Staff Summary Report

WORKSHOP ON THE FUTURE SCIENCE AND TECHNOLOGY (S&T) RELATIONSHIPS OF THE AGENCY FOR INTERNATIONAL DEVELOPMENT (AID) WITH INSTITUTIONS IN ADVANCED DEVELOPING COUNTRIES

Organized by
The Board on Science and Technology for International Development
Office of International Affairs
National Research Council
Washington, D.C. 20418
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PREFACE

This is a staff summary report of a Workshop organized by the Board on Science and Technology for International Development (BOSTID), Office of International Affairs, National Research Council (NRC) for the Office of Research and University Relations (RUR), Bureau for Science and Technology, U.S. Agency for International Development (AID) on the subject Future Science and Technology (S&T) Relationships of AID with Institutions in Advanced Developing Countries. The meeting was held on Monday, March 14 and Tuesday, March 15, 1988, at the main headquarters of the NRC, 2101 Constitution Avenue N.W., in Washington, D.C., and was supported under AID Contract Number DAN-5052-0-00-6037.

AID has contracted the assistance of NRC to organize discussion meetings and advisory inputs for the ongoing work of the AID Research Advisory Committee (RAC). The RAC is an officially appointed advisory body of the Agency whose members are drawn from universities, foundations, nonprofit institutions, and industry. Its charge is to work directly with AID on policy formation for economic and social development. BOSTID draws upon the best and most current thinking of the American scientific community on the issues upon which it is invited to work with the RAC. In this manner AID benefits from the experience and expertise of a wide range of expert groups and individuals in planning and analysis of its foreign assistance programs.

The findings expressed in this workshop report represent individual views, often shared by informal consensus among those who attended a particular session.

STAFF SUMMARY REPORT

Workshop on the
Future Science and Technology Relationships of the
Agency for International Development (AID)
with Institutions in Advanced Developing Countries

INTRODUCTION

Over the past two decades significant changes have occurred in AID technical assistance and cooperation programs as nations in Asia, Latin America, and to a lesser extent in Africa, have progressed economically. In a number of countries institutional and particularly economic strengths grew so significantly that formal U.S. bilateral assistance was greatly reduced or phased out entirely. Countries were declared to be "AID graduates"; as their economic growth in terms of per capita income changed from that of "less developed" to "middle income" or "advanced" developing country (ADC) status. Relationships with the U.S. based upon normal bilateral trade and diplomacy instead of concessional assistance were expected to continue and even grow.

Experience has shown, however, that the termination of development-related bilateral contacts has, in many cases precipitated rapid deterioration in hard-won relationships between the U.S. scientific and technological communities and those of the ADCs. Cooperation in agricultural and health related research, natural resources development, environmental conservation efforts, educational exchanges, population and demography studies, and the social sciences has not continued as expected. With very few exceptions the development of commercial ties, new investments, and joint ventures has not proceeded as rapidly as anticipated. The decline in ADC-U.S. relationships is being partially filled by European and Japanese groups who have been able to adapt their

programs to the new reality and capitalize on the investments made by the U.S. during the years of strong U.S. involvement. In particular the United States is finding itself losing close working relationships with an entire generation of scientists whose training and research experiences were linked in earlier years in significant ways to U.S. institutions. Furthermore, a new generation of scientists trained in the late 70s and early 80s in Mexico, Brazil, Argentina, and countries of Asia as well as the Americas has had fewer opportunities to work with scientists from the United States.

Recognizing these unfavorable trends, AID asked its Research Advisory Committee (RAC) to review current U.S. relationships with ADCs and provide policy guidance on ways in which the Agency might revise its S&T programs to take account of the current situation. NRC, in turn was asked to organize a workshop under the auspices of BOSTID that would focus directly on the issues involved and thus assist the RAC in its review. Three broad questions were addressed to the NRC in the AID requests:

- What are the important U.S. or mutual interests that should influence the continuation of relationships with ADCs?
- Given AID's legislative mandate and historical focus (to work with the least developed countries), is there a practical role for the Agency in maintaining linkages with the ADCs? How might these linkages be financed? How might they become self-sustaining?
- What are the priorities for AID within this role? Are there specific programs or activities that warrant early attention?

WORKSHOP ORGANIZATION

The workshop was organized in early 1988 by BOSTID in the context of several related activities:

- Beginning in the autumn of 1987 AID already had an intra-Agency task force studying policy issues on relations with ADCs. Completion of its work and the approval of a new Agency-wide policy statement on relations with the ADCs was targeted for FY 1988.
- The RAC meeting agenda of March 31-April 1, 1988 focused upon the topic.

In January 1988 when AID requested BOSTID to organize the workshop, it was understood that there would be no formal NRC panel appointed nor a specific set of recommendations prepared. Instead, RAC members who would attend the workshop in mid-March 1988 would subsequently report to the full RAC meeting at the end of March. This was done. The purpose of this staff summary, prepared by BOSTID with assistance from the general chairman of the workshop, is thus simply to fulfill a contractual reporting requirement to AID.

The workshop was designed to give ample opportunity for discussion among three major groups of participants: a) RAC members, b) individuals invited by BOSTID who had directed S&T programs with ADCs, and c) persons in AID responsible for the new policy dialogue. For convenience in discussing the issues two working groups were formed in subject areas of importance to AID and in one more general, or functional area:

- Group I: Agriculture, natural resources, forestry, and the environment.
- Group II: Health, population, the social sciences, education, urbanization, and related development.
- Group III: The "cross-cutting" issues of organization and management.

Dr. A. George Schillinger, Director of the Institute for Studies in Technology Management and Policy, Polytechnic University, Brooklyn, New York, was General Chairman of the workshop; Dr. Daniel Aldrich, Chairman of the RAC and former Chancellor of the University of California at Irvine was responsible for organizing participation in the workshop discussion meeting of the RAC members; and Mr. Bradshaw Langmaid, Deputy Director for Research, AID Bureau for Science and Technology, coordinated participation from AID. Annex A gives the agenda; Annex B a list of all participants. The principal reference documents were:

- "Science and Technology Relationships with Advanced Developing Countries." An issues paper prepared by Mr. Langmaid and dated February 1988 (Annex C).
- "Occasional Paper No. 6: U.S. Development Assistance Policy (for) Middle Income Countries." A report prepared by D. Woods Thomas, Professor of Agricultural Economics, Purdue University, April 1983 for the AID Board for International Food and Agricultural Development (BIFAD). Because of its length, the paper is <u>not</u> appended to this report.

Also included with this report are a summary of the remarks presented at the opening session by Mr. Hyung Ki Kim, World Bank, (Annex D) and by Dr. Franklin A. Long, Cornell University, (Annex E).

PRINCIPAL ISSUES

1. What are the important U.S. or mutual interests that should influence the continuation of relationships with advanced developing countries (ADCs)?

Workshop participants were in general agreement that the principal justifications for strong and continuing U.S. relationships with advanced developing countries are:*

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* Note: Workshop participants believe that the general thrust of the D. Woods Thomas paper (cited on page 4) is as valid in 1988 as when it was written in 1983, with attention focused on S&T <u>collaboration and cooperation</u> rather than "technical assistance."

- The long-term economic self-interest of the United States necessitates strong ties with ADCs. Countries like Mexico, Brazil, Taiwan, and Korea are already important trading partners. These and other ADCs are of increasing importance for the future world economy in the 1990s and represent growth areas for trade and exports for the United States and other nations.
- The scientific and technical interests of the U.S. and the ADCs are of increasing mutual importance because of the need to address global and regional issues as well as interests having a more bilateral focus. Priority global and regional S&T issues include basic climatalogical research; environmental degredation resulting from air and water pollution and soil erosion, acid rain, desertification; natural hazards reduction; loss of biological germ plasm; and natural resources depletion.
- The national security interests of the U.S. and the ADCs are mutually self-supporting in terms of peace and amity among nations; political stability as a basis for sound and sustainable economic development; and respect for human rights.
- Humanitarian interests of the U.S. include the elimination of world hunger; promotion of education and work opportunities; and alleviation of disease and poverty.

In addition to these long-term justifications for strong and continuing relationships, there are others having more immediate consequences that have grown out of partnerships forged over the past three decades. These include:

- Continuing need for research collaboration in agriculture, health, and the sustainable utilization of increasingly scarce natural resources.
- Recognition that a significant contribution to the maintenance of a strong U.S. leadership role in S&T depends upon the mutuality of benefits in exchange programs, the continuing participation of foreign students in U.S. educational and research institutions, and the healthy two-way communication of scientific information.
- The opportunity to utilize advanced developing countries as successful models or laboratories for assisting the less developed countries. In this respect ADCs can play an important role in continuing development and technical assistance programs. By joining the United States in providing training and extension opportunities an ADC, which is often a more realistic laboratory or venue for training than is the U.S., can reach out significantly to accelerate or extend S&T educational and other opportunities to the least developed countries.

In summary, there is ample evidence to demonstrate that the deterioration in S&T relationships that accompanies the termination of U.S. bilaterial technical assistance has been detrimental both to the U.S. and the new, middle-income, or advanced developing countries. There need to be new relationships formed with clearly stated common interests; agreements in which each party assumes responsibility for costs; and long-term partnerships formed on the basis of cooperation, collaboration and high quality rather than quantity of interactions.

2. Given AID's legislative mandate and historical focus (to work with the least developed countries) is there a practical role for the Agency in maintaining linkages with ADCs? How might these linkages be financed? How might they become self sustaining?

Role of AID in ADC Relationships

- Presence. One of the lessons learned from the AID experience in technical assistance activities that has direct applicability for the partnership mode with ADCs recognized by the workshop participants is that of an in-country presence. Problem solving is a day-by-day activity that needs constant collaboration and on-site cooperation. The presence of direct-hire AID personnel, however, need not be the only model. When collaborative activities are of sufficient magnitude, both the ADC and the U.S. partners may find it cost effective as well as advantageous scientifically to have representatives in one another's research headquarters. Utilization of U.S. foreign service employees, such as science or commercial attaches, should also be exploited more skillfully.

- Leverage. In the past AID bilateral projects were of such size and funding that they assumed a dominant position within the overall development portfolio of a country. With but few exceptions, this is no longer true. Given budget constraints for the forseeable future, U.S. programs are likely to be small and therefore can only catalyze efforts with an ADC. Hence the need to leverage funding.

  In new programs it is essential that ADC institutions, public or private, support a share of the cost of the activities with U.S. institutions. AID funds also must be leveraged from other

U.S. sources. Options to be considered are: a) other U.S. Government programs; b) U.S. foundations, professional organizations, and private voluntary organizations; c) U.S. private sector sources and multinational companies; and d) international organizations.

When funding arises from multiple sources, each contributor will expect to participate in all steps of a program in meaningful ways. Utilization of funding from the private sector, particularly from industry, brings both limitations and advantages. For example, care should be exercised to avoid overt endorsements of proprietary products while at the same time giving recognition to the assistance provided by an industry or firm. On the other hand, an industry is often more successful than government in promoting long-term objectives in an education, training, research or extension activity.

- Brokerage. The traditional technical assistance role of AID involves it in brokerage; i.e., bringing two parties together--one with a well-defined need and the other experienced in helping to answer that need. When an ADC and the U.S. Government recognize the need to promote partnerships and collaboration beyond the technical assistance mode, there still will be a role for brokerage. To accomplish the function is personnel-intensive and time consuming. And it may not be feasible, either for reasons of funding or policy, for AID itself to be the broker on a continuing basis. Nevertheless, it may be the appropriate task of AID to be the "wholesaler" of brokerage services, making it possible for other government or private organizations to arrange specific

activities. Precisely because the Agency has had so much experience in development relationships, it brings a unique perspective to international collaboration and cooperation. One traditional limitation in the AID brokerage role should, however, be recognized. The Agency has not been as active in brokerage with industry as with universities, private voluntary organizations, professional societies, and other nonprofit institutions. Thus, when the direct involvement of an industry is sought, particularly when training within a firm or industry is desired, other U.S. institutions may be needed to secure the services required.

- Networking. In the context of the workshop, networking was described as the establishment and functioning of communication links among S&T or other independent development groups that work on mutually reinforcing activities. Research and technical journals are a traditional example of a network; written exchanges of information have long been effective in promoting the transfer of knowledge and skills. Important as technical journals and publications are, they are no longer sufficient for the maintenance of strong S&T ties with groups in ADCs. Personal, face-to-face communication at technical meetings and timely individual visits of scientists with colleagues in other countries are essential for more rapid and effective information transfer. It is the personal communication that promotes synergistic relationships to occur.

Modern communications technologies enable collaboration groups to maintain routine contact such as the sharing of field-generated data and laboratory research. A scientific team no longer needs to be physically at one location to achieve rapid results. In spite of the reality of nearly instantaneous communications, however, networking is more effective when periodic personal working meetings are possible among collaborationg S&T groups.

Networking should not become a disguised form of technical assistance. It must be managed so that costs are equitably shared. When the parties are fully collaborating and participating as partners, the benefits accrue to all and justification of costs to the funding agencies in both countries is far easier.

- Windows of Opportunity. One of the consequences resulting from genuine collaboration in a program is that of identifying "windows of opportunity" for a special action. Although clear-cut examples are rare, the ability of both parties to respond imaginatively and quickly to an opportunity is very important. Project design and financing should include opportunities for collaborating scientists to exploit windows of opportunity in a timely manner.

Financing and Sustaining Relationships

Workshop participants did not feel it would be possible to build and maintain new U.S.- ADC relationships in S&T in the absence of specific budget allocations for those activities. Some level of core funding in the range of $5 million to $30 million per year would seem to be needed. Initially the U.S. Government or a combination of Government and private

sources should take responsibility for the U.S. side. Similarly, an ADC would need to provide funding in the appropriate manner for its participation.

Leveraging of funding has been discussed previously (page 7) and is an important mechanism to stretch core funding from governments. Given current U.S. budget constraints, the ability to leverage core financing is extremely important. It is also recognized to be a difficult and personnel-intensive activity.

Also evident from workshop discussions was an emphasis on program relationships for the long-term. AID programming cycles of 3, 5, or even 7 years were considered short-term. For dividends to accrue, the time frame needs to be 10 years or longer.

Presently, there is no U.S. Government mandate to consider collaborative programs and relationships with 10 year or longer time frames. Perhaps this suggests the need for a new mechanism to work on collaborative activities which arise from the development context. The Canadian Government, through its International Development Research Centre (IDRC) in Ottawa, provides just such a mechanism for its relationships with developing countries and advanced developing countries.

Another collaborative model is the India - U.S. and the Israel - U.S. science and technology cooperation foundations initally funded by P.L. 480 surplus currencies. The Luso-American Development Foundation with Portugal is similar in concept and operation. Foundations with independent funds and long-term goals provide one means for sustaining joint collaboration without the need for year-to-year appropriations from two separate governments. Annex F describes the Luso-American Foundation's goals and procedures.

3. What are the priorities of AID within this role? Are there specific programs or activities which warrant early attention?

Priorities

- Common Interests. Workshop participants recognized that there may be differences between the U.S. perception of priorities and those of any advanced developing country. A first step in entering into a relationship should be negotiating an agreement on the common interests. This provides a foundation for all that follows in setting goals, selecting specific projects, determining where activities are to take place, determining evaluation and review criteria, work schedules, and publication of results.
- Collaborative Research. High on the general list of activities which need strengthening is renewal of commitment to collaborative and cooperative research. Specific priority should be the subject of negotiation but might include agriculture, health and nutrition, population, natural resource utilization, and maintenance of the environment and of biological diversity. Many of the participants pointed to the social sciences as an area meriting greater priority attention.
- Educational Exchanges. U.S. institutions have benefited from the many students from abroad who have come to this country for higher education and participation in research. Commitment to exchanges should remain strong because of the scientific, technical, and cultural enrichment that exchanges provide the U.S. and the individual participants. There is no better way to build bridges of friendship with the future intellectual leaders of the world than by strong education-based exchange programs.

For an ADC, receiving exchange professors that come to a country for teaching and research has obvious advantages. Thus, educational exchanges are mutually beneficial. They represent a sound, long-term investment in S&T collaboration and cooperation.

Activities for Early Attention

- Management Training. Since so many foreign students from ADCs major in the sciences or engineering and, when they return home, will be faced with management responsibilities for R&D, the U.S. should strengthen its outreach in R&D management training and orientation. This would help to build an additional bridge of understanding for continuing collaboration. Some management training can be offered in short courses in the U.S. but collaboration in in-service management training in the ADCs themselves is a better long-term solution.
- Industrial Orientation. More difficult than R&D management orientation but important both for understanding and for long-term trade relationships, would be industrial experiences for foreign technical (engineering) graduates who have had a period of training in the U.S. Familiarization with, and use of U.S. equipment in these programs creates the desire to purchase similar U.S. equipment when a trainee returns to his home laboratory. Industrial internships also provide short-term, direct benefits to the trainees prior to returning home. Workshop participants recognized that obstacles to industrial training and orientation

exist and can only be solved on a case-by-case basis. The problems of technology loss and proprietary rights often preclude an industry accepting foreign-born trainees for internships. Even insurance liability for trainees arises as an obstacle that must be overcome.

- Collaboration in LDC Outreach. Where facilities and expertise exist in ADCs, the U.S. should selectively collaborate in organizing training programs for personnel from the less developed countries. This could complement training programs in U.S. institutions and has advantages in terms of access to training opportunities (proximity and lower cost), fostering a shared responsibility in technical assistance outreach to LDCs, and by providing training that may be more relevant technically and culturally than might be the case in the United States. This does not imply that the U.S. should shift responsibility for training of LDC students to the ADCs. It is a way to participate in, and create more opportunities for training LDC human resources.

CONCLUSION

Participants in the workshop recognized that strengthening and sustaining S&T relationships with institutions in advanced developing countries is important for the long-term scientific, economic, and cultural well being of the United States as well as for its security. The task is not an easy one, nor can it be carried out by AID alone. The fact that the Agency is currently reviewing its policy toward ADC relationships is a very positive action. What needs to be undertaken is a larger, shared effort among both public and private scientific and technical institutions and funding agencies, especially the formation of new government-university-private sector relationships.

The workshop met over a period of only one and one-half days--a time period far too short to consider the broad range of issues in sufficient depth. It represents, however, another step in creating a wider appreciation of the benefits for strengthened S&T collaboration and cooperation between the United States and advanced developing countries.

ANNEX A

Agenda

Workshop on Future S&T Relationships of the Agency for International Development with Institutions in Advanced Developing Countries

Convened by
Board on Science and Technology for International Development (BOSTID)
National Research Council (NRC)

Main NRC Headquarters 2101 Constitution Ave., N.W.
Washington, D.C. 20418
March 14-15, 1988

General Chairman
A. George Schillinger
Polytechnic University

AID Coordinator
Bradshaw Langmaid
Bureau for S&T, AID

Monday, March 14, 1988		Lecture Room
9:00 a.m.	Welcome	Mr. John Hurley BOSTID
9:15 a.m.	Overview of Issues from the Perspective of AID	Mr. Langmaid Bureau for S&T, AID
9:45 a.m.	Developing Country Perspective	Mr. Hyung Ki Kim World Bank
10:15 a.m.	Break	
10:30 a.m.	Views from the U.S. Scientific Community	Dr. Franklin Long Cornell University
11:00 a.m.	Discussion and General Charge to the Panels	Dr. Schillinger Polytechnic University
12:00 Noon	Lunch	NRC Refectory
1:30 p.m.	Group I: Agriculture, Natural Resources, Forestry, and Environment	Room #150 Moderator Dr. Pimentel
1:30 p.m.	Group II: Health, Population, Social Sciences and Education	Room #250 Moderator Dr. Fonaroff
4:00 p.m.	Adjourn	

Tuesday, March 15, 1988		
9:00 a.m.	Group III: Cross cutting issues and building linkages	Room #150 General Chairman Dr. Schillinger
10:30 a.m.	Break	
10:45 a.m.	Summation and closing discussion	Dr. Schillinger Dr. Langmaid
12:30 a.m.	Adjourn	

ANNEX B

Participants

Workshop on Future S&T Relationships of the Agency for International Development with Institutions in Advanced Developing Countries

Board on Science and Technology for International Development
National Research Council (NRC)
March 14-15, 1988

Main NRC Headquarters 2101 Constitution Ave., N.W.
Washington, D.C. 20418

Invited Speakers

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Bradshaw Langmaid
Bureau for Science & Technology
Agency for International Development
Washington, D.C.

Hyung Ki Kim
Economic Development Institute
The World Bank
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ANNEX C

SCIENCE AND TECHNOLOGY RELATIONSHIPS With ADVANCED DEVELOPING COUNTRIES

Draft Information Paper
for Discussion

Workshop on S&T Relationships of AID with Institutions
in Advanced Developing Countries

By
Bradshaw Langmaid, Deputy Director for Research
Bureau for Science and Technology
Agency for International Development
February 1988

There are a number of developing countries that have achieved in the last thirty years a substantial increase in per capita GNP, are capable of mobilizing the resources needed for their development effort, and have substantial modern or rapidly modernizing sectors. As a result they are capable of sustaining their economic development program without resource to concessional capital. Korea, Taiwan, Brazil, and Mexico fit this model. There is another group of countries that is approaching this level of development. This latter group may still require concessional assistance to maintain their rate of development and may have important populations of poor people. However, they also have sectors or areas of their economy and society and institutions which are modernizing rapidly. India, Thailand, and Costa Rica are examples of this group.

The economic and institutional strengths of these countries enables them to play an increasingly important political role regionally and internationally. They frequently are the leaders of their particular geographic or subject matter interest. Important U.S. foreign policy and security interests are significantly dependent on close and effective political relationships with many of these advanced developing countries.

These countries are also economically important to the United States. They are a major source of essential raw materials. They are an even more important market for U.S. exports. Their markets and U.S. exports to those markets are growing more rapidly than any other group of countries. U.S. exports to the developing world already substantially exceed exports to Western Europe, and the advanced developing countries are the principal markets in the developing world.

These countries are becoming an increasingly important source of new science and technology. Many contain world class scientists and scientific institutions working collaboratively with their counterparts in the United States and other countries of the Western world on problems of major importance to the people of the United States and the welfare of our economy. Increasingly, their research is playing an important role in the solution of our problems.

These countries are also the laboratories and models for successful development programs. Their neighbors and other developing countries, with which they may have close ties, follow closely the development experience, successes and failures, of the advanced developing countries. The institutions of these advanced development countries are an important training ground for students and leaders from less developed countries. The policy approaches and institutional arrangements of the advanced developing countries are frequently replicated. In this respect, the advanced developing countries can play a very important role in the continued development efforts of their neighbors, even though the resources they may have to contribute to that process remain limited.

When the U.S. Development Assistance programs with these countries began, the relationship was dominantly government to government. As the aid program broadened and the countries grew, these relationships became more diversified, complex, and largely independent of the government-to-government tie. In the process, a spectrum of political, economic, social, and in some ways cultural, personal and institutional relationships developed. Some of the relationships such as the ties between institutions and associations are quite concrete. Others, such as the familiarity with the U.S. market place or an appreciation of U.S. political systems or pragmatic problem-solving approach to issues, are harder to quantify, but no less important. These relationships and this orientation are important economic and foreign policy assets. This is clearly recognized by other donors who freqently increase their technical assistance and training relationships with this group of countries as our program levels begin to decline.

U.S. government and state agencies, foundations, educational institutions, professional societies and voluntary organizations have resources with which to work with foreign governments on problems of common interest. An uncountable number of institutional and personal networks evolve from this process. In the case of an issue of common interest between two developed countries, the question of resources is generally not controlling inasmuch as each contributes according to its own degree of interest. In the case of many advanced developing countries, the resource demands of their own development effort leave little to support such continuing relationships. Their interests remain strong and the development benefit of such continuing linkages may be high, but their own resources for maintaining these relationships are limited The governmental and private resources in the United States for these purposes are also limited.

In the field of science and technology:

-- Is this an accurate, general portrayal of the situation? Are there other important U.S. or mutual interests that also need to be identified? How serious is this gap?

-- What can be done to close it? Given AID's legislative mandate and the historical focus of our program, is there a particular role for AID in maintaining these linkages and how might they become self-sustaining?

-- What are the priorities, and are there specific programs or activities, which warrant early attention?

The plan is to have a two-day workshop. The first morning would be spent in general discussion to ensure that all the key characteristics of the issue are on the table. The afternoon session of the first day would be broken down into discussion groups covering the priority sectors. Another session would focus on delivery mechanisms; i.e., the nature of the linkages between the U.S. private sector, universities, foundations, and other associations, and institutions with their counterparts in advanced developing countries. How are these relationships financed? How well do these sustain U.S. relationships with counterparts in the advanced developing countries. Are there problems which an agency such as AID could constructively address?

The sectoral orientation should encompasss the major areas upon which AID is now focused. This group should also address the degree to which there is a growing mutuality of interest in these sectors and, to the extent practical, identify the major benefits to U.S. science and technology likely to flow from sustained technical and scientific relationships with advanced developing countries.

ANNEX D

Workshop on Future Science and Technology Relations of the Agency for International Development with Institutions in Advanced Developing Countries

National Research Council (NRC) Washington, D.C. 20418
Monday, March 14, 1988

Personal Views and Perspectives
Hyung Ki Kim

Economic Development Institute
The World Bank

I am Mr. Hyung Ki Kim, currently an employee of the World Bank in Washington. Prior to coming to the Bank about 7 years ago I was closely involved in science cooperation activities both inside and outside the Government of Korea in such posts as Director General of Technical Cooperation which oversees the intergovernmental programs of technical cooperation and as Secretary General, Korea Science and Engineering Foundation. The Foundation itself was created by the Korean Government as a nongovernmental organization with its own board of trustees with the advice of an expert panel from the National Academy of Sciences and the National Academy of Engineering of the United States. Since my coming to the World Bank, I have participated in science and education missions to Argentina, Brazil, China, Malaysia, Peru and Portugal, among others. In all of these countries except Malaysia, the Agency for International Development (AID) had technical assistance programs. Thus I feel I have some modest insights into S&T relationships with the United States both as a participant in development activities from my country, Korea, and from my present responsibilities in the World Bank.

First some remarks as a citizen to Korea. Korean ties with the American scientific and technical community, as with education, economic development planning, public administration and many other related fields go back thirty years and more. Those ties are strong and very pleasant ones. I remember so well in the early days of Korea's reconstruction and struggle for development, how we frequently turned to our American friends for stimulation and support. Relationships were established on a wide front. Many of us came to U.S. univerisites for advanced study. When we returned home we saw experts in many fields who came to our country to work with us. Ties with universities and the National Sceince Foundation, the National Academy of Sciences, and the Agency for International Development became strong. We especially appreciated the presence of the AID. AID was in the country and its representatives were accessible to us.

As the years went by we, and I believe you, were proud of Korea's progress. Progress that was achieved together. There was a bond of good feeling and of confidence.

When we were told that Korea was soon to become a "graduate" of the technical assistance programs of the United States, we were told to consider this to be a great accomplishment. What we did not forsee clearly was an abrupt abandonment of the previous joint efforts between institutions and individuals in our two countries in fields of S&T. We know and I believe understand some of the political realities in this country. The American Congress determined that American aid should go that American aid should go first to countries that were still struggling in the first stages of economic development. Korea was becoming stronger, a bigger brother who was more self dependent in science, technology, and other sectors. We tried to persuade our friends in the AID Mission of the mutual value of these relationships which would not involve direct technical assistance or aid, but our view did not prevail.

Thus, the reality of becoming a graduate was quite different from what we expected it would be. We expected a strong partnership to continue. We perceived there was mutual benefit for both. We believed there would be a gradual shift in benefits so that our American partners would profit more equally from lessons learned in the Korean development process. We expected collaboration to grow in research and in the applications of that research. We did not expect graduation to be a breaking of ties, contacts and long associations. We tried in various ways to find new modes for maintaining cooperation. There was a study to establish a Korean-American binational science and engineering foundation. For a variety of reasons it failed to achieve the support desired. We looked to the use of repayments to commodity import funds that Korea owed to the U.S. government that had arisen prior to 1948 as an American contribution to the working capital of the proposed binational foundation (known commonly as the "Candy Fund" because of the inclusion of candy in the commodities), and it also was unsuccessful.

Today there is a vacuum caused by the graduation process and that vacuum extends beyond S&T. But surely in the realm of science and technology there is the long-term mutuality of benefit which accrues when both sides have identified common priorities. Instead, we see a growing propensity for confrontation on issues of trade. Surely one way to deflect that confrontation is to maintain so many ties in S&T, education, the arts, and people-to-people interaction that the issue of trade imbalance is negotiated in an arena where each side understands and respects the economic, political and social problems of the other. We were of the opinion that the USA should develop a new relationship with industrializing countries and we felt that the Korea-United States relations in S&T could be the prototype.

Turning to my experience with the World Bank I see a parallel situation in the S&T relationships between the United States and some countries in South America. Again I would say that strong ties built so carefully during years of economic development cooperation were too abruptly discontinued when countries became AID graduates. I hear of experiences in Brazil that are very similar to those of Korea. I see others from Japan, the USSR or elsewhere stepping into the vacuum created by the U.S. breaking of ties. I perceive those other countries have gained access to new markets as one consequence of their cultivation of S&T relationships.

In summary, I am witnessing in Korea, Brazil and elsewhere a loosening of valuable ties and relationships with the American scientific and technical community just when mutual benefit can and should logically increase. In a world where inter-dependence grows and becomes more necessary, the U.S. seems strangely to draw back and make itself less able to work with dynamic economies where technological innovation is very forcefully pursued. I personally am encouraged that our friends in the AID are speaking today about strengthening ties. Together we should find the ways for new efforts. In the long term the price for not sustaining cooperation with advanced developing countries in S&T would become prohibitive.

ANNEX E

Workshop on
Future Science and Technology Relationships of the
Agency for International Development with
Institutions in Advanced Developing Countries

National Research Council (NRC) Washington,D.C. 20418 Monday, March 14, 1988

Personal Views and Reflections from a Member of the United States Scientific Community

Dr. Franklin A. Long
Department of Chemistry and the Program on Science, Technology and Society, Cornell University
Ithaca, New York

I was invited to give some personal views and reflections on issues concerning S&T relationships with advanced developing countries which reflect my concern for, and judgement about the interests of members of the U.S. scientific community as they collaborate with colleagues from those countries. My remarks arise from an involvement over the last 30 years in policy issues concerned with the role of science and technology (S&T) in the development process. That experience has been primarily in Asia, more particularly in India, Indonesia, Malaysia, and Thailand. I also have had a number of opportunities to observe the development process in Latin America and to a lesser extent in parts of Africa.

I shall draw upon the specific example of India where my experience is in greater depth, extending over a period of about 20 years. Recently, I completed for the European Economic Community a rather comprehensive study entitled "Science, Technology and Industrial Development in India." It is from some of the conclusions and observations of that study that I draw today.

India is surely one of the more interesting, significant, and paradoxical of the world's developing nations. Its per capita GNP for 1984 of roughly $260 would classify it as one of the world's least developed countries. But India has a very large number of university graduates, many of whom were trained as scientists or engineers. There are about 3 million Indian scientists and engineers (excluding M.D.'s) and an annual influx from colleges and universities of an additional 175,000. To be sure, the quality of training is extremely variable and the number of scientific and technical positions in India probably does not exceed 350,000. Nevertheless, India has many highly qualifed scientists and engineers engaged in programs recognized to be of high caliber. Indeed, India easily is among those that should be classifed as an advanced developing country with respect to its human resources in S&T. And, with respect to some fields such as atomic energy applications and the space sciences, India ranks with the industrially developed nations.

As a member of the U.S. scientific community looking at India where would I, and my Indian colleagues, feel there could be mutually beneficial R&D collaboration or close consultation on scientific and technological activities? This is a very interesting question. We both know that the U.S. is increasingly not inclined to provide concessional R&D assistance. If both sides must pay their own costs for cooperation and collaboration, choices have to be made.

It happens that a pioneering effort in joint collaboration began in 1982 when the then Prime Minister Indira Gandhi and President Reagan signed an agreement known as the Indo-U.S. Science and Technology Initiative. Progress and interest have occurred such that the program was renewed in June 1985 when Rajiv Gandhi visited the United States.

The S&T areas chosen for Indo-U.S. collaboration were agriculture, health, monsoon forecasting and solid state science and engineering.

- In agriculture the specific subareas are biological nitrogen fixation, nitrogen fertilizer efficiency studies, and biomass studies directed toward problems of relieving fuel wood and fodder scarcity in areas of resource-poor subsistence agriculture.
- In health the research emphasizes the prevention of blindness, development of new anti-fertility vaccines, and vaccines for infectious diseases.
- In the monsoon research program there is agreement on the sharing of sea-level data from the Indian ocean collected by an Indian satellite.
- In solid state science and engineering the work involves two separate areas--mineral processing and photovoltaci materials, with initial emphasis on amorphous silicon.

A major aspect of this Indo-U.S. S&T collaboration is that it has been planned and is managed by the scientists themselves. It arose from a government-to-government agreement, but the bureaucrats have, to a far greater extent than is the usual pattern, allowed the scientists themselves to be the planners and managers.

If I step back from the Indo-U.S. program and try to generalize on that experience, I conclude and suggest to AID the following:

- Excellence in the biological and physical sciences must be coupled with excellence in the social sciences and in management systems in order to achieve success in S&T for development programs. Note my emphasis on the concept of "excellence;" <u>quality</u> over <u>numbers</u> of exchanges is the sine qua non.
- Genuine collaboration on both sides in every step of planning, designing and implementing of projects is absolutely essential. In working with advanced developing countries any holdover of the proclivity for one country to dominate the partnership must be put aside.
- As a person from a university community, I would emphasize that university-based researchers, who have so often been excluded from development initiatives in countries like India, be specifically included in the cooperative programs. Government research institutes are an essential part of the R&D community but should not constitute the only group with whom our collaboration and cooperation occurs.

In recognition of the fact that funding for S&T cooperative programs with the advanced developing countries will remain difficult and that the

mandate of AID to work with the least developed countries (the poorest of the poor) is as important as ever, I suggest the following approaches and mechanisms be examined as new initiatives:

- Workshops and technical symposia, carefully planned and implemented, are among the more cost effective means to bring together the best people for interaction on key technical and policy issues. Moreover, workshops can be structured so that the costs are modest and are shared equitably.
- Long term (over 6 month) exchanges are highly desirable, even though they may have to be kept to a minimum because of costs. It is difficult for active scientists to participate often in long-term exchanges, but occasional semester-long visits by university teacher-scholars can be of great value to a developing nation, and a very good way to demonstrate U.S. interest and concern.
- New direction for collaboration with advanced developing countries implies working together on activities in industrial R&D as well as university based projects. This necessitates care in the protection of intellectual property rights. But other nations such as Japan and Canada have successfully incorporated the business and industrial communities into their international programs. The time has come for the United States to do likewise.

Finally, I would reiterate that S&T for development is entering a new era. True cooperation and partnership as are exhibited in the U.S. Fulbright exchanges and in the programs of the International Development Research Center (IDRC) are models from which to draw experience and upon which to build.

ANNEX F

Luso-American Development Foundation

1. The Foundation

The Luso-American Development Foundation is a Portuguese Foundation created on May 20, 1985, by Decree Law 168/85. Its goal is to contribute to Portugal's economic and social development by promoting cooperation between Portugal and the United States in the scientific, technical, cultural, educational, commercial and entrepreneurial fields.

The Foundation operates under Portuguese law as a private organization which provides public benefit. It has the administrative and financial independence necessary to carry out its purposes.

The initial endowment of the Foundation was $38 million contributed by the Portuguese Government as a result of cooperation with the Government of the United States. Increases in endowment from the same source are foreseen in the statutes which established the Foundation.

The Foundation has Directive, Executive and Advisory Councils. The Directive Council determines the basic policies of the Foundation and approves annual budgets, accounts, and reports. It consists of three members — two designated by Portugal's Prime Minister and the third being the Ambassador of the United States.

General administration of the Foundation is the responsibility of the Executive Council, consisting of two Portuguese members designated by the Prime Minister and an American selected by the American Ambassador.

The Advisory Council is composed of eight distinguished representatives of the Portuguese and American business and scientific communities. Four are selected by the Prime Minister and four by the Ambassador of the United States.

The Foundation will give priority to projects which promote rapid modernization of the Portuguese economy; and the role of the private sector will be given particular importance. The Foundation prefers to support proposals to be administered by other organizations, rather than administering projects itself. This approach will enable the Foundation to maintain flexibility in its operations and limit the number of its employees.

Directive Council Dr. Rui Mateus (President)
Eng. António Vasco de Mello
Ambassador Frank Shakespeare

Executive Council Mr. Donald Finberg (President)
Dr. Bernardino Gomes
Dr. Rui Machete

Luso-American
DEVELOPMENT
Foundation

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January 1986

2. Areas of Emphasis

Initially the Foundation has decided to concentrate on the following program areas:

Private Sector Development

To modernize and strengthen the private sector, enabling it to compete effectively in the EEC and other international markets. The Foundation may participate in activities such as expanding capital markets, increasing foreign investment in Portugal, promoting exports, and creating new firms (including joint-ventures) in order to accelerate economic development.

Science and Technology

To develop modern technologies and promote technology transfer which will increase the efficiency and competitiveness of the Portuguese economy. Particular emphasis will be placed on applied research and projects involving cooperation among industries and universities.

Education

To improve the quality of education, particularly at the secondary and higher levels, including post-graduate and technical training. Academic and research fellowships will be provided according to criteria and priorities which will be established. Priority will be given to projects aiming at improved management, including educational administration.

Public Administration and Regional Development

To support reforms which will lessen bureaucracy and make public administration more efficient. Support will be given to projects which contribute to regional development, correcting imbalances and improving municipal organization and management.

Culture

To contribute to the diffusion of Portuguese language and culture. Cultural and artistic initiatives which develop a spirit of innovation and progress will be encouraged. Cultural exchanges between Portugal and the United States also will be supported. The Foundation will initially give greater support to the first three program areas.

3. Criteria for Approval of Projects

Since the Foundation's ability to provide financial assistance is limited, it will not be possible to support all worthy requests submitted. Therefore, it is necessary to establish selection criteria. The most important guidelines for consideration of projects follow:

- Projects should make a significant contribution to Portugal's economic development. Projects should be realistic, with clearly defined objectives which are included within the Foundation's areas of emphasis.
- The Foundation will support projects which contain innovative approaches, giving priority to projects involving cooperation among Portuguese organizations or collaboration between Portuguese and American institutions. Portuguese institutions will normally be responsible for the administration of projects.
- Support for a project normally will not exceed three years.
- The Foundation generally will not finance more than 50% of the costs of a project, except for some research activities.
- In the field of private sector development, the Foundation will give preference to financing of projects through financial intermediaries and trade associations, cooperatives, etc.
- Financing of equipment, training, seminars and conferences, etc. normally will be considered only when part of a comprehensive project.
- The Foundation will not support current operating costs, charitable activities, or building construction.
- The Foundation will not support partisan political activities.

4. How to Present a Project Proposal

Most Foundation assistance will be in the form of grants, although it may also provide loans or loan guarantees.

Decisions on projects submitted to the Foundation will be made impartially and based on rigorous analysis, soliciting the views of independent individuals and organizations of recognized quality when appropriate. Decisions will take into consideration whether or not proposals are within the Foundation's fields of emphasis and meet selection criteria, as well as the importance of the problem addressed and the financial and administrative capacity of the institution requesting assistance.

Preliminary grant applications (preferably not to exceed ten pages) should be sent to the Foundations's temporary office. Requests should contain the following information:

a) Background information on the requesting individual or organization — name, address, telephone number, person responsible for the proposal; and a brief description of the purpose, history, and activities carried out by the organization.

b) A brief description of the proposed project, including
   - The problem the project will address, and the purpose of the project;
   - Anticipated specific accomplishments of the project;
   - How the project will be implemented, over what time period, and at what total cost;
   - Other financial assistance available for the project;
   - The names and addresses of any other funding organizations to which the proposal has or will be submitted;
   - Indication of American or other organizations whose cooperation in the project is desired;
   - A detailed budget showing how the funds of the Foundation and all other contributors will be distributed;
   - Indication of how the project will be continued after Foundation support ends.

The Foundation will reply as soon as possible, indicating whether or not assistance is likely. If Foundation support seems likely, the Foundation will work with the applicant to develop a final project proposal.