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Development policy

French and American agricultural science for the third world

Jacques Gaillard and Lawrence Busch

The French approach to agricultural science in the third world is characterized by several central scientific agencies, each employing large numbers of scientists for the whole of their careers. In contrast, the US draws on university scientists as mainly short-term consultants on particular projects.

Despite these differences in approach, both nations are moving away from the older technical assistance models toward scientific cooperation with developing countries. There are also clearly expressed needs for institutional changes to allow for more flexibility and efficiency and more long-term support. Although they are rarely seen in that light by either the French or the Americans, both systems play roles that are often complementary.

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SCIENCE AND TECHNOLOGY are hallmarks of contemporary western civilization. Western societies are permeated with scientific and technical values and much of the rest of the world now strives to copy the technologies that have made western material culture what it is.[1] Thus, it is not at all surprising that the United States, as a scientific and technical (S&T) power, should have attempted to spread science and technology around the world. Nor is it surprising that France as a former colonial power and an important S&T power has considered the development of science primarily in her former colonies as a moral obligation and altruistic mission.[2]

In this paper, we examine the particular role that scientific and technical assistance has played in American and French foreign aid programs. Even if the US has recently curtailed its aid, the two systems remain major donors on the international scene. While the focus is clearly put on agricultural science policies, these are examined in the overall framework of the two systems.

As we shall see, agricultural research is receiving a significant share of the overall support in both systems. Furthermore, the agricultural sector has been a major source of political support for the entire aid appropriation and for science and technology programs in particular, both at the national and international levels, although health and population programs have also received significant support.

While a brief historical overview is attempted, the history of these efforts is beyond the scope of this paper.[3] Similarly, we acknowledge the importance of hundreds of small non-governmental

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organizations, though a detailed discussion of their role is impossible in this space.

The main objective is to compare current institutional structures and programs, and negotiations for change, as well as to analyze possible new directions in both countries. In the comparison a particular attempt is made to show the extent to which both systems are complementary, as well as to stimulate critical analyses that might serve to improve them.

THE FRENCH SYSTEM[4]

Brief historical background

The institutionalization of French tropical S&T activities took place at the end of the 19th century. In tropical medicine, the first laboratory of biological medicine was created in Saigon in 1871 and the first overseas Institut Pasteur was inaugurated in Algers on 1 November 1894. The first botanical gardens were established in Africa at the beginning of the 20th century.

At this time, the development of industrialization in Europe had already increased the demand for raw materials and accelerated important changes in colonial policies. Following a period of commercial coastal activities, a strategy of occupation and use of the land was developed. This in turn required the establishment of technical services in the French colonies. Thus, a groundnut experimental station was established in Bambey, Senegal in 1913.

The necessity to provide French colonies with a research organization was brought forward at several scientific congresses held in France during the years preceding World War II (WWII). The Office de la Recherche Scientifique Coloniale (ORSC to be renamed ORSOM and then ORSTOM) was created in 1943 with the main objective of supporting agricultural research.[5] ORSTOM's research areas were then rapidly diversified to include natural sciences, human biological sciences, social sciences, engineering and communication sciences.

At about the same time, several commodity-oriented (for instance, oilseeds, cotton, fruits) agricultural institutes were also created, modeled on the French rubber research institute (IFC) created in 1942. The headquarters of these institutes was (and is still) located in France. Personnel was almost exclusively French expatriates and very little attention was paid to research-capacity building in the colonies.

The end of the colonial era did not immediately change this situation. In most cases, the activities of the French institutes continued on the same lines in the context of bilateral agreements. Later on, with the training of an increasing number of national researchers, most of the French-speaking African States have progressively established their own National Research Institutes.[6]

In 1970, in order to cope with this progressive nationalization, France restructured the specialized institutes within an umbrella organization named the Groupement d'Etudes et de Recherches pour le Développement (GERDAT). In 1984, GERDAT was transformed into the Centre de Cooperation Internationale en Recherche Agronomique pour le Développement (CIRAD) integrating the former GERDAT institutes as departments and adding a new one: Systèmes Agraires (farming systems).

In the same year, ORSTOM, while keeping its old acronym, established multidisciplinary departments and was renamed Institut Français de Recherche Scientifique pour le Développement en Coopération. With the reform of these two specialized institutes (CIRAD and ORSTOM) French scientific cooperation aims at "maintaining a balance between basic and applied research" through an interdisciplinary approach to the problems.[7]

In 1992 CIRAD underwent yet another reorganization to make it more responsive to problems that extend beyond a given commodity. In particular, environmental problems associated with agriculture are to be given more emphasis. Departments are no longer organized along commodity lines but by broad areas of research such as perennial crops.

Current institutional structures

According to the Ministry of Research, France is spending 2.2 billion FF (approximately US$ 400 million)[8] and is mobilizing about 5000 people working on third world research,[9] out of which some 3000 are scientists. The main course of the system has been set by three Ministries (Research, Cooperation and Foreign Affairs), which have traditionally relied on specialized institutions (ORSTOM, CIRAD, and the Institut Pasteur Outre Mer [IPOM]) for implementation. Important efforts have also been made during the last decade to mobilize the entire French S&T potential to work on problems relevant to the third world through competitive research grant programs.

With the exception of Indochina, French tropical research remained limited to Africa until the early 1960s. Research activities in the French overseas Department and Territories (DOM-TOM)[10] only developed in the early 1970s. In Latin America, French researchers started to form a visible critical mass only in the late 1970s and early 1980s. Work in Asia has been (and still is) very limited. Thus, despite a redeployment in the other geographical areas, the continent of Africa remains the primary beneficiary.

Agricultural research, with more than half the total resources, is by far the most important research area, followed by environment and health: other areas which were promoted during the 1980s receive a much smaller share of the national effort

Agricultural research, with more than half the total resources, is by far the most important research area. It is followed in order of importance by environment and health. Other areas which were promoted during the 1980s receive a much smaller share of the national effort. They include mainly engineering, development studies and urban research.

French participation in the Consultative Group for International Agricultural Research (CGIAR), although still limited to about 1% of the CGIAR budget, has steadily increased through the 1980s. Closer relations have also been established between CIRAD, ORSTOM, and the Institut National de Recherche Agronomique (INRA), and the CGIAR centers, involving information exchange, researcher exchange programs, complementary projects and joint studies. France has also contributed to the creation, and participates in the main activities, of the Special Program for African Agricultural Research (SPAAR).

Three ministries

French colonial history still affects the respective responsibilities of the different ministries responsible for international development research activities. Thus, the world is divided into two categories of countries: the former French colonies in Africa (known as countries *du champ*) and the others (countries *hors champ*). The former are under the responsibility of the Ministry of Cooperation, whereas the latter come under the Ministry of Foreign Affairs.[11]

The Ministry of Cooperation spends about 2% of its budget for S&T activities. The Ministry of Research is responsible for the budgets allocated to all French public research institutions. For the specialized research institutions for development through cooperation such as ORSTOM and CIRAD, the budget is developed in consultation with the Ministry of Cooperation. Within the Ministry of Research there is a special department responsible for research activities in cooperation for development (RCD). To these three ministries could be added a fourth, the Ministry of the DOM-TOM, for the research activities with which it is concerned.

In order to give a new impetus to S&T cooperation between France and the developing countries, the Ministry of Research took the initiative of launching a countrywide review of research activities in cooperation for development. The results were presented in the Berque Report.[12] One of the main outcomes was the launching of a National Program (Programme Mobilisateur no 4), "Research and Technological Innovation for Development", under the co-trusteeship of the Ministry of Research and the Ministry of Cooperation. This program was in operation until the end of 1985.

With the change of government a new triennial plan (1985-1988) for Research and Technological Development was adopted. In this the importance of research in cooperation with the third world was reaffirmed but, at the same time, budget allocations for that purpose in the RCD Department within the Ministry of Research decreased significantly. A new interministerial coordination mechanism was set up in 1990 entitled The National Research Coordination Committee for Development.

Two specialized institutions

The two main specialized institutions are ORSTOM and CIRAD.[13] CIRAD is the only French research institute specializing in tropical agricultural research for development. It defines itself as "an applied research body... [which] must produce useful results for development".[14] With an annual budget of 900 million FF and close to 900 researchers and technicians, CIRAD accounts for about two-thirds of the French resources for international agricultural research.

Technical fields such as agronomy and soil sciences predominate whereas the social sciences are a tiny portion of the professional staff. Half of this staff work in France, the remainder being shared between Africa (30%), DOM-TOM(10%), Latin America (5%) and Asia (5%). Within the last year CIRAD has been reorganized into departments for Rural Systems and Food Technology, Annual Crops, Perennial Crops, Livestock, Forests, and Horticultural Crops.

With a slightly higher number of researchers and slightly lower budget than CIRAD, ORSTOM carries out research activities in a much greater number of scientific disciplines and research areas. It is organized into five departments of which the Environment and Agricultural Activities department is directly involved in agricultural research. With slightly more than one-third of the scientific staff and the budget, it is the biggest department within ORSTOM. Half of ORSTOM staff work in France, the remainder being shared between Africa (22%), DOM-TOM (14%), Latin America (8%) and Asia (2%).

In addition to a wider scientific spectrum and a

more fundamental research approach, ORSTOM distinguishes itself from CIRAD by its strength in the social sciences (about a quarter of the total scientific staff). Furthermore they have slightly different mandates. ORSTOM is a public scientific and technological body while CIRAD is defined as an industrial and commercial parastatal organization. One of the implications is that, while ORSTOM gets close to 100% of its budget from the Ministry of Research, CIRAD has to complement the government subsidy (63% in 1990) with self-generated income and additional grants.

Research for developing countries

There are some institutions whose main mandate is to work on national scientific problems but part of their activities is devoted to third world research. Efforts made in this direction by the Centre National de Recherche Scientifique (CNRS) are, although difficult to evaluate, far from negligible. They tend to concentrate in the area of research training mainly through collaboration with the Maghrebian countries. The participation of many Maghrebian PhD and post-doctoral students in the work of CNRS laboratories is also substantial: it must be considered as an important gain for CNRS and a way to continue promoting collaborative research links between France and Maghrebian countries.

Another institution whose third world research activities are important is the Institut National de Recherche Agronomique (INRA). It is estimated that about 150 full-time equivalent INRA scientists (about 10% of the total staff) carry out agricultural research activities in the tropics. Half of these activities, however, are concentrated in the West Indies (Guadeloupe and Martinique) and French Guiana where INRA has its own centers. Other main partners include, by order of importance, Argentina, Brazil and Mexico in Latin America, the Maghrebian countries, as well as China and India.

In addition to CNRS and INRA there are numerous dispersed laboratories belonging to universities and other higher learning institutions as well as a number of other institutions including: IFREMER (National Research Institution for Sea Exploitation), INSERM (National Health and Medical Research Institute), CEA (Nuclear Energy Agency), AFME (French Agency for Energy Conservation), and BRGM (Geological and Mining Research Bureau). Most of these, except for some higher learning institutions, are not directly involved in agricultural research.

Negotiation for change

While the French system is often judged favorably abroad,[15] in France it has many critics. Paradoxically, the most virulent of these critics are former or current officials within the ministries or institutions concerned.[16] Most of them do recognize the importance and the potential value of the system which occupies, according to the French Ministry of Research, "the first place in the world in relative value and the first place in absolute value".

However, the very fact that France still has many research centers abroad (particularly in French-speaking Africa), and an important number of specialized researchers having a unique knowledge of local conditions, constitutes the strength and the weakness of the French system. In contrast to many developed countries, France does not have a mechanism to provide direct financial support to national research systems (NRS) and research teams in the developing countries. Heavily engaged in financing French research centers in Africa, France is not in a position to strengthen NRSs as well.

A major constraint which limits collaborative scientific efforts between France and its developing country partners is the lack of sustainable funding for NRS. To address this problem, the Ministry of Cooperation has set up a special fund for implementing collaborative agreements between African and French researchers. A forum of partners on the conditions of sustainable research in Africa was also organized by ORSTOM in 1991 and mechanisms to support collaborative partnerships have been strengthened.

Future directions

Despite the gradual transfer of the French centers to national authorities and the progressive integration of French researchers in national research systems in Africa, too many African researchers are collaborating with 'French' projects, partly because they have not developed the capacity to negotiate. We feel that the massive presence of French researchers in a number of French-speaking African countries, such as Senegal, may retard the emergence of national scientific communities.

The situation is, however, progressively changing with the gradual transfer of the French centers to national authorities. But again, partly due to the absence of sustainable funding, this transition may prove to be problematic.

A transition from technical assistance to scientific cooperation will only be possible if NRS can become true partners. French researchers are certainly eager to share their skills and experience with their partners in developing countries, but more should be done to provide improved services to the latter in a number of essential areas such as training of personnel, access to scientific information, access to scientific journals to publish their results, participation in research networks, and in-

stitutional management. At the same time, French researchers need to be recognized and rewarded for their participation in these activities and not solely for their scientific achievements.[17]

The fragmentation of the third world, the recent rapidly shifting political environment, and the need for a scientific comparative approach may demand a geographical redeployment of the French scientific cooperation. Most decision makers in the specialized institutions tend to agree, but the French government and particularly the Ministry of Cooperation still want the efforts to be focused in Africa.

The distinction between the countries *du champ* (former colonies in Africa) and of the rest of the world — the countries *hors champ* — is anachronistic and relies heavily on the definition of the geo-scientific policies of the specialized institutions.[18] However, the reform of the institutions has permitted a closer collaboration between CIRAD, ORSTOM and INRA.[19]

France is also working together with her European partners at strengthening European alliances. To create a new north-south scientific partnership it is important to transcend the strict bilateral dimension. Collaboration between European and third world institutions has already been enhanced since the early 1980s through the Science, Technology and Development program of the European Community (EC). More recently France (CIRAD), Portugal, The Netherlands, and the United Kingdom formed ECART, the European Consortium for Agricultural Research in the Tropics. The Consortium will promote institution building and rural development through research.[20]

The establishment of a European Foundation to support research activities in Africa has also been proposed by the French government to the EC. For various reasons, this project is not likely to be implemented in the near future although efforts are being made to revive it in France. Such a foundation would nicely complement the French system, by providing her partners in the third world with some of the necessary means to fulfill that role.

THE AMERICAN SYSTEM

Brief historical background[21]

The development of the Marshall Plan (1948-52) represents a watershed in American thinking about foreign assistance. Europe, devastated by the war, would be given very large sums of money and some (very limited) technical assistance to get it back on its feet again. This was seen as in the interests of the US, as a prosperous Europe would be a market for American goods. It also became clear as the Plan developed that political objectives were foremost.[22]

The fragmentation of the third world, the recent rapidly shifting political environment, and the need for a scientific comparative approach may demand a geographical redeployment of the French scientific cooperation

By the early 1950s, while the Marshall Plan was still in effect and following the announcement of President Truman's Point Four program, the US turned its interest to the developing nations, many of which had only recently achieved independence from the colonial powers. American interest shifted for very complex and overlapping reasons involving:

- a concern that communism might spread throughout the developing world,
- a desire to find new markets for American goods, and
- a humanitarian concern for the impoverished peoples of the third world.

With the establishment of the Mutual Security Act of 1954, all US foreign assistance programs, including economic, military and security programs were recodified, thus forming the major components of the current US foreign assistance programs.

American scientific and technical assistance has had three thrusts historically. First, American private foundation personnel began to work in developing nations, with a clear and specific emphasis on creating a Green Revolution to counteract the Red Revolutions that had occurred in several places. Second, in its early days, the predecessors of the Agency for International Development (AID) and the agency itself had their own scientific and technical experts upon whom they could draw to carry out programs. Finally, AID drew on the expertise of the Land-Grant Universities[23] (LGUs) to help provide technical training and what later became known as 'Institution Building' projects.

The foundations

The Ford and Rockefeller Foundations began to invest in the improvement of agriculture in developing nations during WWII. The approach of the Rockefeller Foundation was similar to the one it had taken earlier in the century, first with the creation of an agricultural extension service in the United States and then in its support for molecular biology.[24] That approach consisted of providing

support for a large number of scientists many of whom were directly hired by the Foundation. The best-known example is probably the support given to develop what is now CIMMYT in Mexico in 1943, when the Foundation supported numerous scientists and developed a strong interdisciplinary research program.

The Ford Foundation also invested heavily in agriculture, but it tended to support scientists in other institutions rather than to create its own agencies and to focus more attention on extension and on "rural poor people" of the less developed countries (LDC). The foundations have the great advantage of being able to take the long term view,[25] maintaining programs of far longer duration than government agencies and perhaps more rapidly providing scientists with excellent facilities and benefits.

Government

The forerunners of AID developed a model not unlike those of the Foundations. Even before the end of WWII, Americans had provided some assistance to the development of cooperative experiment stations in Latin America.[26] However, unlike the Institution Building efforts established later, these focused largely on export crops. The Point Four program of President Harry Truman was the first major effort to assist developing nations. It assumed that western science, technology, and institutions would be sufficient to solve the problems of the third world.[27]

In 1961, President Kennedy inaugurated the Alliance for Progress which was the first attempt to transform the image of aid.[28] An administrative structure in the State Department to be known as Agency of International Development was established.

At this time, Congressionally imposed restrictions limited the type and amount of research that AID was permitted to undertake. In addition, AID staffing patterns were changed such that less technical expertise remained within the agency. By the late 1960s, centrally funded AID expenditures for agricultural research had dwindled to about $3.5 million forcing cuts in training and other research related programs.[29]

In the early 1970s, as a response to strong criticism of the agency, the thrust of development policy shifted again with emphasis being placed on helping the "poorest of the poor". This shift to a focus on poverty did represent a radical change in the objectives of AID programs, though in practice there was much lip service paid to it.

The 'New Directions' mandate focused attention on small farmers and income distribution, though it, too, often became merely a justification for anything done in rural areas. Moreover, the emphasis was placed on rural development activities and research was seen as only marginally relevant to that. Only with the passage of the Foreign Assistance Act of 1975 was the ceiling on research expenditures removed. However, to this date, the agency contains relatively few technically trained staff.[30]

The 1970s also saw the meteoric rise (and fall) of Farming Systems Research (FSR). FSR was probably the most important attempt to transcend the single-commodity, production-oriented research that had been the central focus of both AID programs and those of the International Agricultural Research Centers (IARCs) since their inception. Despite a number of limitations and criticisms, AID-financed research using the FSR approach has raised a significant number of important new questions, forcing many scientists to rethink not only their research in the third world but in the US as well.

During the 1980s the Reagan administration started to explore the possibilities for creating research-oriented foundations in developing countries. This was much in line with the professed policy of privatization of services. Simply put, the idea was that, by creating research foundations in small Latin American nations, stable funding of agricultural research — difficult at best under financial stress — might be achieved.

However, a study for the Latin America and Caribbean Bureau[31] suggests that, when such foundations are established, there is often little or no control of their agenda by any democratically elected authority. More recently, in the framework of the Inter-American Scientific Cooperation Act of 1991, the establishment of a Mexican-US science foundation is envisioned using debt-swaps as an endowment.

Universities

Soon after the announcement of the Point Four Program of President Truman, John Hannah, President of Michigan State University and of the National Association of State Universities and Land Grant Colleges (NASULGC), offered the services of the LGUs to further the objectives of Point Four. At that time, however, scientists in the US Colleges of Agriculture had little experience in technical assistance. With the prospect of federal support for such activities, efforts were made to provide technical assistance as it was requested. But these efforts remained somewhat unfocused and no clear goals were developed.

In response to this, the Institution Building (IB) approach was born. It was assumed that the problems of developing nations stemmed in part from a lack of modern institutions, particularly agricultural research and extension institutions. Since the LGUs were seen by many as the very model of scientific institutions, it was argued that the Land Grant model be transferred to developing nations.[32]

The Institution Building approach assumed that the problems of developing nations stemmed from a lack of modern institutions: American confidence in its institutional forms led to the insistence that the Land Grant model be adopted in its entirety

American confidence in its institutional forms, and in their transferability, led to the insistence that the Land Grant model had to be adopted in its entirety. For example, in attempting to transfer American models to India, Agriculture College Dean, Harold W Hannah[33] used the metaphor of a blueprint.

A 1968 review of some 68 university contracts, many of which were IB contracts, concluded that insistence on the Land Grant form had impaired many IB projects. The report went on to note that, "It is unfortunate that alternative models have not been experimented with more imaginatively by US university teams".[34]

In the late 1970s the Collaborative Research Support Programs (CRSPs) were created. These were consortia of LGUs organized around one or a small number of commodities. Exceptions were those relating to soils and to farming systems and a new one now being launched on sustainable agriculture. The idea behind the CRSPs was to create truly collaborative and interdisciplinary programs with scientists in developing countries.

A novel aspect of the CRSPs was, and remains, the involvement of social scientists in them from their inception.[35] In addition, the CRSPs have been quite successful in training students from developing nations and in creating a global scientific literature on selected commodities. Unfortunately, the CRSPs have had to contend with the fact that science in developing nations is often unevenly developed, such that the mix of disciplines obtainable in the US is not matched by the developing nations. Moreover, for reasons to be discussed below, the CRSPs have not been appreciated by the field missions and they have had mixed results.

At their inception, they tended to attract scientists who saw in them significant sources of funds, but who often had only a minor interest in international work. This problem was soon resolved, but scientists still had to learn how to cooperate with their counterparts in the third world. In recent years many problems have been rectified by better review procedures involving scientists from the developing nations themselves.

Current structure of S&T assistance[36]

AID has some 4,700 direct-hire civil service employees (down from a peak of 17,500 in 1968). About half the agency personnel are located overseas at a given time, and just slightly less than half are foreign nationals.[37] The agency also has contracts involving some 7,700 other persons at any one time: a significant portion of these are engaged in some form of scientific or technical work.[38] Among agricultural scientific personnel, about 25% of these 'other persons' are employees and the rest are from private consulting firms. Fully 45% of consultants are hired on contracts of two months or less.[39]

AID is organized along both regional and functional lines. Regional bureaus cover Latin America and the Caribbean, Asia, the Near East, Africa, and now Europe plus a Newly Independent States Task Force (former Soviet Union). In recent years two nations, Israel and Egypt, have received the lion's share of total US foreign assistance, especially so-called Economic Support Funds. Other nations such as Pakistan, Turkey, and the Philippines have also received very large shares of the pie. In contrast, Africa and most of the nations of Latin America have received relatively little. Thus, the Asia and Near East bureaus have been favored heavily.

Each Regional Bureau contains a 'desk' responsible for coordinating affairs relating to a particular country in the region. It is through these bureaus that country missions are administered by Washington. Regional Bureaus also have very small technical advisory staffs within them. In addition, functional bureaus are responsible for various substantive concerns.

Of most interest to us here is the Science and Technology (S&T) bureau, renamed Bureau for Research and Development (R&D) in 1991, which contains within it an Office of Agriculture. Unlike the Regional Bureaus, R&D has no formal linkage to the national programs; however, it does have funds for regional and global initiatives and uses them to encourage the development of certain types of program at the regional level or project at the country level.

In addition, and unlike the Regional Bureaus, R&D does have some technical competence. Occasionally, it uses this competence to prepare papers on issues of general concern to the Agency. A very significant share of R&D funds goes to support the programs of the Consultative Group for International Agricultural Research (CGIAR).

Given the essentially static funding for AID, annual inflation, and earmarked countries such as Egypt and Israel, the flexible portion of the agriculture budget has been shrinking each year, much to the chagrin of most people in the R&D bureau. The tendency to earmark AID funds has been on the rise during the 1980s.

Negotiations for change

As is true of most organizations, the structure of AID gives a somewhat misleading idea of its operation as an agency. There are essentially three types of assistance provided: security,[40] food, and development. The State Department and its allies strongly support security assistance, while a segment of the public supports food aid on humanitarian grounds. Commercial interests support those portions of all programs that further their interests. Development assistance tends to 'fall through the cracks' as it has few identifiable supporters.

The result is that development objectives are often given short shrift. Moreover, given that scientific and technical assistance are by definition long-term activities, they tend to suffer the most when AID projects and programs are canceled, scaled-down, or reoriented.

In addition, while AID was at one time intended to be an autonomous agency, it is housed in the State Department and is largely integrated into the foreign policy bureaucracy. As a result, AID tends to tailor its programs to the diplomatic objectives set by the State Department.[41] AID faces other constraints from its external environment (for instance, Congress, special interest groups) over which it has little or no control.

In addition to these broad conflicts that cut across all types of aid programs, there are other conflicts that are specific to scientific and technical projects. In particular, AID and the university community frequently do battle with each other over the nature and scope of these projects. This, in turn, is a function of the response of AID officials to its highly bureaucratic structure.

Being rewarded in large part for spending money (and not on the outcome of the approved projects), AID mission staff tend to develop projects which have the greatest chance of being approved quickly in Washington. The high turnover of mission staff, designed in part to prevent them from 'going native', also puts pressure on staff to get projects developed and approved quickly and ensures that almost no one in a given mission is there at both the inception and completion of a given project. Another consequence is the lack of an institutional memory.

At the same time, the mission directors, who tend to be noticed for doing something novel and successful, have an incentive to stop everything when they arrive on the scene and attempt to redirect the mission's program. This almost invariably leads to hostility between the staff and the director.[42]

The LGUs march to the tune of yet another drummer. When seeking AID funding, universities are at least as concerned about the quantity of the overhead generated (about one-third of a given contract) as they are about the substance of the project. Some of this money is used to support necessary services on the campus in direct support of international programs; much more of it is used to underwrite the general university budget.

In many cases, faculty who do get involved with international development activities risk losing status in the eyes of their colleagues, who see such activities as second-rate science or not even science at all. Such perceptions may also translate into a reduction in more substantive rewards.

In recent years, AID has attempted to enroll universities in longer-term relations through the CRSPs. Consortia have been organized around particular commodities of relevance to the third world (such as, sorghum, cowpeas, small ruminants). Within each consortium, projects are developed by groups of scientists in collaboration with third world counterparts. These projects are then funded for work in specific countries.

One of the dilemmas faced by the CRSPs, however, is that AID missions often see them as threatening. First, they take money that would otherwise be in mission budgets and give it to US scientists. Second, teams of scientists associated with CRSPs require the time and resources of AID missions — time that otherwise would be spent in developing mission projects. Thus, some missions have blocked CRSPs from operating in a given nation.[43]

The CRSPs are also plagued by two internal problems. First, they are supposed to be collaborative in nature. Yet, AID desires to see them operating in the world's poorest nations. Not surprisingly, these nations have few or no scientists with whom American scientists might collaborate. Thus, AID often criticizes scientists for not working in a truly collaborative mode.

Second, CRSPs are supposed to be interdisciplinary in character. Both natural and social scientists are to be represented. Only in this way, it has been argued, can the research achieve the critical mass necessary to move it from the research station to the farmers' fields. Yet, LGUs do little domestic interdisciplinary research.[44] Therefore, CRSPs all too often simply divide the available funds among the various disciplines rather than develop truly interdisciplinary programs. This weakens the overall effectiveness of the program.

Future directions

American bilateral assistance to developing countries has always been the object of sharp criticism and renewed proposals for philosophical and institutional changes. During the last three decades no less than 12 major reports have reexamined the situation and proposed recommendations.[45] Six of these reports were published between 1988 and 1992.[46] They represent the recent flurry of concern about AID which is partly

due to the very large portions of the total AID budget spent in Egypt and Israel and the overall disarray in the agency.

There is also a feeling on the part of some that, while AID may have played its role well in the past, a changing world demands a changing agency. For example, the report by the late administrator Alan Woods[47] argues that the debt crisis in the third world, the growing concern about the environment, the communications revolution, and the US fiscal deficit demand a rethinking of development agency goals. Taking into account the rapidly shifting political environment which has brought an unexpected end to the Cold War, the Carnegie Commission Report also argues that "the US existing laws and apparatus for 'assistance' — or better, for cooperation for development — are outdated" and suggests pursuing a new strategy organized around a central theme: Partnerships for Global Development.[48]

Most of these reports stress that the foreign aid legislation is cluttered with obsolete, ambiguous and contradictory policies and argue for more clearly defined objectives and responsibilities, more flexibility, fewer conditions,[49] restrictions and earmarks, more accountability for results and better coordination among different parts of the US aid efforts. Many reports argue for a clear separation of responsibilities: programs requiring large funds transfers should be left to international institutions; military assistance should be administered by the Defense Department; political and security assistance should be handled by the State Department.[50] They also put the case for more long-term commitment and funding.[51]

Most of the recent reports say little about science and technology.[52] Some of them, however, argue for continued support to agricultural research.[53] Moreover, they also reiterate an argument made several years earlier by the Office of Technology Assessment[54] that the US should use its LGUs to increase food production in Africa.[55]

The more recent reports recommend the abandonment of the old idea of aid and its replacement with the idea of mutual gain through cooperation. Most of them rightly stress that only programs that respond to American national interests are likely to receive support from Congress. They also note that American national interest lies in a healthier, more prosperous third world.

Those reports prepared by independent commissions (external to the AID organization), repeatedly proposed the creation of an autonomous and decentralized agency (more or less modeled on the National Science Foundation), staffed with technical personnel, and operating through a simplified procurement system and collaborative approach to development assistance. None of these proposals or any other alternatives have been acted on to date.[56] They have been opposed by the Congress "who want only one Agency to deal with, and by AID managers who want undivided authority and responsibility".[57]

The creation of such an autonomous agency was close to being implemented following the 1979 United Nations Vienna Conference on Science and Technology. As part of the preparation for this conference, President Carter announced in a speech in Caracas the creation of the Institute for Technical Cooperation (IFTC), a semi-autonomous organization under a new umbrella organization, the International Development Cooperation Agency. However, although it formally exists, and despite extensive lobbying efforts by the Carter Administration, funds have never been appropriated by the Congress for its implementation.[58]

The conditions allowing long-term investments in science and technology having not been fulfilled, it is not surprising to see that renewed calls are made for the creation of an independent foundation for technical assistance and research. A recent document proposes the establishment of a semi-independent institute or a foundation for sustainable development associated with a reconstituted and revitalized (and perhaps renamed) Agency for International Development.[59] The Carnegie Commission[60] report also suggests organizing a National Roundtable for International Development to foster creative cooperation among all US institutions with the objective of catalyzing specific task forces to address urgent problems.

Independent commissions have repeatedly proposed the creation of an autonomous and decentralized agency staffed with technical personnel, and operating through a simplified procurement system and collaborative approach to development assistance

Comparison of approaches

It is clear from the above discussion that the French and American scientific and technical assistance programs are different. However, they play roles that are often complementary, though they are rarely seen in that light by either the French or the Americans. Consider some of the issues:

Length of contract The French can draw on a scientific and technical staff of over 5000 persons who are full-time researchers. Half are in agricultural

fields. These people have focused their careers on scientific and technical issues that pertain to developing nations. They can be stationed in a given developing nation for ten or more years to work on a highly specific project.

In contrast, American scientists are drawn into overseas work on short-term consulting assignments. A two-year term is considered long by American standards. This means that scientists barely have enough time to assess the situation before their contract has ended. Moreover, there are few rewards, other than a modest salary increment, for spending time overseas.

Length of project Groups of American scientists can be brought in to focus on a particular issue or problem. They are often part of a larger team that is charged with building institutional capacity locally. This means that, in principle, those scientists who do go overseas for a particular project will be motivated to work as a group to improve a particular situation. However, the short-term character of this approach often is an obstacle to success.

In contrast, the French approach permits scientists to develop long-term programs within broad guidelines. At its best this means that excellent scientific work is conducted by individual researchers or small groups. At the same time, this may lead to fragmentation and large numbers of very small programs scattered around the world.

Type of crop Until recently, as noted above, much of CIRAD research was organized around tropical cash crops. In contrast American research remains nearly entirely focused on food crops and appears to have moved in recent years from wheat, rice, and maize to crops grown by the poorest of the poor (such as, cowpeas, sorghum, millets). The commodity focus of both groups has often led to simple solutions that do not take into account the multicommodity world which farmers inhabit.

Neither the Farming System Research approach now common among US researchers nor the *Systèmes Agraires* approach of the French are well-integrated into commodity studies. Both tend to ignore the larger environmental, economic and sociopolitical context within which production takes place. The reorganization of France's two major institutes is designed in part to tackle these issues. In contrast, the US has seen many reports but little action. The Carnegie Commission[61] report contains many concrete proposals: the time for action is long overdue.

Politics While American scientific and technical assistance is intimately linked with foreign policy, French assistance is much less influenced by the prevailing political winds. This is undoubtedly a function of the administrative structure of CIRAD and ORSTOM which permits them to operate as quasi-autonomous entities, largely independent of development projects. This has the advantage of permitting them the latitude, with a few exceptions, to complete ongoing projects irrespective of changing diplomatic relations with the nations involved.

In contrast, the US system has the great disadvantage of tying scientific and development concerns too tightly together. The result is that scientific and technical projects, which are long term by definition, suffer when development projects are terminated for diplomatic reasons.

Dual agencies The French system is unique in that foreign assistance is delivered through two ministries and two major scientific cooperation agencies. This is a holdover from colonial days and is dysfunctional in many ways, most obvious of which is that the two ministries can and do develop different policy positions on similar issues. The lack of a uniform policy suggests (perhaps wrongly) a paternalistic approach towards the former colonies. It also has little substantive basis.

Similarly, France maintains two research organizations, CIRAD and ORSTOM, ostensibly because the former focuses on applied, and the latter on basic, research. It is debatable whether this distinction was ever a valid one: certainly today, in an era of biotechnology and 'high tech', the distinction between basic and applied research is unsupported by the evidence.[62] A single, broad-based research agency that served the entire world would be more effective and probably more efficient as well.

Serving overseas Both the US and France are faced with the dilemma of a scientist population that sees major difficulties in serving overseas. In the French case, this has led to a situation in which an overly large portion of ORSTOM and CIRAD scientists are more or less permanently based in France itself. While some scientific backup in France is undoubtedly necessary to the maintenance of the scientific networks, the numbers cover up a much more serious problem related to the aging of the scientific population. In most cases, scientists are reluctant to remain in the field once their children attain a certain age.

In the US case, the results are the same, though the issues are different. Specifically, after 40 years of foreign-assistance programs, there are still few rewards given (and sometimes even penalties paid) to scientists for spending time in the developing nations. It is often seen as time spent away from good laboratories and libraries, when contact with colleagues and the literature is reduced, and at a point in one's career when scientific productivity (as measured by journal publication) is likely to be at its highest.

This situation is compounded by the fact that LGUs are financed largely by state funds and that state legislatures want to know how the research

conducted overseas can possibly be of benefit to the state. Thus, many of the best scientists, who might contribute the most to third world development, never engage in overseas activities.

Partnerships Although France and the US have, during the last decade, developed means to work with developing nations as partners in the international scientific community, all too often both nations find themselves recruiting their own scientists to do jobs for which host-country scientists are already trained. This causes resentment on the part of host-country nationals and perpetuates a dependent situation.

Moreover, given the increasing difficulty that both nations are experiencing in getting their best scientists to spend time overseas, serious consideration needs to be given to the possibility of supporting third-world scientists, at least insofar as they participate in collaborative projects. Whether institutional support should be provided is a more complex issue; clearly, a lack of national support suggests that agricultural research occupies a low priority among national policy makers. External financing is unlikely to rectify that problem.

Africa Neither nation has yet developed an effective strategy for dealing with the problems posed in Africa.[63] Despite long-term French presence and considerable American investment, Africa has yet to develop an adequate research infrastructure. To some extent this is due to the small size of most African nations and the lack of much infrastructure at the time of independence.

However, France, the US and other donors must take part of the blame, as they have tended to put overly large sums of money into particular projects creating research systems that are simply unsustainable. They have tended to overload small nations with numerous aid projects. Local officials have little time and limited expertise available to coordinate their projects.

The problems plaguing Africa are likely to continue and even worsen in the very near future.[64] With the establishment of coordinating programs or networks like SPAAR and CORAF[65] tangible progress has been made but much remains to be done. In particular, a more sustainable funding mechanism still remains to be created.

Public opinion In France, even if public opinion is more and more tending to question the effectiveness of foreign aid, a majority of French citizens still supports some sort of foreign aid program which includes scientific and technical assistance. This is not the case in the United States where foreign assistance is constantly under attack.

While documentation is hard to come by, it appears the greater French support has several components, not all of which would be replicable in the US context. First, France had a colonial empire which is still remembered well by many Frenchmen alive today. Second, France is concerned about the promotion of French culture. Finally, French aid is seen as beneficial by French industry — a way to build new markets that will later yield handsome dividends in trade volume. On the other hand, many, if not most, of the sub-saharan nations where France expends the bulk of its aid, are net losses to France, though not necessarily to French industry.

Aid is seen as beneficial by French industry — a way to build new markets and ultimately increase trade volume: it is puzzling that American industry only supports aid to the extent that it represents a direct market for their capital goods

While the first two aspects of French support for aid cannot be duplicated in the US, it is puzzling that American industry only supports aid to the extent that it represents a direct market for their capital goods. Greater wealth among the peoples of the third world as a potential source of increased commerce is apparently not convincing to American business.

In short, American agricultural research for international development tends to be short term, focused on food crops, and conducted by university scientists who are not civil service employees. In contrast, French research tends toward the long term, emphasizes cash crops, and involves a corps of full time scientists.

Yet, both nations now find themselves converging at a crossroads as a result of changes of a global nature. Assistance must be replaced by technical cooperation. New incentives must be found to encourage the long-term commitment of scientists to the problems of third-world development. New ways to insure that developing-nation scientists are treated as equals need to be found.

New sustainable and more independent funding mechanisms for supporting national research systems and scientists need to be developed. New agricultural strategies are necessary to increase food production while preserving sustainability. In particular, the chronic food problems of Africa need to be overcome.

By examining each other's programs and uniting their forces together with other donors and the less developed countries, both France and the United States can respond in a complementary manner to the challenges that the next century is sure to pose. Finally, while the revised policies suggested above might partly compensate for weak national institu-

tions, they will never replace the LDCs themselves assessing the importance of S&T activities in their national priorities and taking the necessary steps to support them.

Notes and references

1. We do not pretend here that the western science and development model is not being criticized. Yet, alternatives to western science have tended to be partial and often self-defeating, and it is difficult to see a full fledged alternative emerging. See A Jamison, "Modern science in perspective and the search for alternatives", in J-J Salamon, F Sagasti and C Sachs (editors), *The Uncertain Quest, Science, Technology and Development* (The United Nations University, forthcoming).
2. Colonial science was, however, supposed to serve a large spectrum of objectives including the advancement of knowledge, the development of the colonies for the benefit of the metropolis and the particular interest of the colonial farmer. See, for example, Y Goudineau, "L'altruisme et la science, de la bonté des sciences coloniales à l'excellence des sciences du développement", *Journées des Sociologues de l'ORSTOM*, September 1991, pages 53-64.
3. A comprehensive history of US and French scientific and technological assistance has yet to be written. For a detailed account of the legislative history of US foreign aid see AID, *Historical Overview of US Foreign Assistance Legislation* (AID, Rossyln, Virginia, 1989). On the development of French colonial science see C Bonneuil, *Des savants pour l'Empire, la structuration des recherches scientifiques coloniales au temps de la "mise en valeur des colonies Françaises", 1917-1945* (ORSTOM, Collection Etudes et Thèses, Paris, 1992).
4. For a more detailed analysis and discussion of the French system see J Gaillard, "Les politiques d'aide à la recherche pour le développement du tiers monde: de l'assistance scientifique et technique à la coopération?", *Cahiers des Sciences Humaines*, 26(3), 1990, pages 407-427.
5. M Gleizes, *Un Regard sur l'ORSTOM* (Editions de l'ORSTOM, Paris, 1985).
6. J Gaillard and R Waast, "The uphill emergence of scientific communities in Africa", *Journal of Asian and African Studies*, 27(1-2), 1992, pages 41-67.
7. Response of the Ministry of Research to a parliamentary request.
8. 1 US $ was approximately 5.5 FF in March 1993.
9. Communication on French research activities for development by the Ministry of Research (18 August 1988).
10. France has five overseas departments (Départements d'Outre Mer = DOM): Guadeloupe, Martinique, Réunion, Guyane, Saint-Pierre-et-Miquelon; and two major overseas territories (Territoires d'Outre Mer = TOM): New-Caledonia and French Polynesia.
11. An attempt to integrate all cooperation activities into one Ministry of External Relations was made in 1981 by the new socialist government. This, however, was reversed after 1986 when the political right returned.
12. J Berque, *Recherche et Cooperation avec le Tiers Monde, Rapport au Ministère de la Recherche et de l'Industrie* (La Documentation Française, Paris, 1982).
13. In addition, the Overseas Pasteur Institutes (IPOM) specialize in medical research. With close to 100 scientific staff and a budget of about 30 million FF, they carry out research in parasitology (malaria, trypanosomiasis, bilharzia), bacteriology (tuberculosis, leprosy, plague) and virology (yellow fever), as well as on sexually transmitted diseases.
14. CIRAD, *The CIRAD Strategic Plan* (CIRAD, Paris, 1991).
15. For example, see R A Solo, *Organizing Science for Technology Transfer in Economic Development* (Michigan State University Press, East Lansing, 1975), and D Williams, *Plan by objectives for putting into operation activities of scientific and technical nature for the benefit of developing countries 1984-1987* (Commission of the European Communities XII-1168/82EN, Brussels, 1982).
16. This became particularly obvious during the interviews we conducted in France during May and June 1989.
17. The criteria for evaluating researchers at ORSTOM are being reconsidered. In addition to evaluating scientific achievements, the peer review committees have been given new evaluation criteria including implementation of research results and diffusion of scientific knowledge in general, research in partnership with developing countries' scientists, research training, research supervision and management. But the peer reviewers, being scientists themselves, not surprisingly tend to consider scientific achievements (in particular number of publications in refereed journals) as the most important (and sometimes sole) criterion.
18. The position of the institutes varies slightly. Whereas ORSTOM has clearly reaffirmed that its first priority is Africa with a deployment towards English-speaking Africa, CIRAD clearly stated in its recent strategic plan that its objective is to contribute to the development of tropical and subtropical regions wherever they may be.
19. A coordinating body, CIO (CIRAD-INRA-ORSTOM), has been established. This coordination is useful for clarifying and unifying the French position particularly with the international centers and networks, with which a number of agreements have been reached.
20. European Consortium for Agricultural Research in the Tropics, *The Amsterdam Declaration* (ECART, Amsterdam, 1992).
21. For a more detailed overview see National Academy of Sciences. *Supporting Papers: World Food and Nutrition Survey*, volume 5, Study Team 14 (National Academy Press, Washington DC, 1977).
22. The report entitled "European recovery and American aid" prepared in 1947 by the President's Committee on Foreign Aid, chaired by then Secretary of Commerce Averell Harriman stated that: "We all know that we are faced in the world today with two conflicting ideologies. If these countries by democratic means do not attain an improvement in their affairs they may be driven to turn in the opposite position" (cited in AID, 1989, reference 3.
23. The Land-Grant Universities were established during the Civil War. Each state was granted a piece of federally owned land, the proceeds from the sale of which would be used to endow a university that would teach students "agriculture and the mechanic arts". Hence, the expression 'Land-Grant University'.
24. For a history of the Rockefeller Foundation's work on molecular biology, see R E Kohler, "A policy for the advancement of science: the Rockefeller Foundation 1924-29", *Minerva*, 16, 1978, pages 480-515; R E Kohler, "Warren Weaver and the Rockefeller Foundation Program in molecular biology: a case study in the management of science", in Nathan Reingold (editor), *Sciences in the American Context* (Smithsonian Institution Press, Washington DC, 1980); and E Yoxen, *The Gene Business: who should control Biotechnology? (Pan Books, London, 1983).*
25. For example Ralph Cummings, Sr spent ten years in India developing the Rockefeller programs there. Uma Lele and Arthur Goldsmith ("The development of national agricultural research capacity: India's experience with the Rockefeller Foundation and its significance for Africa", *Managing Agricultural Development in Africa* (World Bank, Washington DC. 1989)), report that he spent six months just sizing up the situation before proposing any specific activity with India. No government agency could afford that luxury.
26. R E Moore, "Tingo Maria", *Agriculture in the Americas*, 3(6), 1943, pages 107-108.
27. E R Morss, and V A Morss, *US Foreign Aid: An Assessment of New and Traditional Strategies* (Westview Press, Boulder, 1982).
28. Among the key components proposed by Kennedy were: "a unified administration and operation; unified country plans instead of a series of individual, unrelated projects, long-term planning and financing; increased emphasis on development loans repayable in dollars; self help as a criterion for assistance; and separation of economic assistance from military assistance". See AID, reference 3.
29. P R Crawford and A H Barclay, Jr, "AID experience in agricultural research: a review of project evaluations" (Agency for International Development, Washington, DC, Program Evaluation Paper no 13, 1982.
30. Efforts were made to attract top technical talent in the early 1980s when the Bureau of Science and Technology and the Office of the Science Advisor were established. However,

many initiatives were diluted or blocked by the regional bureaus.

31. M Sarles, *Recommendations for Supporting Agricultural Research Institution-Building in Latin America and the Caribbean* (Agency for International Development, Bureau for Latin America and the Caribbean, Washington DC, 1987).
32. It should be noted that the Land Grant model was, and remains, somewhat of a fiction, masking a wide array of institutional forms. In addition, proponents of the Land Grant model often forgot that LGUs were not themselves entirely responsible for the rapid growth of American agriculture. Farmer organizations that lobbied for research, private seed, chemical and machinery suppliers, and others also played significant roles. However, they were usually so taken for granted by Institution Builders, that they were overlooked.
33. H W Hannah, *Blueprint for a Rural University in India* (Indian Council of Agricultural Research, New Delhi, 1956).
34. Committee on Institutional Cooperation, *Building Institutions to Serve Agriculture: A Summary Report of the CIC-AID Rural Development Research Project* (CIC, Purdue University, West Lafayette, IN, 1968) page 111.
35. C M McCorkle (editor), *The Social Sciences in International Agricultural Research; Lessons from the CRSPs* (Lynne Reinner Publishers, Boulder, 1989).
36. For a more comprehensive account of US scientific and technical assistance programs, see R P Morgan , *Science and Technology for International Development* (Westview, Boulder, 1984).
37. Hamilton Report, *Presentation of the Task Force on Foreign Assistance to the House Foreign Affairs Committee* (Washington DC, photocopied, 1989).
38. Since we do not know the exact portion, these figures are difficult to compare with those of the French system.
39. Agency for International Development, *A Characterization of Scientific Personnel Accessed for A.I.D.'s International Development in Food and Agriculture* (Ohio State University College of Agriculture, Columbus, 1984).
40. Security Assistance can and does include military support, but it may also include other items deemed desirable from the point of view of American foreign policy.
41. C Rossiter, The Bureaucratic Struggle for Control of US Foreign Aid: Diplomacy vs. Development in Southern Africa (Westview Press, Boulder, 1985).
42. Apparently, this is a problem that is not limited to the US: Paul Mosley, (*Foreign Aid: Its Defense and Reform* (University Press of Kentucky, Lexington, 1987)), cites a Canadian official who makes the same argument for Canadian assistance programs.
43. It should be noted that AID missions have to approve the visit of members of CRSP teams. They can and do delay visits when they see them as not in their best interests.
44. L Busch and W B Lacy, *Science, Agriculture and the Politics of Research* (Westview Press, Boulder, 1983).
45. For a more comprehensive insight on eight of these reports see, C Weiss, *Lessons from Eight 'Reforms Commissions' on the Organization of Science and Technology in US Bilateral Development Assistance*, a report prepared for the Task Force on Development Organizations of the Carnegie Commission on Science, Technology and Government (Carnegie Commission, New York, 1992).
46. R H Smuckler, R J Berg and D F Gordon, *New Challenges, New Opportunities: US Cooperation for International Growth and Development in the 1990s* (Michigan State University, Center for Advanced Study of International Development, East Lansing, 1988); A Woods, *Development and the National Interest: US Economic Assistance into the 21st Century* (Agency for International Development, Washington DC, 1989); The Phoenix Group, *Reforms Needed in US Assistance to Developing Countries* (International Trade and Development Education Foundation, Washington DC, 1989); The Hamilton Report, reference 37; G M Ferris, *President's Commission on the Management of AID programs, Report to Congress. An Action Plan* (USGPO, Washington DC, 1992); and Carnegie Commission on Science, Technology, and Government, *Partnerships for Global Development: The Clearing Horizon* (Carnegie Commission, New York, 1992).
47. Woods, reference 46.
48. Carnegie Commission on Science, Technology, and Government, reference 46, pages 13-14.
49. The Hamilton report (reference 37) indicates that current legislation specifies not less than 288 reporting requirements (second only to the Department of Defense). It further sets forth 33 objectives, and 75 co-equal priorities.
50. The Carlucci Commission, however, argued for a clear connection between security and development assistance so that development assistance motivated by security considerations would also be oriented to development ends ("The Commission on Security and Economic Assistance", A Report to the Secretary of State, Washington, DC, 1983).
51. See, in particular, J W Gardner, *AID and the Universities: A Report to the Administrator of the Agency for International Development* (Washington, DC, 1964); National Association of State Universities and Land Grant Colleges, *International Development Assistance: A Statement by the Task Force on International Development Assistance and International Education* (NASULGC, Washington DC, 1969); Phoenix Group, reference 46.
52. Cf Carnegie Commission, reference 46, page 15: "For the 1990s on into the 21st century, science and technology will continue to be a linchpin in the efforts to achieve most of the world's social and economic goals. They undergird the research that creates needed knowledge. They help build the education and training systems that advance skills. And they thrive with the freedoms of inquiry, communication, and association that ensure, and are ensured by, democracy and liberty".
53. Woods, reference 46; Smuckler, Berg, and Gordon, reference 46.
54. Office of Technology Assessment, *Africa Tomorrow: Issues in Technology, Agriculture, and US Foreign Aid: A Technical Memorandum* (Office of Technology Assessment, Washington DC, 1984).
55. Some efforts have been forthcoming. See, Agency for International Development, *Plan for Supporting Agricultural Research and Faculties of Agriculture in Africa* (Agency for International Development, Washington DC, 1985).
56. The only exception is the Babb Report, which became the basis for AID's implementation of the "New Directions" (Task Force Report for the Administrator, *Agency for International Development: Organization and Structure of AID* (Washington DC, October, 1977)).
57. See Weiss, reference 45.
58. The only vestige left from the IFTC/IDCA proposal is the research grant program in Science and Technology Cooperation (PSTC) originally administered by the Office of the Science Advisor to AID which in turn has been reabsorbed into the Office of Research of the Bureau for Research and Development. But see Ruttan's proposal for revitalizing AID for a more optimistic view (V W Ruttan, "Solving the foreign aid vision thing", *Challenges*, May-June 1991, pages 41-46).
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63. For a more detailed discussion of donor relations with African nations, see U Lele (editor), *Aid to African Agriculture: Lessons from Two Decades of Donors' Experience* (Johns Hopkins University Press, Baltimore, 1992).
64. C K Eicher, "Sustainable institutions for African agricultural development" (International Service for National Agricultural Research, The Hague, Working Paper no 19, 1989).
65. CORAF is a Coordinating body for African Agricultural Research established by the French-speaking African countries and France. Efforts are not being made to extend it to the rest of Africa.

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