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SYNTHESES OF SELECTED STRATEGIC DOCUMENTS

For Information

This paper was prepared by the TAC Secretariat and provides a brief overview of the findings of selected strategic TAC and CGIAR documents. The purpose of this paper is to provide background material for the discussion on CGIAR Vision and Strategy.

TAC SECRETARIAT

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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SYNTHESES OF SELECTED STRATEGIC DOCUMENTS

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I Summaries of Recent TAC Strategic Studies and Stripe Reviews

1. Marginal Lands

The study was charged with addressing CGIAR priorities for research on marginal lands. Its terms of reference called, *inter alia*, for suggesting priorities for research on these lands and assessing the appropriate balance of effort between marginal and favoured lands. The study was motivated by concern that CGIAR research programmes address the problems of the poor in less-endowed areas, based on the view that most of the poor live in these fragile areas and are a cause and consequence of a downward spiral of resource degradation and deepening poverty.

The main conclusions of the study were that:

- There is no evidence to support the view that the poor are the prime cause of resource degradation on marginal agricultural lands.
- Inconsistencies and lack of data on the location of poverty, its incidence, and the underlying site-specific forces driving poverty processes were such as to invalidate the utility of such data in guiding research strategy towards poverty alleviation on marginal lands.

The study recommended that the CGIAR should:

- Sharpen its strategic focus on poverty alleviation, particularly in setting priorities for research related to marginal rural areas; a prerequisite is development of a geo-referenced database linking biophysical land conditions with poverty and the processes that produce it.
- Focus on poverty processes, opportunities and constraints to institutional change, and viable options for improving welfare within existing constraints; on generation of new and improved technologies to fit institutional and socioeconomic characteristics as well as biophysical conditions; and on diversification of land use systems and income opportunities
- Develop improved mechanisms by which centres can be involved with other partners in generating and interpreting improved scientific evidence on the extent and magnitude of the impacts of agriculture, forestry and fisheries on the degradation or enhancement of natural resources and the consequences for production and food security; and on the linkage between poverty and observed resource degradation.
- Develop expanded collaborative mechanisms and activities among centres and between centres and their non-CGIAR partners, to help focus research and institutional strengthening on issues related to adoption, adaptation and utilization of research results that so far have remained unused.

2. CGIAR Commitments in Latin America and the Caribbean

The study was charged with analysing opportunities to enhance complementarities between the CGIAR and other actors in the LAC region and, specifically, with assessing congruence in priorities among these actors, coincidence in concerns and approaches for NRM, and potential for substitution in tasks performed by IARCs and NARS. TAC inferred from the study the following implicit or semi-explicit recommendations and suggestions:

- In countries having strong public NARIs, the CGIAR should move upstream toward research on germplasm conservation and management, biotechnology, NRM, GIS, and data management techniques via collaboration with representative regional organizations and networks capable of cooperating with the CGIAR. In poorer countries having weak NARIs, the CGIAR should increase its level of activity and seek closer participation with national programmes, either directly or through sub-regional organizations.
- Given increasing privatisation of research and of proprietary claims over research results (IPR), the CGIAR's collaboration in LAC should fully capitalise on the potential contributions of the private sector through modalities for joint research that serves the needs of poor farmers.
- NRM issues should be addressed through reform of property rights, use of biotechnology, fiscal incentives, infrastructure policy, and capital extensive technologies. Policies are also needed to ensure that regional trade agreements do not erode the terms of trade of less endowed areas, possibly leading to more marginalisation and deforestation.
- In addition to aiding the poor by improving agricultural commodities and technologies, IARCs could serve as platforms for the organization of broad inter-institutional efforts involving NARS, NGOs and agencies involved in rural development programmes using the instruments of technological and policy innovations for a more frontal attack on rural poverty.
- The CGIAR could play an important proactive role in accelerating the participation of NGOs and private sector interests in regional networks and other cooperating mechanisms in LAC. These entities need to be involved at all stages of research and development in the region.
- The CGIAR should be more innovative in its approach to the issue of biodiversity if it is to have significant impact on its preservation in the LAC region. Complex issues of incentives for *in-situ* conservation and for use of biotechnology in support of biodiversity need to be addressed.
- Serving as a platform for the interchange of information in LAC may become a more important function for the CGIAR - e.g., as a repository for genomics information, as a link between NARS and the private sector, as a source of information on best practice for policy making and institutional development, and as a platform for negotiation in international agreements on issues that affect the

welfare of the poor. Ways in which this can be done efficiently and cost effectively need to be explored.

3. General Issues In Biotechnology

The study was to advise the CGIAR on general issues in biotechnology with a view to defining a way forward for the future. The study panel saw its primary role as one of assessing the current and future application of molecular genetics and other developments in biotechnology to those aspects of CGIAR work that relate to germplasm improvement, while acknowledging the value of biotechnology to other areas of research relevant to the CGIAR mission (i.e., trees, livestock, fish, ecology, environmental conservation).

The main conclusions and recommendations of the study were that:

- The CGIAR should develop a new strategy on biotechnology that would (a) position the System alongside others committed to a greater understanding of germplasm, (b) foster the evolution of international networks for biotechnological research on problems directly associated with the CGIAR mission, and (c) ensure that Centres have the capacity to apply the increasing pool of knowledge to meet the needs of their client countries.
- To address concerns about potential risks associated with the release of transgenic organisms, the CGIAR should establish a policy framework on biosafety and gene deployment providing mechanisms to ensure that the benefits and risks associated with the release of transgenic organisms are assessed and regional and national regulations and priorities are fully observed.
- The CGIAR should be instrumental in bringing about a “Genome Summit” involving representatives of multinational companies, major funding agencies, charitable institutions and other organizations to pool existing genome initiatives, stimulate collaboration, raise the profile of the CGIAR mission, and bring more information into the public domain.
- An expanded networking approach to biotechnological research for development in agriculture, fisheries and forestry should be developed in which Centres participate together with public and private sector organizations throughout the world, the basic aim being to harness and augment resources already being applied to biotechnology in these areas through collaborative and networking approaches.
- Centres should review their expertise in genomics and bioinformatics as well as in capacity for assessing potential contributions of biotechnology to their research programmes, giving. Strategies for the greater use of biotechnological approaches should give appropriate weight to in-house contributions as well as to external, collaborative and contractual approaches.

- Biotechnology should not be treated separately by the CGIAR for purposes of planning, funding or assessment but should be fully integrated into the broader germplasm conservation and improvement programmes to which it relates.

4. Proprietary Science and Technology

The study was to identify and examine legal and policy issues of major concern to the CGIAR in the area of proprietary science and technology and to recommend a strategy for addressing them.

The main conclusions and recommendations of the study were that:

- Proprietary rights in agricultural biotechnology and in germplasm are increasingly being claimed by both private firms and public institutions, with implications both for Centres' access to proprietary technology and recipients' use of materials released by Centres.
- In dealing with proprietary science, the CGIAR must be guided by its mission which, in turn, will determine the need for access to the proprietary science of others; protection of the CGIAR's developments; preventing misappropriation by others of CGIAR material held in trust; and selection and design of research programmes.
- Research and development should never be undertaken to generate either revenue to support CGIAR work or bargaining chips for acquiring rights to technology from others. On the issue of protection, panel members are divided: some would never approve seeking protection primarily to produce bargaining chips, while others would find it appropriate in certain situations.
- The CGIAR must promptly acquire relevant expertise to enable it to deal confidently with technology transfer, intellectual property and alternative rights regimes. It should set up a central office to deal with such matters; conduct an immediate review of current proprietary science used by the Centers to correct any irregularities; and take steps to ensure that Centers can deliver to clients the benefits of the research they undertake.
- The Centres' existing Guiding Principles on IP should be revised, formalised and enforced. In particular, decisions to seek IP protection should be governed by clear mission-based rules. Unless this is done, Centers will follow inappropriate and inconsistent policies, causing confusion, legal liability and loss.

In its commentary on the study, TAC emphasised that:

- The CGIAR must attend closely to the evolution of international agreements on genetic resources (e.g., Convention on Biological Diversity, International Undertaking for Plant Genetic Resources) and of alternative rights regimes (e.g., farmers' rights, national sovereignty) which may become dominant considerations for some classes of genetic resources.

- The CGIAR might wish to acquire protection for its own work in three situations: access proprietary technology, partnerships, and technology transfer. While claiming IPR for tradeables and revenues is to be generally discouraged, CGIAR policy should permit an assessment of patenting where Centre research aims explicitly at CGIAR goals.

5. Systemwide Genetic Resources Programme (SGRP)

The purposes of the review were to assess SGRP in terms of its role in positioning the CGIAR within the global genetic resources effort and policy environment; evaluate programme performance in terms of mission, strategy, governance, resourcing, accomplishments; and identify options to enhance and strengthen SGRP's future role.

The main conclusions and recommendations of the review were that:

- While SGRP has been instrumental in helping Centres reach agreement on common policies on genetic resources through improved coordination and discussion, delays in fully implementing the recommendations of the Review of the CGIAR Genebank Operations suggest the need for devoting more resources to activities in the areas of genetic resources policy research and capacity strengthening.
- The CGIAR's main contribution thus far has been in *ex situ* conservation of plant genetic resources; increased attention is needed in support of *in situ* conservation. SGRP and the Centres should, therefore, clarify the aims and objectives of their genetic resources conservation programmes.
- International agreements determine the policy environment within which the CGIAR's genetic resources programmes operate. SGRP should continue to monitor policy decisions at national, regional and global levels, as well as to identify needs and opportunities arising from such decisions, so that appropriate actions can be taken by the CGIAR in a Systemwide way. SGRP should also be involved in the analysis of the consequences for developing countries of proposed and agreed policies.
- Previous reviews of CGIAR genetic resources activities stressed the need for strengthening inter-Centre collaboration and improving the quality of individual Centre genebank operations. SGRP and the Centres should therefore give high priority to: quantifying costs of maintenance of accessions of different crops; guaranteeing the long-term security of Centre genebanks; adhering to appropriate standards; and identifying sources of sustainable funding.
- To consolidate genetic resources management and related research and development activities of the CGIAR and to develop and fund activities which would benefit from multi-Centre or System-level approaches, SGRP should prepare a strategic plan with prioritized objectives and areas of research/activity.
- Performance of SGRP's planning, resource allocation, representation, and policy functions should be improved by developing a new governance structure permitting greater functional effectiveness and efficiency in Systemwide cooperation in genetic resources activities. The ICWG-GR should also improve the process of selecting activities/projects for resource allocation.

- In line with SGRP's attempts to widen its scope to include minor crops, animal, forest/agroforest, aquatic, and microbial genetic resources, the Programme should allocate resources and efforts in a balanced fashion to accommodate the various commodity groups so as to meet the requirements of comprehensive coverage of genetic resources in the context of the CBD.

In commenting on the review report, TAC emphasized that:

- SGRP should sharply define its priorities and strategies in relation to its mission, giving urgent attention to: (a) policy, representation, information, public awareness, and training activities to help Centres meet their obligations as trustees of their respective *ex-situ* collections of agricultural, forestry, and aquatic genetic resources; (b) formulating a minimum standard for genetic resources facilities and a set of guidelines for upgrading the facilities so as to keep them at acceptable international norms.

6. Systemwide Programmes with an Ecoregional Approach

The review was to evaluate experiences with ecoregional programmes at the System level with particular emphasis on how well such programmes performed in linking strategic and applied research on natural resources conservation and management with that on production systems.

The main conclusions and recommendations of the review were that:

- The principles underlying the ecoregional approach are valid and of continuing high priority for pursuing the sustainable improvement of agricultural productivity. However, there is lack of a clear general understanding of the meaning of the approach. The full power of its holistic methodology, especially its human and policy dimensions, has not been fully explored.
- Achievements of the ecoregional programmes include (a) significant research on problems of tropical deforestation, sustaining high food grain yields in Asia, and providing more sustainable management practices for the hillsides and mountains of Latin America; (b) characterization of regions and research sites; (c) scaling up to global level of research findings on carbon sequestration/biodiversity tradeoffs and agricultural productivity; (d) practical benefits from enhanced technology transfer and adaptation.
- Although good evidence exists of effective NRM and productivity linkages in the research of several of programmes, particularly at the applied level, there is generally scope for greater investment in innovative strategic research on NRM
- Excellent progress has been made in developing partnerships with national agricultural research systems and there is considerable potential to build on this foundation in the future. The facilitation units of collaborative research consortia have played a vital role in developing partnerships in several of the programmes.

- In future, most of the natural resources management research of the CGIAR can be managed and supported at the Centre level. Only in exceptional cases, where the research problem or opportunity is of major importance on a global or regional scale, should the CGIAR support a combined System effort. Special action will still be required in such cases to overcome communication and funding constraints.
- The CGIAR should adopt and Centres apply a revised framework for NRM research that focuses on problems of sustainable NRM of major international importance, uses holistic systems approaches combining human and technical elements to address problems on multiple scales, and measures progress toward programme objectives using performance indicators. Criteria for System support of such programmes should be that problems are highly relevant to CGIAR goals, no single Centre has a natural advantage in terms of mandate, and high potential exists for efficiency gains from combined efforts of two or more Centres.
- A special effort is required to strengthen collaboration with strong partners in strategic research on biophysical and social science and policy aspects of NRM. The frequently observed imbalance between biophysical and social science research must be redressed.

In its commentary on the review report, TAC emphasized that:

- The original concept of ecoregions as zones of similar climate and natural vegetation has proven, in most cases, to be not operationally useful and should be dropped as a technical term. INRM should be applied to circumstances in which both biophysical and social/economic dimensions are combined and a multi-centre rather than Systemwide approach be applied when two or more centres combine in INRM research.
- While the extent of mainstreaming of INRM will depend on each Centre's mandate, a conceptual framework for integrated programmes combining sustainable production systems with INRM and having socioeconomic dimensions and a regional scale is essential for appropriate programme planning and management. Natural resources management concerns should be balanced by stronger focus on poverty variables and on "users" role in the management of natural resources

7. The CGIAR and National Agricultural Research Systems (NARS)

The study was to focus on strategic issues in CGIAR-NARS collaborative relationships in the context of the priorities and strategies for the CGIAR System.

The main conclusions and recommendations of the study were that:

- Organizations that usually comprise NARS do not operate as a connected system. CGIAR Centers generally have collaborative relationships at the organizational or scientist rather than system level. Thus, a main challenge facing the international

agricultural research community is to help countries form more coherent, system-focused NARS.

- CGIAR-NARS collaborative relationships should be established in the context of the basic criteria for CGIAR participation in research, namely, that the CGIAR produces or focuses on international public goods and that the centre(s) involved have a comparative advantage in carrying out the research based on the principle of subsidiarity.
- The setting of priorities and strategies for effective collaborative relationships with NARS organizations must take into account that NARS organizations differ in terms of their objectives and priorities; strengths and weaknesses in different areas of science; and resource endowment.
- Future partnering of the CGIAR will increasingly involve other actors in the national systems beyond NARIs. There is need to expand understanding of the continuum of NARS and the organizations within them so barriers to more productive relationships can be removed.
- There is need to expand understanding of the dimensions of the comparative or relative advantage that are crucial to the success of partnering activities between CGIAR Centers and NARS. Such improved understanding should flow from the operation of the ecoregional programs and other related activities initiated by the Centres and their NARS collaborators over the past years.
- An improved framework is needed to assess the characteristics and relative strengths of the NARS organizations involved in collaboration with CGIAR Centres with a view to generating improved information on the continuum of NARS organizations with which the System and its Centres work. The types of relationships that function best under different conditions also need to be assessed.
- A variety of mechanisms and modalities need to be developed to maximize the future effectiveness of CGIAR-NARS collaborative relationships in different contexts, including with regional and subregional organizations, non-conventional partners (e.g., the private sector, NGOs, universities, professional associations), and in the context of Systemwide programmes.
- The question the comparative advantage of the CGIAR and its partners or other collaborators relative to that of other partnerships, consortia or individual research organizations doing work in the same fields and areas as the CGIAR-NARS collaborators needs to be addressed to improve the effectiveness and efficiency CGIAR-NARS relationships.
- The relationships between priorities of the centers and those of the different organizations in the NARS need to be explored both conceptually and empirically, particularly where universities, development and environmental NGOs, and private agricultural research groups are strong elements in the NARS.

- Opportunities for improving information flows within NARS, between them, and between them and the IARCs and other partners need to be aggressively supported through collaborative relationships.
- Finally, a strategy is needed to strengthen CGIAR-NARS relationships in the context of the changing global agricultural research management and funding environments, and of the changing nature of the NARS (in terms of interests, priorities, capacities, resources and needs).

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

The report was to provide an analytical framework for examining the long-term vision of the CGIAR, to identify the CGIAR programmes that would be part of the vision, and to sketch the institutional structure required to implement the vision in the medium term. It was also identify priorities for Systemwide initiatives and opportunities for reducing System costs by streamlining non-research activities from a System perspective.

The main conclusions and recommendations of the report were that:

- The framework for structural change should be consistent with the CGIAR's mission statement, priorities, and strategies; it should be guided by the principles that centres conduct research of high priority and international importance, and research links are strengthened between the CGIAR, national programmes, and other partners in the global agricultural, forestry, and fisheries research system.
- Whenever possible structural change should build on existing mechanisms that operate efficiently and have proven competence and delivery capacity, avoid overlaps in responsibilities, achieve synergy between activities through programme integration, permit programmes and centres to have the critical mass to address their mandates effectively, and maximize expenditures for research while keeping the costs of governance, management and administration to reasonable levels.
- Based on considerations of international public goods, economies of scale and spillovers, the CGIAR's highest priority programmes at the global level should be:
 - (a) germplasm conservation of mandate commodities, including the central mechanisms supporting this work;
 - (b) strategic germplasm enhancement research of an international character, including application of biotechnology, of the most important CGIAR commodities;
 - (c) strategic natural resources management research of long-term importance focusing on issues of highest priority;
 - (d) public policy and public management research;
 - (e) catalyzing global information services related to CGIAR-related activities.

- The CGIAR's principal contribution to strengthening NARS is through its collaborative research and research-related activities and the technologies and knowledge it generates.
- In the medium term, the CGIAR should provide continuing support for ecoregional programmes of high priority and to high priority research endeavours targeted at particular regions.
- Systemwide initiatives should have funding priority over centre-specific programmes as they provide an innovative mechanism to promote partnerships among centres, national programmes and other actors in the global agricultural research system.
- 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:
 - (a) Global mechanisms would focus on strategic research on germplasm enhancement of the important CGIAR commodities or on subject-matter areas, and would be highly focused and relatively smaller than current IARCs with global mandates.
 - (b) 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.
- Institutional options for global mechanisms should be consistent with 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.
- For regional/ecoregional thrusts, institutional options should promote streamlining of research efforts targeted at research needs of particular regions and encourage partnerships between the different actors involved in research for a particular region. Such activities might be organized by geographic sub-region where most ecoregions are represented, or by a combination of geographic regions which have a common and overriding ecological constraint. Regional mechanisms might also have a natural resources management wing.
- There is need for structural consolidation/integration in the following programme areas: collection and conservation of genetic resources; roots and tubers; cereals (except rice); livestock; forestry and agroforestry; policy and management.

Research on natural resources management may warrant creation of a new global programme/mechanism that would establish strategies and priorities for such research. A further option would be to incorporate global agroforestry/forestry policy research into such a mechanism

9. The World Bank, the Grant Program, and the CGIAR: A Retrospective Review

The study reviewed the CGIAR's role in development, programme outputs and impacts, and future constraints as background for a more general study of the World Bank's Special Grant Program and its successor, the Development Grant Facility.

The main findings and conclusions of the review were that:

- There is a special need for technology and policy research to provide international public goods in the agricultural and natural resources sectors in developing countries to (a) maintain levels of productivity and production that ensure prices of basic food crops do not increase in the face of population growth (thereby stimulating economic and social development to reduce poverty), and (b) to maintain the natural resource base.
- Public sector research in the above areas is particularly important to developing countries, especially poorer ones. The private sector is not very active in such research, preferring to operate in areas having large markets, well-developed infrastructure, and appropriate policy and legal settings. Much of the public sector research for the principal domestic crops consumed by poor people will continue to require external assistance from an international agricultural research system providing public goods.
- The CGIAR's research contributes to poverty reduction through its direct (enhancing rural employment and income generation) and indirect (reducing prices of basic foods by increasing production) effects, although the precise linkages and impacts are complex and have proven difficult to measure.
- Programmatic issues currently facing the CGIAR include:
 - (a) The System's focus on rural poverty alleviation through improvement of basic food crops and livestock for domestic consumption may lead to an efficiency trade-off with research that could procure the greatest total economic return at the farm level. Other commodities, higher-value food crops, and non-food commodities for domestic consumption and export may offer greater promise of raising farm income. But it is not certain that the CGIAR has a comparative advantage in conducting research on these other commodities. There is also question whether such a shift in emphasis would increase the System's overall contribution to poverty alleviation, since much of the social benefit of current CGIAR programmes comes from their effect on lowering the prices of food purchased by low-income rural and urban consumers. A shift to higher-income or export commodities would not do this.
 - (b) While calls for more research on marginal areas as a way of reducing poverty and arresting resource degradation may be appropriate, in some of the most difficult situations the rate of gain from improved technology may very slow. Agricultural intensification in areas that have both high production risk and a fragile resource base may not be an effective form of intervention. Complicating factors here are the spillover effects from productivity gains in more favoured areas, and the migration of workers from marginal to more favoured areas.

- Issues posed by developments in biotechnology and bioengineering of transgenic crops, intellectual property rights, global climate change, and urbanisation are beyond the capability of the CGIAR to resolve and will require new approaches and expanded activities with a wide range of advanced research organisations.

In structuring agricultural research, the international model exemplified by the CGIAR is a proven method for generating spillover benefits to many countries and has conditioned the CGIAR's expansion into other research areas. However, some fields of research are intrinsically specific to certain agroecologies and there may be no substitute for locally conducted R&D. Clearly, a balance of international and local research efforts is needed and the scope for substituting one for the other is limited. One special challenge in this respect is that expectations of what the CGIAR can or should deliver exceed its capabilities

10. CGIAR Priorities and Strategies for Resource Allocation During 1998-2000

The report was to provide TAC's recommendations to the CGIAR on medium-term resource allocation in context of the System's mission, goals, and strategy and of projected changes in external environments influencing System priorities.

CGIAR Missions and Goals

- The CGIAR's mission is to contribute, through its research, to promoting sustainable agriculture for food security in developing countries. Its goals are to alleviate poverty and protect natural resources so as to achieve sustainable food security.

Framework for Priority Setting: 1998-2000

- TAC's framework for priority setting consists of research and related activities, production sectors, commodities, and Systemwide work. The analytical process emphasizes alternative sources of supply of CGIAR products and the potential influence of new science on probabilities of success.
- Basic assumptions of the CGIAR's strategy are that improved technologies and policies are key to increasing productivity within agriculture (crops, livestock, fisheries and forestry) and to improving management of natural resources (biodiversity, land, and water), necessary conditions for the alleviation of poverty in the poorest countries.
- CGIAR activities - increasing productivity, protecting the environment, saving biodiversity, improving policies, and strengthening NARS – are carried out by CGIAR Centres through projects and, where applicable, Systemwide programmes involving collaboration between Centres and partners.

Environments Influencing the CGIAR

- The CGIAR's priorities are influenced by changes in the socioeconomic and ecological, scientific, and institutional environments. Salient changes influencing priorities during 1998-2000 include:

- (a) Slowing of growth in global crop production since the early 1980s and increased growth in livestock production in developing countries;
- (b) Projected increase in global demand for food by 2025 to more than double current production levels, causing some regions (notably, SSA) difficulty in meeting food needs;
- (c) Declining cropland per capita, water scarcity, biodiversity loss, and declining access to forests, rangeland and fisheries in developing countries;
- (d) Continuing environmental damage from pesticides, soil erosion, fertilisers, and effluents from intensive animal production;
- (e) Increasing use of tools from molecular biology for germplasm improvement and of GIS techniques and electronic information technology for NRM research;
- (f) Emergence of international legal and regulatory frameworks and conventions having a direct bearing on agriculture and natural resources management;
- (g) Declining public sector support for agriculture and agricultural research globally, only partially offset by increases in some research fields by the private sector;
- (h) Emergence of regional groupings of national research capacities in developing countries and of NGOs in adaptive research and community action for NRM;
- (i) Growth of alternative sources of supply for the products of the CGIAR from other centres, NARS and advanced research institutes;

Implications for 1998-2000 Resource Allocations

- In the context of the CGIAR's mission, goals and strategy, and of the trends identified in relevant external environments, the following changes in priorities are recommended¹:
 - (a) Increase in pre-breeding and germplasm improvement in livestock, fisheries and forests; equality maintained for crop germplasm improvement, but with the emphasis shifted to crops of importance to countries less able to handle the task.
 - (b) Expansion of production systems work in livestock (especially on mixed crop/livestock systems), forestry and fisheries; contraction in crop systems research; phasing out of production-systems work not contributing to resource conservation and sustainability;
 - (c) Increase in work on the management of water, postharvest issues, and integrated pest management;
 - (d) Work on protecting the environment maintained, with NRM research focusing on outputs of generic (rather than local) application, on understanding the role of

¹ Expressed quantitatively, TAC's 1997 recommended allocations by CGIAR Activity are Increasing Productivity (39%); Protecting Environment (18%); Saving Biodiversity (11%); Improving Policies (12%); Strengthening National Programmes (20%).

institutions/community organisations in fostering adoption of improved management techniques, and on work integrating productivity increases with resource conservation;

- (e) Modest increase in work on biodiversity, especially to enhance centre-based efforts to manage *ex situ* and *in situ* (in the case of forestry) conservation;
- (f) Policy analysis to shift from trade and market to economic and social issues bearing on, e.g., common access/common property resources and other generic NRM themes;
- (g) Rebalancing of work on governance and management of public systems towards the research end of the spectrum;
- (h) No change in priority to strengthening national programmes, but emphasis on professional development rather than training.

11. Expansion of the CGIAR System

At ICW90, the CGIAR took a number of decisions to strengthen the connections between productivity research and natural resources management research. The Group formally recognised natural resources management as a twin pillar of CGIAR-supported research complementing productivity research. These decisions were based primarily on the findings of the TAC report, *A Possible Expansion of the CGIAR*, which addressed the question whether some or all of the so-called non-associated centres be included within the CGIAR.²

TAC felt it could not approach this question as a simple matter of recommending the inclusion or exclusion of new institutions. It saw the potential expansion of the CGIAR as the starting point for System restructuring. The basis of the changes proposed was an integrated approach which would apply to all aspects of the CGIAR, whether it be commodity research, the broad spectrum of natural resources management, or the agroforestry/forestry sector. Consequently, TAC's report contained proposals for integrating agroforestry/forestry in the CGIAR system, a major expansion of the System, substantial restructuring of the System in the medium term, and for the long-term evolution of the System.

Specifically, TAC proposed that medium term research supported by the CGIAR fall into *global* activities focused on commodities and selected subject matter areas such as policy, management, conservation of germplasm, and the maintenance of biodiversity. *Ecoregional* activities would focus on applied and strategic research on the ecological foundations of sustainable production systems, commodity improvement in collaboration with global commodity activities, and interaction with national partners.

Against the background of this analysis, the CGIAR endorsed the concept of ecoregional activity within the CGIAR System as a means of merging productivity concerns with natural resources management; called for a continuing examination of a series of natural resources management themes such as the relationship between soil and water, soil fertility, plant protection and the institutional changes required to ensure that these themes were encompassed by CGIAR-supported research; decided that a number of commodities of particular importance for poor people should be included in future research programs within

² The centres were AVDRC, IBSRAM, ICIPE, ICIARM, ICRAF, IFDC, IIMI, INIBAP, ITC, and IUFRO.

the CGIAR framework; and emphasised that the full benefits of international agricultural research could not be attained unless national agricultural research systems were significantly strengthened.

As an immediate consequence of these decisions, two non-associated centres joined the CGIAR – IIMI and INIBAP. To ensure that agroforestry and forestry research were firmly established within the CGIAR, it was further decided that ICRAF and a new institution, CIFOR, would also be admitted. The Group also broadly agreed that vegetables research should be supported by the CGIAR, and recognised the global contribution made by AVRDC, but noted the need for political developments to mature before any final decision could be made on including this centre.

A new mission statement was also adopted: “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 among low-income people.” Goals or priority areas for action were identified as: effective management and conservation of natural resources and their integration into sustainable production; improved production of important trees and systems; improved productivity of important fish and their integration into sustainable production systems; improved productivity of important crops and their integration into sustainable production systems; improved productivity of important livestock and their integration into sustainable production systems; improved utilisation of agricultural, forestry, and fish products in both rural and urban areas through improved post-harvest technology; improved diets, family welfare, and equity (including gender equity) through better understanding of the human linkages between production and consumption; appropriate policies for increased productivity in agriculture, food, fisheries, and forestry and for the sustainable use of natural resources; and strengthened institutions and human resources in national research systems to accelerate the identification, generation, adaptation, and utilisation of technological innovations.

II Summaries of TAC Commissioned Studies excerpted from Chapter of 4 of TAC's report on *CGIAR Priorities and Strategies for Resource Allocation During 1998-2000.*

4.3. TAC Commissioned Studies

4.3.1. Inter-Centre Review of Rice

The review panel were of the opinion that the overall level of core funding for rice research in the CGIAR should be maintained and that regional allocations should be commensurate with global needs. Resources should be shifted from West Africa to Asia, which will consume over 90% of the increased output in rice required by the year 2030. Productivity improvement should be brought about through technological change which is the best way to achieve the levels of production required by a twofold increase in demand.

It was felt that research should focus on (i) raising the yield potential for irrigated environments, (ii) managing pests and diseases to close yield gaps, and (iii) managing natural resources to sustain yields in irrigated, upland and inland valley environments. Efforts in the less favourable environments should be closely monitored, to ensure that the potential gains that must be eventually realized are commensurate with the present high level of funding (20%). In addition, IITA and WARDA activities should be integrated, so that the reduced level of core support can be effectively applied.

In view of the above, TAC concluded that the global share of the CGIAR funding for rice research should not be reduced. In principle, resources allocated to research in Asia should be increased, possibly by shifting some responsibilities from IRRI to Asian NARS. The CGIAR may be overinvesting in the rainfed lowlands and uplands, although the issue warrants further consideration.

The current regional rice research mandates of CIAT for Latin America and the Caribbean, and WARDA for West Africa, should continue to be supported. Given the CGIAR's policy decision to support rice improvement in West Africa, TAC finds no compelling reasons at this time to adjust the level of the resources it assigned to WARDA in the MTP for 1994-98. Over the ensuing five years (1999-2003) the CGIAR core funding to WARDA should be at a level consistent with its contribution to the CGIAR priorities. An IITA-WARDA integrated programme for resource-management research is required, at least for the inland valley ecosystem of West Africa.

4.3.2. Stripe Study of Genetic Resources in the CGIAR

The main conclusions of the study were that centres should operate collectively as a System for genetic resources by: defining a unified direction; developing interactive genetic resources conservation and development activities, particularly with regional partners; integrating existing efforts across centres; and exercising greater accountability to the major stakeholders. All work concerned with the conservation of genetic resources should be integrated into a single Systemwide programme, within which policies will be developed and coordinated. There should be a specific Genetic Resources Programme Fund in the CGIAR, which would provide funds to operate the Systemwide Programme. IARC's germplasm

collections should be held in trust and financial benefits should not be sought from their commercialization. A standardized information management system for the Genetic Resources Programme (GRP) should be created to integrate databases across the CGIAR and to simplify communication with NARS.

Subsequent to a joint session with Centre Directors and co-sponsors, TAC recommended that IPGRI should become the lead Centre for the Genetic Resources Programme, its Director General being the GRP Director with overall responsibility for the principles of the CGIAR's involvement in genetic resources, including some policy and representational responsibilities for fisheries and livestock. Genetic Resources Units in the CGIAR Centres should have a programme or equivalent status and their day-to-day management should remain with the centres in which they are located. There should be a GRP fund from which earmarked financial contributions will be allocated to all centres following TAC recommendations.

4.3.3. Review of the CGIAR Commitments in West Africa

The panel's recommended that there should be a decrease in IITA's and ICRISAT's research investments in the development and management of production systems (activities 1.2.1 and 1.2.2 in the present classification), and there should be an increase in IARCs' efforts on upstream germplasm enhancement and breeding (category 1.1) and on process-oriented research in natural resources management (categories 1.2.3/5.a and 2.5). It was also felt that long-term joint programmes should be developed in which IARCs will be broadly responsible for upstream research in germplasm improvement and NRM, devolving to NARS research on production systems and management. (TAC does not believe that outright devolution will be appropriate under the existing circumstances and will rely, therefore, on strengthening partnerships as a way of shifting centres' research towards the more strategic end of the spectrum.)

An in-depth review of the current scientific approach to crop improvement in dry areas should be carried out, to know why "improved" materials do not perform better than local varieties under field conditions; this should include a high-level review of ICRISAT's crop improvement programme, including sorghum research at CIRAD. Millet research efforts should focus on agroecological zones where it can be integrated into more complex cropping patterns. This should involve shifting millet improvement from Niamey to a less arid area.

Furthermore, training activities in the region should be consolidated along the lines of the "Inter-Centre Training Programme for sub-Saharan Africa" in order to strengthen NARS. Also, IARC's regional research efforts should be harmonized by creating a common Board of Trustees for WARDA and IITA, with *ex-officio* representation of ICRISAT, ICRAF and IRRI.

4.3.4. Inter-Centre Review of Root and Tuber Crops

The review recommended that global investment in R&D research should continue, at least at its present level, and that there should be an increase, in relative terms, in research on cassava and potato, and a decrease in that on sweet potato. It was also believed that the creation of an Inter-Centre Committee would increase inter-centre collaboration, develop a Systemwide strategy, and promote collaboration on vegetative propagation and conservation, biotechnology, postharvest, policy, training and mechanization. The Committee should commission a task force to rationalize international phytosanitation regulations affecting the shipments of

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postharvest methods, research, practices? Or is the comma an error, i.e. post-harvet policy?

vegetatively-propagated materials which should remain in operation for as long as it adds value to inter-centre activities in the CGIAR. Furthermore, the Committee would take responsibility for reconciling discrepancies in the production/consumption data available from different sources in order to reassess priorities.

In addition, a joint collaborative programme should be designed to devolve research on sweet potato to strong NARS. Reductions in CIP's research on sweet potato should be linked to opportunities for strategic partnership with the Chinese Agricultural Research System. Also, the work carried out by CIAT, CIP and IITA in technology transfer aimed at overcoming constraints to the dissemination of improved cultivars should be supported, while avoiding duplication of the effective technical assistance work of other development agencies.

Partnerships with NARS, ARIs and the private sector on postharvest technologies should be explored, especially on the characterization of starch and flour, food-processing technologies and market research. The duplication of advanced biotechnology with ARIs should be avoided and CGIAR's activities should focus on safe and viable technologies for vegetative propagation, especially of cassava.

4.3.5. Public Policy and Public Management Research

The main conclusions of the study were that the CGIAR mandate on policy and management research be broadened to encompass i) the public-private interface, ii) the co-production of public goods by public and private sectors, and iii) the role and management of NGOs and other non-profit organizations. The current efforts in research on common property resources should be pursued, particularly in terms of solid empirical research. The work on global-food and natural-resources-use projections should be advanced and the possibilities of research on the political economy of policy and management decisions should be explored. Furthermore, the potential of "new" institutional economics in policy and management research need to be explored and attempts made to understand determinants of choice of efficient institutions.

With regard to the budget, it was believed that investment in socioeconomic, policy and management research should be maintained at its current level. While, the budget reporting on the programmes for policy, and protecting the environment should be disaggregated to identify the real extent of policy and management research in the System.

It was felt that a Systemwide initiative on policy research, as an instrument to enhance collaboration and coordination, should not be pursued. However, six specific criteria for priority setting should be adopted, dealing with relevance to goals and efficiency, nature of outputs useful to NARS, comparative advantages, and quality and impact assessment mechanisms. There was need for a modality to be defined to allow TAC to allocate resources on a competitive basis in response to requests by two or more centres to support project preparation and coordination, and methodological backup activities.

The centres should have a minimum capacity to collaborate with IFPRI on policy and management research. IFPRI's and ISNAR's involvement in ecoregional initiatives should be reviewed and the opportunities to derive lessons of international relevance and achieve greater synergy in inter-centre collaboration questioned. The responsibility for studies on global-food and natural-resources-use projections should be assigned to IFPRI.

4.3.6. Institution Strengthening Research and Services

The main conclusions of the study were that CGIAR's activities in institution strengthening should be demand-driven, more structured and based on collaboration with other partners (internal and external). Resources should be shifted from services to research on institutional development related to agricultural research in developing countries, including the assessment of NARS institutional requirements, organizational structures, management practices, leadership skills, and planning, monitoring and evaluation tools. Careful review of TAC's system to classify activities in relation to the "fortifying NARS" category should be made, to clearly distinguish those providing direct services to NARS.

Additional resources should be made available for ISNAR to enable a more comprehensive analysis on NARS' strengths and weaknesses to form the basis for a proposal for inter-institutional collaboration. Studies on successful and unsuccessful examples of institution-building activities should be carried out by ISNAR in collaboration with major donor agencies and/or with selected NARS.

There should be closer collaboration among centres in all facets of institution-strengthening support to NARS, particularly between the other centres and ISNAR. Joint projects on areas such as setting research priorities, programme planning and evaluation, project preparation and budgeting, could be developed under the umbrella of a Systemwide initiative on institution strengthening.

Generic, methodological tools that can be used by other organizations and consultancy firms should be developed and disseminated, freeing resources for R&D activities. ISNAR should assist in strengthening emerging regional groupings to facilitate the Centre's efforts to strengthen institutions and encourage the participation of NARS in CGIAR priority setting. The information services provided to NARS partners should be distinguished from those given to the Centre's own scientists and those provided to donors and the public. There should also be a differentiation between advice on research in mandated commodities and that on management of research in general.

4.3.7. Soil and Water Aspects of Natural Resources Management Research

The main conclusions of the study were that as well as the general requirement that CGIAR research should produce international public goods, the CGIAR should concentrate on those aspects of soil and water research for which the benefits are likely to be delayed, remote, difficult to identify, and do not accrue to the investor of effort, money or foregone use. This follows from the generalization about NRM that a larger role for publicly funded institutions is likely to be needed in such circumstances. Conversely, user (landholder) responsibility on an individual or collective basis will be more feasible where NRM benefits, relative to costs, accrue quickly, locally, visibly and to those who bear the cost. However, the CGIAR could still have a legitimate role in research on the constraints, especially institutional, that deter land users from accepting responsibility for NRM, even when it appears to be clearly in their interest to do so.

The necessary conditions for CGIAR involvement in NRM-related environmental research is that it should be clearly identified with the impacts of agriculture, forestry and fisheries on the System's goals of sustainable poverty alleviation and food security. With some adjustment, such CGIAR research can also yield results that will assist in achieving other, broader environmental objectives, and it should do so, costs permitting.

CGIAR research should generally be conducted within an integrated NRM framework. So, if the emphasis is on water issues, a catchment-management framework is needed, though rarely will it be possible for centres to participate in comprehensive studies of whole river basins. Nevertheless, research on the off-site effects of agricultural, forestry and inland fishery practices is a legitimate part of the CGIAR's responsibilities. Therefore, production experiments should take account, whenever possible, of the possible consequences of new technologies for all downstream water users, for stream health and for coastal fisheries. Similar principles apply to the use of an integrated NRM framework for other kinds of research, such as IPM.

There is a need to improve the information on land and water degradation and its impacts on agricultural, forestry and fisheries production. Obviously, the CGIAR has limited resources to devote to fixing the deficiencies of the existing data, but it can work with other agencies to this end. In the absence of more definitive information, the CGIAR itself has little choice but to work on combating forms of degradation known to be serious, notably soil erosion and irrigation salinity, in selected hot spots. At the same time, some CGIAR resources should be allocated to monitoring trends in the condition of the resources under study and to setting baselines for future evaluation of impact.

A lot of sound scientific information already exists that could be adapted for the practical improvement of NRM. Two important conclusions follow from this assessment, which is supported by several authoritative sources. Firstly, future activities should focus on the incentives and other policy tools needed for effective widespread adoption of appropriate NRM knowledge and technologies. There is a common perception that the track record for the adoption of the results of research on NRM improvement is not good, at least in the less-developed world. While there are important exceptions, as in IPM on rice in Indonesia, this experience indicates that a cautious approach should be taken by the CGIAR in strengthening its NRM research. Where there have been successes already in developing countries, local participatory organizations working in a learning mode have been a common feature.

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What is a learning mode?

Secondly, the CGIAR should be highly selective in choosing areas needing further research, at least until there is a better understanding of the conditions necessary for worthwhile impact. Research should make full use of existing knowledge and contribute to filling gaps. This counsel is reflected in the careful preparation given recently to the Soil, Water and Nutrient Management Programme and the Systemwide Programme on Water Management.

The final point is that there is a powerful argument for more closely linking objectives on enhancing productivity and reducing the degradation of resources in conducting CGIAR research. The solutions to many soil and water problems lie not in expensive soil remediation or water-treatment processes, but in reducing or preventing their development in the first place.

Beyond this, in prioritizing its work, the study calls for the CGIAR to first attend to natural resources issues in terms of their implications for present and future production, and then for their effects on global environmental concerns.

4.3.8. Harvest and Postharvest Research in the CGIAR

The studies main conclusions were that the CGIAR should move towards an approach in determining priorities and strategies that gives greater weight to the harvest and postharvest parts of the production-consumption continuum. Centres should review, and strengthen where necessary, their internal capacities for identifying needs in harvest and postharvest research, and for assessing the most cost-effective ways of implementing projects. Monitoring and evaluation of harvest and postharvest research should be strengthened through existing mechanisms of internal and external review.

There is a need for a strategy to ensure that appropriate mechanisms are in place to enable the centres to identify harvest and postharvest problems so that centres, by working together, can evolve informal coordinating mechanisms. In any new approach to harvest and postharvest research, the centres should take full advantage of opportunities for collaboration with others, such as national organizations, sister CGIAR centres, ARIs, and industrial, manufacturing and processing companies.

III Summary of the report prepared by an External Panel Appointed by the Oversight Committee of the CGIAR, *Sustainable Agriculture for a Food Secure World: A Vision for International Agricultural Research, July 1994*

The main conclusions and recommendations of the report were that:

- Successful agricultural development requires: an enabling policy environment that does not discriminate against agriculture, forestry or fisheries; liberalised markets for farm inputs and outputs with major private sector involvement; efficient rural financial institutions; adequate rural infrastructure; and effective institutions to develop and disseminate appropriate agricultural technologies.
- Ensuring that agricultural growth contributes to poverty alleviation, equity and food security requires: creation of employment for the land poor and landless; increased production on small, medium-sized and large farms; attention to regions of varying agroclimatic potential, not only high potential areas.
- Instruments for achieving these proposed goals include: appropriate targeting of agricultural research and extension; ensuring adequate access by all types of farmers to credit, inputs and marketing services; investments in rural education, clean water, health, family planning, and nutrition programmes to improve human resources; attention to women's needs and legal rights; and, in some cases, land reform or redistribution.
- The research priorities that follow from the foregoing vision include: (a) continued work on high potential areas and generic technologies having widespread application (with the aim of achieving higher yields per hectare, at less cost, with less environmental damage) coupled with research on pricing, marketing, and distribution policies that ensure the poor gain; (b) research targeted to the majority of the rural poor living in areas that are resource poor, highly heterogeneous, and risk prone (aimed at improving farming systems rather than specific commodities, with less reliance on use of fertilisers and pesticides and more on IPM, green manures, agroforestry and cropping systems reducing erosion, and genetic systems increasing tolerance to stress).
- In summary, a revolution is recommended that is even more productive than the first Green Revolution and even more 'Green' in terms of conserving natural resources and the environment, a Doubly-Green Revolution addressing the new priorities of food security, income and employment generation, and conservation of natural resources and the environment. The outcome will be the creation of sustainable livelihoods for the poor. Increased use of molecular biology and an ecological approach in tandem with economics, sociology and anthropology will figure significantly in the research paradigm supporting this revolution.

- The CGIAR is envisaged as contributing to international research activities through *global* programmes geared to strategic research problems of international significance, and *regional* action programmes addressing specific sustainable production problems faced in significant geographic regions. Within this framework, three types of global programmes are suggested: long-term, centre-based programmes, multi-centre programmes, and collaborative strategic research programmes.
- Centre-based programmes would target research to regions where increased production is needed most urgently (SSA, S. Asia) and to situations where public research is most required because of market failures and where sustainability concerns are most pressing. These programmes would focus mainly on development of genetic materials for selected crop, livestock, forestry, and fish species.
- Multi-centre programmes would require coordinating mechanisms and focus on such activities as the conservation, characterisation and evaluation of selected germplasm; the provision of information, materials and training in research methods and approaches; and analyses of institution strengthening and of food policies for sustainable food security.
- Collaborative strategic research programmes would focus on research problems that are global in nature and cut across the core themes covered by the centres, for example: decline in yields of major cereals in intensively cropped, cereal-based systems; development of small scale irrigation and water conservation systems; improved understanding of key biological, physical, social and economic dynamics of selected critical agroecosystems; reduced production of global pollutants from agricultural practices (especially nitrous oxide and methane); development of user participatory approaches in the design and management of irrigation, forestry, and fisheries systems.
- Regional action programmes would undertake problem-specific research of shorter duration than global strategic research programmes, with agendas set by NARS, regional organisations, and interested donors. Such research might focus on sustainable farming systems for cash crops, synergetic cropping and crop-livestock systems for highland agriculture; and the like.