From: The Secretariat

April 21, 1994
MT/94/09

Mid-Term Meeting, May 23-27, 1994
New Delhi, India

Feeding 10 Billion People in 2050
The Key Role of the CGIAR's International Agricultural Research Centers

The attached report entitled "Feeding 10 Billion People in 2050. The Key Role of the CGIAR's International Agricultural Research Center" has been prepared by the Action Group on Food Security chaired by Ambassador Robert O. Blake. The Action Group was established shortly after ICW93, to assess the continuing role of international agricultural research and formulate strategies for obtaining the funds required to sustain research.

At the Mid-Term Meeting, members of the CGIAR will have the opportunity to discuss the report and its recommendations.

Attachment

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FEEDING 10 BILLION PEOPLE IN 2050

The Key Role of the CGIAR's International Agricultural Research Centers

A Report by the Action Group on Food Security

April 20, 1994

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ACTION GROUP ON FOOD SECURITY - APRIL 20, 1994
I. INTRODUCTION

1. Without question, the international community must give a higher priority to providing strong and stable support for international agricultural research aimed at increasing food productivity and protecting the environment. At this time, a major vehicle for such efforts must be the continuation and strengthening of the international agricultural research centers operating under the aegis of the Consultative Group on International Agricultural Research (CGIAR). Without stronger support for international agricultural research, a growing number of developing countries -- and a growing number of poor within those countries -- may face increasingly serious food shortages as early as the first decades of the next century, and these problems will certainly occur in later decades. If such widespread hunger and damage to the environment are to be avoided, farmers of those countries must have access to, among other things, a steady stream of effective new technologies so they can raise their agricultural productivity and have cost-effective ways to manage their increasingly threatened stocks of soil and water. We believe that to meet this need effectively, the international centers of the CGIAR must play a major role, and that to do this they must receive more financial support than is presently forecast.

II. THE FOOD SITUATION TODAY

2. Over the past three decades, rates of increase in food production in developing countries as a whole have been satisfactory. Between 1960 and 1990, food production in developing countries outpaced population growth. But these overall gains mask five important issues:

   a) First, in some regions food production is falling. Between 1960 and 1990, the per capita output of food declined in Sub-Saharan Africa and the Middle East. Per capita output of food fell in 75 of the poorest countries of the world (most of which are in Africa, though several are in heavily populated Asia).

   b) Second, as the inevitable companion of poverty, undernutrition persists throughout the developing world. Recent FAO-WHO estimates show that around 700 million people -- nearly one-fifth of the population of developing countries -- are undernourished. While the proportion of Asians who are undernourished has decreased, the absolute numbers are high and rising: in all, some 500 million people can't satisfy their basic caloric needs. One-third of all Africans -- close to 170 million people -- have inadequate diets.
c) Third, past rates of increase in food production in the developing countries may be slowing down. Per capita output of cereals, the major foodstuff produced in developing countries, declined between the mid-1980s and 1993. Annual increases in yields of rice and wheat have been slowing down in some of Asia's most productive areas where there has been sustained, intensive production.

d) Fourth, the natural resource base is steadily deteriorating. Though difficult to quantify, salinization, soil erosion, and the loss of top soil are reducing productive capacity in a number of tropical countries and, unless checked, will reduce this capacity still further — often irreversibly.

e) Fifth, the international agricultural research system is eroding. The number of international research personnel in the major CGIAR centers — organizations that were the foundation of the Green Revolution and that are essential to the further technological advances needed to support sustainable food production in the decades ahead — has been reduced by over one-third since 1989 because financial support has declined.

3. Today, achieving and maintaining food security in the developing world is a larger and more urgent task, requiring stronger emphasis on agricultural development and better management of natural resources. Most of the hungry and malnourished live in rural areas and need to produce more food for themselves. In addition, in predominantly agrarian societies agricultural development is the principal engine of national growth; if agriculture falters in such societies, the entire economy stagnates.

III. FUTURE FOOD REQUIREMENTS

4. The volume of food produced must increase enormously to meet demands in the next century. According to World Bank projections, the world's population is expected to rise by an average of 90 million people a year up to 2050 (making total population 5.5 billion in 1994; 8.5 billion in 2025; and 10 billion by 2050). Of this annual 90-million increase, 86 million a year will be born in developing countries (making total population in these nations 4.2 billion in 1994; 7.0 billion in 2025; and 8.7 billion by 2050). The largest absolute increases are expected in Asia, where populations are likely to grow by nearly 50 million a year to 2025, bringing the region's population to around 4.9 billion. The Asian population will then rise by a further 33 million a year to reach 5.7 billion by 2050. The steepest increases will be in Sub-Saharan Africa, where the region's population is expected to grow by an average of 25 million a year up to 2050 (making total population 490 million in 1990; 1.38 billion in 2025; and 2.064 billion in 2050).
5. In theory, the aggregate supply of food produced in developing countries is now
great enough to provide an austere, largely vegetarian diet to satisfy the basic caloric
requirements of everyone in those countries. But in practice, not all food produced is for
direct human consumption, and it is not distributed equally among the population at
large. Even if it were, future food supply would still have to increase at the same rate as
population growth to meet all people's basic caloric needs. If current trends in domestic
production and consumption don't change, an additional 400 million tons of grain -- a 20-
percent increase above projected production by 2025 -- will be needed to cover the
"hidden hunger" of the poor in the developing countries, according to estimates from the
International Food Policy Research Institute. Most of the hungry will continue to be in
South Asia and Sub-Saharan Africa.

6. Realistically, the demand for food will grow as population increases and
projected rises in per capita incomes spawn new consumption patterns. A steady
increase is expected in demand for staple foods among the poor in Asia and Africa,
whose numbers will probably grow from around 700 million today to well over a billion
by 2025, and whose incomes will remain very modest. Demand for wheat is expected to
grow more rapidly than for rice as people leave the country for the city and their eating
habits change. The sharpest increases in demand, however, are expected to be for meat
and meat-related products as many millions cross income thresholds that enable them to
afford these foods. Consequently, the derived demand for grains used as animal feed will
increase substantially as well.

7. In sum, the demand for food in the developing countries is projected to more
than double by 2025 and then to rise by at least a further 50 percent by 2050. By 2025,
the increase in demand for grain in the developing countries is expected to equal more
than three times the size of the current U.S. harvest. By 2050, the increase in demand is
expected to equal five times the size of the current harvest in the U.S. (which
approached 310 million tons in 1990 and accounts for nearly one-fifth of global output).
The projected increase in demand for rice -- more than 95 percent of which is produced
and consumed in developing countries, mostly in Asia -- is especially significant. By 2025,
the annual demand for rice in developing countries (currently 350 million tons) is
expected to increase to more than 700 million tons (two-and-one-half times the 1990 rice
production of China, by far the world's largest producer), and by around five times that
amount by 2050. Along with projected increases in demand for grains, substantial
increases are expected in demand for potatoes, cassava, pulses, and other crops that
account for around 40 percent of total food consumption in developing countries.

8. This increased demand for food can be met by domestic production, imports
(including food aid), or both. Food aid (currently around 15 million tons of foodstuffs
annually) is unlikely to augment domestic supplies appreciably except to relieve human suffering during emergencies. Imports of food, mostly grains, have risen rapidly over the past decade and currently represent around nine percent of total grain consumption in developing countries. However, any rapid and continuing increase of food imports would divert scarce foreign exchange needed to meet other national priorities. Most developing countries will thus have to continue to provide the bulk of their national food supply themselves.

9. Given current trends and the certain need for substantially more food in the next century, the recent downward spiral of aid for agricultural development is self-defeating, even perilous. In our view, steps must be taken now to begin increasing sustainable food production in developing countries, especially in Sub-Saharan Africa and South Asia. The long lead time between the initiation of research and the application of results only compounds this urgency, as does evidence that agricultural growth may be less rapid in the future than it has been in the past.

IV. THE RESEARCH NEEDED TO MEET FUTURE FOOD REQUIREMENTS

10. Over the past thirty years, "Green Revolution" technology has dramatically changed the source of food-production increases in many developing countries. Before 1960, most increases resulted from expanding acreage under cultivation. Between 1960-1990, however, at least 80 percent of the 110-percent increase in cereal production came from raising yields per acre. These stunning increases in yields were largely the product of the development and spread of improved varieties of cereals, a 70-percent expansion of irrigation (from 100 to 170 million hectares), and more than tripling chemical fertilizer use.

11. In the years ahead, increasing crop yields will continue to be the key to raising agricultural output. The most productive areas are already being farmed, and the scope for further expansion of acreage for cultivation is limited, particularly in Asia and the Middle East. In addition, increased competition for scarce water and the escalating costs of irrigation construction have already slowed the expansion of irrigated agriculture from two percent a year in 1960-70 to one percent in 1980-90, and growth like that of the 1960s appears highly improbable. (Irrigated lands currently account for 20 percent of all arable land, and irrigated agriculture provides about 60 percent of the rice and wheat produced in developing countries.)

12. Even if the area under irrigation increases (albeit slowly), average yields of food grains will have to more than double by 2025 if domestic production is to meet most
food needs in developing countries. Current technologies, however, may not be able to help farmers attain these yields on a sustainable basis; almost certainly, they can’t raise the average yields of most grains to the levels needed by 2050.

13. Raising productivity in the future will require a wide range of policies and programs to ensure that millions of farmers -- mostly smallholders -- have the means and incentives to adopt improvements. To this end, stable support for effective agricultural research is needed. A recent analysis of more than 100 studies of agricultural production shows a strong positive correlation among research, technological change at the farm level, and agricultural growth in Asian and Latin American countries. Studies undertaken by the InterAmerican Development Bank also confirm the substantial contribution that well-managed research makes to raising on-farm productivity, as well as the exceptionally high economic returns on investments in research -- especially in genetic research, the main thrust of the CGIAR centers. Where good leadership, dedicated scientists, good science, and adequate resources combine to make research a success, the economic returns on investment have been at least 30 percent per annum.

14. Priority research must from now on focus on increasing yields, bettering farm management, and improving natural resource management. The kinds of plant-breeding efforts that have already boosted the productivity of many crops deserve special emphasis because they can continue to enhance the yield capacity and stabilize production in the many environments where food crops are grown. Such research will have to aim at increasing yields of both major food crops and the hitherto "under-researched" crops (such as cassava and pulses, as well as sorghum and millet, the staple foods in semi-arid areas of Asia and Africa) that millions of subsistence farmers grow.

15. Increasing emphasis on biotechnology research will probably be required to sustain the desired growth in yields. Although some genetically altered insect- and disease-resistant varieties of food crops may be on the market within a decade, more basic research on growth processes and multiple gene manipulation will be required before biotechnology can fulfill its promise. Since it may take years for research to yield usable results, work on sustainable production of food crops grown in the tropics, especially foods grown and consumed by the poor, must begin now.

16. Research on how to fully exploit the yield potential of improved varieties also deserves more attention. Improving the efficiency of farming by better timing farm operations, developing more effective crop rotations, intercropping, and optimizing the use of fertilizers and pesticides and, where appropriate, irrigation water are all important to agricultural success. To be effective, these technical approaches must include a strong element of farmer participation.
17. Another need is to increase research on the processes of resource degradation and to develop technologies that slow or reverse these processes while improving productivity. The goal must be to combine agronomic and ecological principles in an analytical framework for improving agricultural efficiency while protecting the natural resource base and maintaining biodiversity.

18. Combined crop-management research and research aimed at improving the management of natural resources will help develop techniques for implementing environmentally benign food production strategies such as agroforestry, no-till farming, water harvesting, and integrated pest management. To buttress this research, further work is needed on raising the productivity of irrigation systems by using scarce water more efficiently and on integrating crop and livestock production (key to making the best use of available resources in many parts of Africa and Asia).

V. WHO WILL DO THE NEEDED RESEARCH?

19. In the early 1970s, most agricultural research was conducted in developed countries; private-sector research there produced machines, agrochemicals, vaccines, implements, and seeds used mostly by commercial farmers. To the extent that resources were allocated to crop production in developing countries, the emphasis was on high-value crops, usually for export, rather than on basic foodstuffs. Public-sector research in developed countries was directed mainly at commercial farmers in the temperate zones, whose needs differed greatly from those of small-scale food producers in the arid, semi-arid, and humid tropics. Consequently, the vast bulk of research in developed countries only tangentially benefitted food producers in developing countries. To a considerable degree, this remains true today.

20. With few exceptions, the national agricultural research systems in developing countries in the 1970s were weak and in no position to fulfill their mandates. Most lacked the political support, the financial means, and the scientific leadership to carry out the substantive research needed.

21. Over the past 20 years, investment in agricultural research on food production in developing countries increased, reaching roughly $4.5 billion in the mid-1980s. At the same time, seed companies have stepped up their research on such crops as hybrid maize. Donor agencies, especially the United States Agency for International Development (USAID), have funded a number of valuable cooperative programs between universities in developed countries and national agricultural research systems in
developing countries. Also, donor-assisted investment in expanding research capacity in developing countries has substantially increased. Large numbers of scientists have been trained and funds have been made available to build research facilities. Several national research systems in the larger developing countries are now well managed and have the capacity to undertake excellent research. However, many questions about the most effective ways to organize and manage national research systems in many parts of the world remain unanswered.

22. Despite weaknesses in the research systems of many developing countries, a complex, mutually supporting network of research institutions has evolved. This network includes the CGIAR centers, universities and other advanced research institutions in developed and developing countries, national agricultural research systems, and, in some instances, seed companies, agribusinesses, and nongovernmental organizations. Each element of this research network plays a vital role. Advanced research centers provide basic research on, for instance, biotechnology and plant nutrition. The CGIAR centers and organizations such as France’s Center for International Research and Agricultural Development (CIRAD), provide scientific leadership, training, and collaborative research with national agricultural research systems.

23. The relationships among these various research groups will continue to evolve, especially as some of the national agricultural research centers grow stronger and assume new responsibilities (as some are now doing). For the foreseeable future, however, there is no substitute for the CGIAR; no other body that can provide the scientific leadership (including research coordination), research of international significance, and training needed to continue developing the overall international research system, and, ultimately, to improve food security in the developing countries.

VI. THE CGIAR

24. The CGIAR was established in 1972 under the co-sponsorship of the World Bank, the United Nations Development Programme (UNDP), and the Food and Agriculture Organization (FAO) to finance and manage a network of International Agricultural Research Centers. It started with four centers, expanded to 13 by 1980 and to 18 in 1992. (See Table 1.) It now supports 17 centers, each with its own Board of

1 In addition to continued support for the CGIAR, USAID must continue to support the Collaborative Research Support Programs and other agricultural and related research and institution building efforts that are important complementary components of an overall strategy to increase food security in developing countries.

ACTION GROUP ON FOOD SECURITY - APRIL 20, 1994
Directors. The original mandate of the CGIAR centers was to undertake research to increase food production of a limited number of food crops in the tropics. Subsequently, its mandate was expanded to include research on additional food crops, as well as that on forestry and fisheries, strengthening national agricultural research systems in the developing countries, and improved management of natural resources.

25. The CGIAR has many strengths that stem from its international character. First, the system provides an apolitical consortium for large and small donors who wish to support international agricultural research. Second, the system has been able to recruit talented scientists from developed and developing countries, providing them with long-term security and the means to do problem-solving research in situ in different environments. Through the CGIAR, a critical mass of more than 1,000 senior scientists now works exclusively on international-level research to raise food production and to improve resource management in developing countries. Third, the CGIAR centers are able to develop research strategies that transcend national concerns and boundaries, so they are in a position to lead cooperative efforts to implement these strategies. Like no other institutions, the CGIAR centers can work closely with advanced research institutions in developed countries as well as with thousands of collaborating researchers in developing countries to test and evaluate new and improved plants and technologies. Thus, in many respects, CGIAR centers provide a bridge not only between "North" and "South," but also between "East" and "West," and they can focus efforts to deal with research topics of wide importance to developing countries.

26. The CGIAR centers have many accomplishments to their credit. These include generating a number of improved varieties of the major cereals and working with collaborating institutions to adapt these varieties for use in a wide range of environments. Overall production increases traceable to the introduction of these varieties are estimated to have provided enough food for more than one billion people. At the same time, the increased yields have reduced the pressure to expand cultivation into environmentally fragile areas.

27. The CGIAR centers have had success in collaborative breeding programs with national research systems on non-cereal crops, including potatoes, cassava and some legumes, although these programs have not had the same impact as the work on the major cereals. In addition, these centers have contributed importantly to crop-management research and have participated in several highly successful transnational integrated pest management programs. The CGIAR centers have also provided technical assistance that has helped to strengthen many national agricultural research systems. They have trained close to 50,000 research workers from all parts of the world, many of whom have assumed positions of responsibility in national agricultural research systems.
28. While the CGIAR can take credit for many successes, concerns remain. The system has expanded incrementally and opportunistically rather than as part of a well-conceived strategy with a clearly articulated mandate. The highly decentralized organization that was appropriate for a $20-million program is inadequate for a $250-million program: more responsive and responsible central management is clearly needed. Moreover, the current planning process, based on expectations of donor support that often exceed actual funding levels, compounds the instability of the system. (See Table 2.)

29. On the research front, the CGIAR has been criticized for not giving enough priority to applications of advances in biotechnology and entomology or to soil science, water management, and better management of the natural resources associated with agriculture. Also, some centers have not worked closely enough with farmers and local groups to ensure that research results are directly relevant and widely available to the end-users.

30. The CGIAR centers have begun to address these concerns and to respond to new trends. Although not all have made equal progress, an increasing number have begun to:

a) integrate natural resource management into their agricultural research agendas;

b) employ more social scientists and women to strengthen and diversify their staffs;

c) conserve genetic diversity by establishing and maintaining gene banks and promote it in the breeding of crop varieties, thus departing from an early focus on genetic standardization; and

d) increase their work with farmers.

More progress is needed. It should be noted, however, that as funding for the international centers shrinks, these new approaches are often the first to be cut.

VII. THE CGIAR'S FUNDING

31. The CGIAR's core funding rose from $20 million in 1972 to $229 million in 1993; in constant 1994 dollars, this represents growth from $79 million in 1972, when there were four centers, to $238 million in 1993, when there were 18. The funding level is expected to be $215 million in 1994. As Table 3 shows, the funding of the core
programs for the system rose rapidly in the early years, then increased at a slower rate, with an upward shift in 1992 to fund five additional centers before declining in 1993 and 1994. In current dollars, funding for the larger system declined by seven percent between 1992 and 1993, and a further six-percent decline is projected between 1993 and 1994. This represents a 21-percent decline in real terms over two years. The impact of the cutbacks has been uneven, and the largest burdens have fallen on the centers created before 1980; indeed funding for these centers will decline by 31 percent in real terms over five years. As mentioned above, the problem of decreasing funds is compounded by the significant gap between the levels approved for funding and the actual funds made available.

32. The increase in funding between 1972 and 1992 was fuelled by steady growth in the number of donors and by increased contributions from some donors. There were 38 donors in 1993, including 19 bilateral aid agencies from OECD countries, six developing country governments, 10 international and regional agencies, and three foundations. (See Table 4.) Between 1972 and 1993, 66 percent of all contributions came from bilateral aid agencies (principally USAID), while international and regional agencies contributed 28 percent (with the largest contribution coming from the World Bank); three percent came from foundations.

33. USAID and the World Bank are the only donors that have established quantitative goals for their contributions. USAID originally agreed to provide 25 percent of the total funding and the World Bank agreed to contribute first 10 percent, then 15 percent. While USAID has been the largest single donor (providing $40 to $48 million a year from 1982 to 1993), its contribution has declined from a peak of over 25 percent of the total core contributions in 1982 to 20 percent in 1988 and 18 percent in 1993, and is expected to be as low as 13 percent in 1994. The World Bank's contribution has risen steadily, reaching $37.5 million in 1993 (about 16 percent of core funding) and could total $40 million in 1994 (18 percent of core funds).

34. The actual decline in funding between 1992 and 1993 totalled $18 million. The largest drop was the U.S. contribution (more than $6.5 million). The Canadian, Italian, Swedish, and British governments reduced their funding by some $2 million or more each, while four other European governments and the European Union chopped their contributions by more than $1 million each. The Japanese and Netherlands' contributions increased by more than $5 million and $1 million, respectively. Thus, the funding drop in 1993 mainly reflected a fall in the U.S. contribution (which fell yet further in 1994) and "wide but shallow" cuts from the OECD bilateral donors. The United States is currently considering cutting its funding by a further $10 million in 1995.
If this occurs without any offsetting increases from other sources, the system will erode seriously.

35. These current and projected cutbacks make it increasingly important that all concerned focus urgently on the long-term outlook for the world food situation and the related need not only to support, but also to expand, agricultural research to increase food production.

36. The cutbacks also necessitate an examination of whether additional sources of funding and alternative methods of financing the CGIAR centers can be developed to insulate the system from cutbacks arising from largely domestic concerns in donor countries. Although there have been some efforts to encourage the private sector to help fund the CGIAR, and some thought has been given to establishing endowments and taking other steps to find funding for essential parts of the system, these efforts have had little success and are not likely to resolve the system's immediate financial problems. In sum, overall funding has fallen substantially in real terms at the same time that the system expanded by five new centers. As a result, all the centers have been constrained and the larger, more established centers have suffered very heavy cutbacks (roughly 33 percent in real terms).

37. The CGIAR centers have been allowed to slide into a dangerous and untenable situation. There is no visible plan for coping with the expected shortfall in funding in 1994, much less with the possibility of longer-term shortfalls. In the interim, cutbacks have been managed ad hoc by the individual centers already hard-pressed to keep within their current and projected budgets.

38. The centers have reduced costs by attempting to consolidate and rationalize their operations, including cutting staff benefits. In addition, many senior staff posts have been left unfilled. Beyond the cuts already made, around 20 percent of the senior posts planned for by 1994 will probably be abolished or left vacant under the current budgetary proposals.

39. The centers have also curtailed important research work, as well as outreach and training programs. The scope of research has been narrowed, work on such areas as germplasm improvement has suffered, and the capacity for technology generation has been reduced.

40. The cutbacks that have taken place and uncertainties about funding have already demoralized CGIAR scientists. Key staff are leaving, and attracting the high caliber and highly motivated scientists who have long been the backbone of the system is
becoming difficult. The uncertainty has also made planning very difficult and undermined the serious and sustained research effort that is essential in dealing with agricultural problems.

41. Cutbacks — both current and projected — are not the result of a well organized and well planned reordering of research priorities. Rather, complacency and inattention of the system’s donors and management are to blame. If current funding levels are accepted, an accidental, unplanned funding level will become the basis for international policy on an important component of food security in developing countries.

VIII. THE OUTLOOK FOR THE CGIAR

42. If funding declines continue, centers will have to be eliminated, programs dropped, or both. Whatever path is suggested, already diminished research programs would be seriously undermined. Further cuts would fall on innovative research, such as that on improving rice-wheat rotations on 12 million hectares in Asia, restoring the productivity of intensively cropped rice-producing areas, improving nitrogen efficiency in irrigated wheat areas, improving disease resistance (in beans, sorghum, millet, and cassava), improving crop management in the semi-arid areas, and developing a vaccine for East Coast Fever in cattle.

43. There is no way of quantifying the cumulative effects on food security of reducing the CGIAR centers’ research programs. However, the possible impact can be illustrated by considering the effect cuts would have on one promising line of research at the International Rice Research Institute, where scientists are working to develop an irrigated rice plant that raises yield potential by 50 percent (from 10 to 15 tons per hectare) in the tropics. Funding cuts would set back the targets to release this plant type to national agricultural research systems before the end of the century. In turn, rice production increases of an average of at least one ton per hectare on 80 million hectares of irrigated land -- an increase large enough to provide the calorie requirements for 400 million people -- might be delayed.

45. We believe that the decisive steps discussed in our recommendations below must be taken to establish a clear vision of the CGIAR’s future role, as well as a minimal scale of activities to be sustained in the future. The keys are shifting away from the priorities of earlier years reducing some less essential activities while expanding more urgent ones. In all likelihood, funding for the centers in the years ahead would have to be larger than in 1993 to allow the system to fulfill its food security and natural resource protection mandates. For the years immediately ahead, the world needs a CGIAR
system funded at no less than $225 to $250 million in core funding per year in 1994 dollars; this figure excludes "complementary" funding for special programs.

46. To stabilize the research program, steps must be taken to develop a more robust and predictable method of financing the system. In our view, the World Bank, as the senior partner in establishing the CGIAR, must take a strong lead in restructuring the system's activities and in ensuring its financial security in the years ahead.

IX. RECOMMENDATIONS

General

1. We strongly recommend that the international community commit itself to sustained support for continuing and strengthening the CGIAR. Stronger backing from all the CGIAR's financial supporters is needed to assure the system's integrity. The CGIAR centers have made important contributions to food security in developing countries, and their future role is every bit as vital.

2. Since the integrity of the system is now in peril, the first and most urgent short-term need is for stability. The present financial instability of the CGIAR is devastating to the centers' research programs, and the need to review both the system's funding and the content of its work is urgent by any reckoning. An internal review is now under way, and the results of this review will be discussed by donors at the system-wide mid-term meeting in May. We strongly support this effort, and we urge the reviewers to recognize that, over time, the CGIAR's mandate has been broadened from a narrow focus on increasing food production to include alleviating poverty, improving the management of natural resources, and protecting the environment. We believe that these goals, properly focused, should be the overarching priorities of the CGIAR in the next century. While this broadened research agenda is necessary, the system should not be pressured, or expected, to be something other than a research network. The CGIAR can make an enormous contribution to the sustainability of agriculture in developing countries, but only if donors resist seeing it as an all-purpose development tool.

3. If no final decisions are taken at the May meeting, we recommend that: (a) interim measures be taken immediately to give the research institutes a firm base of financial support for 1994 and 1995 at an annual core funding level of $215 million in 1994 dollars (see paragraph 4 below); and (b) the internal review process be expanded to include a broader range of internationally recognized technical experts from outside the system. This work must be done swiftly so the results can be used by the Chairman of
the CGIAR to develop a strategy document. This document would be a tool to cultivate international consensus among the donors on the long-term scope and financing of the CGIAR centers; this in turn should be the basis for final decisions on these issues at the CGIAR annual meeting in October 1995.

Financing the CGIAR System

4. In the short term, the World Bank, as the senior cosponsor of the CGIAR, should take the lead through its President in providing emergency financial support for the system. The Bank should assume leadership for rebuilding the system's financial sustainability in the longer run. The system's financial supporters, especially the United States, must cooperate fully in such an effort, in part by finding ways to restore previous levels of financial support. With respect to short-term financing, the World Bank should work with the leading CGIAR supporters to assure that 1994 and 1995 financing for the system at least equals 1993 levels in constant dollars. The World Bank should be prepared to make up any shortfall by providing direct support from its earnings. If short-term financing cannot be stabilized, steps to reorganize the system, including the termination of support for some centers, should be initiated promptly.

Management and Governance of the CGIAR

5. The CGIAR's collective leadership should adopt a new management system allowing it to make timely adaptive decisions as needs change. To support this process, we recommend that:

- The World Bank, as senior co-sponsor of the CGIAR, should provide leadership with the full support of its President to ensure the effective operation of the system;

- A small but strong Executive Committee, which would include experienced persons from developing countries, should be established; and

- The Chairman of the CGIAR should continue to devote the time necessary to provide active, system-wide leadership for all elements of the system in this crucial period.
# THE CGIAR SYSTEM

<table>
<thead>
<tr>
<th>Center</th>
<th>Date of foundation and joining</th>
<th>Headquarters location</th>
<th>Core budget (US$ millions, 1993)</th>
<th>Main areas of focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRRI (International Rice Research Institute)</td>
<td>1960 (1971)</td>
<td>Los Baños, Philippines</td>
<td>25.8</td>
<td>Rice (global); rice-based ecosystems (Asia)</td>
</tr>
<tr>
<td>CIMMYT (Centro Internacional de Mejoramiento de Maíz y Trigo)</td>
<td>1966 (1971)</td>
<td>Mexico City, Mexico</td>
<td>24.1</td>
<td>Wheat, maize, triticale (global)</td>
</tr>
<tr>
<td>IITA (International Institute of Tropical Agriculture)</td>
<td>1967 (1971)</td>
<td>Ibadan, Nigeria</td>
<td>21.9</td>
<td>Sustainable production systems for the humid lowland tropics; soybean, maize, cassava, cowpea, plantain, yams, sweet potato (sub-Saharan Africa)</td>
</tr>
<tr>
<td>CIAT (Centro Internacional de Agricultura Tropical)</td>
<td>1967 (1971)</td>
<td>Cali, Colombia</td>
<td>25.5</td>
<td>Sustainable land use in tropical America; beans, cassava, forages and pastures (global), rice (Latin America and the Caribbean)</td>
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**Original members of the system, founded before the CGIAR:**

- IRRI (International Rice Research Institute) 1960
- CIMMYT (Centro Internacional de Mejoramiento de Maíz y Trigo) 1966
- IITA (International Institute of Tropical Agriculture) 1967
- CIAT (Centro Internacional de Agricultura Tropical) 1967

**Founded or adopted by the CGIAR, to broaden the system, after 1971:**

- ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) 1972
- CIAP (Centro Internacional de la Papa) 1970
- ILRAD (International Laboratory for Research on Animal Diseases) 1973
- ILCA (International Livestock Center for Africa) 1974
- IBPGR (International Board for Plant Genetic Resources) 1974
- WARDA (West Africa Rice Development Association) 1970
- ICARDA (International Center for Agricultural Research in the Dry Areas) 1975
- ISNAR (International Service for National Agricultural Research) 1980
- IFPRI (International Food Policy Research Institute) 1978

**Founded or adopted by the CGIAR to strengthen its mission, after 1990:**

- ICRAFI (International Centre for Research in Agroforestry) 1977
- IIMI (International Irrigation Management Institute) 1984
- ICLARM (International Center for Living Aquatic Research Management) 1977
- INIBAP (International Network for the Improvement of Bananas and Plantains) 1984
- CIFOR (Center for International Forestry Research) 1993

### Table Notes

1. Adapted by the Group (i.e., not founded by the CGIAR).
2. Will merge to form a unified thrust on livestock research.
3. Will merge.

---

1. Adapted by the Group (i.e., not founded by the CGIAR).
2. Will merge to form a unified thrust on livestock research.
3. Will merge.
TABLE 2

CGIAR Core Programs Funding Gap
(1989-92 Actual; 1993-94 Estimate)

( Constant 1989 US$ Millions)
### Table 3

#### CGIAR Core Funding, 1972–1994

<table>
<thead>
<tr>
<th>Year</th>
<th>Nominal Funding ($ million)</th>
<th>Nominal Annual Change (%)</th>
<th>Annual Inflation Rate (%)</th>
<th>Real Annual Change (%)</th>
<th>Funding in 1994 values ($ million)</th>
<th>Inflation Adjustment Factor (1994 base)</th>
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<td>77</td>
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<td>14%</td>
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<td>94 3/</td>
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<td>4%</td>
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</table>

1/ In 1972 there were 4 centers in the CGIAR, 13 in 1980, and in 1992 the number increased to 18. 1994 funding for the 13 centers which comprised the system before 1992 is forecast to be $190 million in current dollars, that is, a 31% decline from 1990, when funding was at its highest (in 1994 values).

2/ Estimated.

3/ Projected.

---

**Graph:**

CGIAR Core funding, 1972–1994

(1994 $ million)
### TABLE 4

**CGIAR Donor Ranking of Core Grants, 1988 – 1993**

(US$ millions)

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| Total     | 211.54     | 224.52     | 234.91     | 232.02     | 247.29        |

08-Mar-94