

THE INTERNATIONAL AGRICULTURAL RESEARCH CENTERS

and

THE FORD FOUNDATION

A Report to The Ford Foundation by David E. Bell

October 1981

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| <u>Contents</u>   | <u>Page</u> |
|---|-------------|
| Introduction  | 1           |
| Summary   | 5           |
| Principal findings and issues for the future  | 10          |
| . On the importance of agriculture and agricultural research in developing countries                    | 10          |
| . On the significance of the international centers - past and prospective                               | 14          |
| . On the centers' approach to questions of equity and the disadvantaged                                 | 24          |
| . On the changing roles of the centers, and their relations with national agricultural research systems | 31          |
| . On the structure and functioning of the centers and the Consultative Group                            | 37          |
| . On the role of the Ford Foundation  | 48          |
| Annex I-Organizations supported by the CGIAR  |             |
| Annex II-CGIAR membership, October, 1980  |             |

## Introduction

At the beginning of the 1960s, the Rockefeller and Ford Foundations jointly designed a new kind of organization, the international agricultural research center, in order to accelerate the production of food in developing countries. The innovation was successful. By the mid-1960s, the first two centers - the International Rice Research Institute (IRRI) in the Philippines and the International Center for Maize and Wheat Improvement (CIMMYT) in Mexico - were producing impressive results and talk of a "green revolution" sparked by better food production technology had begun. Over the next ten years new centers sprouted rapidly, funded by increasing numbers of donors. While the pace has slowed markedly in the last five years, there are today eight centers on the original model, plus five associated international organizations, all referred to generally (and in this paper) as "centers." The thirteen organizations are primarily funded through a Consultative Group on International Agricultural Research which was created in 1971 for this purpose. In 1981, some \$145 million is being contributed to the core budgets of the organizations by some 19 governments, 11 international agencies, and 5 foundations that are members of the Consultative Group.

The two Foundations have been prominent and active in the development of this complex set of enterprises through the twenty-year period, although their financial contributions have steadily declined, both in relative and in absolute amounts. In the 1960s, the Ford Foundation contributed about \$30 million to the capital costs of two of the centers and its annual contribution to operating costs rose to \$3 million per year; in the 1970s the Foundation contributed no capital funds and its contribution to annual

operating costs declined from \$3 million to the current figure of \$1.3 million per year. Rockefeller Foundation funding has followed a generally similar course. Apart from financial contributions, staff members of the two Foundations serve by invitation on the Boards of several of the centers, and participate in a major way in the formal and informal procedures of the Consultative Group. Over the past decade, it is fair to say that the influence of the two Foundations on the centers and on the Group has been much larger than their proportionate financial contribution.

The present paper results from a review, conducted on behalf of the Ford Foundation, over the first half of 1981, of the present status and future outlook of the centers and the Foundation's relationship to them. The objectives of the review were stated at the outset:

1. To review the relevance and effectiveness of the centers, and the Consultative Group, to date;
2. To assess their prospective contributions to the needs of the developing countries in the 1980s; and
3. Against this background, to consider the need for and potential usefulness of further involvement of the Foundation with the centers.

The primary sources of information drawn upon in conducting the review were visits and discussions during two field trips, one in Asia in February and early March, the other in Africa and Latin America in April and early May. Most of the time was spent with officials concerned with agriculture and agricultural research in developing countries: the Philippines, Indonesia, Thailand, Bangladesh, India, Pakistan, Kenya, Nigeria, Brazil, Colombia, and Mexico. Also included were visits of one or two days

each to five of the centers and two of the associated organizations: IRRI in the Philippines, the International Crops Research Institute for the Semi-arid Tropics (ICRISAT) in India; the International Service for National Agricultural Research (ISNAR) in the Netherlands; the International Laboratory for Research on Animal Diseases (ILRAD) in Kenya; the International Institute for Tropical Agriculture (IITA) in Nigeria; the International Center for Tropical Agriculture (CIAT) in Colombia; and CIMMYT in Mexico. I talked at length with, and received written comments from, Foundation staff members knowledgeable about agriculture and about the centers, in all the Foundation's field offices and in New York, and talked also with a number of other knowledgeable international observers resident in the developing countries I visited.

In addition to the information obtained on these trips, I have learned a good deal from participating in the second five-year review and evaluation undertaken by the Consultative Group itself, which has a professional staff of four persons who began their work in January 1981 and are aiming to complete it in August. I am a member of the Group's review committee and have benefitted greatly from discussions with its staff and from the three meetings of the committee, held in January, May, and July, 1981. In particular, the committee meetings have provided up-to-date information on the views of major donors to the centers, several of whom (including the governments of the United States, Germany, Australia, and the United Kingdom) are represented on the review committee.

These discussions and meetings have provided a rich array of evidence about the past and prospective significance of the centers, the changing relationships between national agricultural systems and the international centers, and other questions

important to the review. The evidence is summarized in this report. I am very conscious of the limitations of the report, especially the need to omit much highly interesting detail and illustration in the interests of brevity. I believe, however, that the evidence gathered permits firm conclusions to be drawn on the major issues addressed in the review, and I hope the report presents the argument clearly.

David E. Bell  
August 25, 1981

Summary

1. The international centers were conceived in response to judgments about the urgent need to increase food production in developing countries, and the crucial importance of stronger agricultural research efforts in tropical conditions if food production was to be stepped up. These premises have been verified over time and stand firm today. Indeed, the urgency of research has been heightened by the increases in energy prices in the 1970s, and the steadily rising awareness through these years of the limitations in the resource base on which improvements in agricultural production and the well-being of rural people depend.

2. The evidence is clear that the international agricultural research centers have thus far made a powerful, although uneven, contribution to raising food output in developing countries. Most of the gains have resulted from the high-yielding varieties of wheat and rice stemming from the work of CIMMYT and IRRI, grown in favorable environments in the developing countries. Some of the research at the other, more recently established centers, and on more difficult growing conditions, has begun to have an impact but most of it must still be listed as potential rather than actual.

3. The evidence is also clear that the centers have contributed in very useful ways to the build-up of agricultural research capacity in developing countries. There have been cases of tension and antagonism but there is no doubt of the net contribution made by the centers. National agricultural research directors particularly praised the training offered at the centers, which gives young researchers valuable experience with disciplined, results-oriented research organizations.



4. Looking ahead, the strong and uniform testimony of the developing country officials is that the international centers will be needed at least through the end of the century. The force and unanimity of this view was one of the clearest - and most surprising - findings of the review. The perception of the developing country scientists is that the world must find ways to feed another two billion people by the end of the century, most of them in the developing world. This increased production must come from the use of land and water resources that are already pressed very hard. The international centers can provide crucial contributions through their own research, through linking together researchers in different developing countries, and through providing effective links between applied researchers and advancements being made in fundamental science.

5. The international centers are generally alert to questions of equity as between smaller and larger farmers in reaping the benefits of agricultural improvements. Indeed, in my discussions with them, center managers generally gave more weight to equity than did national agricultural officials, most of whom put primary emphasis on production. The research programs of the centers have been influenced in many ways by concern for small farmers, but the centers' work on production technology does not, of course, reach directly to questions of agricultural institutions and policies - tenure, credit, access to supplies and markets, etc. - that affect strongly the distribution of benefits from technological change.

6. With one or two conspicuous exceptions, neither the international centers nor the national agricultural agencies have yet shown concern for the special problems of women in agriculture.

7. The role of the international centers changes as national agricultural research competence grows. There are still many countries, especially in Africa, where national research capacity is very thin. These countries press the centers for training and other help in capacity-building, and for research results applicable in their countries. Other developing countries by now have relatively advanced national research systems; while they can do much of their own applied research, they want the centers to join them in collaborative research on their most difficult scientific questions. Although it will clearly be difficult for the centers to stretch their responses effectively across this wide spectrum of demands from different developing countries, the leading centers such as IRRI and CIMMYT seem to be successfully adapting their style of work.

8. The centers and the Consultative Group are organized in a "loose federation." While this has the advantage of giving the centers much scope for independence and innovation, its effectiveness, and the continued flow of donor funds, are heavily dependent on maintaining the confidence of donors in the quality and relevance of the centers' research. At present, several improvements in the structure and process of the centers and the Group seem warranted. Among these are steps to improve the capacity of center Boards to ensure the managerial effectiveness as well as the scientific quality of center programs, and steps to improve the staffing and procedures of the Group for planning and evaluating the activities it sponsors in a time of high inflation and increasing financial pressures.

9. While it is accepted that the Foundation's participation is declining, strong arguments were offered, especially by center directors and the Foundation's

overseas staff members, for the Foundation to maintain its involvement with the centers and with the Consultative Group. The arguments clustered around three propositions:

- the Foundation, because of the character and continuity of its professional participation, contributes in a major way to the maintenance of quality standards in the centers and the Group, on which the effectiveness (and the financial support) of the work depends;

- the Foundation, because of its flexibility and style of work, provides important contributions to the capacity of the Group to investigate alternatives and to innovate in new directions;

- the centers and the Group are powerful instruments for serving objectives the Foundation believes are important, and by continuing to participate the Foundation can influence the direction and scale of effort toward those objectives.

10. If these arguments are accepted, operational conclusions that would follow include:

- The Foundation should continue for the time being its active participation in the affairs of the Consultative Group, and Foundation staff members should continue to serve on center Boards, when invited, where the Foundation's interests would be served.

- The Foundation's contribution to core budgets can perhaps decline further, balancing the need to retain a significant voice in the system with the desirability of doing so at minimum cost to the Foundation. (The Foundation would of course continue in appropriate cases to support special projects involving the centers.)

-The Foundation should vigorously encourage steps to increase the professional quality of Group processes and to strengthen the Group's capacity for planning and innovation, thus reducing progressively the reliance on Foundation involvement.

-Because the situation will continue to change rapidly, the Foundation should undertake another review in four or five years.

Principal Findings and Issues for the Future

On the importance of agriculture and agricultural research in developing countries

The original premises on the basis of which the international centers were conceived in the late 1950s can be summarized very briefly as follows:

-the demand for increased food in developing countries was seen as sure to rise rapidly over the remaining decades of the century, in response both to population growth and to increasing per capita income;

-for reasons both of economic rationality and of sheer physical feasibility, most of the needed food would have to be produced in developing countries, where at the time agriculture (and especially food production) was generally being given a low priority; this increased production could not be accomplished simply by the transfer of American or European agricultural technology, because such technology, as repeated experience had shown, was not suitable for most of the tropics and sub-tropics;

-to increase food production as rapidly as necessary would require many changes in the policies and programs of developing countries; a major requirement - in Frosty Hill's phrase, "a key log in the jam" - was to increase sharply agricultural research on food production in the tropics, which had been badly neglected in the past (most research in tropical agriculture had emphasized export crops - cotton, cocoa, coffee, palm oil, etc.);

-to get a quick start on more research on food production in the tropics, a few international centers of excellence should be established, to turn out research results rapidly and to help with the necessarily slower task of building up national agricultural research capacity.

Some of these propositions were controversial at the time. Within the Ford Foundation, for example, some staff members felt strongly that agricultural extension, not research, was the principal need. In retrospect, however, the premises underlying the centers have been fully borne out and they remain solid today. In particular, those who argued that agricultural research should be given high priority, and that without it extension agents would have little to offer the farmer, have clearly been proven correct.

Events in the intervening period have added additional strong reasons for giving high priority to agriculture and agricultural research in developing countries. Not only has demand for food risen rapidly with population growth and rising incomes. The ability to buy food abroad has been squeezed by the extreme pressure placed on the balance of payments of most developing countries by the high cost of petroleum imports. Even the countries with large oil revenues, such as Indonesia, Nigeria, and Mexico, whose attitude toward food imports a few years ago was a casual "we can afford them", have reversed their attitudes as imports have risen and claimed an embarrassingly large share of petroleum earnings.

Consequently, in most developing countries recent years have seen a steadily higher priority given to agriculture. And this trend has been reinforced by the uneven but unmistakable evidence of success, in many countries, in raising production substantially, with the double result of increasing domestic food supplies and raising the income and welfare of many rural families. It is remarkable, for example, and too little noted, that India and the Philippines are now marginally self-sufficient in grains (though not in other food needs, notably oilseeds). Even Bangladesh, though still an importer of grain, is doing much better, thanks largely to the same sweeping

gains in wheat production in the winter season that occurred a decade ago in India and Pakistan. And Richard Critchfield's evidence from the villages shows that these gains in national totals have begun to improve the lives of smallholders in many countries.

All this is seen by leaders in developing countries as only a beginning. The inexorable rise in food demand continues, and the early signs of a slackening of population growth will not reduce the anticipated 50 percent increase in world population in the next twenty years. African countries, because they have not yet achieved major gains in food production, feel with special urgency the need to emphasize agriculture. Most of the rural poor around the world have taken only the first small steps, if any, toward better lives.

Consequently, the developing countries see continued agricultural improvement as an urgent necessity. They also see it as a very hard problem, because they are pressed increasingly toward more marginal lands, more difficult sources of water, and more expensive agricultural production methods.

In the developing countries I visited, agricultural research is universally given a major share of the credit for the gains in food production of the last decade, and nearly all of them are investing substantial sums in increasing their own research capacity, using their own budgetary resources in most cases and large funds from the World Bank, AID, and other donors. As a result, agricultural research capacity is rising significantly in developing countries, although they are at very different stages of development. India is the furthest advanced, having quite strong staffs and national programs in rice, wheat, sorghums and several other crops, although also having

important gaps and weaknesses: for example, lesser work has been done so far on rain-fed (as distinguished from irrigated) rice or on oilseeds; efforts at regional adaptation in different parts of India are generally weak; and capacity for socio-economic research is very limited. Brazil has greatly expanded its research capacity in the last few years and trained several hundred researchers to the Ph. D. level; its annual budget for agricultural research is on the order of \$300 million. Other countries too, such as Mexico and Thailand, show real strength. From these relatively advanced cases, the variation in national capacity is very large, and ranges through a substantial number of countries that are making good progress to some of the poorer and less well-organized situations in which as yet there is very little local research capacity.

In summary, there is plainly a rising tide of interest in and support for agriculture and agricultural research throughout the developing world, and an extremely wide variation in research capacity among different countries.



On the significance of the international centers - past and prospective

The centers were established to help increase the quantity and quality of food production in developing countries (a) by speeding up the development and use of better technology for producing food in the tropics, and (b) by helping to strengthen the national agricultural research systems in developing countries, through training, advice, collaborative research and other means. How far have these purposes been achieved over the past twenty years? To what extent are they still important in the 1980s?

Leaders in agricultural research organizations, in ministries of agriculture, and in planning organizations of the developing countries I visited gave me consistent and clear testimony that the international centers have been of great value to date. National leaders in all parts of the developing world reported a variety of difficulties, differences of opinion, and disputes in their relations with the centers. Many of these relate to past problems that have since been rectified; others are current and unsettled. But the unmistakable and impressive fact is that the view in the developing countries of the value of the centers to date is overwhelmingly positive. The views of Ford Foundation overseas staff and other observers resident in developing countries were equally clear-cut and equally positive.

Three kinds of evidence are cited in support of these judgments: the quick adoption of new varieties; the value of the centers in training and capacity-building; and the impact of the centers' work on developing country policies toward agriculture and agricultural research.

1. The evidence is unquestioned that the results of the centers' research, especially the higher-yielding varieties of wheat and rice, have made a large contribution to raising food output in developing countries. While there are marked differences among countries, in overall terms by 1977, about one-third of the wheat and rice acreages of the developing world were planted to varieties that derived from CIMMYT and IRRI, and obtaining sharply higher yields. Reasonable estimates suggest that the increased production of wheat by 1976 attributable to improved varieties was worth around \$3 billion per year. These were certainly the most rapid adoption of technical changes in agricultural history, and were the more remarkable because they required individual decisions by literally millions of farmers, and because farmers had to adopt a variety of changes in planting and cultivation practices, not simply the use of different seeds. (This phenomenon is not limited to developing countries. By 1974 an estimated 26 percent of the semi-dwarf wheat acreage in the U.S. had a Mexican base.)

Important qualifications to this judgment should be noted. There are significant differences among centers in the contributions made to date. By far the largest impact - and the main basis for the high repute the centers enjoy world-wide -- has stemmed from the work of CIMMYT on wheat and of IRRI on rice. This is not only because they were the first two centers to be established, but also because they were able to draw on a great deal of earlier basic research. Most of the later crop-oriented programs were not able to draw on similar stocks of basic knowledge and only now, after a decade or so of research, are these programs beginning to be able to offer important gains - for example, in beans, cassava, and forage grasses at CIAT, in cowpeas and cassava at IITA, in millet and groundnuts at ICRISAT.

Moreover, the centers designed their initial products, naturally enough, for the most favorable environments. This resulted in the startling growth in wheat production in northwestern India and Pakistan, (and now, a decade later, in northern Bangladesh), where the winter growing conditions for wheat are superb, and the rapid adoption in areas with controlled water levels of the short-strawed, heavy-bearing types of rice. Finding wheat and rice varieties that are adapted to less favorable environments, and that are resistant to the wide variety of diseases and pests encountered in different places, is a difficult task on which considerable progress has been made but much remains to be done.

Finally, while the focus of the research at the centers has been on breeding better varieties, their objectives have required them to address related issues of great complexity, such as how to achieve stable, high-intensity farming methods for difficult environments (e.g., tropical rain forest, semi-arid tropics), and how research can identify and respond to the enormously varied conditions in which low-income farm families live and work. Important progress is being made on some of these problems but not on all.

It seems fair to summarize by saying that the centers thus far have made major although uneven contributions to increased food supplies, but they are tackling progressively harder questions and much of their anticipated usefulness is still to be realized.

2. A second judgment on which agricultural leaders in developing countries and outside observers were in accord is that the centers have contributed significantly to the improvement of agricultural research capacity in developing countries. They have done so in three principal ways:

-by providing specialized training at the centers' headquarters to several thousand agricultural research workers from developing countries;

-by extensive communications and consultation between scientists of the centers and those of the developing countries; and

-in special cases by the centers accepting responsibility for particular technical assistance projects intended to establish high-quality research institutions in developing countries.

The great emphasis placed by national agricultural officials on the training role of the centers was impressive. In country after country, the training offered by the centers was praised not simply for its content but because it gives participants first-hand experience in a tightly disciplined, results-oriented, research environment. Persons who have been through this experience are described as having gained attitudes and skills of great importance to their subsequent work in national research organizations - attitudes and skills they do not learn in the usual M.A. or Ph.D. graduate degree program. At the same time, excellent as the training is, there are clearly ways to increase the training value of the centers to the developing countries. While the numbers are substantial - a representative center may run several short courses in a year, enrolling a total of 200-400 scientists and technicians from developing countries, plus having in residence 20-40 pre- and post-doctoral junior scientists - some centers are not utilizing all the training capacity they have, nor do most centers interrelate their training plans closely with those of the developing countries.

Research directors in developing countries also value highly the extensive inter-communication between their scientists and those in the centers. Center

scientists travel a great deal, and each center has a continuous stream of visitors. Much of the travel is organized around workshops, annual joint assessments of research progress, and other meetings, at the centers or in the developing countries. All this has helped national research agencies substantially in building more professional, higher-quality programs. At the same time, as national programs in developing countries have become larger, and the inter-connections between them and the centers have become more complex, greater demands are being placed on the centers, and it is not clear how they can all be met.

With respect to special technical assistance projects, the record of the centers is a mixed one. Some have worked very well - for example, projects financed by the Ford Foundation in which IRRI helped to develop what is now the Bangladesh Rice Research Institute, and in which CIMMYT helped to increase the wheat research capacity of the national agricultural research organizations in Tunisia and Algeria. Other technical assistance projects - including some financed by the Foundation - have not been so successful. In general, there has been a view, shared by both the centers and the developing countries, that centers should limit their assumption of responsibility for large-scale technical assistance projects lest they detract staff and management time from research, training, and collaborative work. At the same time, there has been continuing pressure on the centers, from donors and from developing countries alike, to undertake particular projects in order to help build more quickly research capacity in developing countries. The establishment of ISNAR, it is hoped, will relieve some of this pressure but ISNAR is too new to offer any evidence on the point.

A third contribution of the centers to date was not anticipated - or at least not planned for. Through providing a convincing demonstration that large increases in food production are possible in developing countries, the centers have made a major contribution to changing priorities and policies. Because the results have in many cases been large and spectacular, they have changed the image of the agricultural sector from one of static, unchangeable tradition, to one of considerable and rapid response to scientific and technical opportunity. Policy-makers and planners in a variety of developing countries - and in donor agencies as well - state freely that the work of the centers changed their minds, and the minds of many political leaders, and showed them that investment in agriculture, supported by well-directed agricultural research, could pay rich dividends in larger output. This is not a lesson that has sunk in everywhere as yet but it is spreading.

Testimony from national agricultural officials as to the past value of the international centers, while impressive, was not unexpected. What did surprise me was their firm and unanimous testimony on the prospective value of the centers for at least the next two decades. Agricultural research directors, agriculture ministry officials, planning agency experts without exception took the same view. And again their views were shared by Foundation staff and other informed observers. Their argument was straightforward and relatively simple. They see the oncoming demands for food of another two billion people by the end of the century. They believe that while a good start has been made, there are very difficult scientific and technical problems to be overcome if food supplies are to rise to meet demand. And they consider the centers not just helpful allies but indispensable participants in the research effort that will be needed. The leading scientists I talked to in the developing countries

- men like H. K. Jain, Director of the Indian Agricultural Research Institute - stated that even the strongest national research organizations need the centers to make a crucial contribution in meeting the scientific challenges they see ahead.

Several functions for the centers are foreseen:

First, the centers are seen as leaders in identifying and dealing with complex research problems. H. K. Jain put the matter this way: until now, to improve agriculture in developing countries was understood to mean moving in the direction the U.S. had pioneered, with its heavy dependence on chemical fertilizers and combustion engines; with present energy prices that is a route developing countries cannot possibly afford, and new, low-energy agricultural systems must be devised. To do so is an extraordinarily demanding research task, beyond the capacity of any single country; it will require imaginative and innovative collaborative research efforts among the various national groups, organized and supported by the international centers, to achieve the objective. The same argument was made to me repeatedly, citing other difficult research problems, including (1) the need to develop rice varieties that will yield heavily in the uncertain and variable water depths of annual floods (in contrast to the regulated depths of controlled irrigation), and (2) the need to untangle the reasons for and develop counter-measures to the declining soil fertility increasingly found in areas of high intensity cultivation.

Second, the centers are seen as crucial links between the applied research efforts of the national systems and the more fundamental research scientists, primarily located in the advanced countries, who are working on subjects of great potential benefit to agriculture. The international centers can - and do - act as two-way links, pressing on the fundamental scientists the need for research advances that appear likely

to help with agricultural problems, and speeding the effort to apply to agricultural uses research results emerging from fundamental work. Examples of the need for more, and better targetted, fundamental research that were cited to me ranged from the complex problems of biological nitrogen fixation to the new biological technique of cell culture.

These two functions for the international centers - to help identify and deal with the most difficult scientific problems, and to provide a vital link between applied research and fundamental scientists constitute strong and (at least to me) relatively new perceptions of the prospective scientific value of the centers. In addition, the international centers are seen as making several other contributions of great importance.

A third function is to serve as a central source of genetic material. Under the guidelines of the International Board for Plant Genetic Resources, a Consultative Group-sponsored enterprise, centers concerned with various crops have been designated as world centers for gathering and retaining germ plasm banks. IRRI, for example, now stores some 50,000 different varieties of rice, and more are being added constantly. The stored germ plasm is available on request to plant breeders of all nations, and is a resource of enormous significance. Each year thousands of new crosses are made, all around the world, in the effort to find varieties better suited to particular conditions. Moreover, the central store of genetic material is insurance against emergencies. At present, for example, some 60 percent of the rice area of Indonesia is planted with a single variety, IR-36, which is both high-yielding and resistant to a major Indonesian insect pest, the brown plant hopper. It is very risky to have so much of Indonesia's



rice crop dependent on a single variety, and the existence of IRRI's germ plasm bank is a safety net because it contains genetic material that could be called on if a mutant insect or disease suddenly devastated IR-36. (These germ plasm banks, incidentally, are of increasing interest and value in advanced countries; for example, the germ plasm bank at CIMMYT was called into play a few years ago when the U.S. maize crop suffered severe losses from southern leaf blight.)

Fourth, while many of the research organizations in developing countries are becoming gradually stronger, there will be need for years to come for the kind of training and consultation contributions by the centers that the countries have found so valuable. In addition, there is as yet no persuasive concept of how agricultural research services can be effectively provided to the smaller and poorer countries. To some extent their needs conceivably could be met through regional institutions, cooperatively supported, or by drawing under agreed guidelines on the stronger national systems nearby. But solutions such as these encounter obvious practical difficulties and are likely to grow very slowly. Meanwhile the centers are heavily pressed to give special assistance in such cases, and clearly they should respond to the extent they can.

Finally, there is a role for the centers - an informal and sensitive role - in helping to communicate with governmental leaders in developing countries about the policy, program, and budget requirements for agricultural improvement. The centers are often (though not always) well-informed on the constraints that are holding back agricultural development in particular countries, and center directors and scientists, who have considerable prestige, may be able to call on and communicate with senior officials in ways that supplement usefully what national agricultural scientists can do.

Norman Borlaug of CIMMYT has often played this role with considerable effectiveness. It is not a role that can be given formal status but there is no doubt that, if carried out with skill and discretion, it is understood and appreciated by national agricultural research leaders.

These various responsibilities make up a formidable agenda, and the centers, as this reviewer sees them, need to change their staffing, styles, and programs in various ways if they are to respond as they should to the demands and opportunities they face. But the need for important evolution in the centers does not alter the fundamental conclusion: the research and training programs of the centers are needed and wanted for at least the next couple of decades, on the strong evidence of those in the best position to judge - the leaders in developing countries concerned most directly with agriculture and with agricultural research, and their Foundation and other resident colleagues on the scene and familiar with the circumstances.

On the centers' approach to questions of equity and the disadvantaged

When founded, the centers' objective was to find ways to raise food production yields per acre. This was expected to benefit both low-income consumers (through larger supply and therefore cheaper food) and low-income farmers (through larger production and therefore higher earnings). Both results have in fact occurred, but with important qualifications.

Low-income consumers have indeed benefitted from larger supplies and lower prices for food. Some studies suggest they have been the major beneficiaries of the centers' work. There is, of course, still enormous hunger in the developing world; this is seen to stem primarily from poverty among urban and rural families, and has not led to major demands on the international centers to change their research agendas or methods of operation.

The story is very different on the production side. Observers noted from the earliest days of the "green revolution" that larger and wealthier farmers benefitted more than poorer farmers from the introduction of more productive varieties. This led to much criticism of the centers and many urgings that they focus their research to concentrate the benefits on smaller farmers. More recently, as it has become plain that the problems of women in agriculture have been neglected, the question has arisen how far the centers can and should focus their research and training programs to benefit women. These issues figured prominently in my discussions at the centers and with developing country officials, and I came away with three main conclusions.

1. The centers have given much attention to the question of smaller, resource-poor farmers, and their research and training programs have been modified in important ways as a result.

-The choice of crops on which the centers do research has been broadened to include a series of crops that are important to resource-poor farmers - cassava, beans, maize, sorghum, millets, pulses, and others. These crops are typically grown in less-favorable environments and by subsistence farmers. Most of these crops had received little or no scientific attention in developing countries before the centers took them up. To find better varieties of these crops, and more efficient production methods, is directly reflected in improved diets for resource-poor farmers, and in increasing market supplies of foods eaten by the poorest people, urban as well as rural.

-The centers have broadened their attention to the more difficult environments faced by many small farmers. In some cases - ICRISAT, ICARDA, IITA - this objective was built into the charter of the center. In other cases, the centers' initial research focus has been changed. The most striking example is the major shift, over the past several years, in IRRI's research focus toward rice grown under rain-fed conditions. For its first ten years IRRI concentrated on rice grown under controlled irrigation, conditions in which large increases in yields were expected and obtained. But less than half the world's rice - in Thailand, for example, less than 20 percent - is grown in irrigated areas, and since the early 1970s IRRI has been increasing its attention to rain-fed rice, much of which is grown under flooded conditions (up to a meter of water, with the depth varying depending on the degree of flooding each year), with additional amounts grown under deep-water conditions (one to six meters of water), and under upland conditions (dry-land). By now, IRRI estimates that about 60 percent of its research is directed to rain-fed rice, only 40 percent to irrigated rice.

The shift in IRRI's research attention was made with the objective both of raising food production and of reaching farmers who work under more difficult conditions than those who enjoy controlled irrigation. IRRI's economists point out that the data do not exist to prove that the shift from irrigated to rain-fed rice raises IRRI's relative attention to poor rural people, because there are large numbers of very low-income people in irrigated rice areas. Nevertheless it is clear that including rain-fed rice means that in absolute terms IRRI is now working on the problems of much larger numbers of resource-poor farmers.

-The centers have increasingly focussed on breeding for resistance to insects and diseases, on biological methods of insect control, on maximizing biological fixation of nitrogen, and on other means for reducing or eliminating the need for costly pesticides, fertilizers, and other chemical inputs. These research objectives will help all farmers by reducing costs. But they will especially help low-income farmers who have the most difficulty in purchasing inputs.

-Some of the centers (notably IRRI and CIMMYT) have led the way in seeking methods through which agricultural research can respond to the needs of small farmers who use diversified cropping patterns rather than the single-cropping conditions on which agricultural scientists have traditionally focussed their attention. These experiments in "cropping systems" and "on-farm" research are very interesting in themselves, based as they are on the concept that agricultural research should be directly related to the actual conditions faced by farmers. For present purposes, it is important to note that these methods, if used by national agricultural research systems and by the international centers, should lead to research results more adapted to

small farmers' needs - as has in fact happened in experimental cases in the Philippines, Indonesia, Kenya, and elsewhere.

All this is impressive evidence that the centers are putting considerable emphasis on the problems of resource-poor farmers. Indeed I found some real contrast between the strong emphasis on equity issues in the international centers, and a somewhat lesser concern in the agriculture ministries and research units of the countries I visited. Those national organizations for the most part emphasize production first and equity second.

In consequence, the centers receive divided counsel on how far to shift their research toward the problems of smaller farmers - toward equity - to the possible detriment of research aimed at maximum output (which usually comes from the better lands and the larger farms). One center director said his Board divides clearly on this issue: the members from developed countries press him toward more research aimed at small farmers' conditions, while the members from developing countries press him toward a research plan aimed simply at maximum gains in production. In fact, this center and the others try to accommodate both objectives: production and equity. And it is not possible with the data available to make anything but rough estimates of what the trade-offs are.

2. A second important conclusion is that while the centers' work on food production technology can do much to help small farmers, it will not necessarily do much to reduce disparities in income among farmers. The discomforting fact is that virtually any improvement in technology that helps a small farmer can also help a larger one. Varieties that resist insects will save money for a small farmer - but will save even more money for larger farmers. In general, improvements in food production

technology developed by the centers are "scale-neutral" - that is, they can be applied with equal effectiveness on small or on large land areas.

Study after study has shown that most of the differential effect of the introduction of technical improvements results from differences in the distribution of land and other assets, and of political power, in each country. Larger farmers usually have easier access to credit, to water, and to supplies of fertilizer and other inputs. They are normally in a position to take larger risks in introducing something new. And the mere fact that they have more land and other assets ensures greater absolute gains to larger farmers, widening the gap in incomes between them and smaller farmers.

To increase equity for smaller farmers, therefore, requires attention to laws and policies concerning land tenure, credit, prices, and many other elements affecting farmers' opportunities and constraints. Officials of developing countries with whom I talked uniformly and firmly stated that these are matters for consideration by national governments, with which the centers should not concern themselves.

This is not, however, the end of the matter. Quite clearly the centers have (and should have) no power over national policies. At the same time, experience to date shows, it seems to this reviewer, at least two important ways in which center activities may legitimately and properly affect national policies. One is through the stimulation and support of studies in different countries of the conditions confronting small farmers and the constraints that limit the introduction of new technology. Such studies, conducted with care and accuracy by researchers in several countries working to common standards have already resulted in highly valuable information on the practical conditions facing farmers - which is the kind of information needed by

policy-makers in the various countries. The centers' role is not to draw the policy conclusions or to recommend specific policy changes but instead to contribute to the knowledge needed for those purposes.

A second way in which the centers can properly affect national policies is to ensure that the nature and effects of policy changes in specific countries are analyzed and the results communicated widely. The centers - perhaps especially IFPRI - are in a good position to examine the comparative results of different policies, and to try to make sure that policy-makers are informed of that comparative experience before they reach decisions.

These are sensitive matters and the centers are naturally cautious in approaching them. But some very illuminating studies have already been done by some centers on constraints to the introduction of new technology and others are moving in the same direction. At a time when agriculture and agricultural policies are being given increasing attention in developing countries, it would seem important that the centers should be encouraged to do everything they properly can to contribute to the best possible changes.

3. The third conclusion is that while the centers have done quite a lot, and are moving to do a good deal more, to recognize the special problems of smaller farmers, the record is not nearly so positive with respect to the special problems of women in agriculture. In contrast to the substantial concern I found for resource-poor farmers, with two principal exceptions I found little concern for women either in the international centers or in the national agricultural agencies. The reaction among many persons I talked to, especially in national governments, was a familiar one that we have seen repeatedly in the United States: a half-embarrassed, half-defiant



questioning whether women in agriculture face special difficulties and whether the issue is not an artificial one, created by the extreme views of a few "feminists."

The two exceptions I found are important and encouraging. One is the top civil servant in the ministry of agriculture in a large Asian country, who is an ardent believer in the need to give special attention to women in agriculture, and told me with pride that his ministry now has fifty women agricultural extension agents and more being trained. The other is ISNAR, the newest organization in the CGLAR group, whose top leadership are thoroughly alert to the problems of women in agriculture, and whose senior staff includes a woman who has given special attention to the subject.

Moreover, the recent letter sent to all center directors by the Ford Foundation, noting the increasing evidence that there is good reason to pay special attention to women's roles in agriculture (and in the centers) is being given serious notice. Each center director I spoke with acknowledged that the subject warrants increasing concern and several are beginning to do so.

Consequently, it seems fair to conclude that while sustained encouragement is plainly needed on this matter, one can see the real possibility of a steady increase in the centers' concern for women.

On the changing roles of the centers, and their relations with national agricultural research systems

It was part of the original concept of the international centers that their effectiveness was to be measured by gains in production in farmers' fields, not by increased yields on the experiment station or by publications in scientific journals. Therefore from the beginning the centers have been required to build working relationships with national agricultural research services so their research results could be tested and adapted locally and made available to farmers.

Furthermore, it was part of the original concept that the centers were to be places for advanced training, advice and assistance for the improvement of national research systems. And in some cases, as noted earlier, centers undertook special projects of institution-building, with funds provided outside their core budgets, intended to help create national research capacity.

All this made for a set of complex and sensitive relationships that often resulted in tension, friction, and controversy. International center scientists often were seen by their national counterparts as impatient and domineering, overpaid and over-praised. National scientists were often seen by their international counterparts as slow-moving, uncooperative, out-of-date and mired in bureaucratic red tape. Relationships were (and are) especially sensitive in host countries, where the comparatively favorable research environments and employment conditions of the international centers usually contrast markedly with those of the national research community, and questions of who is entitled to credit for any gains that are made loom especially large. Moreover, changing conditions over time may add special elements of difficulty - as in cases where the tutorial relationship of a technical

assistance project has come to an end and, in theory, been replaced by a collaborative relationship among equals, a transition not easy for either side.

It is not surprising, therefore, that relationships between national research services and international centers have often been difficult. In my discussions with national officials I heard a variety of disparaging or hostile comments about particular cases - many of them past cases but a fair number reflecting current perceptions. What was more impressive, however, as I have indicated above, was the overwhelming view among senior agricultural research leaders that the centers as a group have been extremely valuable and are crucially needed for the future.

As far as I can see, there are at least three main reasons for this net positive view and each carries lessons for the period ahead.

First are the unmistakable facts of success, as sizeable gains in output have occurred in country after country as the result of cooperation between national and international scientists and credit has been given to both. Today, it is the centers that have not yet made strong and widespread contributions about which one hears most of the skeptical or critical comments. The lesson for the centers is salutary: they are under strong, continuing, and public pressure to collaborate with national researchers and to produce results in farmers' fields - and, as recently happened to one center, when an initial claim of results was not verified in field trials, to recognize error quickly and begin again on more promising lines.

A second reason for the generally high regard in which the centers are held is the proven value of their training programs. By now in many developing countries

not only junior but middle level and some senior agricultural research scientists have received part of their training at one of the centers. With very rare exceptions they consider their training to have been excellent, they retain high regard for the center scientists who were their teachers and they welcome opportunities for collaboration - attitudes that are reciprocated by the center scientists for their colleagues in national research systems. The lesson is plain: strong training programs contribute powerfully toward building collaborative relationships between the centers and national research services, and the centers are under much pressure to expand their training activities. The agricultural research directors of eighteen African countries recently asked for a reservation of 60 percent of the training openings in all centers for Africans, an indication of the rising demand for center training as more and more countries give higher priority to agricultural research.

The third reason, in my view, why the centers are regarded highly is that the boards and managements of the centers have changed the centers' style and methods of operation substantially as the national research organizations have grown in competence and maturity. The changes at IRRI are a clear illustration.

As stated in its own long-range planning document, IRRI was originally designed on the model of a first-class national center: its scientists conducted their own research on IRRI's station, and their results were disseminated as IRRI's products. Today, IRRI functions in a very different way. It no longer names and releases varieties as IRRI products, but instead contributes genetic materials, to be used by breeders in different countries as they may wish - to be released there (with a local name) or used as crossing material. And, rather than concentrating almost exclusively on their own research at Los Banos, many of IRRI's senior scientists spend half or more of

their time organizing and participating in collaborative research activities with colleagues in national research systems.

A good example of the newer style is IRRI's International Rice Testing Program (IRTP). This is a collaborative research network in which rice breeders at IRRI and in national programs, each year, offer their most interesting new crosses for testing by their colleagues; test each other's offerings and report the results; and once a year join together in a week-long workshop to assess results and plan ahead for the following year. It is a true collaboration; scientists from IRRI and from the countries test each others' varieties and join in assessing progress and identifying next steps. There is obviously competition among the breeders (and IRRI's new crosses do not always come out at the head of the list), but the major attitude described by the participants is one of cooperation and mutual learning for all participants.

Such a collaborative research network is plainly a powerful method for encouraging rapid scientific progress in all the participating countries and by the group as a whole.

A collaborative research network like IRTP can also be a highly effective arrangement for achieving mutual confidence and cooperation among national and international scientists. It is not managed - or perceived - as an instrument through which IRRI dominates. All the scientists participate - and feel themselves to be participating - as equals, choosing which new varieties they want to test and making their own decisions, when the year's results are available, about next steps. At the same time, all are under substantial pressures for scientific rigor and discipline: all accept the mutual

obligation of conducting the tests and reporting the results accurately; and through visits to and from IRRI (and increasingly, to and from other countries), and through the annual assessment workshop, all benefit from exposure to the ablest scientists in their field.

The lesson is that the collaborative research network, initiated and supported by an international center, appears to be an excellent method both for making rapid scientific progress and for achieving harmonious cooperation among scientists whose different nationalities, salary scales, and working conditions might otherwise easily result in friction and controversy.

At the same time, operating through collaborative research networks places special requirements on an international center. While each of the center's staff members does not have to be the best in his field in the network, collectively the center's staff has to be of very high quality and able to be consistently on the frontiers of scientific advance if the center is to have the respect and credibility that will permit it to play a central role in organizing a network. Moreover, the individual scientists who take the lead in organizing networks must have personal qualities - of openness, generosity, cooperative attitudes, and managerial skills - that are not universally available: many scientists who are excellent individual researchers do not have the personal characteristics that would permit them to be good organizers and leaders of collaborative networks. To operate in this newer mode therefore requires some restaffing of the centers and a search for the appropriate qualities when new hiring is done.

In my observation, the centers vary in the degree to which they have modified their attitudes and practices toward a collaborative research style, but all are moving in this direction and it therefore seems legitimate to anticipate a continuation of productive relationships as the roles of the international centers continue to change and the national agricultural research organizations continue to grow in competence and maturity.

It is important to recognize, however, how demanding are the various requirements being proposed for the centers. To accomplish the set of functions making up the evolving role of the centers, center scientists, in addition to first rank research abilities, need now also to be able to organize international collaborative activities, and to draw the interest of fundamental scientists to problems growing out of applied research on food production. Among the most important, but most difficult to organize, of the collaborative research activities on which the centers need to take leadership are those concerned with socio-economic constraints and questions of agricultural policy. At the same time, the centers must continually differentiate their activities, supporting usefully on the one hand sophisticated research organizations like those of India, Brazil, and Mexico, and on the other national research units that have as yet very limited capacity. They must conduct professional and personal relationships with scientists in many developing countries - for some centers, with dozens of countries. Clearly the centers face extraordinary demands for sensitive and effective staffing and research management if they are to respond successfully to their various constituencies.

On the structure and functioning of the centers and the Consultative Group

The international centers and associated institutions, and the Consultative Group on International Agricultural Research, make up a "loose federation" whose structure and functioning are historically unique. (A list of the centers and institutions is attached as Annex I; a list of Group members as Annex II.) Each individual center and institution is organized as a separate legal entity under its own board of trustees. The Group is a voluntary association of donor agencies that meets once a year (occasionally twice) to review the progress of the centers and institutions, to determine whether new organizations should be supported by the Group, and to pledge contributions for the following year. Donors make pledges - and payments - to individual centers and institutions; there is no central pooling of funds. The Group is supported by a Technical Advisory Committee of part-time scientists, and a small, full-time Executive Secretariat.

In formal terms, the rather astonishing result is that a substantial set of research enterprises, necessarily requiring for their effectiveness long-term continuity of effort, are financed one year at a time by a large group of donors each of which is free to withdraw at any time. Plainly what has made this fragile arrangement stable and effective thus far is a series of mutual understandings and informal commitments, among the more important of which are:

- The boards and management of the centers understand that their legal independence is tempered and that in practice they must be accountable to the Consultative Group on which they depend for financing;

- The members of the Consultative Group understand that their freedom to withdraw is tempered by a common responsibility to raise each year some



minimum level of funding for the centers;

-The boards, management, and scientists in the centers understand that their excellent working conditions and freedom of scientific inquiry are justified by the expectation that they will produce important results, rapidly applicable in farmers' fields;

-Two members of the Group have made general funding commitments: the United States will provide 25 percent, and the World Bank 10 percent, of whatever total the Group is willing to finance;

-Above all, these various understandings and commitments rest on a common agreement among all parties on the importance of agricultural research, and on their joint confidence in the high quality and relevance of the research and training being conducted by the centers.

Thus far the results are very positive:

-the Consultative Group has a remarkable record of raising funds over the past ten years, and most of its members are solidly committed to continued provision of funds, (although it is by no means certain that sufficient funding can be found over the next few years to keep up with inflation, let alone to provide for an expansion of the CG system in real terms);

-CG meetings and proceedings have established an enviable record of addressing substantive issues in a serious and straightforward manner, and conducting business informally and expeditiously. Persons from advanced and less developed countries commented frequently and favorably on all this, and contrasted it to the usual processes of intergovernmental organizations whose processes are slower, more cumbersome, and much more affected by political considerations.

At the same time, there is clear need for a number of improvements to be made in the structure and function of the centers and the Group. These are being reviewed and considered in detail by the Group's own five-year review process, and only the more important issues are discussed in the present paper.

The international centers.

Improving the centers begins with their boards. The essential independence of each center and its board of trustees is a cornerstone of the present arrangement, because it is universally agreed to make for flexible, high-quality, fast-moving research organizations. But it also can and does result in uneven performance among the centers, which underlies the need to try to assure the highest possible quality in board members.

Initially, the center boards were conceived of as self-perpetuating, and made up of persons experienced in scientific research and scientific management; most boards have 12-16 members, about half from developed and half from developing countries. The Ford and Rockefeller Foundations were represented by charter provision on the boards of the first four centers and have been represented by invitation on some of the more recent boards.

Three changes seem desirable:

-In order to knit the center boards and the donor community more closely together, the practice has been introduced in some centers of having some members of the board (usually three) nominated by the Consultative Group. This seems to be working well, and presumably will be gradually extended to all centers.

-As the centers have grown larger and their programs more complex, it is clear that several of the boards need members chosen less for scientific and more for managerial experience.

-As the boards gradually turn over membership, new persons come on who may have little experience with boards of this type and the responsibilities they entail. Clearly new board members need more orientation and education - perhaps even a brief "manual for board members."

In addition to the boards, the center directors and other senior managers in several centers also need to pay more attention to managerial concerns, including financial controls. The fact that some financial control problems have arisen is a clear warning that some top managers have concentrated too exclusively on scientific questions. The centers are substantial enterprises with highly specialized management requirements. It seems fair to say that in several centers, top managers need to pay more attention to management questions and financial and administrative staffs need to be strengthened.

Are the centers too lavishly constructed and equipped? Could costs be substantially reduced by applying tighter standards? My own conclusion is that undoubtedly, in retrospect, the construction standards in some cases were unwisely generous (and the Ford Foundation bears at least as much blame for this as any other organization). But even if the original planning had used more austere standards, it would still have had to include such expensive elements as emergency generators to maintain power when the local electrical system fails, and housing in cases where the local supply is inadequate. Moreover, the financial pressure of recent years has forced the centers to reduce standards of operating costs and defer capital maintenance and replacement. At present it is my impression that there are no large savings to be made and it is steady improvement in managerial efficiency across the board, rather than major cuts in frills, that is the appropriate objective.

The centers have repeatedly raised a question of efficiency which has to do with the donors, not the centers. This is the cost to the centers of the practice of many donors of paying their pledges slowly in the fiscal year. The result is that most centers run short of cash during the fiscal year and are forced to borrow temporarily at high rates of interest. They clearly need more working capital of the type the Foundation has provided in some other fields, but so far no way has been found to provide it.

Two other matters which present problems have to do not with the separate centers but with the centers as a group.

One is the question of outposted staff. To maintain liaison with developing countries and to participate in research activities, the centers have a number of staff members who are not resident at headquarters but are posted elsewhere, in countries on a regional basis. (For example, CIMMYT has three persons posted in Nairobi for work in East Africa, and three in Bangkok for work in South and Southeast Asia.) The different centers use quite different patterns for such postings and there is no reason to strive for uniformity for its own sake. There is reason, however, to be concerned about the rather confusing picture presented to developing countries - especially to countries that do not have large and mature research staffs. Such countries feel the need for some simplified way to have access to the centers; the African research directors have indeed asked for some sort of consolidated centers' field office through which they could deal with all centers. This is a problem not yet solved.

The second question relates to interchange and cross-fertilization among the centers. There are clearly cases in which different centers, proceeding

independently, are not benefitting as quickly as they could from what is being learned at other centers. The current work on "cropping systems" or "on-farm" research methodology is an example. Without derogating the value of independence - and even competition - among the various centers, it would seem desirable to arrange for more frequent and sustained interchange among them.

The above changes would represent significant improvements with respect to the centers. It is generally agreed, however, that the needs for improvement are larger - and more difficult to achieve - with respect to the Consultative Group itself.

#### The Consultative Group

It was recognized from the beginning that the Group is an arrangement both for raising funds and for making policy. There are current problems with respect to both.

a. As the Group has grown larger and funds have become tighter, the planning issues confronting the Group - such as whether to establish a center for research and training on water management - have become more difficult to resolve through the customary informal, consensus-building processes the Group has used until now. (The same difficulty will confront the Group as and when it is appropriate to consider whether to phase out a center.)

b. The Group has difficulty making budget decisions in situations in which total funds raised are less than budgetary requirements. Last year (1980) was the first year in which this problem was serious; prospective funds for 1981 were several millions dollars short of budgeted needs, even after budgets had been squeezed substantially. The outcome was that the Group imposed an across-the-board

percentage reduction, an unsatisfactory result, because it had no means for making careful judgments on relative priorities.

c. The Group has difficulty dealing with cases where things go seriously wrong. One center has had considerable difficulty over several years settling down to a clear and effective program of research; another center recently discovered a serious case of misuse of funds. In both cases, the Group's reaction has had to be improvised.

d. While the Group has been in agreement since its beginning on the importance of careful evaluation, each five years, of the effectiveness of each center, the quality of the evaluations has in practice been quite uneven. Consequently, a center that has been judged against rigorous standards, by an evaluation team that states its views clearly, may be disadvantaged in the eyes of donors in comparison with a center whose evaluators have been more lenient and wrote their report in more muffled prose.

e. As agricultural research has moved up the priority scale, and the combined work of the international centers and the national research organizations is seen as increasingly important, there has been a rising desire on the part of developing country officials to have a larger voice in the decisions of the Consultative Group.

To address these various problems, several changes are under consideration - all being carefully weighed in the light not only of the defects needing correction but also of the uniform desire to retain authority in the centers to act in innovative ways, and to keep to an absolute minimum the central bureaucracy of the Group.

First, it will clearly help to strengthen the Technical Advisory Committee to the Group. The Committee is the Group's scientific conscience, advising on the desirability of adding new lines of research and terminating old ones, in existing centers as well as possible new ones. It is therefore active in the budget and planning process, and it conducts on behalf of the Group formal, five-year evaluations of each center. (Annual reviews and evaluations are conducted by the board of each center, usually through a program committee that includes distinguished visiting scientists as well as members of the centers' board.)

The TAC is made up of twelve scientists, half from developing and half from developed countries. All serve on a part-time, consulting basis and as the work load has risen they have had difficulty giving it sufficient time. One improvement that would clearly be desirable would be to choose as Chairman of the Committee a person who could devote close to full time to the job, and to choose some members who can give substantial time to Committee business.

Another difficulty with the present system is that turnover is too rapid. Committee members serve two year terms, with a limit of two terms. Clearly it would be desirable to permit some members to serve at least six years, in a situation where continuity has considerable value.

Second, the Executive Secretariat of the Group needs to be strengthened. The Executive Secretary in the future probably should be a person of considerable stature and experience in agriculture, rather than, as in the past, a person with primarily World Bank experience. A scientist was added to the Secretariat some years ago; this was a valuable improvement and the post has been ably staffed. At

present it would seem desirable to add an economist, which would substantially strengthen the capacity of the Secretariat to analyze planning and budget choices and to help evaluate the system's effectiveness.

Third, the representation of members of the Group in its meetings and deliberations should be strengthened. Too often, members are represented by officials from foreign ministries or embassies who are not well qualified to discuss the substance of the issues before the Group.

All these steps would help. Many observers, however, including most Foundation staff, believe that in addition ways need to be found to deal with the fact that the Group is a large body (over thirty members regularly attend) whose major means for taking decisions is the unwieldy one of plenary sessions. An increasing number of issues would benefit from some process in which a smaller group discusses and debates a question, at greater length than the full Group can afford, and recommends a solution to the full Group. Several ideas for meeting this need have been put forward, and in special cases, on an ad hoc basis, sub-committees of one kind or another have been used successfully (the present five-year review committee is an illustration). There is still much resistance, however, to the concept of establishing a regularly-constituted sub-committee that would sit several times a year. Many members of the Group believe this would be an unwise delegation of authority and prefer to maintain the present system, unwieldy as it is. If this view should prevail, as now seems likely, the other ways cited above for strengthening the staff services to the Group, and for strengthening the representation of members in Group meetings, become even more important.



The question of how to improve the efficiency of Group processes is inter-related with the question of participation by developing countries. The Group is often criticized as being dominated by a small number of persons and organizations from developed countries.

Participation by developing countries in the affairs of the centers and the Group needs to be looked at in several settings. By and large, developing country participation on centers boards, on the staffs of the centers, and on TAC, is seen as satisfactory. Many research scientists in developing countries want to participate more in determining the research programs of the centers; this is in many cases a justified view, which will be responded to satisfactorily as centers move more fully toward a collaborative research style.

Developing country representation in the Consultative Group itself is more difficult and has been recognized as such from the Group's beginning. At that time all the donor members of the Group were from developed countries or were international organizations. To provide for developing country representation, each of the five FAO regional assemblies was asked to designate two countries that would send people to Group meetings, one of whom would speak for the region on any issue before the Group.

In general, this pattern of representation has worked poorly. With some notable exceptions, those who came to the Group meetings were uninformed about the Group's way of doing business and the issues before it. Their interventions were therefore ineffective, leaving them frustrated and the other members of the Group impatient.

For the future, two changes would seem relevant. First, some developing countries have joined the Group as donors: Nigeria, the Philippines, India, Mexico, and (expected this year) Brazil. (Iran and Saudi Arabia joined in the past but are inactive.) These members will need like any others to send competent representatives to the meetings, but assuming they do so their voices should carry heavy weight in the Group's deliberations.

There is not likely to be a large number of additional developing countries that join the Group as donors because an informal rule has been accepted that a donor member will be expected to contribute at least \$500,000 each year. (The rule seems reasonable as a means of keeping the Group to manageable size.)

How then will smaller developing countries be represented? The most useful course would seem to be to continue to use the FAO regional selection process, but to urge the assemblies to choose persons of known competence rather than designating countries (which then send whom they please), to appoint them for longer periods than two years, to arrange for their orientation and briefing, and to pay their way to the meetings when they need it. If these improvements could be introduced the voice of the developing countries in Group meetings would be substantially strengthened.

On the role of the Ford Foundation

The Ford Foundation, like the Rockefeller Foundation, has over the years become less prominent in the affairs of the centers and the Consultative Group. Since the first four, more recent centers have been established under the auspices of the Group, not of the Foundations, (although Foundation staff members have often been asked to serve on the Boards of new centers). The Technical Advisory Committee and the Executive Secretariat have gained competence and experience. The Consultative Group, originally an organization with a dozen members, has become a much larger body. In recent years, at the request of the two Foundations, the charters of the four original centers have been in process of change, to delete the requirement that the two Foundations name members of their Boards; this change has now been completed for three of the four.

On the financial side, the two Foundations have become in the course of the last decade relatively minor elements in financing the centers. In the present year, the Foundation is contributing \$1.3 million toward a total of about \$140 million in core budgets, (and perhaps an equal amount toward the support of special projects undertaken by the centers, which total about \$30 million this year). In these circumstances the question naturally arises whether the Foundation's financing of core budgets, and participation in the Consultative Group, should be brought to an end; the question is sharpened by the unusually long period of time the Foundation has stayed with one group of grantees.

The evidence and argument I heard on this subject were clear and forceful. Not everyone I spoke to on this subject had an opinion to express, but the heads of the international centers, the members of the Foundation's field staff and other foreign

observers, and several of the national agricultural research leaders all strongly urged the Foundation to continue its involvement with the centers and the Consultative Group. Three main arguments emerged.

1. The first is that the Foundation contributes in a major way to maintaining the high standards of quality and relevance on which the entire enterprise depends, and we are able to do this because of the professional character and continuity of our participation. The testimony of many observers was that Foundation staff members serving on center Boards, participating in Consultative Group meetings, advising and consulting with the TAC chairman, with secretariat staff, and with others in the system, provide an important and positive influence for sustained, high-quality, professionally-based decisions. The Foundation is able to make this contribution not by special staffing or program activities, but as the natural result of having professional staff, both in New York and in the field, who are concerned on a continuing basis with the progress of agriculture in developing countries. In some countries the Foundation is directly involved in agricultural research, in other countries it is not, but in nearly every case it is easy for overseas and New York staff jointly to bring to bear an informed and influential judgment on the issues before the Group.

The logical question to ask is how far other members of the Consultative Group could bring to bear the same continuity of professional judgment the Foundation does. It is true that many donors do not have resident overseas staff as the Foundation does. But all the major donors by now have scientists who have served on the Boards or staffs of some of the centers, and others who are highly knowledgeable about tropical agriculture. Donor agencies who are members of the Group could tap this knowledge in appropriate

ways when they address Group questions, and include such scientists in their delegations to Group meetings - and do this with sustained care. One center director told me he had been asked by officials in one member government why the delegates of his government were not listened to at Group meetings as attentively as the delegates of the Ford Foundation were - even though the Foundation's monetary contribution is far smaller. The director replied, he told me, that the answer was easy: the government in question is represented at CG meetings by "the third secretary of the nearest embassy"; if the country were instead to draw in an organized and sustained way on scientists who know a lot about the centers and about agriculture in tropical countries, they "would soon find their influence larger than the Foundation's."

The conclusions to be drawn for the Foundation seem clear. We should take seriously the judgment of informed observers that our participation in the centers and the Group is, for the time being, of considerable importance. As indicated earlier in this report, there are important and difficult issues facing the various centers and the Group as a whole over the next few years, in a time of inflation and financial pressure, and it would be unseemly for us to turn away from their need for our participation.

At the same time, there are several actions the Foundation can take to encourage stronger and broader professional continuity in the management of the centers and the Group:

-We can encourage the kind of changes in membership in center Boards, and in the orientation and support of Board members, that were outlined earlier in this paper; in addition Foundation staff members can continue to play an important informal role in identifying new Board members, from both developing and advanced countries, who have the managerial and scientific experience needed to strengthen Boards.

-We can encourage the kinds of improvements in membership and staffing of the Technical Advisory Committee and the Executive Secretariat that were suggested earlier in this paper;

-With respect to professional participation by the other members of the Group itself, we can encourage this in general discussions, as I am currently doing in the deliberations of the five-year review committee. In addition, it might be useful to discuss it separately with several of the major donors - and this might be done appropriately in the course of familiarization visits by the Foundation staff members who will be responsible for relations with the Group.

2. A second argument made to me in support of the view that the Foundation is currently very important to the centers and the Group is that the Foundation provides major contribution to the capacity of the system to investigate alternatives and to innovate in new directions. The argument is that the large international and governmental donors are prepared to support activities that have been demonstrated to be sound and productive, but much less ready to support initial experimentation. Cited in support of this view are the facts that the Rockefeller and Ford Foundations supported the first experimental centers; the Ford Foundation supported the first introduction of economists into the centers; the Ford Foundation supported initial outreach activities to bring the centers into direct support of national agricultural systems in Pakistan, India, Bangladesh, Indonesia and several other countries; and the Ford and Rockefeller Foundations along with the International Development Research Centre of Canada (a governmentally-supported foundation) established and maintained the International Food Policy Research Institute in its initial years before the Consultative Group was prepared to accept sponsorship.

There is plainly a good deal to this argument, as a current illustration demonstrates: some of the most interesting and useful work now being done on the question of establishing a new center for water management is being done by Foundation staff members in New Delhi and New York. Moreover, the centers are in a period when not all innovation will be additive; a series of questions will need to be addressed about which activities should be phased out, either because their main contribution has been made or because room must be made for more important new work. Such questions will raise hard issues of analysis and judgment to which the Foundation can make substantial contributions.

Again the conclusion for the Foundation seem clear. We should respect the judgment of responsible observers that we are currently contributing something important to the centers and the Group. At the same time, we should take what actions we can to improve the Group's capacity for planning and innovation:

- Encouraging the strengthening of the Technical Advisory Committee and the Executive Secretariat, as suggested above, will be helpful in improving the capacity of the Group as a whole to face choices;

- We can encourage further improvement in the capacity of each center for planning and evaluation; several are now using multi-year forward planning processes, which draw heavily on the economics staffs the Foundation has promoted;

- An interesting idea, suggested to me by a European donor, was that the Group might create a special fund for innovation and exploration, and that the Foundation might devote its contribution to the system to that fund, rather than to individual centers as in the past. Many questions immediately arise, of course, about how such a fund might be designed and managed. But the idea is clearly worth pursuing.

-Another idea, suggested to me by a Foundation staff member, was that the Foundation might be able to help, through the Program Related Investment approach, with the working capital requirements of the centers. This seems difficult to me in view of the scale of funds required, but I have not followed the recent work of the PRI staff and it is certainly worth a careful look.

3. The third argument for continued participation by the Foundation is pressed by members of its own staff: The Foundation should continue because the centers and the Group are powerful instruments for serving important Foundation objectives, and it can accomplish a great deal at reasonable cost through participation. The Foundation can press the system toward greater attention to the disadvantaged, to women, to economic and social concerns. One Foundation staff member made an eloquent plea that one or more of the centers should take up a concern for fuel wood, which is becoming such a scarce commodity for poor farm families.

The current discussion of water management is a good illustration of the case. The Foundation has strong views on how such a center ought to be organized and managed so that it will bring maximum benefit to farm families; there are vigorously competing views; and the Foundation can because of its participation in the system have a significant influence on the outcome.

The argument, in short, is that the Foundation, as a respected participant in the system, can have a substantial impact in influencing the system to serve a variety of objectives it considers of great importance. It is clear that various field offices of the Foundation will continue in the future as they have in the past to support particular projects in which the centers are involved. But the argument here relates to the leverage the Foundation can exercise not on specific projects but on the broad



research and training objectives of the system and the priorities that guide the use of core budget funds. That can be done only if the Foundation continues to be a member of the Consultative Group and to contribute to core budgets.

If the Foundation heeds these three arguments - two asserting that the Foundation should continue to participate for the good of the system, the third asserting that we should do so for our own purposes - what operational decisions might follow? Perhaps four might be identified.

1. Foundation representatives should pick up and carry forward the active roles in Group and center affairs that senior Foundation staff have long been playing, based on familiar patterns of widespread and continuous communication between New York-based and overseas Foundation colleagues.

2. The Foundation's total contribution to core budgets can in my opinion continue to edge downward, balancing the need to retain a significant voice in the system with the desirability of doing so at minimum cost to the Foundation.

3. The various steps outlined earlier to increase the professional quality of Group processes and to strengthen the Group's capacity for planning and innovation - plus additional steps that may be identified - should be undertaken, in order to reduce progressively the reliance on Foundation involvement.

4. Because the circumstances will continue to change steadily, another review along the lines of the present one should be undertaken in four or five years.

| <u>Organization</u> |  | <u>Starting<br/>Date</u> | <u>Location</u> | <u>Major<br/>Program</u>                  | <u>Senior<br/>Posts</u> | <u>1981 Core<br/>Operating Budge<br/>(\$ million)</u> |
|---------------------|--|--------------------------|-----------------|---|-------------------------|---|
| WARDA               | West African Rice<br>Development<br>Association (partially<br>supported) | 1971                     | Liberia         | Rice                                      | 31                      | 2.9   |
| IBPGR               | International Board<br>for Plant Genetic<br>Resources                    | 1973                     | Italy           | Genetic<br>Materials                      | 2                       | 3.4   |
| ILRAD               | International Labora-<br>tory for Research on<br>Animal Diseases         | 1974                     | Kenya           | Trypanoso-<br>miasis; East<br>Coast Fever | 50                      | 10.0  |
| IFPRI               | International Food<br>Policy Research<br>Institute                       | 1975                     | United States   | Food policy                               | 23                      | 2.9   |
| ISNAR               | International Service<br>for National Agri-<br>cultural Research         | 1980                     | Netherlands     | Institution-<br>building                  | 12                      | 2.4   |

Organizations supported by the  
Consultative Group of International Agricultural Research

| <u>Organization</u> |  | <u>Starting<br/>Date</u> | <u>Location</u> | <u>Major<br/>Program</u>   | <u>Senior<br/>Posts</u> | <u>1981 Core<br/>Operating Budget<br/>(\$ million)</u> |
|---------------------|--|--------------------------|-----------------|--|-------------------------|--|
| IRRI                | International Rice Research Institute                            | 1960                     | Philippines     | Rice   | 57                      | 19.2   |
| CIMMYT              | International Maize and Wheat Improvement Center                 | 1963                     | Mexico          | Wheat<br>Maize   | 79                      | 20.1   |
| ITA                 | International Institute of Tropical Agriculture                  | 1967                     | Nigeria         | Farming systems in the Humid Tropics;<br>Cowpeas<br>Cassava<br>Maize | 53                      | 16.5   |
| CIAT                | International Center for Tropical Agriculture                    | 1968                     | Colombia        | Field beans<br>Cassava<br>Forage<br>Rice                             | 62                      | 17.1   |
| CIP                 | International Potato Center                                      | 1972                     | Peru            | Potatoes   | 29                      | 8.7  |
| ICRISAT             | International Crops Research Institute for the Semi-Arid Tropics | 1972                     | India           | Farming systems;<br>Sorghum<br>Millet<br>Legumes<br>Groundnuts       | 69                      | 12.9   |
| ILCA                | International Livestock Center for Africa                        | 1974                     | Ethiopia        | Livestock production systems   | 67                      | 8.8  |
| ICARDA              | International Center for Agricultural Research in Dry Areas      | 1976                     | Syria           | Mixed farming systems;<br>Barley<br>Lentils                          | 31                      | 11.5   |

CGIAR Membership, October 1980

| <u>Member</u>    | 1980<br>Contribution<br>(\$ Thousand) | <u>Member</u>  | 1980<br>Contribution<br>(\$ Thousand) |
|------------------|---------------------------------------|--|---------------------------------------|
| <u>Countries</u> |                                       | <u>International Organizations</u>                     |                                       |
| Australia        | 2,910                                 | African Development Bank                               | 40                                    |
| Belgium          | 3,210                                 | Arab Fund for Economic and<br>Social Development       | 255                                   |
| Canada           | 6,810                                 | Asian Development Bank                                 | -                                     |
| Denmark          | 1,080                                 | Commission of the European<br>Communities              | 4,300                                 |
| France           | 850                                   | FAO  | -                                     |
| Germany          | 9,440                                 | Inter-American Development Bank                        | 6,700                                 |
| Iran             | -                                     | World Bank   | 12,000                                |
| Ireland          | -                                     | International Fund for Agricultural<br>Development     | 4,150                                 |
| Italy            | 700                                   | OPEC Special Fund                                      | 1,000                                 |
| Japan            | 7,000                                 | United Nations Development Program                     | 4,868                                 |
| Mexico           | 1,000                                 | United Nations Environment Program                     | -                                     |
| Netherlands      | 2,625                                 |  |                                       |
| New Zealand      | 25                                    |  |                                       |
| Nigeria          | 833                                   |  |                                       |
| Norway           | 1,930                                 |  |                                       |
| Philippines      | 150                                   | <u>Foundations</u>                                     |                                       |
| Saudi Arabia     | -                                     | Ford Foundation  | 1,300                                 |
| Spain            | -                                     | International Development Research<br>Centre of Canada | 1,335                                 |
| Sweden           | 3,180                                 | Kellogg Foundation                                     | 133                                   |
| Switzerland      | 2,370                                 | Leverhulme Trust                                       | 494                                   |
| United Kingdom   | 6,500                                 | Rockefeller Foundation                                 | 1,600                                 |
| United States    | 29,000                                |  |                                       |

Non-donor members: Five countries chosen every other year by the Regional assemblies of the FAO.