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The Activities and Modes of Operation within the CGIAR System: Options for the Future (AGR/TAC: IAR/90/4) was prepared by Dr. M.H. Arnold at the request of the TAC Chairman as a background paper for TAC discussions on the institutional options for an expanded CGIAR System. It outlines the principles on which the System has been based, poses questions on whether or not such a System is still necessary, and analyses those aspects that might be subject to change if the System expands. It is intended as a thought-provoking piece, not as an operational prescription for the future. However, it points to directions in which operational changes might be made to take into account changes already taking place and others that might be thought desirable for the future.

A first draft of the paper was discussed by TAC at its 50th meeting in Washington in October 1989. As a result of this discussion, a small panel was appointed to examine evolving relationships between international centres and national systems. A revised version of the relevant parts of the paper was made available to the panel, which met in Washington on 11 and 12 January, 1990. The whole paper was then revised and issued as a background document to the panels involved in assessing the non-associated centres.

This version of the paper was discussed by TAC at its 51st Meeting in Rome in March 1990 and was also provided to the Centre Directors and Centre Board Chairmen at the joint session at that meeting. Their comments are currently being sought. It is now being released to a wider audience as a discussion document in order that TAC can have the benefit of further inputs on these important institutional issues before preparing the second part of its report on the non-associated centres.

The paper should be considered as background material to Agenda Item 4: "TAC Chairman’s Report".

Attachments

Distribution

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ACTIVITIES AND MODES OF OPERATION WITHIN THE CGIAR SYSTEM:
OPTIONS FOR THE FUTURE

TAC SECRETARIAT
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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# TABLE OF CONTENTS

1. Introduction .......................... 1

2. Basic CGIAR Precepts ................. 2
   2.1. The Original Concept of an International Centre 2
   2.2. The Political Dimension of CGIAR Affairs ...... 3

3. A Clean Slate Approach ............... 4
   3.1. The Crucial Questions ............... 4
   3.2. The Case for International Research .......... 5
   3.3. The Case for International Centres .......... 6
   3.4. International Research and National Research Systems 7
       3.4.1. Definitions ...................... 7
       3.4.2. Collaborative Relationships ......... 8
       3.4.3. Contracting Relationships ........... 9
       3.4.4. Enabling Relationships .......... 9
       3.4.5. Conflicting Priorities .......... 10
   3.5. Strengthening National Research Systems ...... 10
       3.5.1. The Role of International Centres .... 10
       3.5.2. International Centres as Development Agencies 11
       3.5.3. The Need for an Enabling Function .... 12
       3.5.4. The Need for Coordination ......... 13
   3.6. Division of Responsibilities Among Centres ..... 14
   3.7. A Provisional Synthesis ............. 17

4. Conclusions .......................... 18
1. Introduction

The international institutes supported by the CGIAR and the national institutions with which they interact constitute a dynamic and evolving "System". Although the international component of the System's structure is directly controlled by the Group, the institutes it supports are legally autonomous. The Group has not attempted, therefore to exert direct control over their activities or modes of operation. Broad control is exerted through the budgets recommended by TAC, but detailed control has been left to individual boards and managements. The centres are expected, however, to adhere to the "CGIAR philosophy" which has many facets, but has never been comprehensively recorded or formally agreed.

Not surprisingly, therefore, the institutes have sometimes departed, to a greater or lesser extent, from this basic philosophy of the System. Largely through "special projects", boards and managements have exploited opportunities for extending their activities well beyond the provisions of their approved budgets, in ways that they have perceived as being consistent with their mandates, but which might not be consistent with the consensus of the Group.

Testing the Group's consensus on these more philosophical issues is not easy, however. It is possible only when major papers are discussed, such as reports of reviews of the System, or TAC papers on priorities and strategies. But the last review of the System was debated in 1981, and the 1985 TAC paper on priorities and strategies did not discuss all the relevant issues. Indeed, it specifically recognized several important items of "unfinished business".

Even the intended role of TAC is perceived differently among members of donor delegations. TAC is advisory, not executive. It does not control the detailed activities or modes of operation of the Centres. It does not set limits, in absolute terms, to the rate or extent of their growth. It evaluates the relevance and coherence of proposals for programmes and recommends budgets accordingly.

Moreover, some of the changes that have taken place at the Centres have been noticed by TAC only retrospectively - during the budgetary process, as a consequence of external reviews, or through visits of TAC liaison scientists. Indeed, only since the new budgetary process has been introduced and all special projects have come under scrutiny, has TAC been in a position to assess the
Evolution of modes of operation within the system has not therefore been strongly directed by the CGIAR. Rather, the evolution itself has often pointed to the need for rationalization and the re-definition of policy. There is nothing particularly unusual or undesirable about this process, but something more is needed if logical decisions are to be made about future expansion of the system, either in its coverage of subject matter or in its modes of operation.

This paper traces the origins of the basic precepts of the CGIAR System, analyses the causes of the changes that have already taken place and, against a background of a "clean slate" approach, considers options for the future. It then discusses some broad principles related to whether the non-associated centres might or might not fit into an expanded CGIAR System.

2. Basic CGIAR Precepts

2.1 The Original Concept of an International Centre

The first International Centres were created to do applied research on problems related to the food crisis. Solutions to the problems were needed urgently. Available resources were inadequate to contemplate strengthening national research capacities to the extent required to avert impending hunger and starvation. To get the research done as expeditiously as possible, the initial concept of an international centre was to bring together a critical mass of the best available scientists. They were given good support and facilities and were free to work within broad mandates, defined in terms of commodities, agro-ecological zones, or more specific problems that were crucial to increasing food production in developing countries.

Additional centres were progressively established, mainly on the basis of filling gaps in the overall research coverage. Initially, there was little perception that it would eventually be desirable for this collection of independent institutions to evolve into a coherent system; that they should do anything other than research, training and the dissemination of information; or that any individual centre need exist for more than about twenty-five years.

But views on all of these key concepts have now changed. Recent decisions by the Group call for greatly extended coverage. There is general support for the view that the System should be coherent, and that activities should, as far as possible, be harmonized across the System. There is a pervasive view that Centres should expand their role to include strengthening national
agricultural research systems, although ways in which this should be done have not been generally agreed. There also seems to be strong support for the view that, far from nearing the end of their useful life, there will be a continuing need for international centres extending well into the next century.

2.2 The Political Dimension of CGIAR Affairs

For the System to be effective, the donors must act in harmony, both in their collective decisions and in their individual dealings with the Centres they support. Each must therefore be sufficiently flexible to adjust its policies to fit the common philosophy. From the outset, it was the wish of the founding fathers that Centres should be insulated from those undesirable political influences that might divert them from the most expeditious way of bringing the greatest benefit in the shortest time to the greatest number of people in the developing countries.

In essence, this degree of political insulation was achieved through mechanisms designed to harness the opinions of the world scientific community to advise the Group, objectively, on priorities and strategies and on the maintenance of scientific quality. TAC was created for these purposes and the tradition established that its members were to be appointed as individuals, not as representatives of any nation or organization. The boards of trustees were designed to function in a similar way and, with the exception of the host country, all members were also to be appointed in their capacity as individuals. The intention was that neither the decisions of the Group nor of the boards would be biased by the policies of any single donor or beneficiary nation, and that the decision-making processes would not be prolonged through conflicting political interaction.

This principle of allowing priorities and strategies to be set objectively, with minimum political interaction, has been one of the principles that has contributed to the success of the System. It has profound implications, for example, for the types of institution, and types of funding that would fit easily into the mould. Institutions designed to serve a specific group of countries within a region or sub-region would be unlikely to be able to resist indefinitely the pressure for representation on their boards of the countries they served, and thereby come under political control. Equally, an international institute that was perceived, through its funding mechanisms, as promoting the policies of a single donor nation, might not be welcomed by some developing countries.

Notwithstanding these principles, donors have always been entirely free to assert choices that are consistent with their own policies through their financial contributions to individual Centres. The biases in the overall pattern of activities that this might introduce, however, is then largely neutralized through the contributions of the World Bank, acting as "donor of last resort". This unique method of determining priorities and allocating
resources has been another important key to the success of the CGIAR. It protects the institutions from short-term changes in policy and helps to ensure the continuity of effort that is vital for successful research.

Not all of these basic principles, outlined above, have been strictly or consistently adhered to, however. Initial departures from them came partly from the desire to see the results of research implemented as quickly and as widely as possible. IRRI's new package of technology for increasing rice yields could not be adopted by farmers in Indonesia, for example, until the national agricultural research system could be strengthened sufficiently to do the necessary adaptive research. Although technical assistance and the control of capital grants from bilateral funding formed no part either of the concept of the CGIAR System nor of IRRI's mandate, it seemed logical to its board and management for IRRI to accept bilateral funding and get the job done. It could, at that time, legitimately do this without reference to TAC or the Group as a whole.

It was in this and other ways that the "special project" came into being. At its best, the special project accelerated the agreed course of action of an individual centre. At its worst, it undermined some of the basic precepts of the CGIAR, exposed the Centres to the danger of biases in their policies, and made them vulnerable to the criticism that they had acted in the interests of a single donor or a single developing country and not in the best interests of the developing countries as a whole.

Both the First and Second Reviews of the System wrestled with the problems introduced by special projects and bilateral funding and suggested guidelines on what might or might not be legitimately funded from these sources. In general, however, the Centres did not adhere very strictly to either set of guidelines. Although the new five-year budgetary process has attempted to eliminate the differences between core funding and special projects, some questionable requests continue to be made by donors to Centres, and TAC is left to sort out the anachronisms.

It follows that neither the Centres' perceptions of their optimum modes of operation, nor the views of some of the donors on ways in which they might use the Centres most effectively, have always been in harmony with the underlying philosophy of the CGIAR. Put another way, there seem to be certain needs that could not be fully met if the basic precepts of the CGIAR System were rigidly adhered to.

3. A Clean Slate Approach

3.1 The Crucial Questions

To satisfy ourselves that we can visualize a coherent system for the future, while preserving the essential precepts of the
CGIAR, we have to ask some crucial questions. The answers to some of them may confirm what is already in place. If they do, it should not surprise us because many of the considerations that led to the original decisions have not changed. As we have seen, however, some of them have, and perceptions of the requirements have also changed. There may, therefore, be alternatives that are preferable to present modes of operation.

As a start to the clean slate approach, let us consider the following questions:

- Is international research necessary?
- Do we need international centres?
- How should international centres interact with national research systems?
- How should national research systems be strengthened?
- How should centre activities in developing countries be coordinated?
- How might responsibilities be divided among centres?

Although these questions will be discussed without specific delineation of the subject matter to be covered, it is only sensible to take into account that we are considering research and related activities in the general areas of agriculture, forestry and aquaculture.

3.2 The Case for International Research

Among the industrialized countries, there are many examples of international research in the sense of groups of countries collaborating on specific research projects. In some instances, such as in certain aspects of nuclear physics, countries are brought together because of the sheer cost of doing the research individually. This implies a central research activity funded by subscriptions from all collaborating countries. In other instances, countries may collaborate to take advantage of the range of different skills or environments that a group of countries can provide. This implies a decentralized activity in which each collaborating country funds its own contribution. This type of collaboration is now commonly called a "network".

Both examples are equally relevant to developing countries but, in this paper, we are considering research and related activities in the context of international aid. We must therefore add to our considerations, both the donor perspective and the aspirations of the beneficiary nations.

In providing aid for research and related activities, donors require that the funds they provide shall be used in a
cost-effective manner. In some respects it is as true now as it was when the first international centre was created that resources are limited and inadequate to meet all the potential needs.

It is only natural, therefore, that donors should look for ways of concentrating the effort, avoiding duplication, and increasing the probability of success. This is analogous to the cost-sharing that occurs in industrialized countries.

From the perspective of developing countries, however, funds used for research at international centres represent funds not available for their own national programmes. They would favour the research being done at international centres, therefore, only when it can be clearly seen to be more beneficial than the alternative of doing it through the national programmes. Indeed, some already have the trained personnel to undertake research of international relevance on a contractual basis, or through participation in a network, if a generally acceptable way of providing the funding and allocating the responsibilities could be worked out.

3.3 The Case for International Centres

It is the role of international centres to solve problems of wide applicability that would not be solved by developing countries on their own, because of inadequate resources or trained personnel, or because the problems would not be identified as having high priority in the national context. Coordinating the international conservation of genetic resources and their exploitation through genetic engineering would be good examples.

Where the international orchestration of research appears to be the most cost-effective option, decisions must then be made on where the research should be done: at an international research centre, by contract to selected developing countries, or by contract to advanced institutions outside the international framework.

International centres would be prime candidates for those parts of the work that require a relatively large group of experienced scientists and need to be done under appropriate ecological conditions. In contrast, advanced laboratory research, in genetic engineering for example, could be undertaken anywhere in the world and might well be more cost-effective if undertaken by contract to institutions outside the international system.

The principle of contracting could be extended, however, to research on a great diversity of problems. Indeed, there is increasing scope for international research to be undertaken by the stronger developing countries, either individually or collectively, provided there is a suitable international body to administer it. This mechanism has the advantages that it can have a strong component of institution-building for the contracting developing country, and the research usually contributes to solving location-specific problems, as well as international ones.
Contracting for international research should not be confused, however, with the provision of resources to national systems to do their own research. With this type of research, there will often be advantages in forming a network so that the scientists involved can exchange experiences. There might also be increased information to be obtained if the results were pooled for additional analysis and interpretation. In industrialized countries, these activities usually form part of the functions of scientific societies or of less formally constituted working groups. Although some have reasonably argued that this mode of doing research is international in character, it is not what is meant by "international research" in the context of this paper.

Recognizing the importance to developing countries of being associated in networks, however, it has become tacitly accepted by some donors that the administration and funding of this type of network is a legitimate function of international centres. Moreover, it is explicitly stated as a primary function of some of the non-associated centres.

It is, however, a function of international centres that was not analyzed either by the first or second reviews of the CGIAR and has never therefore been explicitly endorsed by the Group. What was implicitly endorsed by the group was the concept that (with the exception of ISNAR and IBPGR) the centres should be institutions for research and training, and should not duplicate the functions of development agencies or bilateral donors.

Consequently, in the clean slate approach, we must be clear about what this distinction might mean in practice, before we can decide whether or not it should still apply. The key to analyzing its implications lies in the various ways in which international centres interact with national research systems. To achieve consensus on these relationships will be one of the key issues in determining the future of the CGIAR and the types of institution it will be prepared to support.

3.4 International Research and National Research Systems

3.4.1 Definitions

Centre involvement with national systems will either involve the centre in contributing resources (funding, technical assistance, etc.), or it will not. Let us first define those that do not, as "collaborative" relationships, whether they are concerned with research, training, the flow of information, or some other activity. Then, other relationships that are not "collaborative" will, by definition, involve the provision of resources. Let us define these as either "contracting" arrangements or "enabling" arrangements.
Under a contracting arrangement the centre will fund (from core or extra-core sources) a particular piece of research, or a training project that is within its mandate and forms part of its approved programme. Under an enabling arrangement the centre might contribute personnel (i.e. technical assistance), capital, or recurrent costs to enable a national system to do its own research or training in the centre's mandated area, or to enable it to participate in a collaborative or contractual relationship.

These definitions can be applied whether the centre is involved with an individual national system, or with a group of national systems in a networking mode. Consequently, similar principles will broadly apply to both sets of circumstances.

3.4.2. Collaborative Relationships

The difficulty with collaborative relationships is that the national system must be strong enough in terms of human resources and funding, to act as an effective partner. Many ways have been promoted for overcoming this difficulty and, in recent years, there has been no stronger protagonist of collaborative research than the Australian Centre for International Agricultural Research (ACIAR). Although called a research centre, ACIAR is essentially a development agency, in that it facilitates collaborative research between scientists in Australian research institutions and those in developing countries, by providing the necessary resources. Using the terminology defined above, ACIAR fulfills an "enabling" function, so that research scientists in other Australian institutes can undertake "collaborative" research.

ACIAR has no direct counterpart in the CGIAR System, however, and the scientist-to-scientist linkages it establishes impose some constraints on the total number of scientists in the developing countries who can be involved at any one time. The networking principle helps to avoid constraints of this type and this is perhaps one reason why it has been much more prominent in the context of the centres, whether within the CGIAR System or not.

There is no inherent reason why collaborative networks in developing countries should not be organized in exactly the same way as those in industrialized countries, provided the national systems have the resources to collaborate. Nor is there any reason why centres should not participate in them or, indeed, why they should not render scientific assistance, such as advising on the design of experiments, helping with the collation and analysis of results, or funding attendance of the participating scientists at periodic workshops.

These would all be regarded as obvious functions of an international research institution. Conversely, to the extent that an international centre might contribute to a network by providing funding, equipment, or technical assistance to the individual countries, it would not be acting as a research institution, but as a development agency.
3.4.3. Contracting Relationships

Similar principles can be applied to contracting relationships. For example, in plant breeding programmes in industrialized countries, multilocation testing is achieved through contracts with cooperating organizations or individual farmers. Contracts are negotiated to re-imburse the contractor for the full economic costs incurred, plus perhaps a small bonus for cooperating. The number of such contracts is restricted to those necessary for the purpose of the research.

To produce improved genetic material for developing countries, an international centre needs to do likewise. In reality, however, contracts with the national programmes might involve much more than just reimbursement for the economic costs. They might involve the provision of a vehicle, or a plot harvester, as well as additional funding for labour and staff in order to provide the resources for an effective national breeding programme. Moreover, many more countries might wish to participate than would strictly be necessary for the centrally directed research. To the extent that the centre might provide resources beyond those required for the centrally coordinated research, it would not be acting as a research institute but as a development agency.

Contracts of this general type naturally extend to any research results, or new methodologies, that need to be validated over a range of environmental conditions - whether arising from research in the natural or the social sciences. Moreover, an international centre might wish to make special contractual arrangements with an individual national programme, for example to work on a specific plant disease or pest of wide importance, but not of regular occurrence at the centre location.

This principle can be widened to take advantage of any special circumstance or skill within a national system that could be used to further the purpose of the international programme. Such contracts provide opportunities for making use of well-trained personnel in developing countries, giving them greater motivation and helping generally to strengthen national research capabilities. The costs involved might be less than would be involved in doing the work at an international centre. The main disadvantage is that it precludes the involvement of the weaker national systems.

In all these contractual arrangements, however, similar distinctions to those already described for collaborative research would apply in relation to what might legitimately be regarded as part of the approved international research programme and what might, in reality, amount to direct development assistance to an individual country.

3.4.4 Enabling Relationships

In contrast, enabling relationships between international centres and national systems are those that are designed
specifically to provide resources to individual national research systems. Their purpose might be to enable a national system to participate in a network or other collaborative relationship, to enable it to undertake a contract, or to enable it to undertake its own research or training in the centre's mandated area. They involve the provision of funding, often involve individual donors and bilateral agreements, and sometimes involve technical assistance.

The main advantage of involvement by centres in this type of activity is that it enables the centre to extend its working relationships to a greater number of developing countries, thus giving valuable feedback, and also providing opportunities for greater impact. These are some of the justifications that centres offer for becoming involved in activities that are essentially the role of development agencies. Whether or not the end justifies the means, there is no doubt that enabling mechanisms are essential if the work of international centres is to be translated into national development.

3.4.5 Conflicting Priorities

In all of these relationships, there will be questions of priority, especially with respect to whether the Centre's priorities are in harmony with those of the national programme. Although priorities for contract research must be determined by the centre in relation to its approved international programme, priorities for collaborating and enabling arrangements should clearly be the prerogative of the countries involved.

Even with contracting arrangements there must be agreed ways of avoiding conflicting priorities. Scarce expertise in national systems should not be diverted from activities of high national priority to fulfil a centre's need for contracted research.

3.5 Strengthening National Research Systems

3.5.1 The Role of International Centres

To summarize, international research institutions would be expected to make their main contributions to strengthening national research systems through scientific collaboration and by providing information and improved genetic material. International development agencies would be expected to contribute through training, technical assistance, and capital grants. The issue is whether international centres should function in both capacities.

As far as training is concerned, the involvement of centres is unlikely to be controversial. Although the training offered by centres could never become a substitute for formal training at universities, it can make an important contribution to the overall training needs of national research systems. Indeed, training
is a natural function of international centres and fits comfortably into the philosophy discussed so far.

Technical assistance and the administration of capital grants are not international in character, however, and are often associated with bilateral agreements that are inevitably influenced by the policies of a single donor. They are therefore more difficult to reconcile with the basic precepts of the CGIAR.

These considerations give rise to important issues relating to possible ways in which the CGIAR should contribute more directly to strengthening national research systems. Many of the important considerations are implicit in the two questions that follow.

- What are the advantages and disadvantages of international centres being involved in technical assistance and the administration of development funding?
- What mechanisms, if any, should be adopted by an expanded CGIAR System for fulfilling such enabling functions?

3.5.2 International Centres as Development Agencies

We have already seen some of the advantages relating to the transfer of technology that centres derive from being involved in the scientific and technical aspects of enabling relationships with national systems. The centres can also benefit financially from the consultancy, coordination and other services for which they might legitimately be reimbursed.

From the donor's point of view, implementation of the research component of a bilateral development project by an international centre might present the easiest option. As well as being best placed to provide the technical input, Centres are often better placed than donor agencies to recruit personnel for technical assistance and to provide them with logistical support.

It might also be easier for the centre to administer the funding. Some donors have mechanisms for administering small grants, either through their own technical assistance activities, or through their embassies or high commissions. Others apparently have not. Some find it particularly difficult to administer the small amounts of funding involved for each participating country in a networking activity. This is one of the reasons why they call on the centres to do it for them.

There have undoubtedly been occasions when involvement of centres in bilateral development projects has benefited both the centre's research programme and the national systems involved, but there are also dangers in these relationships that tend to become greater as the centre's involvement in them increases. Indeed, over-involvement in bilateral projects, whether with individual countries or in a networking mode, can have distorting and even corrupting effects on both the centre and the national systems.
For example, staff appointed as international scientists may have their productivity eroded through heavy routine administration. Pressure from individual donors may distort the centre's priorities. A centre might seek participation in bilateral projects primarily to increase its budget or to achieve impact. This could distort the priorities of the developing country. Centres can become over-committed, resulting in the recruitment of staff for technical assistance who have little more experience than the national scientists, and do not command their respect. In one or more of these ways, the credibility of the centre might be undermined.

Although all centre involvement in bilateral projects now comes under the scrutiny of TAC, it has been difficult for TAC to make adjustments to agreements that have already been entered into. Furthermore, from the donor's point of view, these grants are not fungible. To reject them would therefore mean depriving the developing countries of badly needed resources to strengthen their national research systems. Even classifying the projects as "desirable" and not "essential" has caused problems for both the donors and the centres. There is a limit, therefore, to the extent to which TAC itself can prevent the distortion of priorities, unless it were to take a more hardnosed attitude, which might well be regarded as unnecessarily obstructive by all concerned.

Other dangers of too much involvement of centres in bilateral projects relate to the perceptions of the developing countries themselves. There is no doubt that many scientists in developing countries are coming to look upon the centres as donor agencies from whom resources can be obtained if a suitable request is made. That the particular request might be low on that country's list of priorities, might be secondary to obtaining the funding and the perquisites that sometimes accompany it. These might include honoraria to individuals, enhanced per diem allowances, as well as the provision of vehicles or other items of equipment. The extent of these perquisites might even become a bargaining point for collaborating with one centre instead of another.

All of these dangers have been experienced to a greater or lesser extent in the CGIAR System and valuable experience has been gained on how to avoid them. Any proposal for expanding the System, however, needs to take them fully into account.

3.5.3 The Need for an Enabling Function

The enabling function is necessary only for the weaker national systems, but is essential if the benefits of centre activities are to be fully exploited. All of the benefits of centre interaction with national systems could be achieved, however, through collaborative and contractual relationships. The dangers outlined above arise primarily when the centre also acts as the enabling agency.
The logical inference would be that centres should not fulfil the enabling function. Such a policy would be acceptable, however, only if there were adequate alternative mechanisms for doing it. The fact that some of the non-associated centres explicitly fulfil an enabling function suggests either that there are not, or that certain donors prefer not to use them.

Should some of the non-associated centres therefore be seen as enabling agencies and not, primarily, as international research institutions? If so, is this an appropriate role to be fulfilled within the CGIAR System? Indeed, should some of them expand their enabling functions to become more comprehensive in coverage, thus facilitating the application of packages of results produced by other centres?

As far as the CGIAR Centres are concerned, it has often been said that the problems could be avoided if the Centres showed greater constraint and the donors showed greater discipline. In reality, many members of the CGIAR abide by the unwritten rules and refrain from asking the Centres to act as implementing agencies for their bilateral projects, while others have employed development agencies outside the System, such as Winrock International.

An alternative would be for each Centre to fulfill the enabling function through a self-financing development unit, created specifically for this purpose within its overall structure, and actively seeking contracts with bilateral donors. Although such a proposal has not been explicitly discussed by the Group, past indications would suggest that it would not be widely supported because of the different character it would imply for the System. For the "clean slate" approach, however, it will be necessary either to reaffirm or to reconsider this position.

3.5.4 The Need for Coordination

The need to avoid placing too great a burden on national systems, through the independent approaches made by several centres, has been raised many times, especially in the context of Africa. The problems are partly associated with the number of networks that are being created. They all have a collaborative function, but many have an enabling function or a contracting function as well. However, the increasing number of networks is not solely determined by the needs of the countries. It arises partly from the enthusiasm of the centres to see national systems taking up their work, and partly from the encouragement centres get from bilateral donors to initiate them. In other words, the driving force is often supply, rather than demand.

From the viewpoint of the national system seeking help, the number of centres operating in a single region may be a source of confusion. Which centre does it approach for advice on research with a farming systems perspective, for example, or for training in the design and analysis of field experiments? Any one of the commodity centres or resource-management centres might well be able
to help with these problems, or with a wide range of similar, non-specific problems. The country might well not know which centre to approach (how could it?) and there might even be competition among the centres for an invitation to work with the country concerned.

The problem might be alleviated in several ways. The centres and donors could voluntarily cooperate sufficiently closely to harmonize their activities and avoid the overload on national systems; coordination could be effected through a formally recognized mechanism or through a designated institution, either existing or created for the purpose; and attempts could be made to ensure that networks were initiated as a result of specific requests from developing countries, or regional organizations, rather than from the wishes of centres or donors.

These and similar ideas have been the subject of continuing debate and analysis by a diversity of interested parties, such as the Africa Task Force, SPAAR and numerous others. The small panel recently convened by TAC to consider possible options, concluded that, for collaborative and enabling arrangements, there is no viable, long-term alternative to a demand-driven system in which the countries themselves define the problems and determine the priorities. Moreover, recognizing the different strengths of the national systems and the difficulties experienced as a consequence of centres dealing separately and individually with a large number of developing countries, the panel also concluded that there was a strong case for centres adopting a transnational approach.

The panel recognized that these conclusions have two major implications. They imply that centres must be able to respond to requests defined in terms of the countries' own perceptions of priorities, as distinct from priorities defined by TAC or the centre; and they also imply that an essential link in the chain of collaboration is an effective mechanism for transnational consultation. While there are considerable regional differences that might affect the application of both these principles, it is clear that neither could be universally applied without significant changes to the present international research system.

Before considering what those changes might imply, however, we must first consider ways in which responsibilities could be divided among a set of institutions designed to meet the global needs of developing countries for international research.

3.6 Division of Responsibilities Among Centres

Assuming that it would not be possible for all internationally-funded research to be orchestrated by a single centre, a rational way has to be found of deciding on the number of centres required and how responsibilities might be apportioned among them. Leaving aside the precise nature of the subject-matter coverage (which is not part of this paper), we may assume that the research will be concerned broadly with disciplines, limiting
factors, eco-systems, commodities (species), and geographical regions. These broad divisions may be regarded as vectors in a multi-dimensional matrix. Perhaps one or more of these vectors might usefully be used as a basis for dividing responsibilities. Let us consider them in sequence.

Dividing responsibilities on the basis of disciplines is characteristic of universities and institutions for basic research. It is far less appropriate for applied and strategic research, however, where the aim is the solution of problems, rather than the pursuit of academic excellence or the quest for new knowledge per se. The case for multidisciplinary institutes and strong interdisciplinary collaboration has frequently been argued for agricultural research, especially for the developing countries where solutions are dependent on the contributions of research in many different disciplines. We therefore reject a disciplinary basis for discriminating among centres.

Similar arguments apply, to a greater or lesser extent, to what has sometimes been called "factor" research, presumably because it relates to those factors that limit production, be they physical, biological or socio-economic. Although institutes that concentrate on a single limiting factor have often made strong contributions to problems in applied research through their specialized approach, the problems to be solved seldom relate to a single limiting factor. While it might well be workable, therefore, to define responsibilities according to limiting factors in the context of a single country, such institutes would not be well-placed to provide the degree of integration that is required for a global system of research in the context of development.

Division of responsibilities on ecological grounds, however, has much to commend it, especially in the context of integrating all relevant aspects of resource management, production systems, and preserving the quality of the environment. It is consistent with individual centres having global mandates i.e. each centre could have global responsibility for a particular eco-system throughout the world. Its main disadvantage is that it would not be congruent with any aspect of the administrative services in developing countries that are concerned with research and development, except perhaps for those concerned with irrigation schemes (regarding irrigated agriculture as an ecosystem). Moreover, assuming the multi-disciplinary nature of their work, some duplication of effort among centres would be involved because of the lack of congruence between commodities and ecosystems (maize, for example, is important over a wide range of ecosystems).

Division of responsibilities according to commodities, or groups of commodities, also has several attractions and some draw-backs. Although most production systems involve more than one commodity, well-directed production research built around a single commodity, or group of commodities, can strongly integrate work in different disciplines and on different limiting factors. Perhaps for this reason, extension packages are often most successfully promoted when they are built around a single commodity. Division
according to commodities also links directly to national development plans, in that some of the targets are usually defined in terms of commodity production.

Its disadvantages arise mainly from over-emphasis on the single commodity approach, or on a single limiting factor, such as genetic adaptation. Moreover, division of responsibilities entirely on a commodity basis involves duplication of effort, especially in research on resource management and related subjects.

Division according to geographical boundaries, i.e. according to regions or sub-regions, would have much to commend it in terms of logistics, close collaboration with national systems, and the organization of networks. A further, related advantage would be that developing countries within a region need collaborate with only one centre.

Geographical boundaries are also political boundaries, however, and the concept of international centres with independent governance, insulated from political influences, is incompatible with the concept of regional organizations with intergovernmental control. This is not to discount the value of regional organizations, but simply to recognize their different character. Another limitation of the geographical division of responsibilities among international centres is that it would mean a great deal of overlap in their research programmes and information services.

Using a single vector for discriminating among centres, therefore, ecosystems and commodities appear to have the most to commend them and, perhaps, the least serious disadvantages. To discriminate entirely among centres using either the one, or the other, however, would mean compromising on the disadvantages already mentioned. If it has been possible in the past to marry the requirements of a good commodity research programme with the requirements of a programme directed more broadly towards sustainable production systems, (and there has been variable success in this respect), it is likely to become more difficult, if not impossible, in future, for two main reasons.

First, research directed towards the improvement of sustainable production systems will have to be multi-commodity in its coverage and move into areas of research on land use and conservation that lie outside those normally dealt with in commodity production research. Second, research directed towards the improvement of commodities will increasingly become more specialised as researchers seek to exploit developments in biotechnology, giving rise to the need for new economies of scale in the provision of the necessary laboratories and equipment.

Consequently, it is difficult to escape from the conclusion that, in future, there will be a need for two types of international institute. Those with an agro-ecological focus and those with a commodity focus, each dependent on the others, and collaborating closely to meet the needs of developing countries.
On this basis, it is possible to envisage two interconnected sets of centres, all with global mandates, but one set based on ecosystems and the other on commodities. The ecosystem centres would act as hosts (sometimes referred to as "relay stations") for all the commodity centres with which they needed to collaborate in that particular ecosystem.

Perhaps the division of responsibilities among existing CGIAR Centres, partly on the basis of ecosystems and partly by commodities, is more logical than it has sometimes appeared, but considerable adjustments to existing mandates would be required to make it fully coherent. Indeed, a clear distinction between commodity centres and agro-ecological centres would imply a rational division of responsibilities, but would be viable only with unrestricted collaboration between the two types.

To combine existing CGIAR centres and non-associated centres in a global system following these principles would imply major changes to both sets, and could be contemplated only if the resulting global system could be predicted to serve the needs of the developing countries in more cost-effective ways. Such a prediction must be based both on an analysis of the needs and of the most effective institutional mechanisms. Other TAC papers have analyzed the needs in terms of subject matter. In this paper we take these needs as given and pursue the institutional options by combining the analyses in sections 3.5 and 3.6 of this paper.

3.7 A Provisional Synthesis

We have seen that national systems must be able to draw from the centres what they want in terms of national priorities, rather than what is available to them in terms of centre priorities. A commodity centre restricted by its mandate to work on specific commodities, for example, might not be well placed to provide an effective service broadly related to research on the production of annual crops in the context of soil conservation and watershed management. However, a centre with an agro-ecological mandate would be, and there would be no conflict of priorities.

The inference is that, especially with increasing emphasis on environmental issues, there would be many circumstances in which the needs of national systems could be more comprehensively met by agro-ecological centres than by commodity centres. As we have seen, however, the model does not imply the end of commodity centres. On the contrary it implies a more focused approach to commodity improvement, allowing commodity centres to specialize in those areas where they have traditionally excelled, with the more applied work being decentralized and done in collaboration with agro-ecological centres. Indeed, there are many precedents in the CGIAR System for this type of relationship, one of the more recent examples being the scientists from seven different centres working on problems of the semi-arid tropics at the ICRISAT Sahelian Centre.
In addition to providing facilities for researchers from other centres, agro-ecological centres would have their own programmes of research in the natural and social sciences related to resource management and production systems, including forestry and agro-forestry. They would also need to have strong linkages with policy research. Moreover, they would be well placed to become the lead international centres for a given geographical region or sub-region, thereby exploiting the advantages of regional centres, but avoiding the disadvantages (see section 3.6).

In their relations with national programmes, lead centres would build on the diversity of useful experience already gained from evolving relationships with national systems in the main geographical regions. In Africa, they would take fully into account the work of SPAAR and the Africa Task Force. In this context, the distinction made by the Africa task force between the “control” of project funding (how it is spent) and its “administration” (general accounting, coping with foreign exchange regulations, etc) is one that might usefully enter into the vocabulary for discussing these issues.

A major aim would be to move to a set of relationships in which priorities for work with national systems were determined by regional or sub-regional associations of countries or scientists, organized either under the umbrella of a political entity, or as an officially approved steering committee. Contractual relationships required either by agro-ecological or by commodity centres, to meet the requirements of their own research programmes, could also be facilitated by the same consultative procedures. Enabling relationships would be controlled through the regional entity and administered by the most appropriate agency, determined in consultations involving the donor, or donors, the regional mechanism and the lead centre.

The model implies that commodity centres would initially consult with national systems through the lead centre for the region, a procedure that might be seen by commodity centres as diminishing their access to national scientists and the collaboration that ensues from it. It would take time and sensitivity to overcome such fears. Moreover, there might well be disadvantages if the procedures for consultation were permitted to become unduly bureaucratic, but the trade-off would be the better fulfillment of national needs and expectations, closer collaboration, and avoidance of some of the pit-falls of the past.

4. Conclusions

Continued expansion of the CGIAR System has caused concern among the donors about future funding - of existing work, of new ventures, and of the non-associated centres, if they were brought into the System. The analysis above indicates that it might be possible to achieve a coherent international research system, covering all the desired types of activity, without requiring an unrealistic increase in funding.
First, there has to be a hard look at the need for work at international centres, as compared with a decentralized approach with greater contracting to national programmes. Second, the total number of centres has to be assessed in relation to the desired coverage and the most efficient division of responsibilities. Third, there needs to be agreement on the role of international centres in strengthening national capabilities.

Greater investment in contract research would be more flexible and, in certain circumstances, more cost-effective than a centralized approach. It might also tap sources of funding unavailable for the core budgets of centres. Moreover, rationalization of centre involvement in enabling arrangements with national systems might lead to a reduction of centre budgets, as well as to a reduction of the administrative burden on centre scientists.

The all-pervading aims would be: to make the most cost-effective use of available scientific expertise, whether employed nationally or internationally; to catalyze productive working relationships among all concerned; and to shape the institutional framework accordingly. With appropriate adjustments to the present division of mandates and responsibilities, new activities could be incorporated into the CGIAR System while keeping the total number of Centres within the bounds of reasonable funding expectations.