF does not fund 100 percent of the total overhead costs of the CGIAR. However, even under the new System Office arrangements, DGF will continue to fully fund the CGIAR Secretariat. Moreover, through the provision of unrestricted funds, DGF indirectly already finances a portion of the CGIAR's other administrative units, as well.

272. Interview with Ian Johnson, August 14, 2002.

the Secretariat published its first-ever "business plan" and annual report for the general public, improved the timely distribution of meeting documents, reduced the turnaround on the proceedings of meetings and has generally actively begun to serve ExCo. Stakeholders indicate that the different operating styles of the two recent Chairmen and Executive Secretary/Director, combined with the pressure from the Bank management and DGF to reconsider the level of Bank support to the CGIAR, may explain the greater responsiveness and larger accountability to the System.

11.8 The Bank's administration of the CGIAR trust fund is an increasingly important service provided to CGIAR members. In 2001, $81.8 million of member contributions were channeled to the Centers through trust funds relative to $35.7 million in 1999. This line of business may well grow. The Bank acts as a fiscal agent in this regard and does not presently charge any administrative fees, since the Bank currently provides minimal project management and reporting services.[273]

11.9 The Bank used to conduct audits of the System at regular intervals and conducted the last one in 1995. The 1995 IAD report was grounded in extensive field discussions with CGIAR Centers, directors, and leaders of scientific programs. It was of high quality and prophetic with regard to the operational concerns it raised — it anticipated many of the problems connected with changes in the Bank's funding formula. Unfortunately, its circulation was restricted to the CGIAR Secretariat. Had it been available to all partners and widely discussed within the Bank, it might have led to an internal debate in the Bank and in the CGIAR membership before the new matrix management reporting system was put in place, and changes in management practices might have been adopted. There has been no similar audit since 1995, despite the current CGIAR Director's request for one upon assuming office.[274] In line with its fiduciary responsibility for the management of trust funds, the Bank should undertake periodic System-level IAD reviews, charge a standard fee for trust fund management, and provide a service by making IAD reports publicly available. This would be consistent with the objective of developing an informed membership able to make decisions based on independent professional analysis.

11.10 Notwithstanding the Bank's large role, the CGIAR System has succeeded in establishing an identity for itself that is quite separate from the Bank. Stakeholders do not regard the CGIAR as largely a World Bank program — unlike some other global programs with in-house secretariats.

FUNDING THE CGIAR AND EXIT STRATEGY FROM THE DGF?

11.11 The Bank's financial contributions to the research agenda of $796 million up to the end of calendar year 2001, have been more valuable than most because they are completely unrestricted, providing 31 percent of the CGIAR's unrestricted funding in 2001. The Bank has helped stabilize the System, by providing extraordinary funds, such as the additional $10 million in each of 1994 and 1995 and by advancing funds from its annual contribution during periods of financial difficulty caused by unexpected shortfalls in other donors' contributions.

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273. The Bank's current policy is not to charge an administrative fee for fiscal agency functions that are provided in connection with programmatic trust funds like the CGIAR. For other types of trust funds the Bank has recently adopted, effective July 1, 2002, a new policy that will be reflected in the revision of OP/BP 14.40 that is currently under way, and in trust fund framework agreements as these are updated to incorporate other modifications resulting from the trust fund reforms. The standard fees are now (a) 5% of the trust fund for consultant trust funds and for trust funds funding technical assistance or advisory activities, whether executed by the Bank or the recipient; and (b) 2% of the trust fund for cofinancing trust funds. VPUs no longer have the discretion to waive or negotiate trust fund fees case by case. However, for large-scale resource mobilization efforts that result in trust funds of $30 million or more, customization of the fee will be considered by TFO and CRM during the Initiating Brief process.

274. One staff member of the Internal Audit Department has also been seconded to the CGIAR to help the System and seven of the Centers meet their internal audit needs. The costs are being shared by the CGIAR Secretariat and the Centers concerned.

11.12 The CGIAR currently receives 40 percent of the DGF funds going to global programs. It is one of 12 "Window 1" programs for which the Bank's Executive Board and the DGF have endorsed multi-year funding of more than three years,[275] and because it was grandfathered when the DGF was created in 1998, it has no strategy for a gradual disengagement or eventual exit from DGF funding. The reluctance of the Bank's Executive Board in June 2002 to shift $2 million of DGF resources from the CGIAR to new, as yet untested global initiatives is understandable. There is little doubt of the continued necessity of investment in agricultural research at the global level, the considerable continued impact of the CGIAR, and the difficulty in mobilizing funds for agricultural research. A steady stream of agricultural technologies adapted to the varied circumstances of developing countries will remain critical for economic growth, poverty reduction, and sustainable development. And it is likely that public sector support at the global level will be needed for a long time to come.

11.13 Yet decisions on DGF allocations to the CGIAR tend to transcend normal DGF processes. The long-standing allocation to the CGIAR of large amounts of DGF funding and the lack of an exit strategy for the program have raised concerns within the Bank about the different standards that apply to the CGIAR compared to other programs — even to the 11 other global programs in Window 1, that have been approved for medium- to long-term funding. The relationship between the DGF and the CGIAR and the oversight arrangements for the allocation of such large sums of funds in an objective manner need to be clarified.

11.14 Some Bank staff are concerned about continuing to finance the CGIAR through the DGF and undermining the DGF criteria in the process. Others argue however that, given the history of lobbying by the CGIAR if the CGIAR were moved outside DGF, it would become more difficult to objectively consider the level of resource allocation to the CGIAR vis-à-vis other global programs. This is one reason for OED's recommendation, in its Phase 1 report on the Bank's involvement in global programs, that continued support to the CGIAR, as indeed to other programs above a particular threshold, should involve a triennial appraisal of the partnership, with Board approval as the basis for continuing Bank support. Down the road, during the IDA 14 replenishment, IDA deputies might also consider expanding the IDA grant-making criteria to include support for long-term research as a global public good.[276]

11.15 The report "Towards a Long Range Financing Strategy for the CGIAR, The Conservation Company," commissioned by former Chairman Ismail Serageldin, presented guidelines to improve the stability and predictability of funding for the CGIAR research agenda and proposed appropriate structures and mechanisms. The report considered a number of financing options and concluded that ODA could not be replaced by alternative sources of funding. Private and corporate philanthropy, for example, offered limited opportunities for the CGIAR and, furthermore, would involve costly cultivation efforts and rethinking of the donor role. Partnerships with the business community had considerable potential, but it could be difficult to bridge the gap between corporate culture and the culture of public good and poverty

275. The other programs are the Post-Conflict Program, the Critical Ecosystem Partnership Fund, the Small Grants Program, the Global Forum for Health Research, UNAIDS, the Special Programme for Research and Training in Tropical Diseases (TDR), the Population and Reproductive Health Capacity Building Program, the Special Programme for Research and Development in Human Reproduction (HRP), the Consultative Group to Assist the Poorest, the Information for Development Program, and the Global Development Network.

276. IDA deputies have recently authorized the expanded use of grants under IDA 13, in the range of 18 to 21 percent of IDA 13 resources, in the following five areas: (1) HIV/AIDS, (2) natural disasters, (3) post-conflict countries, (4) poorest countries, (5) debt-vulnerable countries. Hence, this currently provides only limited scope for providing grants to finance national agricultural research programs in the poorest and debt-vulnerable countries, in order to get beyond short-term, small-scale funding of agricultural research. While IDA resources could currently be used for regional public goods purposes, this would have to be strongly anchored in country-level programs within the region. Based on the agreement with donors, IDA could not currently finance the CGIAR itself, nor its member institutions.

alleviation. An endowment would allow the System to plan for the long-term sustainability of components of the System, but would also call for special management expertise.

11.16 The funding choices the CGIAR ultimately makes will require careful planning of the public awareness and fund-raising strategies, reporting arrangements for the fund-raisers, and the overall management arrangement. In particular, who would be in charge? Should it be carried out by an NGO reporting to the Centers, such as the Future Harvest Foundation? Or should such an NGO report to the stakeholders, the Chairman, the CGIAR Secretariat, or the major funders? The options for funding are many. For example, the donor community could choose to:

- fund certain overall objectives of the CGIAR System (in the manner of the GEF),
- organize periodic replenishments (as in the Global Fund for AIDS, TB, and Malaria)
- fund specific programs with tied aid (as is the case in the current CGIAR),
- opt for completely untied, performance-based funding through IDA,
- solicit private large- or small-scale philanthropy (in the manner of WWF fund-raising, some of it at the retail level), or
- establish endowments for certain CGIAR activities (as the Global Conservation Trust Fund does).

All options remain open. Currently the Chairman, the director of the CGIAR, and the Center directors and boards are all raising funds, while the Future Harvest Foundation is looking for a fund raising strategy around some strategic goals for the System. OED believes that some limited genuine global public goods requiring long-term investments will have to be financed through IDA-type funds being provided on a larger scale than the Bank's net income can allow.

THE BANK'S MULTIPLE ROLES

11.17 OED observed in its 1998 *Process Review of the World Bank Grant Programs*, that whenever the Bank is called upon to handle a combination of leadership, fund-raising, management, and fiduciary responsibilities within such a close-knit collaborative arrangement as the CGIAR, there remains potential for lack of objectivity and conflicts of interest that compromise the Bank's conduct of these roles. The present meta-evaluation concurs that conflicts of interest in the Bank's roles and insufficient oversight have compromised the Bank's ability to provide the necessary strategic leadership (Box 11.1).

11.18 The Bank vice president who chairs the CGIAR plays two conflicting roles: representing the CGIAR to the Bank in advocating DGF funding for the CGIAR and representing the Bank to the CGIAR in ensuring the relevant, efficacious, and efficient use of the Bank's grant resources allocated to the CGAIR.[277] It is problematic for the Chairman to be both advocate and judge — to maintain the political support of the key interest groups and to make the case for continued and even enhanced funding to the Bank and other donors, while also acknowledging the need for and pressing for major reforms. In addition, having a Chairman who is not at arm's length from the Bank compromises the Bank's ability to press for reforms on the scale or at the speed that might be warranted. Generally speaking, because of the pressure from other members to deliver the Bank's annual contributions, the experience to date indicates — and the former Chairmen acknowledged — that the Chairman ends up

277. The chairman also raises funds from DGF for other collaborative programs that fall under his jurisdiction, but those programs may not receive as much attention, or the interests of the CGIAR may conflict with those of other deserving programs. One reviewer of this report has suggested that, to the extent that a problematic relationship exists, perhaps DGF decision-making processes should be revisited rather than moving CGIAR chairmanship outside the Bank.

Box 11.1. Conflicts of Interest in the Bank's Roles and Insufficient Oversight Inhibit Reforms

The ESSD Vice President:
- Chairs the CGIAR
- For fund raising, represents the CGIAR to the Bank
- To the CGIAR donors, represents the Bank's imprimatur of good housekeeping of the System

The Agriculture and Rural Development (ARD) Director:
- Serves as the Bank's Cosponsor Representative to the CGIAR
- Officially represents the Bank in the CGIAR and ExCo
- Chairs the ExCo Finance Committee
- Represents the ESSD vice presidency on the DGF Council
- Reports to the ESSD Vice President

The Bank's Rural Research Adviser:
- Is responsible for Bank oversight of the CGIAR
- Reports to the ARD Director and ESSD Vice President

The CGIAR Director:
- Reports to the ESSD Vice President

representing the CGIAR to the Bank more than representing the Bank's concerns to the CGIAR.[278] For most donors want the Bank to continue to chair the CGIAR, in part because they believe Bank funding and other donor funding will decrease if the chairmanship is moved outside the Bank.[279]

11.19 To his credit during the Change Design and Management Process, the current Chairman explicitly discussed the merit of a Bank vice president chairing the System. He argued that the Chairman's future role might need to be combined with greater executive functions, it might well be close to a full-time job, and it might require someone familiar with managing science. Moving in this direction — and implicitly removing chairmanship from the Bank — was rejected by the CGIAR members.[280]

11.20 The Bank's cosponsor representative on the CGIAR (usually the director of Agriculture and Rural Development), who officially represents the Bank in the CGIAR and ExCo, reports to the same vice president who chairs the CGIAR. He has generally represented the ESSD Vice Presidency on the DGF Council, which is responsible for recommending the annual DGF allocations to senior Bank Management and the Bank's Executive Board.[281] Historically, the ARD Director (or the Bank's director for agricultural research) also chaired the CGIAR Finance Committee until its dissolution in 2000, and the ARD Director chairs the new Finance Committee of ExCo. The likely adverse incentives of the changes in the Bank's funding formula in 1994 were not identified by the Bank's cosponsor representative to the CGIAR at the time. However, the rural development director who replaced him, and who previously served as the chairman of TAC, had reservations about the funding formula and acknowledged to the meta-evaluation team the conflict in roles serving as the ESSD representative on the DGF Council.[282]

11.21 The Bank's Rural Research Adviser, who in principle exercises the Bank's oversight of the CGIAR, reports to the ARD Director (the Bank's cosponsor representative) and the ESSD Vice President (who chairs the CGIAR). The role of adviser in the oversight of the CGIAR has been

278. Interviews with Eccles, Hopper, Thalwitz, Rajgopalan, Serageldin, and McCalla.

279. This view was expressed to OED in several interviews with CGIAR donors in October 2001.

280. Interview with Ian Johnson, August 14, 2002.

281. Until very recently, the DGF has also lacked independent external reviews of proposals presented by different vice presidencies for approval. See World Bank 2002a.

282. Personal communication, Alex McCalla.

dysfunctional for a number of years and the present advisor has acknowledged the ambiguity about his oversight role in a situation where two directors and a vice president manage the System.[283]

11.22 The executive director of the CGIAR Secretariat, recently elevated to the same rank as the ARD Director, reports to the ESSD Vice President who chairs the CGIAR. He is essentially treated as a line manager within ESSD. He attends all meetings of the ESSD management group, including sector board and senior staff meetings, and his performance is assessed by the ESSD Vice President and the managing director responsible for ESSD, illustrating the lack of arm's length in the day-to-day management of the Secretariat from the network and management that is supposed to oversee the System.

11.23 Thus, as is the case for a number of other global programs with in-house secretariats, there is currently no effective independent oversight within the Bank outside the network of its involvement in the CGIAR, nor mechanism to conduct, to assess, and or to follow-up on System-level evaluations. Given a relative lack of DGF guidelines as to how CGIAR funds are to be allocated, the ESSD Vice President has wide latitude to determine how the contribution will be spent, with no checks and balances. It is understandably difficult for the Rural Research Adviser to exert oversight over his own manager. Beyond sponsoring the CGIAR's annual application to the DGF, the Rural Sector Board has played little role in monitoring the use of the funds from a strategic perspective, and is unlikely to have the will to displease its Chairman.

11.24 While the Bank's unique contribution to the CGIAR has been widely acknowledged, the multiplicity of roles it has assumed has led to (1) excessive Bank involvement in the day-to-day management of the System and dependence of the System on the Bank, (2) a disproportionate share of management responsibility allocated to a senior manager already burdened by other heavy managerial responsibilities, and (3) reporting arrangements both for the CGIAR Secretariat and the Bank that are fraught with real or perceived conflicts of interest. These features limit the capacity of the Bank to provide the objectivity and leadership needed to position the CGIAR System to address the external challenges that it now faces, and to allocate the Bank's financial contributions to the CGIAR in a strategic way. It is not surprising that the Bank has been more successful in using its convening power to raise additional resources for the System than to provide the necessary strategic leadership to help the CGIAR respond to the rapidly changing external and internal environment.

11.25 Neither the Bank nor other members have been exercising conflict-free, unencumbered oversight of the CGIAR as a System — not the Bank because of the above-mentioned conflicts of interest, and not the other members because they indicated to the meta-evaluation team that "the Bank is doing so."[284] Bank Management has also presumed, as it generally does with other global programs that are partnerships, that the member partners are exercising adequate oversight over the operations of individual programs.[285]

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283. The oversight roles of the advisors in the networks have diminished considerably with each successive reorganization of the Bank. Unlike in the past, and except when invited to be peer reviewers by their colleagues, network advisers are no longer responsible for oversight of the quality of Bank investments in their sectors, a function now performed Bank-wide by the Quality Assurance Group. The role of the network advisers is increasingly that of "knowledge management." Few have significant cutting-edge technical and operational expertise. In any case, the old role of quality assurance is in conflict with matrix management since the advisers are expected to provide a considerable amount of cross-support to the regions and essentially operate as consultants rather than intellectual leaders of their sectors.

284. To the best of our knowledge the Rural Sector Board has played no role in the oversight of the CGIAR.

285. See, for example, World Bank-Administered Trust Funds: Towards a New Framework for Improved Management and Effectiveness (SecM2001-0605, October 17, 2001), p. 2, paragraph 2.03.

11.26 On the contrary, other cosponsors and donors have been induced to act as "free riders," abrogating their legitimate responsibilities. Some compromises made in delivering the Bank funds while managing the organization for results have been to the detriment of the long-term interests of the CGIAR and its developing country members.

11.27 In short, both the CGIAR and the Bank face a problem of corporate governance with regard to global programs. Having grown from an informally structured System, unlike most of the newer global programs housed in the Bank, the CGIAR has neither a written charter that clearly delineates the roles, responsibilities, and accountabilities of the various officers and bodies that make up the governance of the System, nor an agreed-upon mechanism to reform the governance of the System as needed.[286] The distinction between oversight and management has become blurred. Collective responsibility rather than checks and balances have characterized CGIAR management. While this has facilitated the forging of consensus, it has not been conducive to strong leadership. These weaknesses may have been less of a problem in less complex times, when the mission-oriented genetic research agenda of four to six individual Centers did not require close relationships across the whole System, pooling of resources to tackle major strategic research challenges, or a capacity to forge partnerships with private sector firms.

11.28 The current situation raises a corporate governance responsibility issue in the management of global programs also raised in OED's Phase 1 Report of Global Programs. Who in the Bank can provide the necessary intellectual and managerial oversight to a large, intellectually demanding, and hierarchically challenged global program? In its Phase 1 Report on the *World Bank's Approach to Global Programs* (2002), OED recommended designating responsibility to an appropriately staffed and mandated secretariat linked to a Managing Director or existing VPU. The secretariat would have two interacting units: (1) a think tank to monitor and anticipate changes and emerging opportunities in the global environment for global programs, draw partnership implications for the Bank, and provide intellectual leadership, and (2) a separate operational unit to provide oversight of internal management of global programs and ensure that the Bank has a coherent strategy across networks for global programs such as the CGIAR. The challenges inherent in the Bank's relationship with the CGIAR reinforce the OED conclusion contained in its Phase 1 report of the Bank's involvement in global programs that the level of strategic coherence required in this area could only be achieved if responsibility for it were assigned to a single senior Bank manager to coordinate activities on a Bank-wide basis and to ensure selectivity and quality. Without the intellectual capital, the oversight function will be a bureaucratic hurdle (a concern some have expressed in the course of discussion of the recommendations of the Phase 1 Global Review). Without the hierarchical clout, it will be dismissed. Hence the oversight of the CGIAR, as indeed of other global programs supported by the Bank, should therefore be considered in the context of the larger Bank management response to the strategic and programmatic management of the Bank's global portfolio.[287]

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286. Steps have been taken to formally outline roles and responsibilities of various units within the CGIAR, a laudable development. The CGIAR endorsed rules of procedure for the Executive Council, and a working group has proposed rules of procedure for the Science Council. The System Office Business Plan, which is under development, likewise brings clarity to the purposes and activities of its component units, as does the CGIAR's informal paper on "Committees and Units of the CGIAR." Such clarity is a prerequisite to establishing a written charter, but not a substitute for a charter. Yet the idea of crafting a charter has been under discussion in the context of the TSR's recommendation to establish the CGIAR as a legal entity, although the latter idea was rejected by the membership.

287. Based on OED's recommendations in "The Bank's Approach to Global Programs: An Independent Evaluation, Phase 1 Report," 2002, Bank Management is in the process of instituting reforms in the oversight and management of its global programs. These will help establish Bank-wide strategies and priorities, increase independent oversight and accountability, increase the voice of developing countries in global program governance and management, improve linkages to the Bank's country operations, increase routine quality assurance, monitoring, independent evaluation and follow up, and strengthen Bank Executive Board and partner inputs.

ENHANCING THE BANK'S ROLE AS A DEVELOPMENT PARTNER

11.29 Linkages between the CGIAR and the Bank's agricultural development strategies were strong when the CGIAR was established, especially in Asia. Although the CGIAR Secretariat is located in the Bank, the Third System Review recommended that the cosponsoring agencies should strengthen their programmatic linkages with the CGIAR in various forms: linkages with the CGIAR through Bank country assistance loans; interaction among Bank and CGIAR/Center staff (for example, through Bank staff serving on review panels or Center boards, or Center staff providing input to Bank activities such as ESW or country assistance strategies); and institutional-level discourse on issues of common interest. Indeed many of these currently take place. For example, about 20 Bank staff are former employees of various Centers and several Bank staff serve on CGIAR Center boards, and in the conduct of EPMRs and other thematic reviews.

11.30 But operationally, at the level of Bank policy dialogue and lending to agriculture or agricultural research, there has been little impact. ARD and the CGIAR are currently putting together an inventory of the programmatic linkages between the Bank's lending to agricultural research and the CGIAR. The meta-evaluation team's interviews of Bank staff confirm the conclusions of the previous OED review of the CGIAR that "the Bank, for all its virtues with respect to the CGIAR, has been less than fully effective in building links between its own programs in agriculture and natural resources, particularly loans for agricultural research, and the CGIAR Centers."[288] After reaching a peak in the 1986-88 period, when it represented more than 25 percent of the Bank's new commitments, Bank agricultural lending has declined precipitously (Figure 10.1).

11.31 New commitments in agricultural research and extension peaked somewhat later at $665.7 million in 1992.[289] Commitments to agricultural research and extension have approached this amount only once since — $420.1 million in 1998 — due to the approval of a large agricultural research project to India (for $196.8 million) in that year. Sub-Saharan Africa and Latin America & the Caribbean have been significant parts of this lending, accounting for 24.9 percent and 24.0 percent, respectively, of new commitments in agricultural research and extension since 1971. South Asia and East Asia & the Pacific have accounted for 19.7 percent and 18.4 percent respectively (Figure 10.2).

11.32 With respect to quality, the OED outcome ratings on 57 projects completed by 2001 have been below the Bank-wide average — only two-thirds (38 out of 57) were rated satisfactory. Only 18 out of 57 were rated as likely with regard to sustainability, 19 as uncertain, 15 as unlikely, and 5 not rated. The lack of a sufficient treatment of agricultural development in the country assistance strategies, and the decline in Bank lending to agriculture led to an intense and healthy debate in the context of the preparation of the new rural development strategy between management and the Bank's executive directors. While eschewing rigid lending targets, it was agreed that it was appropriate to analyze lending patterns and trends as indicators of the Bank's role, impact, and responsiveness to country demand under the new strategy. A businesslike monitoring system is being set up to ensure effective oversight of the strategy and regular reporting to the Board about progress.

11.33 The Bank's role, impact, and responsiveness to country demands cannot be isolated from the policies pursued by developing countries themselves. The Bank has cut back lending to agricultural research partly because most countries have not been committed to the reforms needed to make effective use of the funds: putting more resources into public research organizations in many

288. Anderson and Dalrymple 1999.

289. This includes only those projects that have been coded as agricultural research in the Bank's coding system. In recent years, agricultural research has been more often supported as a component of larger multi-component loans.

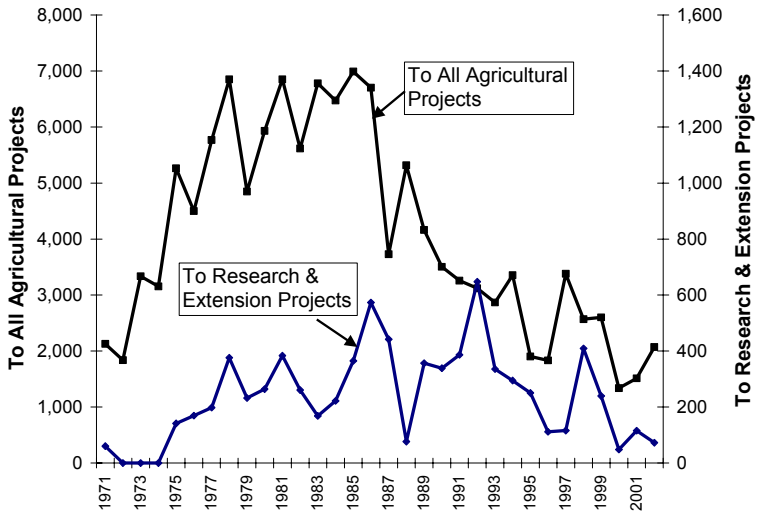
countries is just postponing their demise. Today, more attention is being given to sector work and policy dialogue to open up options for support to research.[290] The Bank's Rural Strategy identifies agricultural research as a high priority. However, OED agrees with ARD research staff that in a demand-led Bank, the task of convincing policymakers in developing countries of the importance of agricultural research and agricultural development must come from the regional vice presidents and country directors, as was the case in India in the 1960s and 1970s.

11.34 How should the Bank develop a vision, strategy, management, and staff incentives for an improved approach to agricultural development and greater linkages between it and the CGIAR? And what does experience tell us about what is needed to convert the vision into action?

11.35 A better approach than the alternatives of lending targets or monitoring of effort as the new rural development strategy proposes is the one pursued in India in the 1970s between the CGIAR, the Bank, and the other major donors, at that time chiefly the United States, namely recognizing the distinction between country demand for Bank borrowing and county needs, since the two do not always coincide. Under McNamara's leadership, the Bank, working jointly with donors, particularly USAID and the CGIAR, played a major role in bridging this gap between wants and needs and lending substantial resources for investment in irrigation research, seed production and distribution, agricultural credit, and price support programs. Similar efforts did not work in Africa.[291]

11.36 Poor-performing loans in the agricultural and rural sector have discouraged the Bank from investing in this sector. The concurrent shift to a demand-driven Bank and the role of the governments known for their urban bias, combined with the controversies surrounding investments in dams, the safeguard issues related to the treatment of minorities, and not least important, the wholesale questioning of the roles of the public sector — even when markets for inputs are altogether absent — has not helped. For example, fertilizer consumption in Nigeria has dropped from 450,000 tons in 1993-94 to 100,000 tons in 1999-00.[292]

Figure 10.1. Bank Lending to Agriculture Declined Dramatically in the 1990s



Source: OED data.

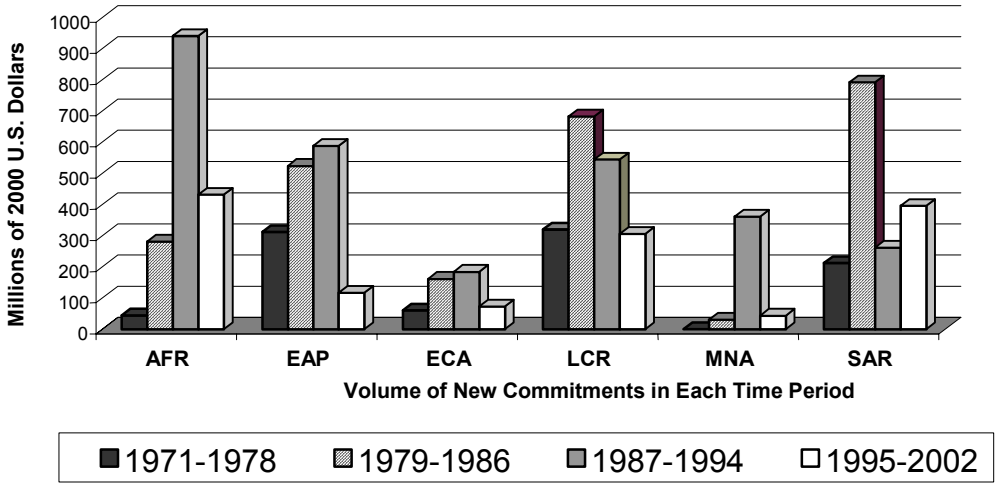
11.37 Poverty reduction strategies (PRSPs) need to recognize the fundamental importance of agriculture and rural development in countries where most of the employment, exports, GDP, and food comes from agriculture. But country directors and regional vice

290. Regional workshops in Latin American and Caribbean region and Europe and Central Asia region were conducted in 2001, while a workshop for South Asia region is slated for 2002, and Sub-Saharan Africa region is conducting a major subsectoral strategy on agricultural research. Communication from Derek Byerlee.

291. See Lele and Goldsmith 1989 and Lele 1994.

292. See Chapter 8.

Figure 10.2. World Bank Lending to Agricultural Research and Extension, 1971-2002



presidents are not convinced of the central importance of agriculture and rural development. Hence, more visible, quick-yielding, and politically popular investments in education, community-driven development, and the like receive priority. Ismail Serageldin's public announcements in 1994, committing the Bank to lend $500 million annually to agricultural research for the following five years,[293] worked only in Brazil, India, and later in China mainly because these countries were convinced of the importance of borrowing from the Bank for agricultural research. Working with Bank staff, they persuaded the Bank's country operations to get engaged. Given the dramatically changing global environment, they seemed to be aware of the need for reforms in their own research systems.[294] Regrettably, few developing countries have such a long-term and strategic view of development.

11.38 The Bank's regional departments need but do not have the commitment, the budgets, or the qualified and experienced staff in the agricultural sector to develop and make a convincing case to the governments of the importance of investment in agricultural research and development. The situation is no different in ESSD — the Bank having lost 60 of its 140 technical staff in the agricultural sector. The number of Bank staff with experience in agricultural research and technology issues, including ex-CGIAR staff, is declining very rapidly due to retirements. Most regions lack capacity to lead dialogue on agricultural research and related policy and agricultural development issues. The situation is especially serious in Africa.[295] Although the Bank is hiring local staff, it lacks the international staff with the requisite global experience in agricultural research and development. The situation is expected to get worse with more retirements. ARD's new rural strategy and the rural sector board's staffing plans do not sufficiently address this issue. Without qualified, internationally respected staff

293. Serageldin 1996b, p. 8.

294. The idea of using part of the proceeds of Bank loans to make a country's annual contribution to the CGIAR was explored in a loan to Brazil in 1997. Other developing countries have been reluctant to borrow IBRD or IDA funds for this purpose, however, though they may be more willing to do so now that their participation in the governance of the CGIAR is likely to increase.

295. From time to time the Bank has mentioned the idea of using a portion of the CGIAR funds for project preparation as a way of boosting Bank investments, for example in a recent discussion in Nigeria. The ESSD leadership regrets that this idea was put forth and will ensure that funds are not used in this manner. OED contends that this would violate the subsidiarity principle. CGIAR funds should not be used to develop the Bank's lending program. The budget for it must come from its own administrative sources.

with the necessary technical knowledge and operational experience the Bank cannot expect to provide leadership in agricultural research and development.

11.39 In short, the Bank needs to re-equip itself to provide the needed leadership to the CGIAR that it has historically provided. Given the rapidly changing external and internal environment for the CGIAR and its global importance in contributing to sustainable development, the Bank needs to deal effectively with the challenges facing the CGIAR in terms of its governance, financing, and management.

12. Conclusions

SCIENCE AND STRATEGY

12.1 **The CGIAR's productivity-enhancing research has had sizeable impacts on reducing poverty.** Its research in germplasm improvement and related areas of natural resource management (such as integrated pest management) has made important contributions to agricultural productivity and poverty reduction. This type of research is a global or regional public good whose production is ideally suited to a publicly funded global or regional network. The research benefits the poor directly through increased production of subsistence foods, employment, and income generation, and indirectly through reduced prices for food-deficit households. The research also generates positive environmental impacts such as large savings in land used, increased production possibilities on resource-poor lands, and improved strategies for the use of water, soils, and pesticides.

12.2 **But the CGIAR is less focused than it used to be; its current mix of activities reflects neither its comparative advantage nor its core competence.** Its research expenditures on *increasing productivity* have declined by 6.5 percent annually in real terms since 1992, while those for *policy research* and on *protecting the environment* (largely related to NRM) have increased by 3.1 percent over the same period. Both policy and NRM research are inherently different in character from germplasm improvement research. To be relevant, effective, fine-tuned, and have impact, policy research on constraints to technology adoption in developing countries should be conducted close to the developing countries whose policy environments are the subject of the research. Most NRM research must also be conducted in situ. The CGIAR's policy research will yield higher returns if it addresses commonly observed policy failures in developing countries while helping to build the capacity of developing country NARS to conduct their own country-specific policy research. The comparative advantage of a global research system in NRM research lies in bringing to bear advanced multi-disciplinary methods and processes that developing countries do not possess, and in conducting research with the potential for wide applicability.

12.3 **A complex combination of factors explains the changing research mix.** First, germplasm improvement and associated biological research has been unpopular in the constituencies of some key donors because of negative perceptions of the Green Revolution — that it made the rich richer and the poor poorer and caused environmental damage. Second, the CGIAR has correctly responded to the genuine second-generation environmental pressures on soils and water created by the radical change in farming systems during the Green Revolution — where research continues to be needed. Third, the rise of environmentalism, the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, and growing environmental advocacy in donor countries led to growing demands on the CGIAR to respond to environmental concerns. Fourth, the failure of governments of developing countries and their donor supporters alike to make the necessary investments in developing countries' own research, education, and development systems limited their ability to adapt CGIAR technologies to their own farming systems. This led CGIAR donors to turn to the Centers to

fill the national and local public goods gaps. Fifth, the biotechnology revolution, the emergence of intellectual property rights issues, and the associated rapid increase in private sector investments have challenged some CGIAR donor constituencies. Thus, to avoid controversy among Centers and within its membership, which makes decision by consensus, the CGIAR leadership has not explored the full implications of the biotechnology revolution for the System — a response reinforced by the autonomy of the 16 Centers.

12.4 Three changes in the funding processes of the CGIAR since the mid-1990s have also increased the influence of individual donors (and their domestic constituencies) on the research expenditures of the CGIAR. First, in response to a funding crisis in 1993-94, the Bank changed the allocation of its own financial contribution from a "donor of last resort" model to a matching grant model. Under the former, the Bank's contribution was used to fill gaps between the System's research priorities as articulated by the TAC and the financial contributions to those priorities by other donors. Under the matching grant model, the Bank's contribution indiscriminately matches funding from other donors, whether in support of System-wide priorities or not. Second, to create incentives for Centers to mobilize additional funding and to accommodate donors, the CGIAR expanded the definition of its "agreed research agenda" to include both the former "core" agenda (largely the high-return global and regional public goods research) and the "non-core" agenda (donor-funded, mostly downstream activities that TAC did not consider as high a priority). Third, donors have collectively increased their degree of restricted funding from 36 percent of total funding in 1992 to 57 percent in 2001, with most of the increase in restricted funding occurring since 1998.

12.5 **CGIAR funding has not kept up with the System's broader mission.** Overall CGIAR funding has stagnated in nominal terms, declined in real terms, and become increasingly restricted over the past decade. Overall contributions grew at an average annual rate of 0.7 percent in nominal terms and declined by 1.8 percent per year in real terms between 1992 and 2001. Therefore, it appears that the increased expenditures on policy and NRM research have come at the cost of germplasm conservation and improvement. However, it is also possible that, due to the principles of donor sovereignty and Center autonomy under which the CGIAR operates, germplasm research would not have received the funding provided to policy and NRM research.

12.6 **Strong NARS are critical to ensure the CGIAR's impacts.** The CGIAR's impacts result from the joint outputs of CGIAR Centers and NARS in developing countries. The NARS generate location-specific technologies and are essential for testing, adapting, and disseminating the products of CGIAR research. Yet the rate of growth of investments, which would enable NARS to undertake such research and which was quite rapid until the mid-1980s, has slowed for well over 15 years, and has even become negative in Africa.

12.7 The meta-evaluation has identified three important issues with regard to the NARS. First, in some regions of the world, most notably Africa, under-investment in NARS has adversely affected their strength and capacity. This weakness has been compounded by economy-wide and sector-level policy and institutional failures that inhibit the development of rural infrastructure, input delivery systems, and output markets. Therefore, technology adoption has not been accompanied by effective delivery of services and increases in productivity and incomes. This failure has led the CGIAR to conduct, adapt, and disseminate research, extension, and information at the national level.

12.8 Second, the CGIAR has not kept pace with the changing and highly divergent needs of NARS. Large and small NARS alike acknowledge that the CGIAR has made major contributions to their growth. But the capacity of NARS in large and middle-income developing countries now substantially exceeds that of the CGIAR. NARS argue that the CGIAR has not kept pace with their increasingly complex needs and does not consider them equal partners. They lament the decline in

research collaboration and the limited efforts of the CGIAR to draw on their expertise and experience to build capacity in smaller, less-advanced NARS. Smaller and weaker NARS are concerned that the CGIAR's training and collaborative research have not kept up with their emerging needs. Both the large and small NARS consulted by the meta-evaluation expressed interest in the large NARS working with the smaller NARS, since their agro-ecologies and development conditions are often similar to each other. Capacity building efforts of the NARS under the CGIAR umbrella could be substantially augmented, based on clear business-like agreements and international financial support for such south-south cooperation.

12.9 Third, the CGIAR faces structural issues in Africa. Eighty percent of Africa's agricultural researchers are concentrated in 13 large countries. The other 30 plus small countries face diseconomies of scale in organizing and managing their own agricultural research and lack the capacity to negotiate with the 16 CGIAR Centers. This highlights the importance of relying on subregional research organizations in Africa if the African agricultural productivity challenge is to be addressed. Many argue convincingly that Africa's excessive donor dependence has reduced the incentive for countries to invest in their own institutions, create domestic constituencies for research, and ensure long-term stability and national priorities. They believe that recent proposals (by Canada, the EU, the World Bank, and the Challenge Program on Sub-Saharan Africa) to increase donor support to the region may waste resources without providing high priority long-term research of regional significance and without creating long-term domestic capacity and a political or professional constituency for research. The overall approach to improving agricultural productivity and reducing poverty in Africa, including the role of the CGIAR, requires fundamental collective rethinking.

12.10 **The CGIAR faces a number of new challenges and opportunities.** These include (1) the growth of modern biotechnology and bioinformatics, (2) effective genetic resource conservation and management of the CGIAR's 600,000 accessions of genetic material, (3) the growing importance of intellectual property rights in agricultural research, and (4) the growth of private agricultural research. Responding to these challenges requires a System-level approach (a) to develop a System-level policy and strategy on intellectual property and public-private partnerships so the CGIAR can speak with one voice and become a powerful force in international negotiations, and (b) to forge active partnerships with the private sector, universities of advanced countries, and the national systems of developing countries.

12.11 **The CGIAR is responding but slowly.** To maintain its genetic material, it has worked with the SDC and FAO to establish the Global Conservation Trust and helped launch a fund-raising effort. The prospects for raising the conservatively estimated $260 million endowment — the interest on which would support the gene banks — are unclear at this stage. By November 2002, commitments of $60 million had been obtained. These steps are appropriate, but are unlikely to be sufficient. The mandate of the System-wide Genetic Resources Program (SGRP) applies only to the Centers fulfilling their obligations under the FAO agreement, and does not extend to the program on the conservation, management, and enhancement of genetic resources, which is the responsibility of individual Centers.

12.12 **The CGIAR lacks a System-level strategy for public-private partnerships.** It needs to mobilize the best *practical* System-level expertise in global public policy, law, and ethics; and develop, monitor, and report regularly on effective partnership arrangements to the System as a whole, while actively developing strategies and policies that advance its poverty alleviation mission. It needs to document and learn concrete lessons from its own experience on public-private partnerships and management of IPRs at the System level. Regaining focus requires bold reforms not only in the CGIAR System but also in shaping the environment in which the CGIAR operates. With a *System-level* policy framework that provides authoritative, transparent, and accountable *System-level* responses to the changing technological and institutional environment, the CGIAR would be a

powerful force in global negotiations backing the interests of developing countries. In its response to the 2001 International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR), the CGIAR showed that it can a develop an appropriate System-level response. But Center autonomy and System-level governance weaknesses have prevented the CGIAR from addressing other challenges.

12.13 **The System is being pulled in two opposite directions.** On one hand, the CGIAR Centers are not conducting sufficiently coordinated research on the *highly decentralized nature* of NRM research, which calls for effective partnerships with NARS to produce regional and national public goods in NRM. On the other hand, the System is *not sufficiently centralized* to deal with advances in the biological sciences and IPRs, which call for a more unified approach to research strategies and policies.

GOVERNANCE, ORGANIZATION, FINANCE, AND MANAGEMENT

12.14 **The CGIAR's founding principles are unsuited to ensuring poverty impacts in a changed environment.** The six founding principles that underlie the CGIAR — donor sovereignty, Center autonomy, consensus decision-making, independent technical advice, informal status of the System, and non-political nature — were adopted when the System consisted of fewer Centers and less diverse constituents, and setting priorities to achieve poverty impact (through its governance, management, and financing processes) was relatively simple. But in today's more politically driven authorizing environment, and with a wider research agenda and expanding membership, the CGIAR's ability to address its mission is now undermined by these six founding principles that exacerbate the System's collective action problem. In particular, unlike more recent global programs, such as the Global Environment Facility or the Global Fund for AIDS, TB, and Malaria, the CGIAR System has no formal or legal persona, or written charter, or even a memorandum of understanding. The only legal entities in the CGIAR are the 16 Centers. Because a considerable superstructure of committees has evolved over the years to deal with a complex set of stakeholders, responsibilities and accountabilities are not well defined. Greater responsibility for managing the overall System has accrued by default over time to the World Bank and the CGIAR Secretariat.

12.15 **Collective action problems are daunting.** The mid-1990s "Renewal" demonstrates how changing the funding rules can have unintended consequences. The "corporate" model recommended by the Third System Review (TSR) to formalize decision-making, transparency, and accountability was rejected for being "top-down" and contrary to the CGIAR's founding principles. A subsequent "Federation proposal" by the CGIAR board chairs and Center directors was opposed because it was "bottom up" and would have increased Center control at the expense of donors and the CGIAR Secretariat. But, while the last two proposals differed in the degree of decentralization, both acknowledged the need for a legal entity with a centralized board to enable System-level responses.

12.16 **Consolidation is needed but resisted.** Since 1994, stakeholders, scientific committees of TAC, and the CGIAR's own internal reviews have proposed many types of consolidation. A large majority (79 percent) of CGIAR stakeholders surveyed by OED agree that consolidating the number and functions of Centers is advisable. African countries as a group have called for consolidation to reduce the transaction costs of dealing with 16 Centers. And the CGIAR has some successful examples of consolidation, which in the livestock sector have positioned the CGIAR to address global issues. Yet, individual countries that host Centers oppose consolidation — as do donors, Center chairs and boards, scientists, and Center directors of "their" Centers. Getting key stakeholders to agree that the time has come for both real reform and organizational change remains a major challenge.

12.17 The current CGIAR Chairman, Ian Johnson, initiated a Change Design and Management Process in 2000 to effect key reforms. As a result of widespread stakeholder consultations, some members and observers feel that there has been greater ownership of both the process and the outcomes

of the current reform process compared to the Third System Review (TSR) in 1998. Given the historical difficulty of achieving change in the System, the reforms are significant, but they do not go far enough.

12.18 **The Chairman gets high marks for establishing the long-overdue Executive Council (ExCo).** ExCo members and others interviewed by the meta-evaluation team at the Annual General Meetings in 2001 and 2002 are optimistic that this is a step in the right direction, but they are reserving judgment until they see how ExCo operates. The fundamental challenge is to appropriately balance legitimacy and efficiency. That ExCo is a stakeholder committee rather a shareholder committee enhances its legitimacy. But, while ExCo members are selected through caucuses of stakeholder groups and can only make decisions on matters delegated to them by the membership, they are not formally accountable to those groups or obliged to solicit the views of their "constituent groups" before decisions are made. In addition, certain factors limit the effectiveness and extent of developing country membership. OED concurs with the proposal that the TSR had made for an executive committee with formally elected members that are accountable to the particular groups they represent.

12.19 **The System Office has promise, although it is a work in progress.** The System Office links 10 independent units in order to increase their coordination and ability to serve the Centers and membership. Issues of authority, responsibility, and accountability between the CGIAR Secretariat (which is the coordinating unit), the Centers, and other units are still being sorted out. Monitoring is required of the System Office's functions, resources, responsibilities, accountabilities, and performance through routine evaluations to ensure its effectiveness in serving the members and clients. Having lost the momentum on divesting certain Center responsibilities to the System level — as proposed in the Center directors' Federation proposal — there is a concern that the System Office may be adding to the duplication of services already performed at the Center level.

12.20 **The transformation of the Technical Advisory Committee (TAC) into a Science Council (SC) raises many questions.** OED is not convinced that the transformation of TAC into a Science Council will achieve the desired objective of ensuring "that the science practiced in the System meets world class standards" for a number of reasons. First, this transformation is taking place without the TAC having been evaluated while major decisions on resource allocations are being made. Second, relative to TAC, the Science Council's role is greatly diminished. It is expected to focus mainly on science quality; to have a more limited (if any) role in priority setting, medium-term planning, and monitoring resource allocation; and to play no role in the annual financial planning process. Third, FAO has indicated to the meta-evaluation team that it is not being adequately consulted about the role of the Science Council. Fourth, the roles and responsibilities of the Science Council vis-à-vis the Challenge Programs and the new and emerging Finance and Program Committees are unclear, particularly as the permanent Science Council is not in place while major decisions on Challenge Programs are being made. Fifth, Science Council members need to be independent and objective, and their findings need to be shared with the full membership when they are transmitted to ExCo. Yet the Working Group on the Science Council has not determined the time and financial resources needed, or the remuneration arrangements for the Science Council members and its chair.

12.21 **The Challenge Programs (CPs) are not addressing issues of System-level funding, priority setting, science quality, and governance.** The CPs are intended to be high-visibility, time-bound partnerships that will address complex issues of global or regional significance, increase the scope for inter-Center collaboration, facilitate a wider range of partnerships, tap new sources of funding from current and new donors, and improve output accountability. They have also been viewed as a way of addressing consolidation indirectly by building new programs and partnerships while, in the words of some interviewees, letting the weak Centers and programs "die on the vine" rather than face politically unpopular consolidation. Their design was also to address three important shortcomings that have plagued previous thematic and eco-regional System-wide programs:

insufficient funding, poorly defined timelines, and a lack of adequate governance and management. In October 2002, after a year-long review process, involving both the interim Science Council and ExCo, the Annual General Meeting approved the implementation of the first two pilot CPs: "Water and Food" and "Biofortified Crops for Improved Human Nutrition." While passing scientific review, these two pilot programs do not address the three shortcomings of thematic and ecoregional programs (funding, timelines, and governance) noted above.

12.22 OED believes that, properly developed, the CPs could enhance the CGIAR's effectiveness and impact. One of their strong and positive features is that they are helping to open up the System by promising to allocate substantial resources to advanced research institutions and the NARS of developing countries. Yet, only one-third of stakeholders surveyed by OED believe the CPs are sufficient to open up the CGIAR, to produce the best science, or to achieve consolidation. OED's interviews with CGIAR members reveal much ambiguity and confusion about the CPs and a range of concerns about their development including (1) proposed levels of funding that are far larger than originally understood, (2) a lack of strategic priorities, (3) inadequate procedures for ensuring science quality, (4) the ad hoc nature of the governance and management arrangements, and (5) a lack of clarity as to how the CPs will address the key global public policy issues associated with public-private partnerships and intellectual property rights identified in this report.

THE ROLE OF THE WORLD BANK

12.23 **The World Bank has played multiple roles in the CGIAR** — as convener (founder and cosponsor), as donor to the System, and as a lender to developing countries for complementary activities. As a result of its multiple roles, the Bank has been described to OED as the indispensable guardian of the CGIAR, and as the "glue" that makes the System coherent and larger than the sum of 16 research Centers. The Bank's leadership role, its financial contributions, and its operational support are viewed by other donors as a seal of approval, giving them the confidence to continue to invest in the System.

12.24 But, while the Bank's unique contribution to the CGIAR has been widely acknowledged, the multiplicity of roles it has assumed has led to (1) an excessive dependence of the System on the Bank, (2) a disproportionate share of management responsibility allocated to a senior manager already burdened by other heavy managerial responsibilities, and (3) reporting arrangements that are fraught with real or perceived conflicts of interest. These features limit the capacity of the Bank to provide the objectivity and leadership necessary for far-reaching reforms the CGIAR, and to allocate the Bank's financial contribution in a strategic way. As a result, the Bank has been more successful in using its convening power to raise additional resources for the System than to provide strategic leadership to the CGIAR.

12.25 **Conflicts of interest and inadequate oversight constrain the Bank's strategic leadership.** Many donors have indicated that they want the Bank to continue to chair the CGIAR, in part because they believe Bank and other donor funding will decrease if the chairmanship is moved outside the Bank. However, it is problematic for the Chairman to be both judge and advocate — to acknowledge the need for and to press for major reforms while also making the case for continued funding to the Bank and donors. Conflicting political pressures and the need to maintain political support for the System can come at the cost of the reforms in the System. Having a Chairman who is not at arm's length from the Bank compromises the Bank's ability to press for reforms on the scale or at a speed that might be warranted, and can increase its exposure and risks.

12.26 There is currently no effective independent oversight within the Bank of its involvement in the CGIAR (as is also the case for a number of other global programs), nor a mechanism to conduct,

assess, or follow up on System-level evaluations. The ESSD Vice President has, among other things, wide latitude to determine how the Bank's contribution will be spent, given a lack of guidance from managing directors or the DGF on how the DGF grant should be allocated. It is understandably difficult for the Rural Research Adviser to exert oversight over his own manager. Beyond sponsoring the CGIAR's annual application to the DGF, the Rural Sector Board has also played little role in monitoring the use of the funds from a strategic perspective, and is unlikely to have the will to displease its Chairman. Further, while the Bank used to conduct periodic financial audits of the CGIAR, the insightful 1995 audit was the last of its kind.

12.27 **Further reforms are needed.** The CGIAR is a unique instrument of international cooperation with a solid record of achievements. In the research and development continuum spanning from basic, strategic, applied, and adaptive research to technology transfer, the CGIAR has made its mark and demonstrated the genius of its framers. It has succeeded mostly because of: (a) its emphasis on strategic research of a global or regional public goods nature, the benefits of which spill across national boundaries and cannot easily be obtained through private, national, or regional research, and (b) its practical, problem-solving focus on bringing the best of known science to address the problem of food security.

12.28 However, the governance, management, and financing of the CGIAR have become increasingly cumbersome in recent years, and fundamental changes in them are called for. The improved skills available to developing countries and the opportunities opened up by the new information technologies have yet to be fully tapped. The CGIAR has operated in relative isolation without strong links to the private sector and developing country institutions. It has failed to keep up with the rapidly evolving technological and institutional environment. Its original science-based character has become more diffuse, and the role of the Bank has become increasingly ambiguous. It is time to make the CGIAR System leaner, more efficient, and more attuned to today's realities. The Change Design and Management Process is a good start, but the Bank should support an accelerated pace of reforms while re-examining its own roles and the conflicts between them. It is also time for donors (including the Bank) and developing countries to reverse the decline in their complementary investments in agricultural research and extension at the national level, without which, reforms in the CGIAR alone will not achieve results on the ground.

12.29 The Bank should fully exercise its leadership role, if necessary by convening the best external expertise to bring about additional reforms in the System. *If additional reforms are achieved, there is a strong argument for increased funding* for the CGIAR, including exploring the use of grants for the provision of regional public goods, and eventually global public goods, that reduce poverty.

12.30 OED also concludes, based on the evidence the meta-evaluation team has assembled, that the rapidly growing but under-evaluated areas of policy and NRM research, and the CGIAR's capacity building activities would benefit from an independent impact evaluation. Yet it would be more appropriate to conduct such an evaluation after the more fundamental, longer-term issues related to System-level strategy, governance, organization, management, and finance identified in this report are fully vetted.

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