The Secretariat May 13, 1994
AGR/TAC:IAR/94/6

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

The CGIAR in the 21st Century: Options for Structural Change

At ICW93, the Group requested TAC to initiate a critical examination of CGIAR programmes in the context of the long-term vision, presented in 1990, and current funding trends, and to present MTM94 with options for structural change. TAC undertook this analysis at TAC 63 in March in Rome. A Preparatory Consultation for MTM94 on strategic issues, convened by the CGIAR Chair in Washington DC on April 13, 1994, requested TAC to present its analysis with options for change in two parts. The attached paper provides Part I of TAC’s analysis. It contains the analytical framework used by TAC to underpin its deliberations and provides the Committee’s views on options for a CGIAR structure in the longer term. Following discussion of this paper by the Group, TAC is prepared to proceed, if requested, with Part II of its analysis for discussion at ICW94.

This is one of four papers that will provide the background for the Group’s discussion of "A Vision for the CGIAR".

Attachment

Distribution

CGIAR Members
Center Board Chairs
Center Directors
TAC Chair
TAC Members
TAC Secretariat
Dear Dr. Serageldin,

It is with pleasure that I transmit to you herewith TAC's paper on 'The CGIAR in the 21st Century: Options for Structural Change'. As we agreed during the preparatory consultation for MTM'94 on strategic issues, which you convened on 13 April 1994, the attached paper provides Part I of TAC's analysis. It contains the analytical framework used by TAC to underpin its deliberations and presents the Committee's views on options for a CGIAR structure in the longer term. TAC proposes that the future structure of the CGIAR should be based on two types of responsibilities - global and regional - with close ties and interactions between the mechanisms addressing each type. Following discussion of this paper by the CGIAR, TAC is prepared to proceed with Part II of its analysis to address the short- and medium-term transition steps needed to implement this longer-term vision of the CGIAR.

In preparing the paper with the assistance of the TAC Secretariat, I was guided by the outcome of the Committee's discussions at TAC 63 in March. While the document has a somewhat different focus from the original outline that was discussed by TAC, TAC Members were consulted individually and fully concur with the format and content of the attached paper.

I hope that the paper will provide a significant input into the discussion by the Group on a future vision of the CGIAR. TAC stands ready to provide a paper on Part II of its analysis if requested. I look forward to a productive meeting and stimulating discussions in New Delhi.

Kind regards,

Yours sincerely,

Alexander F. McCalla
TAC Chair

Dr. I. Serageldin
Chair, CGIAR
World Bank
1818 H Street, NW
Washington, DC 20433
USA
The CGIAR in the 21st Century:
Options for Structural Change

TAC SECRETARIAT
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

May 1994
# The CGIAR in the 21st Century: Options for Structural Change

**TABLE OF CONTENTS**

1. **Introduction**  
2. **Framework for Change**  
   2.1. Guiding Principles for TAC's Analysis  
   2.2. Medium- and Long-Term Vision of the CGIAR  
   2.3. CGIAR Priorities  
      2.3.1. Activities  
      2.3.2. Regions  
      2.3.3. Agroecological Zones/Ecoregions  
      2.3.4. Production Sectors  
      2.3.5. Commodities  
   2.4. Institutional Capacity, Governance and Management Considerations  
      2.4.1. Institutional Capacity  
      2.4.2. Governance and Management  
   2.5. Improved Systemwide Efficiencies  
      2.5.1. Research  
      2.5.2. Research-Related Activities  
      2.5.3. Administration, Governance and Management  
3. **Towards a CGIAR Strategy for the 21st Century**  
   3.1. The Future Role of the CGIAR  
   3.2. Highest Priority Programmes in the Long and Medium Term  
   3.3. Systemwide Initiatives  
   3.4. Structural Options for the CGIAR  
      3.4.1. Global Efforts  
      Genetic resources  
      Cereals  
      Roots and tubers  
      Livestock  
      Aquatic resources management  
      Forestry and agroforestry  
      Public policy and public management/services to NARS
Other options

(i) Global mechanism for research on natural resources management  
(ii) Global information and training service centre

3.4.2. Regional Mechanisms

West and Central Africa  
East and Southern Africa  
Latin America  
Arid and semi-arid Asia/WANA  
Humid and sub-humid areas of Asia

4. Concluding Remarks

REFERENCES
1. Introduction

The CGIAR, established in 1971, has since grown from a System sponsoring four centres with a budget of US$ 20 million, to one currently supporting 18 centres which have a total annual budget of approximately US$ 300 million. Over the years, the CGIAR has widened its scope from a focus on agricultural research to include forestry and fisheries research, and to give much greater emphasis to sustainability and resource management issues.

When the CGIAR was established, some of its founders foresaw that it would have a lifespan of about 25-30 years (Baum, 1986). What they may not have anticipated was:

- that increases in food production alone could not solve equity problems, such as extreme poverty;
- that the populations of developing countries may not stabilize until well into the next century;
- the dramatic rise in significance of long-term natural resources conservation and management issues, including those of forests and fisheries; and
- the growing internationalization of science and technology generally, as a result of the revolution in information technology and global communication.

The expectation that national and regional research systems would rapidly gain adequate capacity to cater for their research needs also proved to be over-optimistic. While investment in national research systems in developing countries increased rapidly during the 1960s and 1970s, the rate of growth slowed down considerably during the 1980s. Although the number of scientists in developing countries has increased almost fourfold over the last 20 years, the real spending per scientist has declined by 3.2% per annum since 1980 (Pardey, 1994). There are wide variations around these averages, and the strength of national research systems varies considerably among countries. While some developing countries now have strong national research systems which are able to cater for their applied and strategic research needs, the capacity of many national systems has declined considerably or remained weak for a variety of reasons such as lack of political support and economic difficulties. There are also considerable variations in the strength of particular programmes within the same national research systems.

The challenges facing agricultural research for developing countries have intensified since the inception of the CGIAR. The world population has grown from 3.7 billion in 1971 to 5.5 billion today, and is expected to reach 7.2 billion by the year 2010, and 8.5 billion by 2025. Of the total increment in world population, 94% will be in developing countries and every year through 2025, almost 100 million more people will need to be fed. Given the current low average levels of per capita food consumption in many developing countries, a continued strong growth in their food supplies and their equitable distribution will be required. The increasing need for food must be met
primarily from land currently under cultivation and without further degradation of the natural resources. Over the next 30 years, yields of food grains will need to more than double if domestic production in developing countries is to meet minimum food and nutritional needs. Only a fraction of the output required can be provided through trade. Over 1.1 billion people in developing countries are poor, of which more than two thirds live in South Asia or sub-Saharan Africa (FAO, 1993). Nearly 800 million people suffer from seasonal and chronic malnutrition. While most of the poor and malnourished live in rural areas, an increasing number live in urban areas. Development of agriculture is essential for poverty alleviation and for a more equitable distribution of food supplies. The challenge of the international agricultural research system, and, in particular, the CGIAR is to assist national research systems to develop new technologies, to raise yields and productivity, and to increase employment and alleviate poverty and malnutrition without degrading the natural resource base.

The CGIAR has always been a dynamic undertaking which has responded to changing internal and external environments. The challenges to research are now more complex than ever. While the Green Revolution, which had its origins in the CGIAR, has led to the improvement of the livelihood of hundreds of millions of poor people, its impact has been most profound in the irrigated areas of Asia and Latin America. More limited progress has been made in the less favourable areas including those where irrigation was not well developed such as sub-Saharan Africa. Further efforts are also required to sustain the gains of the Green Revolution. Greater emphasis needs to be given to sustainability aspects of production by integrating resource management and commodity research in order to maintain or enhance the natural resource base to support increasing output. The CGIAR will also need to make a major contribution to the implementation of UNCED’s Agenda 21.

The CGIAR accounts for around 4% of the global investment in research on agriculture, forestry and fisheries for developing countries, but its importance and contributions far exceed this monetary share, through its value as a role model and a catalyst. The new challenges facing the CGIAR can only be met effectively through greater partnership and sharing of responsibilities with national research systems and other institutes conducting research for developing countries. Given the limited resources available, the CGIAR must limit its activities to those it can do best and for which it has unequivocal advantages. The CGIAR must focus on those activities for which an international effort is required because of economies of scale, the long-term perspective, the magnitude and nature of spillover benefits, and on activities that lead to outputs which are international public goods.

At ICW’93, the CGIAR "requested TAC to initiate a critical examination of the present coverage of activities, programmes and regions because the current funding levels in the medium term will require a repositioning of programmes and institutions; and present MTM’94 with options for restructuring" (ICW’93, Summary of Proceedings and Decisions). TAC undertook this analysis at TAC 63 in March in Rome. A Preparatory Consultation for MTM’94 on strategic issues, convened by the CGIAR Chair in Washington DC on 13 April 1994, requested TAC to present its analysis with options for change in two parts. As indicated in the summary report of that Consultation, “the first part, to be tabled at MTM’94, would provide an analytical framework for examining the
long-term vision of the CGIAR, identify the CGIAR programmes that would be part of
the vision and sketch out the institutional structure that would be required to implement
the vision in the medium term. TAC would also identify priorities for Systemwide
initiatives and opportunities for reducing System costs by streamlining non-research
activities from a System perspective. The second part could be finalized after MTM'94
and would discuss the short- and medium-term transition steps which may have to be
taken if resource levels were to continue below recommended levels.

This paper provides Part I of TAC's analysis. It contains the analytical
framework used by TAC to underpin its deliberations and provides the Committee's views
on options for a CGIAR structure in the longer term.

Chapter 2 presents the framework for change and a set of guiding principles for
TAC's analysis. It also recalls the medium- and long-term visions of the CGIAR, and
provides TAC's views on CGIAR priorities, on institutional capacity, governance and
management, and on opportunities for Systemwide efficiency gains. Chapter 3 provides
TAC's views on the elements for a CGIAR strategy for the 21st century, and proposes
possible options for a future structure of the CGIAR in the longer term. Finally,
concluding remarks are given in Chapter 4.
2. Framework for Change

2.1. Guiding Principles for TAC's Analysis

In pursuing its analysis, TAC recalled the mission statement of the CGIAR, which reads:

"Through international research and related activities, and in partnership with national research systems, to contribute to sustainable improvements in the productivity of agriculture, forestry and fisheries in developing countries in ways that enhance nutrition and well-being, especially of low-income people." (TAC/CGIAR, 1992)

TAC's analysis was underpinned by a set of guiding principles. These principles are related both to the CGIAR mission, goals, priorities and strategies, and to institutional attributes and opportunities for greater cost-effectiveness on a Systemwide basis:

**CGIAR Mission, Goals, Priorities and Strategies**

- restructuring should be planned against the broad framework of the medium- and long-term vision of the CGIAR;
- structural changes should be consistent with CGIAR priorities and strategies;
- to strengthen research links between the CGIAR System and national programmes, and other partners in the global agricultural, forestry and fisheries research system.

**Institutional Attributes and Cost-Effectiveness**

- whenever possible, change should build on what exists that is of quality and efficiently operated, and has proven competence and delivery capacity;
- CGIAR Centres should be institutions of excellence, focusing on research of high priority and international importance;
- overlap in responsibilities should be avoided;
- the basis for programme integration would be to achieve synergy between the activities involved;
- CGIAR programmes and institutes should have critical mass allowing them to address their mandates effectively;
2.2. Medium- and Long-Term Vision of the CGIAR

In 1990, TAC outlined a medium- and long-term vision for the evolution of the CGIAR System. The long term was defined in terms of the period when most national research systems in developing countries will be strong enough to meet their own national research needs. Realization of a long-term vision will therefore depend heavily on the development of capacity of national research systems and of effective regional and transnational mechanisms of cooperation, and for the private sector to become an important alternative supplier of research. Consequently, the CGIAR System will be expected to be smaller than, and different from, what it is at present. However, it is TAC's judgement, based on considerations of international public goods, economies of scale, and spillovers, that there will be a continuing need for international efforts in the long term in (TAC/CGIAR, 1990):

- germplasm collection, conservation, characterization, evaluation and enhancement, and basic genetic manipulation of plants and animals of transnational and/or global significance;
- strategic research on global issues of natural resources conservation and management;
- strategic research on public policy and public management issues of global significance; and
- global information services related to research in agriculture, forestry and fisheries.

Currently, almost all CGIAR Centres are also involved in applied, and sometimes even adaptive, research on natural resources conservation and management, germplasm improvement and breeding, and development and management of production systems. However, this type of research is ultimately better carried out by national systems.

The rationale for developing options for change in the CGIAR is to expedite the process of implementing the long-term vision by improving the efficiency and effectiveness of the System. This would require the CGIAR System to be more selective in its goals and activities than it is at present. Clearly, such a change cannot be achieved instantaneously. A transition period is essential to allow for a gradual change.

In the 1990 expansion report, TAC attempted to define the possible evolutionary path, from the current situation to the long term, in the context of possible institutional arrangements to be implemented in the medium term. In the medium term, TAC
envisaged the CGIAR System as having two major types of activity: global and ecoregional. Global activities would comprise strategic research on selected commodities and subject-matter areas, while ecoregional activities would focus on applied and strategic research on the conservation and management of natural resources, on development and management of production systems, and on commodity improvement. Both these types of activities need to be undertaken in partnership with non-CGIAR institutions and be closely interlinked.

The CGIAR has already taken an important step in 1993 by endorsing TAC's proposals to provide core support to a number of Systemwide programmes of high priority. Such 'programme' funding provides an attractive and innovative mechanism to promote effective partnerships. It should be noted that the original objectives of the CGIAR, adopted in 1971, did not refer to 'centres' as such. The objectives mentioned "examining the needs of developing countries for special efforts in agricultural research at the international and regional levels in critical subject sectors unlikely otherwise to be adequately covered by existing research facilities, and to consider how these needs could be met", and "reviewing the financial and other requirements of those international and regional research activities which the CGIAR considers of high priority." (First Review of the CGIAR, January 1977, Page 34.)

2.3. CGIAR Priorities

In the 1992 Review of CGIAR Priorities and Strategies, TAC made recommendations on CGIAR priorities by activity, region, agroecological zone, ecoregion, production sector and commodity. At TAC 63, the Committee revisited these and its views are presented in the following sections.

2.3.1. Activities

The CGIAR activities are broadly categorized as:

Category 1: Conservation and management of natural resources including germplasm conservation (biodiversity). This area consists of two major types of activities - ecosystem conservation and management, and germplasm collection, conservation, characterization and evaluation;

Category 2: Germplasm enhancement and breeding;

Category 3: Production systems development and management;

Category 4: Socioeconomic, public policy and public management research;

Category 5: Institution building. This area includes training and conferences, documentation, publication and dissemination of information, organization and management counselling, and capacity building networks.
The TAC-recommended balance of effort among these categories in the medium term was 18% for category 1, 22% for category 2, 29% for category 3, 11% for category 4, and 20% for category 5.

Among the major groupings of activities, TAC considered the following as possible candidates for rationalization of efforts as the CGIAR System matures:

a) Category 1, activity 1.2 - Germplasm collection, conservation, characterization and evaluation. This activity accounts for 7% of the System's core resource allocation. There could be economies of scale in the consolidation of these activities among the 13 centres that hold germplasm collections. In commenting on the "Stripe Study of Genetic Resources in the CGIAR", TAC has proposed modalities for the establishment of a Systemwide programme on genetic resources with a separate governance and funding mechanism.

b) Category 3 - Activities in the area of production systems development and management. In the 1992 review of CGIAR priorities and strategies, TAC considered that, in the medium and long term, there would be a reduced need for these CGIAR activities because of increasing national capacity in developing countries to deal with them. These activities are mostly of an adaptive and applied nature, although the results obtained feed into the planning of more upstream strategic research. As national systems assume greater responsibility for research on production systems, the modes of operation could evolve towards greater use of networks and consortia.

c) Category 4 - Activities in the area of socioeconomic, public policy and public management research. The issues addressed by policy and management research have common features and common research approaches, and TAC is exploring mechanisms for a closer integration of these programmes and activities. A stripe study of public policy and management research is planned.

d) Category 5 - Activities in the area of institution building. In this area, there is a considerable amount of overlap between centres. The CGIAR is not equipped to provide comprehensive institution building services. TAC considers that some of these services could also be provided by other institutes and that considerable resources outside the CGIAR are available to support them. The CGIAR contributes to strengthening national research systems through its collaborative research activities as well as through the technology it helps to develop.

Currently all centres have training facilities and organize training programmes which are often targeted towards the same national scientists. While some of the courses are specific in relation to the mandate of particular centres, others are of a more general nature (e.g. farming systems, GIS, gender, etc.) and therefore could be organized on an inter-centre or Systemwide basis. The centres are already actively pursuing opportunities for cooperative activities in training which could result in System savings. All centres are involved in the area of information collection, dissemination and management. There may be
room for consolidation and improvement in efficiency in this area if a System perspective were taken rather than a centre-by-centre perspective. Centres will be meeting at ISNAR in June 1994 to discuss opportunities in this regard. There may also be scope for rationalization of organization and management counselling activities as national research systems gain capacity, and other agencies are now equipped to provide this type of service.

2.3.2. Regions

In its 1992 priorities report, TAC suggested that, in the medium term i.e. by 1998, the distribution of CGIAR core efforts by region, should be 39% to sub-Saharan Africa (SSA), 33% to Asia and the Pacific, 17% to Latin America and the Caribbean, and 11% to West Asia North Africa (WANA).

Given the widespread poverty in the region and the limited capacity of national research systems, TAC considers that the sub-Saharan Africa region remains of highest priority to the CGIAR. The other three regions could be candidates for reduction in CGIAR support in the longer term. Economic growth and development should allow several countries in these regions to invest increasingly in agricultural, forestry and fisheries research, and to provide an increasing share of funding for CGIAR activities to their benefit. It is to be noted, however, that while scientific capacity has been enhanced strongly in many countries, lack of operational funds remains a major constraint to the effectiveness of most national research systems.

In WANA, national research systems have rapidly developed their capacity to undertake applied research. For example, Egypt, Morocco, Tunisia, Turkey and Pakistan have significant research capacity and should be able to assume increased regional roles. A similar situation is arising in Latin America with strong national research systems capable of assuming regional responsibilities, such as in Brazil, Colombia, Chile and Argentina. Other national systems in the region are also gaining research capacity.

With respect to Asia, countries such as India, China, Taiwan, Malaysia, Indonesia, Thailand, Philippines and South Korea are emerging as countries with strong national research systems. India and China particularly have strong national research systems which are not dependent on the CGIAR for their adaptive and applied research needs. Each of these countries could assume important regional research responsibilities.

2.3.3. Agroecological Zones/Ecoregions

In the 1992 review of CGIAR priorities, TAC recommended that the tropical agroecological zones (AEZs) and the cool subtropics with winter rainfall should receive increased attention. However, given the lack of data on previous allocation of CGIAR core resources by AEZ, the proposed allocations had no base line for comparison. Based on its knowledge of relative CGIAR efforts, TAC felt that the shifts in emphasis implied by the analysis were already well under way in the System.
TAC also allocated priorities by ecoregion and, in the framework of the 1994-98 medium-term resource allocation process, identified some priority programmes as Systemwide, core-supported initiatives (Table 1).

The highest priority ecoregions are the warm humid and sub-humid, and arid and semi-arid tropics and sub-tropics of Asia and sub-Saharan Africa. These four ecoregions account for more than two thirds of the priority index used by TAC in the 1992 priorities analysis. The warm humid and sub-humid tropics and sub-tropics with summer rainfall in Latin America and the Caribbean, and the cool sub-tropics with winter rainfall in WANA are also priority ecoregions. The ecoregions of lower priority are the cool tropics and sub-tropics of sub-Saharan Africa, Latin America and Asia when considered individually. TAC could consider core support for programmes for cool tropics and highland areas in different regions provided they are combined in a single Systemwide initiative. TAC also proposed core support for the Slash-and-Burn Programme which is considered a cross-ecoregional initiative.

Table 1: Priority Ranking of Ecoregional Programmes Proposed as Systemwide Initiatives

<table>
<thead>
<tr>
<th>Ecoregion</th>
<th>Priority Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Warm humid and sub-humid tropics and sub-tropics with summer rainfall in Asia and the Pacific (AEZ 2, 3, 6 and 7)</td>
<td>212.6</td>
</tr>
<tr>
<td>2. Warm humid and sub-humid tropics in SSA (AEZ 2 and 3)</td>
<td>166.8</td>
</tr>
<tr>
<td>3. Warm arid and semi-arid tropics in SSA (AEZ 1)</td>
<td>136.8</td>
</tr>
<tr>
<td>4. Warm arid and semi-arid tropics and sub-tropics with summer rainfall in Asia and the Pacific (AEZ 1 and 5)</td>
<td>121.1</td>
</tr>
<tr>
<td>5. Warm humid and sub-humid tropics and sub-tropics with summer rainfall in Latin America and the Caribbean (AEZ 2, 3, 6 and 7)</td>
<td>113.6</td>
</tr>
<tr>
<td>6. Cool sub-tropics with winter rainfall in WANA (AEZ 9)</td>
<td>81.1</td>
</tr>
<tr>
<td>7. Cool sub-tropics with summer rainfall in Asia and the Pacific (AEZ 8)</td>
<td>63.6</td>
</tr>
<tr>
<td>8. Cool tropics and sub-tropics with summer rainfall in Latin America and the Caribbean (AEZ 4 and 8)</td>
<td>42.0</td>
</tr>
<tr>
<td>9. Cool tropics in SSA (AEZ 4)</td>
<td>33.1</td>
</tr>
</tbody>
</table>

Cross-ecoregional - Slash and Burn Programme

N/A

2.3.4. Production Sectors

The CGIAR has traditionally conducted research on crops and livestock of major importance. Since 1992, the CGIAR has incorporated in its portfolio research on forestry and fisheries. Of the four production sectors, fisheries is the smallest one, accounting for only 5% of global value of production, compared to 19% for forestry, 19% for livestock and 57% for crops. Currently, the CGIAR is allocating approximately 2% of its core resources to fisheries research, and work on inland aquatic resources and coastal resources in particular is considered to be of high priority.

With respect to forestry research, TAC has previously argued that there is a strong case to be made for the integration of forestry and agroforestry research, although the Group has agreed to the development of separate institutes. For livestock research, the CGIAR is already proceeding with the recommended structural change, i.e., integrating the two existing institutes into a new one with a global mandate.

TAC also recalls the recommendation in the 1992 priorities report that CGIAR programmes in agroforestry, forestry and fisheries should not be funded at the expense of critical research needs in crops and livestock.

2.3.5. Commodities

The outcome of TAC’s 1992 analysis on priorities by commodity and the implications for resource allocation by 1998, resulting from the 1994-98 MTP process, are presented in Table 2. It is important to note that the percentage shares, shown in this table, only refer to the sum of resources allocated to activity categories 2 and 3 which account for approximately half of the CGIAR core resources. The data should, therefore, not be treated as absolute figures but rather as a broad indication of the relative priority of the commodity. Further, it should be noted that in those cases where TAC has recommended phasing out or reduced relative priority for a specific commodity in the longer term, this would not include activity category 1.2 on germplasm collection, conservation, characterization and evaluation.

The livestock data represent an amalgamation of the multiple products of livestock and research on forage crops. In its 1992 analysis, TAC recommended that the CGIAR investment in livestock research should be limited to research on ruminants, and focus on smallholder mixed farming systems. The future strategy and scope for livestock research in the CGIAR is currently under discussion by the Group. TAC considers that the relative allocation of CGIAR core resources to livestock research should not be reduced below the current relative level.
Table 2: CGIAR Resource Allocation by Commodity (% Share of Core Resources to be Allocated by 1998)

<table>
<thead>
<tr>
<th>COMMODITY</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livestock</td>
<td>18</td>
</tr>
<tr>
<td>Rice</td>
<td>17</td>
</tr>
<tr>
<td>Maize</td>
<td>9</td>
</tr>
<tr>
<td>Wheat/Barley</td>
<td>9</td>
</tr>
<tr>
<td>Cassava</td>
<td>8</td>
</tr>
<tr>
<td>Potato</td>
<td>5</td>
</tr>
<tr>
<td>Phaseolus Beans</td>
<td>4</td>
</tr>
<tr>
<td>Sorghum</td>
<td>3</td>
</tr>
<tr>
<td>Banana/Plantain/Yam</td>
<td>3</td>
</tr>
<tr>
<td>Millet</td>
<td>3</td>
</tr>
<tr>
<td>Groundnut</td>
<td>3</td>
</tr>
<tr>
<td>Sweet Potato</td>
<td>3</td>
</tr>
<tr>
<td>Chickpea</td>
<td>2</td>
</tr>
<tr>
<td>Soybean</td>
<td>2</td>
</tr>
<tr>
<td>Fababean/Lentil</td>
<td>1</td>
</tr>
<tr>
<td>Pigeonpea</td>
<td>1</td>
</tr>
<tr>
<td>Cowpea</td>
<td>1</td>
</tr>
<tr>
<td>Coconut</td>
<td>-</td>
</tr>
<tr>
<td>Vegetable</td>
<td>-</td>
</tr>
<tr>
<td>Agroforestry/Forestry</td>
<td>6</td>
</tr>
<tr>
<td>Fish</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

**SOURCE:** CGIAR Medium-Term Resource Allocation 1994-98

Rice is the single most important food commodity in developing countries. TAC recommended that it should continue to be a commodity of high priority to the CGIAR, although some rice production systems are of higher priority than others. Since the marginal cost of research geared towards obtaining yield increases is high in upland rice and flood-prone rice (deepwater and tidal wetlands) farming systems, TAC considers that, in the long term lower priority could be given to them, particularly in Asia. TAC recognizes that upland rice is grown in particularly complex farming systems, and considers that research on these systems should be organized in the framework of a consortium, to ensure the necessary partnership in the research with other research agencies, who also need to provide expertise in the other dimensions of the upland farming systems.
The CGIAR will also continue to give high priority to maize and wheat research. While the private sector is increasingly important for research on hybrid maize, few international efforts, outside the CGIAR, focus on open-pollinated varieties which, in the long term, will remain of highest priority in the work of the CGIAR because of their importance for the poor. Even for hybrids, the private sector relies on tropical germplasm collected by CIMMYT. TAC has also re-affirmed that high priority should be given to wheat research. However, within wheat a distinction can be made between durum and bread wheats, and within bread wheats, between winter, facultative and spring wheats. Given its limited regional importance, the priority of research on durum wheat could decline in the long term. It accounts for only 5% of developing country wheat production, of which 70% is grown in WANA, but of the latter area, only 40% is grown in dry rainfed farming systems. Moreover, considerable research efforts are made in several Mediterranean countries, in particular, Italy and Spain. Similarly, the priority to be assigned to research on triticale should be carefully assessed. Despite considerable investments by the CGIAR, there has been only minor adoption of the crop by developing country farmers. While triticale is no doubt a superior substitute for rye, it is a poor substitute for wheat or barley. To date triticale is grown on 2.5 million ha of land but on only 165,000 ha of land in developing countries, of which 90,000 ha in Brazil and 36,000 ha in North Africa.

Cassava is an important crop, particularly for low income producers and consumers. A large share of its production, particularly in Asia and Latin America, is used as livestock feed. Cassava has negative income elasticity of demand in most regions, and postharvest technology (which is mostly outside the scope of the CGIAR) is an important element of research efforts. On balance, TAC recommends that in the longer term, CGIAR efforts in cassava research could be reduced in Asia and Latin America, and maintained or expanded in sub-Saharan Africa.

The importance of potato in developing countries is growing, and substantial payoffs have been obtained from CGIAR investments in this commodity. However, a significant amount of potato research, which is often highly relevant to developing countries, takes place in developed countries. Research results can be transferred. The CGIAR has also over-invested in potato research, relative to the TAC priority index. Sweet potato is primarily grown in China, which produces over 80% of total developing country output, and has a strong national research system. Because of its low income elasticity of demand, the importance of sweet potato, as a food, is decreasing steadily as incomes grow. In recent years, there have also been shifts in utilization of sweet potato as a staple food to livestock feed. In its 1992 report on CGIAR priorities, TAC considered that in the medium term, CGIAR efforts in potato and sweet potato could be maintained. In the longer term, however, on balance TAC considers that the priority of potato and sweet potato could be reduced.

While recognizing the potential importance of soybean for resource-poor farmers, particularly in sub-Saharan Africa, TAC considers that there are many other suppliers of research on this commodity. The level of CGIAR core support to this commodity could, therefore, be reconsidered in the long term. The priority of millet research was re-affirmed, particularly for sub-Saharan Africa. In Asia, core support for millet research could be reduced because of the strength of the national research system in
India. Sorghum is an important crop in semi-arid farming systems where poverty is dominant. However, progress in obtaining research results is slow because of the difficulty of the crop leading to a high marginal cost of research. There are also other suppliers of research on this crop. TAC therefore recommends reduced core support for research on this crop in the long term. The relative priority of banana and plantain has been re-affirmed. Most of the CGIAR investment in this area is through a network approach and collaboration with other institutes.

TAC also considered the priority of food legumes. The phaseolus bean is an important commodity on equity and sustainability grounds, but the CGIAR has over-invested in this commodity relative to the TAC priority index. It is also a crop which predominantly is of importance in certain areas of sub-Saharan Africa and Latin America. In the long term, its priority to the CGIAR could be reduced. Chickpea is an important dietary item in south-east Asia, India and the WANA region. Lentils are important in WANA, Bangladesh and India which together account for nearly 90% of the production in developing countries. In 1992, TAC recommended the phasing out of CGIAR support to lentil in the medium to long term on the basis of its geographically-limited importance. Turkey also has substantial research capacity for this crop and could assume regional responsibilities for WANA. Production of cowpea is concentrated in West Africa and Nigeria accounts for over 50% of total production and for over 80% of the area grown to cowpea. Nevertheless, cowpea is an important crop in mixed farming systems of semi-arid Africa, and TAC considers that there is no obvious alternative source of supply of research on this crop. TAC has already recommended that CGIAR support for fababean should be phased out. Pigeonpea is an important crop in one country only, India. ICRISAT has made rapid progress in obtaining research results on the commodity, particularly through the development of a hybrid variety. TAC recommended that in the medium term, CGIAR support for this crop could be maintained but considers that, in the long term, CGIAR support to pigeonpea research could be phased out. Overall, TAC considers that legume research should be conducted in an ecoregional research framework because of the nature of their integration in complex farming systems and localized importance of food legumes.

TAC has re-affirmed the priority to be assigned to research on coconut and on vegetables, although to date, no core resources have been assigned to commodity improvement programmes for these commodities. The Committee also re-affirmed the relative priority it has assigned to research on forestry and agroforestry, and to fisheries, particularly with respect to the resource management issues.

2.4. Institutional Capacity, Governance and Management Considerations

2.4.1. Institutional Capacity

In the 1994-98 medium-term resource allocation process, TAC made an assessment of each centre's institutional capacity to deliver an effective research outcome.
TAC evaluated each centre according to a set of largely supply-oriented criteria, which were equally-weighted. These were:

- the strategic character of the centre’s research programme;
- the potential for breakthroughs;
- past performance and likelihood of continuance (or improvement);
- the external environment, institutional health and quality of management; and
- capacity to collaborate with NARS, other CGIAR Centres, and advanced institutions.

The outcome provided TAC with an indication of the broad perception of the centres’ capacity to deliver an impact-oriented, quality research programme of a strategic international character.

TAC also concluded that several centre programmes were operating below critical mass. Furthermore, the scale of operations of several centres was below the optimum resulting in high overhead costs. The share of centre governance and management costs in several centres seems to be high relative to comparable institutes outside the CGIAR. If a centre becomes too large, bureaucracy is likely to creep in and the centre may no longer be able to function effectively. In considering a future structure of the CGIAR, TAC has therefore also taken into account the need for a critical scale of CGIAR programmes so that they can operate efficiently with minimum overhead and transaction costs.

2.4.2. Governance and Management

In an average CGIAR Centre, the cost of governance, management, and administrative and finance units is estimated at well over US$ 2 million per year. The CGIAR’s decentralized operating structure of independent centres accounts for these relatively high costs. For example, costs arise from the operation of independent Boards of Trustees or Governors, from external reviews, from planning and resource allocation activities, from consultations with the CGIAR’s central mechanisms, from participation in CGIAR meetings, and from activities related to external contacts. These activities are considered essential to maintain the crucial balance between freedom for centres to maximize their creativity, and the accounting requirements imposed on the CGIAR as an international publicly-supported System. However, the examination of options for cost reductions across the System cannot ignore the exploration of savings opportunities in these areas.

In addition to the governance costs, independent operations of individual centres also require maintaining a service infrastructure at most centres. This infrastructure typically consists of training and publication facilities, administrative and financial services, in addition to executive leadership.
Options for maximizing the use of donor funds to support CGIAR research programmes should also take into account future needs for physical plants and facilities. For field research to be productive in often difficult conditions, CGIAR scientists must be well supported by appropriate centrally provided tools and facilities. In some instances, the remote location of research stations requires the provision of essential services such as living accommodation and schooling facilities for scientists and their families.

The costs of these services historically may not have been an important parameter in CGIAR resource allocation decisions since the high returns from CGIAR research investments far outstripped the costs involved. Furthermore, centres wanted to make the work environments attractive to high quality staff. In the present financial climate, all costs should be carefully evaluated but it may be inappropriate to give them undue weight in the overall decision-making process.

Efficiencies have been sought in staffing as well as in the operation of research facilities in the past two or three years. However, the continuing high costs of centre operations due to political and economic instability in host countries, or high costs of physical plant renovation of aging facilities should be considered in decision making. The latter perhaps should be of greater concern as it is evident that the level of resources to renovate, in the short term, all of the CGIAR's aging facilities is unlikely to be available. Maintenance of aging physical plant facilities may claim a larger share of resources in the future. Already, six centres use more than 10% of their core resources for this infrastructural cost. CGIAR Centres have already actively pursued opportunities for efficiency gains in this area.

The fixed nature of these facilities allows limited room for scaling down at the margin, however. A facility has to be operated even if the number of scientists is reduced. As a consequence, in several instances, in addition to considerations of programmatic critical mass, there may come a point where it is no longer cost-effective to operate a downsized physical plant.

2.5. Improved Systemwide Efficiencies

Opportunities for greater cost-effectiveness should be explored by taking a Systemwide rather than the narrower centre perspective. Centres have historically been independent in the management of their resources and activities. As successive external reviews have indicated, centres have generally managed CGIAR resources efficiently and have taken every opportunity to make even more effective use of their resources. In the light of measures taken by individual centres in response to financial stringencies in the last few years, there are very few opportunities left to improve efficiency at the centre level. However, because of their independence, every centre has been required to provide a full spectrum of research support and research-related activities. Further efficiency gains could possibly be achieved by taking a System perspective in the organization of some of this work. In particular, it should be examined whether the System can be re-organized so as to produce the same output mix at a lower cost. This issue is addressed in subsequent sections.
In the 1994-98 CGIAR medium-term resource allocation process, the proposed centre budgets had the following characteristics: on average 62% of the System's effort was allocated to research and research support; 14% to research-related activities such as training and information; and 24% to administration, management and governance. The opportunities for Systemwide efficiency gains in each of these areas are addressed in the following sections.

2.5.1. Research

While the overall share of core resources assigned to research and research support averages 62%, it ranges from a low of 52% to a high of 67% among centres. When the share of research support is subtracted, no less than 8 out of 18 centres currently allocate less than 50% of their core resources to research per se. Given that research should be the major thrust and focus of the centres' activities, attempts should be made to increase the share of resources allocated to research. Also, the operations of several centres overlap in terms of commodities, activities and subject matter areas. There could be substantial scope for rationalization of efforts, elimination of duplication, and for the achievement of economies of scale. Moreover, the System will need to give much greater attention to the activities of other actors in the global agricultural research system for developing countries. These include the possibility of some stronger NARS and regional associations, taking greater responsibility for specific areas of research currently carried out by the CGIAR. Greater account should also be taken of the capacity of developed country research institutions for research of relevance to developing country situations. The critical issue for the CGIAR is the provision of research results that will assist developing countries in overcoming their agricultural, forestry and fisheries problems. The CGIAR should not be concerned about how or by whom these results are provided as long as the supply is efficient, timely and of low cost.

For these reasons, TAC will accelerate the series of stripe reviews proposed in the medium-term resource allocation process. These reviews will examine current activities in particular areas of research, suggest where appropriate, changes in the CGIAR strategy, and explore alternative ways for organizing the work. The Stripe Study of Genetic Resources has already been completed. The other on CGIAR Regional Commitments in West Africa is in progress, and reviews on public policy and public management, roots and tubers and cereals research are being planned. Each of these reviews will also pay attention to the supply dimension of research and critically assess the role of the CGIAR with respect to those of other institutes.

2.5.2. Research-Related Activities

The System currently allocates 14% of its core resources to training, conferences, documentation, publication and dissemination of information. There is substantial scope for rationalization of these activities. Many centre training courses address topics of wider interest than those of the particular centre, such as farming systems research, geographic information systems, gender analysis, data processing, statistics, and biotechnology. Further, centre training efforts often target the same recipients in national research systems. In the area of information, substantial efficiencies could be obtained by making greater use of electronic communication facilities.
Centre Directors have already acknowledged the scope for efficiencies in both training and information, and are considering ways and means to offer the same products and services at a lower cost. Furthermore, the CGIAR is not the sole provider of training and information services. With respect to publications, every centre has its own production infrastructure and facilities. Opportunities for efficiencies in this area should also be explored.

Approximately 2% of the System’s core resources is presently allocated to institution building networks. Several of these networks overlap and could be organized more efficiently, thereby also streamlining relations between centres and national research systems.

2.5.3. Administration, Governance and Management

The CGIAR currently assigns 24% of its core resources to administration, governance and management including expenditures on physical plant operations. This share ranges from 16% to 31% among individual centres.

Overall, the average cost of administration, governance and management in a CGIAR Centre amounts to US$ 2.25 million a year. Opportunities should be sought to reduce these costs, for example, through sharing of administrative facilities, use of computer networks, simpler management structures, etc.

The cost of physical plant operation of centres ranges from 18% of core resources to zero for those centres using rented facilities. Six centres use more than 10% of their core resources for this infrastructural cost. This issue will merit careful attention as the CGIAR plans its future operations.

CGIAR Boards range in size from 8 to 17 members, with an average of 14. The aggregate cost of operating these Boards is in excess of US$ 3 million per year. It should be possible to govern centres more efficiently with smaller Boards, or to use common Boards for more than one centre.

Rationalization of central services, i.e. those required by the System, should also be considered. For example, by increasing the efficiency of the review process, and extending the period between reviews, TAC believes that the total cost of external reviews could be reduced considerably.
3. Towards a CGIAR Strategy for the 21st Century

3.1. The Future Role of the CGIAR

TAC's views of the medium and long-term visions of the CGIAR, its recommendations on CGIAR priorities and strategies, and its consideration of measures to improve Systemwide efficiency, provide the basis for discussions on structural options for the CGIAR. The challenges to research on food production and resource management for developing countries remain enormous. For example, over the next 30 years, yields of food grains will need to more than double if production is to meet minimum food and nutritional needs, and substantially contribute to reducing poverty. The scope for increasing the land area under cultivation in the coming decades is much lower than in the past. Further, a significant proportion of the currently cultivated land, including the intensively cultivated irrigated land, is already under severe threat of degradation. In addition to helping to increase food production and alleviate poverty and malnutrition, research will, therefore, also have to find ways and means to stop further degradation of the natural resource base, to improve the management of these resources, and to protect the environment as unprecedented higher levels of production are sought.

The CGIAR can play a prominent role in making a major contribution to meeting these challenges by concentrating on those research activities for which international efforts offer unequivocal advantages. In its limited capacity, the CGIAR should only do those things that it can do best and for which there is no other reliable source of supply.

The CGIAR should position itself with an effective organization so as to meet the challenges for the 21st century and to implement its long-term vision. Such a task requires a review of the structure of the System to:

- eliminate current overlaps in centre mandates; strengthen resource management research and its integration with commodity research;
- delineate clear responsibilities for global and regional research activities;
- provide clear focal points for the coordination of decentralized activities;
- streamline relations with national and regional research systems; and
- provide a bridge with basic research efforts in advanced institutions.

Structural change is necessary in order to move the "System" towards a more effective organization. It is to be emphasized that the main aim of restructuring should be to improve the way research is conducted, rather than to change what research is done. In this respect, TAC would like to re-affirm the programmatic recommendations it made in the 1994-98 medium-term resource allocation process. Despite current funding shortfalls, TAC re-states that its recommendations on the US$ 270 million and US$ 280 million scenarios remain of high priority.
The success of the CGIAR will be dependent upon the development of efficient national research systems and transnational mechanisms of scientific collaboration. While the CGIAR is not well placed to be the lead agency for institution building, it can contribute substantially through collaborative research activities.

3.2. Highest Priority Programmes in the Long and Medium Term

The long-term vision of the CGIAR provides clear indications of those elements of the current CGIAR which are of highest priority and need to be safeguarded. At the global level, these components include: genetic resource conservation (including the conservation of biodiversity); germplasm enhancement for plants and animals of transnational and/or global significance; strategic research on global issues of natural resources conservation and management; strategic research on public policy and public management issues of global importance; and global information activities related to CGIAR research.

In practical terms, the programmes considered by TAC to be of highest priority at the global level and to be preserved in the long term are, first of all, germplasm conservation of CGIAR mandate commodities as well as the central mechanisms for supporting this work. Strategic germplasm enhancement research of an international character, including application of biotechnology, of the most important commodities such as rice, wheat and maize, which account for more than half the calorie intake in developing countries, should also be preserved. Some of the strategic resource management programmes at the CGIAR Centres are of long-term importance and address issues of highest priority such as the problem of yield decline of rice in intensive cropping systems, scarcity and mismanagement of water in Asia, or resource degradation problems in the high density semi-arid and highland areas of sub-Saharan Africa and Latin America. There would also be a continuing need for the CGIAR to be involved in public policy and public management research, and in catalyzing global information services related to CGIAR-related activities.

TAC re-affirms that it sees the CGIAR’s principal contribution in strengthening NARS to be through its collaborative research and research-related activities and the technologies and knowledge it generates. The Committee has carefully assessed the CGIAR’s future involvement in organization and management counselling of NARS and in other institution-building activities. It considers that the task is large and comprehensive, and that the CGIAR has inadequate resources to cater for all of the needs. Major efforts will have to be provided by other organizations.

The CGIAR should also provide continued support for ecoregional programmes of high priority and to high priority research endeavours targeted at particular regions. TAC has provided clear indications on those ecoregions which are of highest priority (see Section 2.3.3.), and it has recommended additional support for Systemwide initiatives to complement centres’ ecoregional programmes and to strengthen partnerships.
3.3. Systemwide Initiatives

In the 1994-98 medium-term resource allocation exercise, TAC recognized that the process of developing Medium-Term Plan (MTP) proposals at the centre level was limited in centres' ability to deal with concerns of importance at the System level, that transcend but complement the centres' own interests. As a result, such research issues considered important from a Systemwide perspective were not adequately treated in the individual centre MTPs. Also, several centres have research sites around the world that have characteristics which, in a coordinated effort, provide synergies in tackling important global themes. Further, such Systemwide perspectives are viewed by the Committee to be an essential dimension of any restructuring of the CGIAR in the medium term. TAC, therefore, recommended that the CGIAR allocate core funds to a number of programmes of particular importance to the System as a whole. Each of these Systemwide initiatives was to be undertaken by a consortium of partners consisting of CGIAR Centres, national programmes and other relevant institutions. For each of the initiatives TAC identified an IARC as a convening centre which would act as an initiator and facilitator. The convener would be a catalyst for the formation of a consortium and channel seed money to stimulate programme planning activities, but would not necessarily provide research leadership to the initiative concerned. It would also provide financial accountability to the donors.

In March 1994, TAC re-affirmed that it was assigning the highest priority to these Systemwide initiatives and that in a situation of funding shortfall such activities should receive priority over centre-specific programmes. TAC strongly believes that the Systemwide programmes would provide an innovative mechanism to promote partnerships among centres, national programmes and other actors in the global agricultural research system.

TAC recognizes that development of effective partnerships is a time-consuming process, but stresses that the payoffs of successful partnerships are very high. The Systemwide initiatives proposed by TAC for the current medium-term period relate to a set of ecoregional programmes, an inter-centre programme on the conservation of genetic resources, collaborative livestock research programmes, and a water management research programme. TAC considers that these programmes will also be of high priority in the long term. The Committee recommended that in total up to US$ 10 million (in 1992 dollars) could be allocated to these Systemwide initiatives as soon as appropriate projects are available.

3.4. Structural Options for the CGIAR

On the premise that in the long term, NARS capacity in most developing countries will be adequate to meet their essential needs for agricultural research, and that there will be networks of regional/ecoregional mechanisms for transnational research collaboration, TAC believes that the future structure of the CGIAR should be based on two types of responsibilities; global and regional/ecoregional, with close ties and interactions between the mechanisms addressing each type. The absolute advantage of the
IARCs should be in strategic or mission-oriented basic research given the alternative sources of research supply. The global mechanisms would focus on strategic research on germplasm enhancement of the important commodities or on subject-matter areas. These mechanisms would be highly focused and relatively smaller than current IARCs with global mandates. Regional/ecoregional mechanisms would concentrate on strategic and applied research on natural resources management, production systems, and commodity improvement, and provide an essential link to achieving the long-term vision.

In the medium term, TAC sees the need for at least eight global efforts: genetic resources, cereals except rice, rice, roots and tubers, livestock, aquatic resources management, forestry and agroforestry, and public policy and public management/services to NARS. In looking at institutional options for global mechanisms, TAC considered the following criteria:

- proven record and impact of research on particular commodities;
- economies of scale and existing infrastructure for research;
- possibility of spillover effects;
- centres of origin/biodiversity of the commodities; compatibility of research approaches among commodities;
- use of advanced science;
- existing potential research links between CGIAR Centres; and
- governance and management costs associated with decentralized mechanisms.

With respect to regional/ecoregional thrusts, five are considered to be of highest priority. In reviewing options, TAC was led by the need to streamline research efforts targeted at the needs of particular regions and to encourage partnerships between the different actors involved in that research.

3.4.1. Global Efforts

**Genetic resources**

The aggregated efforts of the CGIAR in ex situ conservation of plant genetic resources are the largest in the world. Yet, the centres involved act as separate entities. The CGIAR efforts are, therefore, somewhat disjointed. There is an urgent need for a unified CGIAR strategy and the coordination of the centres' work on the collection and conservation of genetic resources. As indicated earlier, TAC considers this issue to be of very high priority to the System, and has conducted a Stripe Study of Genetic Resources in the CGIAR. All work in the IARCs concerned with the conservation of genetic resources should be integrated into a single Systemwide programme, although its activities would be decentralized in each of the centres concerned. The coordination of the System's effort would be ensured through a lead centre or a central mechanism.
Cereals

Cereals research is currently conducted in seven separate commodity centres, which were established as independent entities in the region of origin of the crop and/or where it was a major component of the local farming system. New developments in molecular biology (e.g. biotechnology) present the possibility of much greater use of more sophisticated research techniques that have relevance across cereal crops. Most of the supporting disciplines that contribute to cereal improvement research are similar across these crops, and a number of advanced research institutions are also working on these crops. Furthermore, it is increasingly clear that each of these crops is only a component of a complex farming system and that a holistic approach to commodity improvement is essential for success.

TAC sees considerable advantages in exploring carefully the benefits and costs of integrating selected aspects of CGIAR research on all cereals (durum wheat, bread wheat, maize, triticale, barley, millet and sorghum), except rice, into a single Systemwide programme. This would allow for economies of scale, elimination of existing overlaps in responsibilities between centres, better focusing in relation to alternative sources of research supply, and better collaboration with advanced institutions. A central mechanism would be a catalyst in the development of global strategies and priorities for research, and could be responsible for genetic resource conservation. A substantial amount of field experimentation would have to be conducted using decentralized regional and ecoregional mechanisms.

Given the overwhelming importance of rice as a staple food in developing countries, and in line with the TAC strategy statement on rice research in the CGIAR, endorsed by the Group at MTM'93, there will be a continuing need for a Systemwide programme to conduct research of global importance on rice which includes both strategic germplasm enhancement programmes and resource management programmes.

A possible further option would be to also include an irrigation research component under this Systemwide rice programme. Rice is the most important crop in irrigated systems of developing countries, and economies of scale could be obtained by integrating the crop aspects of irrigation research within the rice programme.

TAC sees the need, in the long run, for the main beneficiaries of the CGIAR efforts on cereals to contribute a greater share of the support of the resources needed. This could be achieved through cash contributions and/or in kind inputs.

Roots and tubers

Research on roots and tubers (cassava, potato, sweet potato and yam) is currently conducted in three separate centres. These crops are subsistence crops of critical importance to low income producers and consumers. They also are subject to declining demand as incomes rise. Biologically, these crops have many similar characteristics, such as vegetative propagation, their susceptibility to similar pests and viral diseases and their perishability which make post harvest work important. The research disciplines that provide inputs into roots and tubers research are therefore similar. Because of potential
reduced priority of cassava, potato and sweet potato in the future and the emergence of alternative sources of research supply, the scale of future CGIAR efforts in research on these commodities could be lower than it is today (see Section 2.3.). Therefore there is an urgent need to define a CGIAR strategy for roots and tubers research in the medium term and to explore alternative institutional mechanisms. To this end TAC is conducting a stripe review of research on roots and tubers to further explore these issues.

Livestock

Based on TAC's recommendations, the Group has agreed to the establishment of a new global mechanism for livestock research in the CGIAR. TAC sees the role of this mechanism to continue to be important in the long term. A draft strategic plan of this new entity is currently under discussion and it is assumed that activities should be planned as a global programme within a Systemwide framework involving other CGIAR Centres whose work impinges on livestock development. Research on feed resources would be conducted within the framework of ecoregional initiatives, in close consultation with the global livestock mechanism.

Aquatic resources management

Fisheries research remains a high priority to the work of the CGIAR, both in its commodity and, more importantly so, its resource management aspects. Currently, the scale of the resources available to the CGIAR is inadequate, however, to support the full scope of fisheries research required which includes inland and marine and involves both capture and culture fisheries. At present, the CGIAR fisheries research programmes appear to be operating at resource levels well below those considered necessary for an efficient programme. Under these circumstances, the CGIAR contribution to fisheries research can only be marginal. The optimal contribution of the CGIAR could take several forms. Should the CGIAR spread its resources thinly or concentrate its support on one or two highest priority programmes or possibly suspend all allocations until substantially increased resources are available? One option would be to limit CGIAR support to inland aquatic resource management programmes. The scope of CGIAR fisheries research would be strongly focused and be expanded as experience is gained, the impact of CGIAR investment in this sector is assessed, and more funds become available. Important fishery policy research on the management of common property resources and open access issues could also be conducted through the public policy and management research mechanism (see below). If the level of CGIAR support for fisheries research remains at the current level, the research programmes supported should explore possible economies by sharing administrative and research facilities with other CGIAR entities such as IRRI.

Forestry and agroforestry

TAC considers that current CGIAR research on forestry and agroforestry contains a high degree of complementarity and potential overlap. This is particularly true in tree improvement and policy research programmes, as well as in research on land use management of watersheds and forest margins. TAC recommends that forestry and agroforestry research be closely linked to the work on sustainable land use management.
The close integration of forestry and agroforestry appears to be logical both from the viewpoint of programmatic integration and in terms of sustaining a critical mass in the effort. TAC believes that as a minimum the CGIAR should explore the benefits and costs of a common, smaller Board which would be responsible for both institutes. In the future means of economizing on administration and management should be explored. In the section under 'Other options', TAC discusses the possibility of a global Natural Resources Programme/Entity. The role of forestry/agroforestry in such a mechanism would need careful consideration.

Public policy and public management/services to NARS

The CGIAR currently supports a wide range of research and service activities relating to public policy, public management and institution building. There also is a large body of socioeconomic research, some of which is policy oriented, in both global commodity and regional centres. Further, all centres engage in research related activities which contribute to strengthening national programmes. There are several ways one could approach the categorization of these activities. The dominant disciplines in these activities are the social sciences and, in particular, economics. Public policy research involves analysis of policy options for food security which obviously includes research policy. All policy involves mechanisms for the management of policy implementation which is often as important in successful policy as the policy choice itself.

Thus the current organization of CGIAR efforts in public policy and public management research needs careful review. TAC is proposing a stripe review in this area which will be asked to explore appropriate research strategies, and alternatives for its organization. One option to be explored would be to organize the work on the basis of similar research issues. Many of the important research issues (e.g. common property resources) are common to agriculture, forestry and fisheries and an integration of efforts could increase efficiency. The integration of policy and management research would allow for development of synergies in the programmes, reduction of institutional overhead, and the elimination of overlap in centre responsibilities. An outcome could be well-focused programmes which integrate research on policies, policy delivery mechanisms and policy implementation. The Systemwide programme could provide effective support to regional efforts associated with both public policy analysis and policy implementation.

Under this integrated research approach, services to national programmes could either be included as a service division of the centralized mechanism or decentralized to regional/ecoregional entities.

Other options

As described in Section 2.2., there will be a continuing need for sustained international efforts in strategic research on global issues for natural resources conservation and management, and for global information related to CGIAR activities. TAC believes that a move towards rationalizing these activities should be considered in the medium term. This would lay the foundation for further changes in line with the long-term vision. TAC therefore sees a need to explore two additional options as presented below.
(i) **Global mechanism for research on natural resources management**

One option for conducting global research on natural resources management within the CGIAR would be the creation of a new global programme/mechanism that would establish strategies and priorities for such research. The establishment of such a mechanism would be consistent with the medium- and long-term visions of the CGIAR. It could also conduct global strategic research on the conservation and management of natural resources, within the context of sustainable production systems.

A global effort could allow for considerable economies of scale and the elimination of overlap between resource management programmes of other institutions. Much of the current resource management research of the CGIAR with global attributes could be integrated into these activities. The programmes would focus on issues and problems which transcend production systems and geographical regions. It should be emphasized that the nature of these research issues would have to be international and strategic.

These global efforts would of necessity include an important research programme on common property resource management where the issues are similar for public lands and forests, fisheries, shared river basins and water environment. A further option would be to incorporate global agroforestry/forestry policy research as well as a broader approach to natural resource management policy into such a mechanism. Five major research thrusts could be (i) water and irrigation management, (ii) ecosystem management (e.g., watershed, coastal areas and river basins), (iii) ecological foundations of sustainable production (soil/water/nutrient/plant/animal relations and support of ecoregional activities), (iv) ecosystem conservation and restoration, and (v) common property resources.

TAC has not reached unanimous consensus with respect to the potential need for a global mechanism for research on national resources management. Further discussion would be required before the Committee would be in a position to make specific recommendations, particularly with respect to the delineation of global and ecoregional responsibilities in natural resources management research.

(ii) **Global information and training service centre**

As indicated in the earlier sections of this paper, there is considerable overlap in the organization of training, information, and publications activities among CGIAR Centres. One possible alternative would be to create a central service centre which could provide the focal point for, and have a catalytic role in the organization of, CGIAR activities in this area. This mechanism would also provide service activities in organization and management counselling, but CGIAR core support for these activities would be gradually reduced as they become financially self-sustaining. Clearly, this mechanism would not centralize all of the System’s activities in training and information, but would provide the focal point and take the lead responsibility for seeking inter-centre economies of scale. Alternatively, service functions could be integrated into regional entities. In the long run, the service function would evolve into a mechanism responsible for managing the CGIAR’s global information services.
3.4.2. Regional Mechanisms

In ICW'93, the Group endorsed TAC’s recommendations regarding the implementation of the ecoregional approach to research, and TAC identified convening centres to facilitate the development of ecoregional programmes. The organizing principle for these proposals was an ecoregion or combination of ecoregions. An alternative way of organizing CGIAR activities would be a geographic sub-region where most ecoregions are represented, or a combination of geographic regions which have a common and overriding ecological constraint. In sub-Saharan Africa, for example, West and Central Africa, and East and Southern Africa form two logistical regions for the organization of research activities of most centres. The semi-arid areas of Asia and of WANA form an ecological region with a common problem of moisture shortage and major use of irrigation to overcome it. Cropping systems in West Africa provide a continuum of commodity combinations that cut across all agroecological zones. Consider for example the distribution of sorghum, cowpea, maize and groundnuts in West Africa. Consequently, TAC believes that an alternative that should be considered is to use different combinations of geographical regions, sub-regions and agroecological zones, for programme organization.

The objectives of these regional/ecoregional mechanisms would be to strengthen the CGIAR efforts that aim to benefit particular regions and ecoregions, to streamline relations with NARS, strengthen partnerships and eliminate overlap of responsibilities by narrowing the focus of CGIAR efforts. It is expected that greater regionalization would allow for development and exploitation of different research complementarities between centres, national programmes and other research efforts benefiting the particular region. Each of these regional mechanisms could integrate a number of ecoregional programmes and could have a service wing and a natural resources management wing. Legume research would be integrated into regional/ecoregional research mechanisms, because, as also noted in Section 2.3.5., the nature of the integration of legumes in complex farming systems and their localized importance. A minimum of five regional/ecoregional mechanisms, as described below, would be possible. Each of these mechanisms could be governed by a common Board of Trustees.

West and Central Africa

An alternative to an agroecological approach to research in West Africa would consist of a decentralized network of the CGIAR activities. One possible model would comprise a coordinated set of decentralized but focused programmes which could include the Onne Substation in Nigeria (to cover the humid zone and banana and plantain), the Substation in the Cameroon (for the humid forest zone), the Kano Substation in Nigeria (to cover the semi-arid zone), and the Cotonou facility with its work on IPM; these four would be linked with the ICRISAT Sahelian Centre in Niamey, which is located at the drier end of the semi-arid zone, the IITA Ibadan Centre which is located at the drier margin of the humid zone, and WARDA which is located in Bouaké in the Côte d’Ivoire in the sub-humid transition zone. Such a mechanism would allow for a CGIAR presence in all the major agroecological zones of West and Central Africa, a better integration of CGIAR research activities, and for a coordinated network programme in both the francophone and anglophone countries of the sub-region. The mechanism could be
governed by a single Board of Trustees for CGIAR activities. A possibility would also exist for a Council of Regional Participants as is now a part of WARDA’s governance.

The alternative would be to proceed as now planned on an ecoregional model where programmes for the humid and sub-humid tropics would span East, Southern, Central and West Africa as would those for the semi-arid tropics.

East and Southern Africa

A similar model could be developed here and would work in close collaboration with SACCAR and other regional entities, and integrate the activities of the CGIAR Centres specifically focused on the needs of the East and Southern Africa region, and the highlands ecoregional initiative. A highland programme could also be developed on an inter-regional basis.

Latin America

TAC is already recommending a single ecoregional programme for Latin America which would integrate the current ecoregional activities for Latin America particularly with respect to hillsides, forest margins, savannas and the Andes. CGIAR core support for this mechanism could be reduced gradually in anticipation of increased regional funding from the benefiting countries. The Andean programme could also be integrated into an inter-regional highlands initiative.

Arid and semi-arid Asia/WANA

TAC has recommended separate ecoregional programmes for WANA and the semi-arid areas of Asia. An alternative possibility worthy of consideration would be to think of a mechanism that would operate as a decentralized network of research activities in the arid and semi-arid zones of both Asia and WANA. The centres currently involved have the arid and semi-arid agroecosystem as their organizing principle, and have similar research thrusts. The regions also contain the bulk of irrigated ecosystems. The argument for combining arid and semi-arid Asia and WANA in a single ecoregional mechanism would be the commonality of their research needs. TAC recognizes that there is substantial similarity in their ecologies as they both suffer from drought stress and wide swings in temperatures, but notes that the Asian sub-region has summer rainfall and WANA has winter rainfall. The dynamics of the research programmes would therefore be somewhat different.

A range of options with respect to CGIAR efforts in the arid and semi-arid areas of Asia/WANA could, therefore, be considered including: to keep Asia and WANA semi-arid ecoregions as separate sub-regions supported by separate ecoregional programmes and expand CGIAR efforts in water management; or to consider a single entity with the principal responsibility for research on water management and the arid and semi-arid ecoregions of WANA and Asia.

TAC expects that core support for work in these regions could be gradually reduced in anticipation of regional funding from the benefiting countries.
Humid and sub-humid areas of Asia

TAC proposes no new alternatives to the recommendations contained in revised Chapter 13 of the Report on CGIAR Priorities and Strategies. The recommendation was to develop a consortium approach for the humid and sub-humid areas focusing on upland farming systems.
4. Concluding Remarks

This paper has presented Part I of TAC’s analysis on structural change in the CGIAR. It provides an overview of the analytical framework that underpinned TAC’s analysis and outlines options for a CGIAR structure in the longer term. TAC proposes that the future structure of the CGIAR should be based on two types of responsibilities - global and regional/ecoregional - with close ties and interactions between the mechanisms addressing each type. The Committee is ready to elaborate on these proposals if so desired by the Group. TAC re-emphasizes that, regardless of the funding levels, the CGIAR System must strive to be as cost-effective as possible to allow the highest possible share of CGIAR funds to be allocated to research and research-related activities. It must also be selective and willing to recognize the role and contributions of other actors in the global agricultural, forestry and fisheries research system.

Following discussion of this paper by the CGIAR, TAC is prepared to proceed, if requested, with Part II of its analysis which would address the short- and medium-term transition steps needed to implement this long-term vision, and how it could be done more rapidly if resource levels remain below recommended levels. This paper could be prepared in time for discussion at ICW’94.
REFERENCES


