

PROJECT AUTHORIZATION

1. PROJECT NUMBER 931-11-995-029	3. COUNTRY AID/Washington	4. AUTHORIZATION NUMBER TA 0066
2. PROJECT TITLE Strengthening the Scientific and Technological Capabilities of the Developing Countries (National Academy of Sciences)		5. AUTHORIZATION DATE Jan. 29, 1970
7. LIFE OF PROJECT a. Number of Years of Funding: <u>5</u> Starting FY 19 <u>70</u> ; Terminal FY 19 <u>74</u>		b. Estimated Duration of Physical Work After Last Year of Funding (in Months): <u>12</u>

FUNDING BY FISCAL YEAR (in U.S. \$ or \$ equivalent)	DOLLARS		P.L. 480 CCC + FREIGHT	LOCAL CURRENCY			
	GRANT	LOAN		Exchange Rate: \$1 =		HOST COUNTRY	
				U.S. OWNED	GRANT	LOAN	JOINTLY PROGRAMMED
Prior through Actual FY							
Operational FY 1970	600,000						
Budget FY 1971	1,000,000						
B+1 FY 1972	1,000,000						
B+2 FY 1973	1,200,000						
B+3 FY 1974	1,200,000						
All Subsequent FY's	-						
TOTAL	5,000,000						

9. DESCRIBE SPECIAL FUNDING CONDITIONS OR RECOMMENDATIONS FOR IMPLEMENTATION, AND LIST KINDS AND QUANTITIES OF ANY P.L. 480 COMMODITIES

10. CONDITIONS OF APPROVAL OF PROJECT

Approved on assurance from Mr. Bernstein that National Academy of Engineering secretariat and membership will be actively involved and that project identification and formulation will be stressed.

BEST AVAILABLE COPY

(Use continuation sheet if necessary)

11. Approved in substance for the life of the project as described in the PROP, subject to the conditions cited in Block 10 above, and the availability of funds. Detailed planning with cooperating country and drafting of implementation documents is authorized.

This authorization is contingent upon timely completion of the self-help and other conditions listed in the PROP or attached thereto.

This authorization will be reviewed at such time as the objectives, scope and nature of the project and/or the magnitudes and scheduling of any inputs or outputs deviate so significantly from the project as originally authorized as to warrant submission of a new or revised PROP.

A.I.D. APPROVAL	CLEARANCES	DATE
Rutherford Poats (Sgnd) (See attached note) SIGNATURE AA Deputy Administrator TITLE	Mr. Fossum, VN/ND	January 2, 1970
	Mr. Newbry, NESA/TECH	" " "
	Mr. Steinberg, EA/TECH	" " "
	Mr. Rupard, AFR/ID	" " "
	Mr. Black, LA/SCD	" " "
	Mr. Vernon, ENGR	" " "
	Mr. Terderer, PHR	" " "
DATE	A/CONT	
Jan 29, 1970	Mr. Levick, TA/PM	

AGENCY FOR INTERNATIONAL DEVELOPMENT

Office of the Administrator

January 29, 1970

Mr. Bernstein, AA/TA

PROP approved (attached) *

* Approved on assurance from Mr. Bernstein that National Academy of Engineering secretariat and membership will be actively involved and that project identification and formulation will be stressed.



Rutherford Poats
Deputy Administrator

attachment;
action memo re PROP

NON CAPITAL PROJECT PAPER (PROP)

INTERREGIONAL PROJECT

AID/Washington, Technical Assistance Bureau, Office of Science and Technology

PROJECT TITLE: Strengthening the Scientific and Technological Capabilities
of the Developing Countries (National Academy of Sciences)

PROJECT NO.: 913-11-995-029

ORIGINAL: X

SUBMISSION DATE: January 5, 1970

OBLIGATION SPAN: FY 1970 - 1974

IMPLEMENTATION SPAN: FY 1970 - 1975

FY 1970	\$ 600,000
FY 1971	\$1,000,000
FY 1972	\$1,000,000
FY 1973	\$1,200,000
FY 1974	<u>\$1,200,000</u>
TOTAL	\$5,000,000

NON-CAPITAL PROJECT PAPER

STRENGTHENING THE SCIENTIFIC AND TECHNOLOGICAL CAPABILITIES OF THE DEVELOPING COUNTRIES (NATIONAL ACADEMY OF SCIENCES)

1. Summary Description

A. Objectives

This project is intended to increase the capability of AID to assist in strengthening the scientific and technological capabilities of developing countries in areas of direct importance to economic progress. The project will improve and expand existing mechanisms for mobilizing the resources of the U.S. scientific and technological community in support of AID activities. Primary emphasis will be on using these resources in identifying and developing potential AID projects that will contribute to the indigenous capacity of developing countries to (a) develop their own scientific and technological capabilities and institutions, and (b) adapt scientific and technological advancements in the developed countries to the solution of specific development problems. Since identification and development of priority projects will be accomplished to a considerable extent in cooperation with specialists from the developing countries, an important contribution of this effort will be direct assistance to developing countries in clarifying national priorities, relating research and innovation to economic development, and identifying impediments to more rapid growth. These newly mobilized resources will also be available to advise AID on a broad range of technical issues, with particular attention to problems and opportunities in applying scientific accomplishments to maximize the effect of foreign assistance efforts during the 1970s.

B. Project Components

The unique capabilities of the National Academy of Sciences will be used to more effectively direct the resources of the scientific and technical communities in a concerted fashion on development problems. The specific types of activities to be included in this project are:

1. Analysis and Identification workshops, organized on a bilateral and regional basis, involving U.S. and foreign officials, scientists, and engineers to (a) analyze broad research and development policies, programs, institutional requirements, and priorities in selected countries and regions, and (b) identify and assist in developing potential AID projects to strengthen indigenous capabilities in the priority fields. These workshops will also develop recommendations as to how science and technology can be effectively used in solving specific development problems.

2. Functional workshops, organized on a bilateral and regional basis, to (a) analyze specific developmental sectors in selected countries and regions, and (b) assist in developing AID projects in these sectors. Specific applications of technology to accelerate advancements in the selected sectors will also be identified.

3. Ad hoc advisory panels to provide expert advice on selected scientific and technical issues to AID Missions, host Governments and AID/W;

4. A permanent Academy staff of experts in the general field of science, technology, and foreign assistance to provide continuing assistance to AID Missions and AID/W.

5. Continuing analysis by the panels and staff of the Academy of problems in and opportunities for strengthening scientific and technological capabilities in the developing countries during the 1970s, drawing on the experience and expertise of AID and other organizations concerned with development, as well as on a broad spectrum of the scientific and engineering communities;

6. New attention by the Academy's Board for International Development, and by other standing panels and boards of the Academy, to the major direction of scientific and technological development in the developing countries;

7. Academy efforts to strengthen the "talent bank" of qualified scientists and engineers interested in participating in foreign assistance activities.

C. Justification

The importance of applied science and technology to economic development has been repeatedly demonstrated in many fields -- agriculture, health, industrialization, transportation, communication, power generation and distribution, construction, and other areas. At the same time, the inability of many developing countries to apply scientific and technological achievements, which are or could be within their grasp, to development problems is seriously inhibiting economic and social progress.

The United States has unique capabilities in many of the scientific and technological areas that offer considerable promise in accelerating development, but large and important segments of the U. S. scientific and technological community have not been brought into the mainstream of AID activities. This project will partially remedy this shortcoming by increasing the opportunities for scientists and engineers from many of these segments to participate directly in the solution of development problems.

D. Life-of-Project Costs

The National Academy of Sciences has been selected to carry out this project in view of

1. Its demonstrated capability to attract leading U. S. experts in all fields of science and engineering to participate in its activities,
2. The interlocking nature of its multidisciplinary boards and panels,
3. Its extensive network of relationships with scientific and engineering organizations throughout the developing countries, and

4. Its experience in the international development field.

In recognition that only a sustained effort will have a meaningful impact on institution building processes, it is expected that this project will continue for at least five years, provided the resources of the Academy can be applied as an effective asset in achievement of AID objectives. Also, a long-term effort is essential to attract the highest quality of personnel to participate in these efforts and to permit the in-depth analyses, the experimentation, and the follow-through needed to solve specific development problems.

The projected annual funding is as follows:

FY 1970	\$ 600,000
FY 1971	1,000,000
FY 1972	1,000,000
FY 1973	1,200,000
FY 1974	1,200,000

Enclosure 1 sets forth in general the distribution of these costs among project activities during FY 1970 and FY 1971.

II. Setting in the Developing Countries

The institutional framework for scientific and technological development, the level of advancement in these areas, and the availability of trained manpower and facilities vary widely in the developing countries. In general, the organization of the scientific effort is primitive, coordination within government and between public and private organizations is poor, and achievements to date have been very modest. At the same time, there is almost universal recognition of U. S. excellence and accomplishments, accompanied by a strong desire to emulate the U. S. approach in almost every field of science and technology.

Few AID-recipient countries have a deliberate national science policy -- a policy designed to encourage research and innovation, to relate research to economic needs, and to set research and development priorities in a sound fashion. More often than not research is left to the universities and occasionally appended to industrial development projects with little meaningful interplay between laboratory research and developmental and manufacturing processes. At the same time, there is a general awareness that research and engineering development have undergirded U. S. industrial progress but only a vague understanding of the institutional arrangements that have made this possible.

In those few developing countries where there is a plentiful supply of scientists and engineers, these specialists are frequently not in the mainstream of economic activity, and inefficient use of this talent is commonplace. Many countries are largely dependent on U. S. universities for advanced training of the most promising talent, and many of these specialists decide to remain in

the United States. As a result, direct participation by highly qualified local scientists and engineers in production and manufacturing is a rarity in most developing countries, and innovation and advancement in these areas usually depend heavily on foreign involvement. While a gap between researchers and producers exists in all developed countries as well, the United States has made major strides toward bridging that gap, and many of our approaches merit exploration in the developing countries.

Growing foreign investment in the developing countries -- American, Japanese, German, French, and others -- is having a significant influence on the development of the research and development infrastructure in these countries. Usually, such investments are considered by the host government on an ad hoc basis, with little attention to the longer term impact of these investments on development of indigenous scientific and engineering capabilities. Similarly, external lending agencies (e.g. World Bank, IDA, IDB) are usually dealt with on a case-by-case basis within a general scheme of economic development, but with only minor consideration of the contribution of economic and capital assistance efforts to the organization, policies, and priorities of a sound research base within the country.

III. Historical Involvement of the U. S Scientific and Technological Community in AID Activities.

AID has traditionally relied on expertise from the U. S. scientific and technological community in a number of important developmental sectors -- e.g. agriculture, health, education and industry. However, there has been relatively little emphasis, even in these sectors, on strengthening indigenous research capabilities, and only recently have there been attempts to relate scientific opportunities to economic development in a systematic and comprehensive manner. In response to specific development problems, scientific resources have been mobilized within AID, through consultant or contractual arrangements, or through advisory panels. However, the absence of a sustained, broadly based reservoir of readily available scientific and technical expertise has frequently been an apparent weakness in establishment of developmental priorities.

During the past decade, AID and its predecessors have called upon the National Academy of Sciences for advice. Initially, the Academy conducted several studies on needs in different countries in selected fields of science and engineering. Also, the Academy participated in preparations for the 1963 UN Conference on Science and Technology for the Benefit of Developing Countries, and assisted in the recruitment of scientists for participation in AID-sponsored programs. Since 1966, an AID centrally-funded contract has provided a small permanent nucleus of Academy activities, augmented by task orders of interested AID Missions and regional bureaus including:

- an Academy Board on Science and Technology for International Development;
- organization of workshops enabling scientists and engineers of the United States and selected developing countries to consider policies and priorities in relating science and technology to economic development; and
- a professional staff to support the foregoing activities.

Enclosure 2 describes in detail recent activities of the Academy in support of AID activities.

Also in recent years the developing countries themselves have taken the initiative to assess their science and technology infrastructure. The OECD, World Bank, UNDP, OAS, and other international organizations have become involved in these activities to a limited degree, but the scope of their activities has not been as broad as the activities of the Academy.

IV. Alternative Strategies

A. Alternative 1 - Continue as in the Past.

A continuation of the past ad hoc arrangements for mobilizing U. S. talent is an inadequate response to the current international and national demand to apply science and technology as essential tools in development. These past uncoordinated efforts undertaken by different groups in response to isolated problems have resulted in a lack of continuity, repetition of mistakes, and duplication of effort. Furthermore, many very competent U. S. scientists and engineers who have been interested in contributing to development activities have not had the opportunity to become directly involved in such endeavors.

B. Alternative 2 - Expanded In-house Efforts.

While an increased in-house effort is in order, broader involvement of large segments of U. S. industry and the academic community is also critical to the success of an accelerated effort. In-house mechanisms cannot by themselves provide a truly effective means for bringing these sectors into the mainstream of AID activities in a meaningful way.

C. Alternative 3 - Heavier Reliance on One or Several Universities, Non-Profit Organizations, or Commercial Firms.

No single private organization or group of private organizations has the capability to mobilize the level and spectrum of expertise needed to provide the major increase in AID capabilities envisioned in this project.

D. Alternative 4 - Expanded Efforts of the National Academy of Sciences.

The unique capabilities of the Academy to attract to its activities leading U. S. experts in all fields of science and engineering have been repeatedly demonstrated. The quality of its active participants, the interlocking nature of its multidisciplinary boards and panels, and the direct relevance of its capabilities to AID interests adequately justify its selection as the vehicle to bring the talents and experience of the scientific and technological community to bear on development problems in a more concerted manner. Enclosure 3 describes the organizational base of Academy activities, which includes participation by representatives of almost every significant scientific and engineering organization in the United States. Furthermore, existing Academy relationships with scientific and engineering organizations throughout the developing countries can provide an important basis for joint development of significant projects.

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V. Course of Action

A. Development of the Project.

The development of this project began in July 1969 when Dr. John Hannah, AID Administrator, formally invited Dr. Philip Handler, President of the Academy, to submit a proposal embracing a considerably larger and more varied program of assistance to AID than existed in the past (Enclosure 4). The Academy proposal was subsequently received in January 1970 (Enclosure 1). Meanwhile, a series of discussions were held between senior AID and Academy officials to explore the general aspects of the Academy approach. One significant development during these discussions was appointment by the National Academy of Engineering of a foreign secretary whose initial duties will include more fully integrating the resources of that Academy with the resources of the Academy of Science in support of AID activities.

The general Academy approach was reviewed and endorsed, with minor amendments, by the AID Inter-Bureau Committee on Science and Technology on November 20, 1969. It was also reviewed and endorsed by a special panel of the President's Science Advisory Committee on December 6, 1969. On January 2, 1970 all AID Missions were informed of the impending contractual arrangements and were invited to submit comments on how the Academy could most effectively assist in achievement of AID objectives in their countries (Enclosure 5).

B. Formulation of Specific Project Components.

The initial contractual arrangements with the Academy should be made without delay and should encompass the general type of project components outlined below. Immediately thereafter a two-year plan of work should be developed by the Academy and AID, taking into account the views of the AID Missions, regional bureaus, and other interested offices, and the views of the Academy. While the Academy proposal (Enclosure 1) can provide the initial basis for determining the distribution of effort among different types of project components, refinement of the estimated distribution of effort may be needed as the project progresses. The plan of work should set forth in specific terms the content of each project component, the timing, and the anticipated integration of results with broader AID interests. When this plan of work is developed, all concerned AID Missions, Bureaus, and offices should be fully informed to insure the adequate planning essential to the success of the overall project. Since a major purpose of this project is identification and development of potential AID projects which will capitalize on U. S. capabilities and experience in science and technology, it is essential that AID be closely involved throughout the entire cycle of Academy activities, and particularly during the workshops.

The orientation of the entire range of Academy activities will be (1) toward application of specific scientific and technological advancements to solution of specific development problems, recognizing that in some cases exploratory work will be needed to identify such matches; and (2) toward the development of an effective institutional capability in the LDCs to apply technology to their own problems.

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1. Analysis and Identification Workshops

Specialists from the U. S. and the developing country collaborate in analyzing the research needs of the developing country in terms of its resource base and its development goals. The joint group then attempts to map out a series of recommendations as to how those needs can best be met, including consideration of the adequacy of Government policy mechanisms, educational and training institutions, and institutional arrangements for research coordination and planning. Often the workshops lead to the formation of specialized groups to study specific problems in detail. These specialized groups are particularly helpful in defining development problems which might be susceptible to solution through additional follow-on projects.

2. Functional Workshops.

Workshops involving U. S. and foreign scientists, engineers, research administrators, educators, planners, and government officials are also directed to specific development sectors. Past collaborative efforts have been directed to areas such as agriculture priorities, marine sciences, and industrial research. Whenever possible, these workshops are jointly funded and the meetings are usually alternated between the two countries to enable all participants to examine at first hand the relevant institutional considerations and the relative levels of development. These workshops can also be organized on a regional basis.

3. Ad hoc Advisory Panels.

Panels of specialists in selected fields -- e.g., transportation, communications, environmental quality, construction technology, engineering education -- will be assembled to prepare new concepts and approaches, and help evaluate specific project proposals. These panels will include membership from many related Academy boards and panels and thus insure the fullest interaction between AID interests and Academy resources. These panels would be available on a selective basis to all interested AID offices and Missions.

4. Expanded Academy Expert Staff.

An expanded staff is essential to the success of this enlarged Academy involvement in AID activities. For example, careful advanced preparations, both in the United States and in the host country, are very necessary to insure that workshops are productive. Similarly, follow-up activity will maximize the benefits from these sessions. Also, preparatory studies will be needed to provide the background for ad hoc advisory panels that are called to assess a particular development area or evaluate the potential of a new technology. A mix of science administrators and technical experts will be assembled to carry out these activities.

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5. Analysis of Problems and Opportunities during the 1970s.

A comprehensive study will be made of the problems, needs, and opportunities in developing countries likely to arise during the next decade and beyond as a result of scientific and technological change. The study will:

- (a) analyze and make recommendations regarding areas in which science and technology appears particularly promising in economic and social benefits,
- (b) identify potentially applicable technologies, as well as problems which may be anticipated as technologies which are adapted and disseminated in these countries,
- (c) take stock of the current status of research and development in some of the less-advanced states, and
- (d) appraise scientific and technological needs in relation to long-term goals in selected countries.

A panel of specialists will gather during early 1970 for the purpose of planning the study and commissioning of appropriate papers dealing with subject matter important to the report. Particular attention will be given to the expertise and experience gained by AID and other development organizations, and ways in which this knowledge can be integrated into the study effort. The report will project a long-range program for the application of America's unusual technological resources to the problems affecting emerging nations. As visualized it could be utilized by AID and other organizations to improve public understanding of and support for an adequate U. S. technical assistance program. For the developing countries it should offer a model for assessing the ways in which technological changes can be used for economic development through effective planning.

6. Activities of the Academy's Development Board.

The Academy's Board on Science and Technology for International Development will:

- review the advice of its panels and other Academy panels;
- guide the work of the Academy's expert staff;
- serve as the Academy's central point of reference for AID;
- provide and advise regarding AID programs in science and technology;
- evaluate, as requested, the effectiveness of AID supported projects.

Special efforts will be made to integrate the activities of the Board more fully with the resources of the other Divisions of the Academy such as the Agricultural Board and the Agricultural Research Institute, to insure that development problems are analyzed in their broadest aspects.

7. Strengthening the AID "Talent Bank".

The Board or a special advisory panel, with appropriate Academy staff support, will consider means and develop recommendations for improving the quantity and quality of U. S. scientific and technical personnel available for technical assistance activities. The Academy's Office of Scientific Personnel will be asked to assist in this activity.

8. Evaluation of Project Components.

The development of specific aspects of each project component will be accompanied by clear statements of objectives -- including anticipated action-oriented results -- and the relationship of these objectives to the development process. The objectives will then serve as the basis for annual evaluations of the effectiveness of the project components.

9. Relationship of Project to AID Regional and Country Programs.

It is essential that the project components be adequately integrated into the priorities and plans of AID country missions and host country needs and priorities. Also, it is of particular importance that science and technology not be arbitrarily delineated as a separate area of concern since successful development projects require interdisciplinary approaches to insure that ideas, data and enthusiasm that are generated are accepted by host governments for meaningful implementation. Thus, the regional bureaus and a number of other specialized officers within AID are expected to play a major role in determining the specific aspects of project components.

10. Central Funding.

Central Funding is warranted for the workshops as well as the advisory service aspects of this project for the following reasons:

A. While there is sufficient experience with the Academy workshop approach to anticipate a major impact of the overall effort, the workshops nevertheless are still pioneering efforts with attendant risks that a specific effort may not produce tangible results. Such innovative efforts are appropriately funded centrally rather than by Missions or regional bureaus.

B. The results of the workshops and other efforts in specific countries should have relevance to the needs of many countries.

C. Close interactions between the workshops and the other anticipated Academy activities can best be assured through a single funding source which will lead to better program planning and stability in the overall operation.

D. Assured central funding will enable the Academy to recruit a high quality staff and high quality advisory panels which are critical to the success of the entire effort.

These centrally funded arrangements are not intended to replace other normal contractual arrangements between AID and the Academy. For example, a continuation of the following types of arrangements is also anticipated:

(1) Arrangements between AID/W and the Academy on topics of particular interest to specialized offices of the Technical Assistance Bureau and standing panels and committees of the Academy for continuing support in these specialized areas;

(2) Arrangements between AID/W and the Academy on topics of particular interest to the regional bureaus and the Academy for services more appropriately funded by the regional bureaus;

(3) Arrangements between AID Missions and the Academy for services more appropriately funded by the Missions;

(4) Arrangements between AID Missions and the Academy for implementation of selected scientific exchange projects.

The capability of the Academy to respond to requests for services to be funded by the regional bureaus, other AID offices, and the Missions will be significantly enhanced by the centrally-funded contract which will provide a strong nucleus of Academy activities which can be readily expanded to meet such requests. Also, the centrally-funded contract will provide a contractual mechanism under which task orders for such services can be developed.

To insure the proper coordination of Academy efforts in support of AID -- including activities funded by the regional bureaus, specialized AID offices, and AID Missions, as well as this centrally-funded project -- the Office of Science and Technology will serve as a focal point for coordinating the broad range of Academy activities.

ENCLOSURE 1

NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL

Office of the Foreign Secretary

A Proposal
To the Agency for International Development
to Support an Expanded Program
of the Board on Science and Technology for International Development

Contract Administration:

for *B. L. Kropp*
B. L. Kropp
Deputy Business Manager
Code 1224, Extension 213

Program Administration:

William L. Eilers
William L. Eilers
Staff Director
Board on Science and Technology
for International Development
Code 1224, Extension 286

December 18, 1969

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SUMMARY

This is a proposal to the Agency for International Development from the Office of the Foreign Secretary of the National Academy of Sciences to expand the Academy's present AID-supported bilateral scientific workshop programs for developing countries, to identify research and development opportunities and to initiate new programs and methods for applying science and technology for development purposes. We propose an initial five-year program starting with a budget of \$600,000 for calendar year 1970 and \$1,000,000 for calendar year 1971. A two-year budget is attached.

BACKGROUND AND EXPERIENCE

For a number of years the Academy has been involved in bilateral programs with developing countries aimed at accelerating the development process through the creation and strengthening of appropriate scientific-technological institutions and in the formulation of programs for the development of science and technology in these countries. These efforts have often, but not always, been conducted in cooperation with the Agency for International Development. The programs have been based upon the premise that the creation and strengthening of national and regional scientific-technological institutions contributes significantly to economic and social development.

A Science Organization Development Board (within the Office of the Foreign Secretary) was, in consultation with AID, established in 1966 as a successor to the Latin America Science Board and Africa Science Board to help create and strengthen scientific and technical institutions and professional organizations and programs in selected developing countries. In late 1968 this Science Organization Development Board was restructured and renamed the Board on Science and Technology for International Development. These changes reflected the character of the Board's programs, which, in response to needs and interests of foreign science institutions, had become considerably

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broader than the original focus upon building scientific institutions. The members of the Board, distinguished scientists, engineers, economists and other specialists (membership list attached) have had substantial experience in developing countries and are frequently participants in the bilateral programs.

In recent years our bilateral programs have taken the form of joint workshops in which specialists from the two countries collaborate to inventory and analyze the research needs and opportunities of the developing country in terms of its resource base and its development goals. The joint groups recommend ways scientific and technological development needs can be met through the creation of governmental policies, institutions for training technical manpower, and mechanisms for research coordination and planning. Frequently these workshops lead to the formation of study groups designed to analyze specific problems in detail and offer policy and program recommendations to local public and private scientific and technological institutions. Frequently these studies result in action by host governments, universities and other organizations. They also generate specific projects for external aid.

Whenever possible, the developing country's part of the program is conducted by a national institution, such as a research council, close to the center of government. In two cases (Taiwan and Peru) no such body existed and the workshop program helped to create one.

To date programs have been undertaken with Taiwan, East Africa, Nigeria, the Philippines, Indonesia, Argentina, Brazil, Colombia and Peru. A program for 1970 is now being initiated with India.

Typical national achievements stemming from the bilateral programs thus far include:

- 1) The establishment of six institutions for graduate research and education in science and engineering in the Republic of China.

- 2) The creation of presidential level science planning and policy machinery by the Government of the Republic of China.
- 3) The stimulation of governmental interest in industrial research in Taiwan, the Philippines and Brazil.
- 4) The creation of a Peruvian Association for the Advancement of Science and a Peruvian Research Council attached to the Office of the President of Peru.
- 5) The formulation of a U.S.-Brazilian cooperative program to develop graduate research and education in chemistry.
- 6) The formulation of national food and nutrition policies for Indonesia. These policy recommendations were incorporated in the most recent Indonesian five-year plan.
- 7) The establishment of U.S.-Brazil programs aimed at strengthening competence in agricultural economics, earth sciences, computer sciences and research in transportation.
- 8) The creation of a Colombian Science Policy Council, attached to the Office of the President, and of a Science Development Fund within the Colombian Ministry of Education.

* * *

These bilateral programs are truly collaborative in the sense that the scientists, engineers, research administrators, educators, planners and government officials from the two countries work together to solve development problems. They jointly analyze the problems and attempt to arrive at common conclusions of use to the institutions of the developing country. Wherever possible, programs are jointly funded, thus accentuating the cooperative nature of the effort and taking it out of the "gift" category. Meetings of

workshops and study groups are alternated as frequently as possible between the two countries to give participants an opportunity to examine at first hand relevant institutions and to include a broad spectrum of participants. Workshops can consider a broad range of issues, such as national science policy, research financing, manpower requirements and educational policies, or they can focus upon one or more precise problem areas such as agricultural research, oceanography and fisheries, or industrial research and management.

In addition to workshops and study groups and the projects they stimulate, we have organized regional conferences (the 1968 Conference on Agricultural Research Priorities for Economic Development of Africa) and conducted special studies for AID (the latest being the Future of U.S. Technical Cooperation with Korea).

THE PROPOSAL

I. TO EXPAND THE EXISTING PROGRAM OF WORKSHOPS AND STUDY GROUPS

The basic objective of the Academy's bilateral programs in developing countries has been to strengthen the scientific base of these nations to improve their problem-solving capability and their capacity to generate technological advances. Our programs thus far have been largely experimental, aimed at testing various approaches to the development of effective programs, policies, and the creation of mechanisms to enlist substantial numbers of U.S. scientists, engineers, and other specialists in overseas development. We believe the success of these programs warrants increasing both their number and their scope.

With respect to numbers: Countries such as Pakistan and Ceylon, both recipients of U.S. aid, have inquired about establishing new bilateral programs for scientific and technical cooperation. Among others India, Indonesia and Argentina have expressed interest in workshops or collaborative studies with the Academy in specialized fields such as nutrition, food technology, population, industrial research, marine sciences, communications, education and transportation.

In some instances, the local institutions have expressed a desire for only one or two special projects, while in others, there is interest in more comprehensive and long-term undertakings.

In current practice, workshops and related project activities have been funded by AID/Washington and country mission budgets. It is proposed that ~~these activities be continued with the use of mission funds by task order under~~ this contract and that AID/Washington funding support the ~~core activities of~~ the Board and staff. It is also proposed that funds under this contract support workshops and study groups in countries where there are no current Academy activities and where country funds cannot be applied, at least initially, to these programs.

II. TO INITIATE THE ASSESSMENT OF SCIENCE AND TECHNOLOGY FOR SPECIFIC DEVELOPMENT PROBLEMS

It is proposed that the Academy initiate a systematic search for and assessment of science and technology of special relevance to the specific problems of selected developing countries in collaboration with the technical communities of these countries. Examples of some technological issues which might be studied are:

- 1) Advanced technology for the assessment and evaluation of natural resources
- 2) The effects of ecological changes and environmental pollution in developing nations
- 3) New and conventional transportation technology
- 4) New and conventional telecommunications technology for education
- 5) Technological solutions to urban problems
- 6) Applications of new and conventional technology in the development of small and intermediate industries

- 7) The effects of new and conventional pesticides (herbicides, fungicides)
- 8) Uses of mariculture
- 9) New and conventional sources of protein-rich foods
- 10) Applications of solar energy

A special staff unit will be established to enlist the resources of the Divisions, Boards and Committees of the National Academy of Sciences (NAS), National Academy of Engineering (NAE) and the National Research Council (NRC).

Among the immediately interested groups are:

- 1) The Food and Nutrition Board (NRC)
- 2) The Agriculture Board and the Agriculture Research Institute (NRC)
- 3) The Division of Medical Sciences (NRC)
- 4) The Committee on Science and Public Policy (NAS)
- 5) The Space Science Board (NRC)
- 6) The Environmental Studies Board (NAS/NAE)
- 7) The Committee on Scientific and Technical Communications (NAE)
- 8) The Committee on Remote Sensing of Environment (NRC)
- 9) The Division of Biology and Agriculture (NRC)
- 10) The Office of Scientific Personnel (NAS/NRC)
- 11) The Division of Earth Sciences (NRC)
- 12) The Committee on Oceanography (NRC)
- 13) The Committee on Ocean Engineering (NAE)

This new unit would seek to identify and evaluate technologies of particular potential for developing countries. Potentially useful technologies which have been identified will be reviewed by interdisciplinary panels drawn from the full resources of the NAS/NAE/NRC. Possibilities which appear to be of economic and technical promise will be subjected to analysis in depth before being recommended to AID. Members of the Board on Science and Technology for International Development

as well as specialists from AID, will be invited to participate in this analysis.

As part of the program of technology assessment, it is proposed that a continuing attempt be made to examine the whole range of problems associated with technological transfer and to forecast "second generation" problems arising from the diffusion of current technology and from the possible adoption of new technologies. For example, the rapid spread of new strains of wheat and rice can result in problems of marketing, drying and storage, diseases, and pest infestation, fertilizer and pesticide supply, accelerated urbanization, credit needs, pressures for land reform, and trade imbalance. Extensive use of persistent pesticides in developing countries can produce significant ecological change. Through our advisory panels and our workshops, we can assist AID to help less-developed countries anticipate and cope with these increasingly complex problems.

III. TO ESTABLISH AD HOC SCIENTIFIC AND TECHNOLOGICAL ADVISORY PANELS.

We propose to provide advice and assistance to the Technical Assistance Bureau, the regional bureaus and other AID offices for the scientific and technical aspects of their programs by establishing panels of specialists who can, in the tradition of Academy service to the U. S. Government,

- propose new concepts and approaches
- evaluate proposed and ongoing projects
- perform such other advisory functions as may be requested within the terms of reference of this proposal

Panel members will be selected in consultation with boards and committees of the National Academies of Sciences and Engineering and the National Research Council.

IV. TO SUPPORT THE BOARD ON SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT

The Board will, at AID request,

- review the advice of its panels
 - guide the work of the staff
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--advise AID regarding the scientific and technological components of its programs

--evaluate AID-supported programs and projects

--evaluate proposals received by AID

We further propose that the Board assist AID in considering ways by which the numbers and competence of U.S. scientists and engineers available for and interested in technical assistance activities can be increased. The Office of Scientific Personnel of NAS/NRC will be asked to collaborate in this activity as will the administrations of U.S. universities and U.S. institutions interested in international education.

V. FOR A STUDY OF THE FUTURE ROLE OF SCIENCE AND TECHNOLOGY IN DEVELOPMENT

It is proposed that a study be made of selected high-priority problems, needs and opportunities resulting from scientific and technological change in developing countries over the next decade. Such a study should (1) recommend ways in which science and technology can contribute to economic and social development; (2) identify useful technologies and the "second generation" problems that can be anticipated if these technologies are adapted and disseminated; (3) take stock of the current status of research and development in selected countries; and, (4) appraise scientific and technological needs in relation to long-term goals in selected countries. The purpose of the study would be to develop a range of technological assistance strategies for AID programs in the 1970's.

Provision (in the attached budget) is made for a panel of up to ten specialists to meet in a four-day session during early 1970 to plan the study and identify possible authors of topical papers dealing with subjects germane to the report. Following this meeting, a detailed plan for the study will be submitted as a separate task order proposal to AID.

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We believe such a study could project a long-range program for the application of technological resources to the problems of developing nations. As visualized now, this study could be utilized by AID and other aid-giving organizations to improve public understanding of and support for an adequate U.S. and international technical assistance program. For the less-developed countries it would offer guidelines to the use of technology for economic development through effective planning.

VI FOR SUPPORTING PROGRAM ACTIVITIES

Members of the Development Board and its supporting staff will be prepared to travel abroad when necessary for program development and advisory purposes. Experience has shown that periodic visits to consult with scientific institutions and AID missions in less-advanced countries are essential in planning workshops and conducting related programs.

Special studies related to program development should be undertaken to: (1) provide essential background information for participants in bilateral country programs; (2) provide the data base for ad hoc panels convened at the request of AID to assess particular areas of interest; and, (3) provide data for advisory panels evaluating the potential of a specific technology. These studies would be conducted by specially recruited short-term professional staff or by existing staff, depending on the needs of the situation.

REPORTING

The Academy will, in accord with current practice, provide AID with copies of each bilateral country workshop and study group report and, when appropriate, separate recommendations for AID program opportunities. We will critically review and report annually the overall program and operation of the Board on Science and Technology for International Development. If special

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reports are prepared on country or regional projects and activities, the missions and the Technical Assistance Bureau will be given copies. If consultants are retained for specific tasks, reports summarizing their activities will be sent to the interested AID officers. Unless specific funding arrangements are made in advance the Academy will give AID twenty copies in English of each of the above listed reports.

Interested Agency officers will be invited to observe workshops and meetings of the Board.

CONCLUSION

Dr. John Hannah, Administrator of AID, invited the Academy to submit this proposal to expand NAS programs in developing countries (see letter attached).

The programs of workshops, conferences, advisory missions and special projects organized by the Office of the Foreign Secretary since the late 1950's have provided practical experience for work in developing nations and acquainted a growing number of U.S. scientists, engineers and technical people with the important but inadequately exploited role of science and technology in economic development.

The Academy's charter from Congress carries a mandate that it will serve as an adviser, upon request, to the Federal Government in the areas of its competence. The Academy has undertaken programs providing opportunities for the American scientific and engineering community to contribute its knowledge and experience to the progress of the less developed-nations.

The program described in this proposal is designed to further the AID mission to function more effectively in the technical areas of foreign assistance. We believe that through this program imaginative, innovative and challenging projects can be identified and carried out to foster the application of science and technology to economic and social development.

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In responding to this proposal, AID is invited, in consultation with the Academy, to suggest those particular countries or regions where it is believed that workshop/study group programs should be developed; those areas of technology and science in which we may best assess projects and innovative programs to meet AID needs; and those scientific or technological aspects of the AID program which would benefit most from the establishment of ad hoc technical advisory panels.

BUDGET ESTIMATES

	<u>Calendar Year</u> <u>1970</u>	<u>Calendar Year</u> <u>1971</u>	<u>Total</u>
1. Personal Services	\$ 220,750	\$ 401,000	\$ 621,750
2. Fringe Benefits	24,285	44,110	68,395
3. Travel Expenses			
<u>Domestic</u>			
Board, Committee and Panel	49,300	61,800	111,100
Staff	10,900	7,100	18,000
<u>International</u>			
Board, Committee and Panel	76,960	132,650	209,610
Staff	32,950	46,150	79,100
4. Communications and Shipping	11,000	19,000	30,000
5. Materials and Services	18,000	29,000	47,000
6. Indirect Costs	155,855	259,190	415,045
TOTAL	\$ <u>600,000</u>	\$ <u>1,000,000</u>	\$ <u>1,600,000</u>

PERSONAL SERVICES

This estimate is computed on the basis of increasing regular staff by the addition of twelve (12) professionals and eight (8) administrative/secretarial/clerical staff members. The proposal includes the salaries of the Director and Deputy Director of the current staff and their secretaries and totals fourteen (14) professional and ten (10) administrative/secretarial/clerical staff.

The salaries estimated and the staffing pattern proposed are as follows:

	<u>1/70</u>	<u>4/70</u>	<u>7/70</u>	<u>10/70</u>	<u>1/71</u>
<u>14 Professional Staff Members</u>					
1 Director - \$25,000 - \$27,000	1				
2 Deputy Directors - \$23,000 - \$25,000	1	1			
11 Program Associates - \$20,000 - \$22,000	2	2	1	2	4
<u>10 Administrative/Secretarial/Clerical</u>					
2 Administrative - \$10,000 - \$13,500	2				
6 Secretaries - \$ 7,500 - \$ 8,000	3	1		1	1
2 Typists - \$ 5,500 - \$ 6,000	1				1

FUNCTIONAL BUDGET BREAKDOWN - CALENDAR YEAR 1970*

I. Workshops and Study Groups

Workshops estimated cost for 1970 - \$146,700
Study groups estimated cost for 1970 - 76,265
Total \$222,965

We estimate four possible workshops for calendar year 1970 and seven possible workshops for calendar year 1971 in addition to those already planned (Brazil, Colombia, India and the Philippines).

We estimate that three study groups will emerge from about half of the workshops. Each study group will have an average of four U.S. panel members and hold one meeting in the U.S. and one overseas per year. This will average six study groups for 1970 and eleven study groups for 1971.

II. Innovations Assessment Unit

Estimated cost for 1970 - \$150,870

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II. Innovations Assessment Unit (cont'd)

A. Panels on Innovation

Each panel would have up to six members and meet in Washington, D. C. In 1970, eight panels would meet, six for one day and two for two days. In 1971, ten panels would meet, eight for one day and two for two days. (Estimated cost for 1970 - \$63,490)

Panels to meet in other locations in the U.S. with staff members. In 1970 we anticipate four panels; in 1971, six panels. (Estimated cost for 1970 - \$33,600)

B. Special Panels for Overseas Arrangements

Each panel would have up to six members plus one professional staff member. In 1970, two panels could meet, one for one week and one for two weeks. In 1971, three panels could meet, two for one week and one for two weeks.

(Estimated cost for 1970 - \$53,780)

III. Advisory Panels to AID Offices in Washington

Estimated cost for 1970 - \$67,900

Each panel would consist of an average of eight members and meet twice per year (some may meet once, others may meet three or four times). In 1970, four panels would meet; in 1971, five panels would meet.

IV. Board Meetings

Estimated cost for 1970 - \$21,420

It is anticipated that four Board meetings will be held each year.

V. Study of Technology and Development

Estimated cost for 1970 - \$29,700

This panel meeting will set the guidelines for the basic study and permit staff support to determine an outline for broader in-depth study.

VI. Program Development

Estimated cost for 1970 - \$107,145

A. Professional staff activities including travel to scientific meetings. (Estimated cost for 1970 - \$3,615)

VI. Program Development (cont'd)

- B. Consultant studies resulting from workshops and study groups. We anticipate two studies per year, each of three-week duration.
(Estimated cost for 1970 - \$7,610)
- C. Travel of staff overseas to develop new programs. It is anticipated that four such trips could be made each year.
(Estimated cost for 1970 - \$48,480)
- D. Studies by consultants. Studies will be made by consultants of six-weeks duration each. In 1970, two studies could be made. In 1971, three studies could be made.
(Estimated cost for 1970 - \$14,930)
- E. Advisory services of staff consultants to science organizations abroad, two consultants a year, each of sixty-days duration.
(Estimated cost for 1970 - \$32,510)

* For convenient reference the paragraphs listed above in roman numerals for the functional budget breakdown correspond with the roman numeral paragraphs in the proposal narrative, starting on page 4 of the proposal. The estimates in each of the functional categories include a proration of personal services, travel and other budgeted costs.

NATIONAL ACADEMY OF SCIENCES

2101 CONSTITUTION AVENUE

WASHINGTON, D. C. 20418

OFFICE OF THE FOREIGN SECRETARY

BOARD ON SCIENCE AND TECHNOLOGY FOR
INTERNATIONAL DEVELOPMENT

Chairman: Dr. Roger Revelle
Director
Center for Population Studies
Harvard University
9 Bow Street
Cambridge, Massachusetts 02138

Dr. Carl Djerassi
Department of Chemistry
Stanford University
Stanford, California 94305

Mr. William A. W. Krebs
Vice President
Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts 02140

Mr. Robert N. Kreidler
Executive Vice President
Alfred P. Sloan Foundation
630 Fifth Avenue
New York, New York 10020

Dr. Roy L. Lovvorn
Administrator, Cooperative State
Research Service
U.S. Department of Agriculture
Washington, D. C. 20250

Dr. John J. McKelvey, Jr.
Associate Director
Agricultural Sciences
The Rockefeller Foundation
111 West 50th Street
New York, New York 10020

Dr. Edwin S. Munger
Division of the Humanities
and Social Sciences
California Institute of Technology
Pasadena, California 91109

Dr. Joseph B. Platt
President
Harvey Mudd College
Claremont, California 91716

Dr. H. F. Robinson
Vice Chancellor
University System of Georgia
244 Washington Street
Atlanta, Georgia 30334

Dr. Stefan H. Robock
Graduate School of Business
Columbia University
New York, New York 10027

Dr. H. Burr Steinbach
Director
Marine Biological Laboratory
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

Dr. Clifton R. Wharton, Jr.
President
Michigan State University
East Lansing, Mich. 48823

Professor Carroll L. Wilson
Alfred P. Sloan School of Management
Massachusetts Institute of Technology
50 Memorial Drive
Cambridge, Massachusetts 02139

Member Ex-Officio:

Dr. Harrison Brown
Foreign Secretary
National Academy of Sciences

Africa Panel: John J. McKelvey, Jr., Chairman

Latin America Panel: Carl Djerassi, Chairman

Asia Panel: H. Burr Steinbach, Chairman

Staff Director: Mr. William L. Eilers

Professional Staff:
Miss Rose Ameser
Mr. B. K. Wesley Copeland
Mr. Jay Davenport
Mr. Julien Engel
Miss Theresa Tellez

November 1969

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON 25, D. C.

OFFICE OF
THE ADMINISTRATOR

JUL 15 1969

Dr. Philip Handler
President
National Academy of Sciences
2101 Constitution Avenue
Washington, D. C. 20418

Dear Dr. Handler:

Members of the staffs of the Agency for International Development and the Academy have engaged in discussions in recent months of possible new directions and new dimensions for cooperation between the two organizations. I have followed the course of these discussions with interest and have received a favorable impression of the contribution to our objectives which has been made by the NAS Board on Science and Technology for International Development. There seem to be definite advantages in extending this contribution, and we would welcome receiving from the NAS a specific proposal for broadened cooperation between A.I.D. and the Academy.

The patterns of activity already established by the Board offer opportunities for the identification in selected developing countries of potential projects involving the application or utilization of scientific and technological know-how. There undoubtedly are other methods by which the Academy can assist A.I.D. to assure that it is making optimum use of our country's extraordinary resources in science and technology. I assume that the expansion of the Board's activity would take place more or less gradually and that both its eventual magnitude and its optimum direction would be determined on the basis of experience. We would particularly appreciate your assistance in (a) identifying research and development discoveries of potential significance for the developing countries and suggesting ways of developing suitable adaptations of these discoveries; (b) suggesting

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promising directions for our own research activity; (c) developing personnel and institutional competence abroad for adaptive research; (d) developing host country policy and institutional structures for scientific education and the use of scientific personnel in high priority developmental functions; and (e) strengthening contacts between scientists in the developing countries and links between their organizations and those of the advanced nations.

If you consider the prospect of playing a greater role in these or alternative directions to be an attractive and proper function for the National Academy of Sciences, we would be happy to receive a detailed proposal.

Sincerely yours,

/s/ John A. Hannah

John A. Hannah

ENCLOSURE 2

BOARD ON SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT

Anniversary Report, Contract No. AID/csd-1122

April 1, 1968 - March 31, 1969

In compliance with the terms of Contract No. AID/csd-1122, the following is a report of the activities performed under this contract during the period 1 April 1968 to 31 March 1969.

The evolving character of the National Academy of Sciences' relations with developing countries and the increasingly diverse functions it is called upon to perform led the Office of the Foreign Secretary in December 1968 to rename and restructure the Science Organization Development Board. This board had been established in 1966 to create with scientists and engineers of developing countries means for applying science and technology to problems of economic and social modernization. The new Board on Science and Technology for International Development incorporates all the functions of the Science Organization Development Board as well as the Latin America and Africa Science Boards, which were abandoned, through special panels concerned with regional development problems in Latin America, Africa and Asia. (A list of Board members is attached.)

The new Board continues to pursue its primary objectives of organizing and overseeing bilateral country workshops and study groups aimed at strengthening scientific, technological, and research institutions and capabilities in developing countries. The Board is chaired by Dr. Roger Revelle; as of March 1, 1969 its staff is directed by Mr. William L. Eilers.

Formal reports, in accordance with the terms of the contract, were forwarded to AID/Washington at the completion of each workshop, describing in detail each program activity. For this reason only summarized accounts of the various workshop and study group programs as well as a description of related Board activities and future plans are included in this report.

LATIN AMERICAN PROGRAM ACTIVITIES

Colombia

For the first Colombia-U.S. science workshop, held in Fusagasuga, Colombia in February 1968, Colombian participants prepared analyses of the problems facing Colombia in the development of research. Recommendations in the fields of education, industry, and agriculture and

natural resources were formulated and a special working group elaborated a series of recommendations for a scientific and technological policy for Colombia.

In pursuit of these objectives and in recognition of the subsequent actions undertaken by the Colombian government to create a National Council on Science and Technology and a Science Development Fund (Colciencias), the Board is continuing its collaboration with the scientific community in strengthening the scientific and technological development of Colombia. As a first step, the Academy is assisting in the establishment of an office and staff for Colciencias. It will also help plan a national inventory of scientific resources and establish guidelines for making grants from the Science Development Fund.

The Fund and the Academy will work together to study problems concerning the development of science and technology in Colombia and make recommendations for their solution. A second science workshop is contemplated after the Council on Science and Technology has met and determined its course of action. This meeting will probably take place in early 1970. Joint policy studies may be undertaken in the areas of industrial research, agriculture, food technology and nutrition, public health, marine sciences, and earth sciences. Collaborative programs would be aimed at strengthening teaching and research relationships between Colombian and U.S. universities and research institutions.

Peru

Efforts have been directed toward helping the Peruvians gather information necessary to establish a National Research Council, one of the major recommendations made at the workshop during November 1967 in Lima. Following a visit to the United States to examine statutes of a number of research councils, the Peruvian scientists drafted legislation for their proposed council. Legislation was delayed because a rival bill was introduced in Congress at the same time. However, after the military assumed power in October 1968, the new Minister of Finance, who was particularly interested in science, helped to pass a decree establishing a National Research Council and providing funds for its operation.

Another major recommendation of the 1967 workshop was acted upon in February 1968 when a Peruvian Association for the Advancement of Science was created. This organization, together with the Peruvian National Academy of Sciences and the Office of Naval Research and Development, sponsored a meeting in Ancon in December 1968 to follow up recommendations of previous U.S.-Peruvian workshops. One of the U.S. workshop participants who attended this meeting reported that it focused upon problems related to scientific research, the organization of science and the contributions of government as well as private industry.

Brazil

The third U.S.-Brazil workshop took place in Rio de Janeiro in April 1969 at which a general review of last year's activities was made. Final reports of several of the joint study groups were discussed and future programs determined. The formation of two new study groups in highway research and earth sciences was approved. A report of the workshop proceedings has been submitted to AID. Summaries of the activities of the six joint study groups under the Brazilian science program follow below.

In February 1969 the study groups on Agricultural Economics and Agricultural Research met both independently and in joint sessions in Rio de Janeiro to discuss and consider implementation of the objectives of their initial reports.

The agricultural economics group discussed with Brazilian agricultural economists the report prepared in 1967, papers on agricultural development in Brazil research and on new graduate programs in agricultural economics. They considered possibilities of financial support for expansion of work in agricultural economics with both national and international entities. Papers were presented to the study group on agricultural research to help define the role that agricultural economics should play in Brazil's agricultural development programs. The study group projected program activities for the coming year including a three-day meeting to take place in the United States. In conjunction with this meeting, visits by a group of ten to twelve representatives of Brazilian Schools of Agronomy to a number of U.S. institutions are envisaged for the following purposes: (a) to develop programs of professional and intellectual interchange with the U.S. university agriculture schools that have programs in Brazil; (b) to study how policy research in economics and agriculture is conducted in the United States; (c) to consult with non-academic institutions in the United States that have programs in Brazil; and (d) to meet with sources of financial support that might collaborate in implementing recommendations of the study group.

The meeting of the agricultural research group consisted of a week-long international seminar on "Agricultural Research Administration" organized under the auspices of the Brazilian National Research Council and the Ministry of Agriculture in cooperation with our Academy. It was apparent that a far greater recognition of agricultural research is needed for economic growth in Brazil. Agricultural organizations must better identify the role they serve in society. Brazil needs to determine its agricultural research priorities at the national level and pay more attention to the possible contribution of agricultural economists in setting these priorities.

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The agricultural research study group recommended that an inventory be made of on-going and planned research studies throughout Brazil, including all research stations and their branches whether federal or state-supported. In addition to providing data on the numbers of stations and personnel, their location, physical facilities and equipment, the inventory would undertake qualitative evaluations of the studies to assess their relevance to national needs and the intrinsic merit of the study itself. The inventory was proposed for a six-month period and would be conducted by two Brazilian and two American specialists serving as a joint team. The agricultural research group proposed that the results of the inventory and its implications for national policy in research for the Ministry of Agriculture be considered at a follow-up meeting in Rio in February, 1970 if not earlier. It was believed that the inventory findings might suggest a reorganization of research and research institutions in agriculture. (The resignation of Dr. Ayreton Zanon as Director of Agriculture resulted in a postponement of the inventory pending consideration of the project by his successor.)

The Brazilian panel of the Joint Study Group on Norms, Measurement and Testing completed its final report recommending new systems of standards, the establishment of a research laboratory in the standards and testing area, and changes in training for norms, standards and testing. The U.S. members of the study group met last in March 1969 to discuss this report which was subsequently submitted to the Brazilian National Research Council. Due to the general political situation in Brazil, the report was not given further consideration by the CNPq. It was not discussed during the workshop in April, 1968 for similar reasons.

The Joint Study Group on Industrial Research, which met four times between April 1967 and July 1968 in Brazil and in the United States, submitted its final report of activities and recommendations to the Brazilian National Research Council in September, 1968. This report deals with a wide range of areas involving government, industry, technical institutes and universities. The report was prepared by the Brazilians, but involved continuing consultation with the U.S. panel.

Measures have been taken by the Brazilians to implement a number of the recommendations. Included were projects providing for U.S. industrial research specialists to assist in organizing and carrying out management training programs for industrial research in Brazil. Specialists in scientific information and documentation are to advise Brazilians on modern methods of information retrieval and dissemination. It was also recommended that administrators of industrial research organizations in Brazil visit research facilities at U.S. corporation in order to study research management procedures.

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An analysis of the Brazilian five-year plan for scientific development, made at the second U.S.-Brazil workshop in February 1968, indicated that major efforts should be made to improve the field of chemistry, particularly in areas clearly relevant to Brazilian economic development. With this in mind the workshop recommended as one new area for cooperative action establishment of a program concerned with Post-graduate Research in Chemistry. Primarily, it would seek to develop a Brazilian research and education capability in fields of chemistry not presently receiving sufficient attention. This experimental program, now in the initial stages of development, involves the cooperation of eight renowned U.S. chemists from Stanford University, the California Institute of Technology and the University of Michigan who will work with an equal number of Brazilian counterparts from the University of Sao Paulo, the Federal University of Rio de Janeiro and the Centro de Pesquisas Fisicas (Rio). The program is based upon a recognition by U.S. and Brazilian scientists representing the NAS and CNPq of the mutual scientific advantages to be gained from cooperative research programs and from closer institutional ties. It is believed that over the projected 5-year period this program will achieve development of advanced research capabilities in Brazil in a number of areas of chemistry crucial to Brazilian development.

The cooperating U.S. senior scientists visited Brazil in August 1968 to consider the feasibility of specific cooperative research programs and to identify Brazilian professors with whom productive programs could be established. Prime considerations were compatibility of interests and the availability of laboratory space, instruments, and promising graduate students--all essential to a successful program. The senior scientists were asked to consider these requirements with respect to selecting the young U.S. scientists who would be asked for commitments of two to three-year periods for work in Brazil. The senior scientists would oversee the individual programs through short-term visits to Brazil once or twice a year and through continuing correspondence both with their Brazilian counterparts and their young post-doctoral scientists.

This program is unique in that some of the leading authorities in chemistry in the United States have committed themselves for several years to this joint endeavor which, if successful, is likely to serve as a prototype for future cooperative research and training ventures with developing countries.

The areas of collaborative studies agreed upon include: organic macromolecular research; mechanisms of reactions involving transition metal complexes; structures of metal complexes; electron spin resonance; high resolution electronic and vibrational spectroscopy of metal complexes; magnetic properties and theory of electronic structure; mechanisms of photochemical reactions; high energy radiation chemistry; ion molecule reaction mechanisms; use of perturbed correlations of gamma radiation to study biological macromolecules; and electron scattering and theoretical chemical dynamics.

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The American professors arrange for their post-doctoral students to help in the organization of a first-class Brazilian doctoral program in chemistry through research, tutorship and participation in graduate courses and seminars. Up to ten American post-doctoral fellows will participate each year in this program. It is hoped that within the first year at least twenty Brazilian graduate students receiving fellowship support from CNPq and tuition from the Academy where they study for short periods in the United States, would participate in this doctoral training program.

Funds to support the U.S. share of program expenses are being obtained from AID, NSF and private foundations in the United States. The CNPq is confident of financing from appropriate ministries.

In response to a recommendation agreed upon at the February 1968 workshop, a preliminary study was conducted of existing computer facilities in Brazil and of future needs which could possibly lead to collaborative efforts in the computer sciences. This study trip took place in September 1968 and included visits in Rio to the Pontifica Universidade Catolica, the Universidade do Rio de Janeiro and the Getulio Vargas Foundation; in Sao Paulo to the Universidade de Sao Paulo and in Sao Jose dos Campos to the Instituto Tecnologico de Aeronautica. All of these institutions expressed a serious interest in the development of research and educational activities and established initial programs. However, they will require considerable initial help if they are to be assured of any substantial progress. During the 1969 workshop the formation of a study group on computer sciences was endorsed and plans were discussed for Brazilian members of the group to undertake an extensive two-week tour of diversified American computer installations, covering industry, computer centers, university installations and other applications such as in varied government agencies and research institutes. This comprehensive survey would better enable them to come to conclusions with respect to estimating Brazil's growth requirements in application of computers to industry, education and research.

ASIAN AFFAIRS

Indonesia

A week-long Workshop on Food was held in Djakarta May 27 - June 1, 1968 to formulate recommendations addressed to Indonesia's most crucial problem: how to overcome calorie deficiencies and achieve a more nutritious diet for the country's 117 million people. A joint effort of the Indonesian Institute of Science (LIPI) and the National Academy of Sciences, the meeting sought to assist Indonesia's National Development

Planning Board with respect to the development of a national food policy and the identification of budget requirement priorities in connection with the Five-Year Development Plan (1969-1973). In the selection of subjects recommended for concentrated research, an effort was made to list topics for which the country's scientific and technological resources could be mobilized fully to support the top priority national goal of increased food production.

Immediately following the workshop a summary of the conclusions and policy recommendations was presented to President Suharto and to the several cabinet ministers sharing responsibility for economic and agricultural development programs.

A basic guideline for the discussions was the 18-month White House report on world food problems conducted by the U.S. President's Science Advisory Committee and published in May, 1967. The chairman, the executive director and several panel members of this comprehensive study participated in the Djakarta Workshop. In addition to the Academy's panel of 25 specialists, there were ten experts representing Australia, Japan, the Netherlands as well as regional and international agencies. The 86 Indonesian panelists, resource specialists, and observers were drawn from several ministries, universities, and research institutes.

The workshop was the Academy's first activity with Indonesia under President Suharto's government and with the new Indonesian Institute of Sciences. The Academy has maintained close relations with the Indonesian scientific and academic community and with the Institute's predecessor, the Council for Sciences of Indonesia, since 1946.

Philippines

The most recent Philippines workshop, held at Baguio in January 1969, dealt with industrial research. It brought together a broad and representative group of Philippine leaders in research and industry as well as science and technology under the sponsorship of the Philippine National Science Development Board and the NAS. Industrial research, as we have interpreted the phrase in our efforts in Brazil, Taiwan and the Philippines, is a key process and an important element linking science and technology to economic development.

In an effort to direct the funds made available by the Special Science Fund Act of 1968, the workshop participants sought to identify gaps and requirements in existing programs and to formulate general policies and guidelines for an optimum application of industrial research. A first step in the implementation of the recommendations presented by the workshop was creation of a national advisory commission on industrial research.

AFRICAN AFFAIRS

Agricultural Sciences in Africa

Establishment of an Association for the Advancement of Agricultural Sciences in Africa (AAASA) highlighted the Conference on Agricultural Research Priorities for Economic Development in Africa. The conference, held at Abidjan, Ivory Coast in early April 1968, brought together agricultural scientists, planners, government officials and educators from throughout inter-tropical anglophone and francophone Africa to examine the research needs and priorities in the various fields of agriculture contributing to the economic development of their countries.

Approximately 200 participants from thirty-two countries attended the conference which, while organized by the Academy in cooperation with FAO and the Government of the Ivory Coast, was structured and developed by an advisory group of prominent African agriculturalists who had met in Ghana in 1967. Other international organizations represented were the African Development Bank, the World Bank, ECA, and the Organization of African and Malagasy States (OCAf). The Ford and Rockefeller Foundations, currently establishing an International Institute for Tropical Agriculture in Ibadan, Nigeria, were also represented. The balance of participation was made up of agricultural scientists from the United States, Canada, Britain, Germany, Israel, Taiwan and the Philippines.

The discussion was divided into eleven commissions, charged with reviewing problems in the following areas: soil and water management; animal health; animal production; cereal crop production; industrial crop production (humid tropics and savannah zone); economics of agricultural production and marketing; grain legume and root crop production; education; crop storage and protection; and research institutions. Plenary sessions dealt with ecological bases for regional research programs and farming systems in Africa (mechanization and innovation). A seminar was held on agroclimatology and water resources development. Prominence was given to the need for research into increasing diversity of agricultural production and the need for integrating cash and food cropping with animal production. The conference called for greater cooperation and communication between workers in different parts of Africa, particularly francophone and anglophone, towards solution of common problems and maximum utilization of limited resources of technical manpower.

Among specific recommendations were: (1) creation of a study commission to determine factors associated with the recent decline of regional research programs in Africa following independence and factors

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attributable to the effective functioning of the remaining regional research programs; (2) development of inter-state quarantine controls for cotton and regional pest control programs; (3) expansion of research on rice, particularly for West Africa; (4) organization of a study on problems of pesticide residues; (5) establishment of regional germ-plasm collections; (6) and initiation of another study of agricultural mechanization in Africa.

The Association, formed during the Abidjan conference, reflects the desire of African scientists to work together toward solution of their common problems. Publication of a bi-lingual journal was suggested as one possible mechanism to pursue this objective. The responsibility for follow-through is in the hands of an eight-member executive committee elected by the conference participants to develop a constitution and call a first meeting of the membership. The Interim Executive Committee held its initial meeting in Addis Ababa in August 1968 to discuss various ways and means of organizing and strengthening AAASA. The members agreed on several items including the Constitution of AAASA, types of membership, temporary headquarters, objectives of the Association, date and place of the next meeting of the Committee and of the General Assembly of the AAASA.

The Conference served to emphasize common interests of scientists, planners, government officials and educators in Africa devoted to agricultural development. Priorities for agricultural research have been established which provide a sharper focus for technical assistance efforts from national and international sources. They stress the regional aspects of technical assistance which AID is fostering. The accord and unity of purpose of this distinguished international group will increase the likelihood of its recommendations being accepted by member governments.

Related Board Activities and Future Plans

The last joint activity of the Sino-American Science Cooperation Committee consisted of a workshop on "The Industrial Development of Taiwan: Science, Technology, and Management" and reflected the program's growing concern with the promotion of economic growth. This meeting took place in August 1968 in Taipei. Chinese participants included top governmental, industrial, scientific and educational leaders. As a result of these deliberations a Taiwan committee was appointed to advise the Cabinet on the implementation of recommendations made in the workshop. Support of this activity was provided by the Asia Foundation and the Office of International Educational and Cultural Affairs in the Department of State.

At the close of this reporting period preparations were under way for an initial workshop in Argentina and a study of technical

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assistance in Korea. The Argentine Research Council and its Academy of Sciences and the NAS began discussions nearly two years ago to consider a program in scientific cooperation. The military coup in 1966 and subsequent developments disrupted the science faculty of the University of Buenos Aires and the proposed program was postponed by the Argentines. Recently the Argentine Council and Academy proposed that plans for a science workshop be developed. The goals of this workshop, scheduled for July in Buenos Aires, will be to analyze the role of science and technology in the development process with an emphasis upon trained manpower; science policy mechanisms; and strong scientific and technical institutions; to strengthen the voice of scientists and their institutions in the economic planning programs of the country; and to develop through this form of international cooperation a mutually beneficial working relationship between U.S. and Argentine scientists and scientific institutions.

The Academy has been asked by the Agency for International Development to conduct a study of the provision of U.S. technical assistance in Korea. This study would be carried out in July and August 1969. Its recommendations could have implications for several other countries where AID programs may be changing in character during the next few years. An effort will be made to identify feasible machinery through which the United States can continue to exercise an influence in the economic, social and political developments of these nations as well as maintain a modest continuing presence.

The first meeting of the reconstructed Development Board took place in Washington February 14 and 15, 1969. The Foreign Secretary reviewed the programs and activities in the field of science and technology for economic development which had been carried out in the major geographical regions to date. Current project activities were discussed. Particular attention was given to the Brazil chemistry program as it is the first specific, long-range cooperative venture to be undertaken in training and research. Funds to support the Academy share of this program are anticipated from AID, NSF and private sources; the Brazilians have committed an equivalent of US \$600,000 in equipment alone for the program.

The Agency for International Development has approached the Board on the possibility of further assisting the Agency on science and technology matters through a considerably expanded program. Possible new functions of the Board and development staff were discussed. The chairman of the Board, Dr. Roger Revelle, summarized the discussion by listing briefly the following functions and activities of the Board: (1) Encourage and provide intellectual support and stimulation for organizing and institutionalizing science in developing countries; assist in the education process; help in the formation of associations

for advancement of science, national academies of science, national research councils, and other agencies; (2) Consider specific problems for which the Board has expertise that can be utilized on a volunteer and short-term basis; (3) Fulfill our normal NAS function, i.e. advise our own government; (4) Find ways to involve U.S. scientists and engineers in the problems of the less developed countries and try to create an atmosphere of understanding and participation on the part of the U.S. scientists; and (5) Think through in a general way, rather than just on specific country problems, answers to such questions as what kinds of research are needed, who can do it, what will be the likely impact?

The Board decided to call a special meeting for the purpose of defining the role of the Board and its particular assets that may be helpful to AID in those aspects of technical assistance involving the application of science and technology to economic development. The Special Board Meeting was held on April 18-19, 1969 and will be summarized in the next report.

Enclosure:
List of Board Members

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NATIONAL ACADEMY OF SCIENCES

2101 CONSTITUTION AVENUE

WASHINGTON, D.C. 20418

OFFICE OF THE FOREIGN SECRETARY

BOARD ON SCIENCE AND TECHNOLOGY FOR
INTERNATIONAL DEVELOPMENT

Chairman: Dr. Roger Revelle
Director
Center for Population Studies
Harvard University
9 Bow Street
Cambridge, Massachusetts 02138

Dr. Carl Djerassi
Department of Chemistry
Stanford University
Stanford, California 94305

Dr. Joseph B. Platt
President
Harvey Mudd College
Claremont, California 91716

Mr. William A. W. Krebs
Vice President
Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts 02140

Dr. H. F. Robinson
Vice Chancellor
University System of Georgia
244 Washington Street
Atlanta, Georgia 30334

Mr. Robert N. Kreidler
Executive Vice President
Alfred P. Sloan Foundation
630 Fifth Avenue
New York, New York 10020

Dr. Stefan H. Robock
Graduate School of Business
Columbia University
New York, New York 10027

Dr. Roy L. Lovvorn
Director of Research
School of Agriculture
and Life Sciences
North Carolina State University
Raleigh, North Carolina 27607

Dr. H. Burr Steinbach
Director
Marine Biological Laboratory
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

Dr. John J. McKelvey, Jr.
Associate Director
Agricultural Sciences
The Rockefeller Foundation
111 West 50th Street
New York, New York 10020

Dr. Clifton R. Wharton, Jr.
Vice President
The Agricultural Development Council, Inc.
630 Fifth Avenue
New York, New York 10020

Dr. Edwin S. Munger
Division of the Humanities
and Social Sciences
California Institute of Technology
Pasadena, California 91109

Professor Carroll L. Wilson
Alfred P. Sloan School of Management
Massachusetts Institute of Technology
50 Memorial Drive
Cambridge, Massachusetts 02139

Member Ex-Officio:

Dr. Harrison Brown
Foreign Secretary
National Academy of Sciences

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Africa Panel: John J. McKelvey, Jr., Chairman

Latin America Panel: Carl Djerassi, Chairman

Asia Panel: H. Burr Steinbach, Chairman

Staff Director: Mr. William L. Eilers

Professional Staff:
Miss Rose Amaser
Mr. B. K. Wesley Copeland
Mr. Jay Davenport
Mr. Julien Engel
Miss Theresa Tellez

June, 1969

4/6

ENCLOSURE 3

ORGANIZATION AND MEMBERS, 1968-1969

National Academy of Sciences
National Academy of Engineering
National Research Council

Washington, D.C., September, 1968, 231 pages.

(copy available in TA/OST, Room 2847, NS, telephone: 28937)

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1-2
DEPARTMENT OF STATE

ENCLOSURE 4

AGENCY FOR INTERNATIONAL DEVELOPMENT

WASHINGTON 25, D. C.

OFFICE OF
THE ADMINISTRATOR

JUL 15 1969

Dr. Phillip Handler
President
National Academy of Sciences
2101 Constitution Avenue
Washington, D. C. 20418

Dear Dr. Handler:

Members of the staffs of the Agency for International Development and the Academy have engaged in discussions in recent months of possible new directions and new dimensions for cooperation between the two organizations. I have followed the course of these discussions with interest and have received a favorable impression of the contribution to our objectives which has been made by the NAS Board on Science and Technology for International Development. There seem to be definite advantages in extending this contribution, and we would welcome receiving from the NAS a specific proposal for broadened cooperation between A.I.D. and the Academy.

The patterns of activity already established by the Board offer opportunities for the identification in selected developing countries of potential projects involving the application or utilization of scientific and technological know-how. There undoubtedly are other methods by which the Academy can assist A.I.D. to assure that it is making optimum use of our country's extraordinary resources in science and technology. I assume that the expansion of the Board's activity would take place more or less gradually and that both its eventual magnitude and its optimum direction would be determined on the basis of experience. We would particularly appreciate your assistance in (a) identifying research and development discoveries of potential significance for the developing countries and suggesting ways of developing suitable adaptations of these discoveries; (b) suggesting

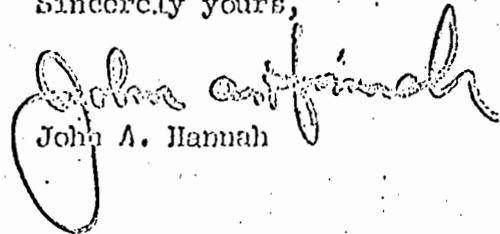
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promising directions for our own research activity; (c) developing personnel and institutional competence abroad for adaptive research; (d) developing host country policy and institutional structures for scientific education and the use of scientific personnel in high priority developmental functions; and (e) strengthening contacts between scientists in the developing countries and links between their organizations and those of the advanced nations.

If you consider the prospect of playing a greater role in these or alternative directions to be an attractive and proper function for the National Academy of Sciences, we would be happy to receive a detailed proposal.

Sincerely yours,


John A. Hannah

Subj: LEG-1-2

NATIONAL ACADEMY OF SCIENCES

ih
INFO: Hannah log
Poats log
Mr. Berstein
AA/PPC

OFFICE OF THE PRESIDENT
2101 CONSTITUTION AVENUE
WASHINGTON, D. C. 20410

July 23, 1969

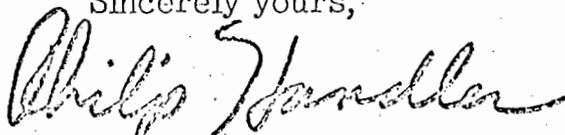
The Honorable John A. Hannah
Administrator
Agency for International Development
Department of State
Washington, D. C. 20523

Dear Dr. Hannah:

Thank you very much for your letter of July 15 which commented favorably upon the Academy's activities in developing countries. We have been pleased with the Agency's interest in and support of our programs in these nations during the past few years.

It is good to learn of your interest in receiving a proposal from the Academy which could provide for an extension in new directions of programs conducted by our Board on Science and Technology for International Development. The functions and activities suggested in your letter appear to fall well within the scope of programs and policies adopted or contemplated by the Academy. I have referred your letter to the Foreign Secretary, Dr. Harrison Brown. A proposal is being prepared by his office and will be forwarded for your consideration shortly.

Sincerely yours,



Philip Handler
President

DEPARTMENT OF STATE

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ENCLOSURE 5

For each address check one ACTION | INFO

DATE REC'D.

TO - AIDTO CIRCULAR A 12

FROM - WASHINGTON

DATE SENT
1/3/70

SUBJECT - Activities of the National Academy of Sciences in Support of
A.I.D. Activities

REFERENCE -

1. To assist in more effectively mobilizing the resources of the U. S. scientific and technological community in support of AID activities, AID/W intends to enter into a centrally funded contract for a major expansion of the activities of the National Academy of Sciences (NAS) directed to assisting the strengthening of the indigenous capabilities of the developing nations in science, technology, and related areas. In recognition that only a sustained effort will have a meaningful impact on institution building processes, it is expected that this contractual arrangement will continue for five years, provided the resources of the Academy can be applied as an effective asset in achievement of AID objectives.

The purpose of this airgram is to provide information on the types of activities that will be available to AID Missions through this contract and to request Mission views on how the Academy can most effectively assist the Mission and the host country in bringing to bear scientific and technological resources on specific development problems.

2. The types of activities to be covered in the centrally funded contract that will be available to AID Missions on a selected basis include:

Enclosures:

1. Academy Activities
2. Academy Proposal
3. Academy Publication

PAGE 1 OF 4 PAGES

DRAFTED BY <i>GES</i> GESchweitzer:zw	OFFICE TA/OST	PHONE NO. 28939	DATE 12/10/69	APPROVED BY <i>[Signature]</i> AA/TA: Bernstein
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AID AND OTHER CLEARANCES
 SButterfield, DAA/TA (In Draft) RRJohnson, EA/TECH (In Draft) JNBlume, WESA/TECH (In Draft)
 KLvick, TA/FM (In Draft) AJacobs, VM/ND (In Draft) LMHale, ENG (In Draft)
 RLRupard, AFR/ID (In Draft) UNCLASSIFIED RBlack/BEowie/JRothberg, LA/SCD (In Draft)

AIRGRAM
CONTINUATION

DEPARTMENT OF STATE

AIRGRAM

POST NO.	CLASSIFICATION UNCLASSIFIED	PAGE 2 OF 4	PAGES
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a. General workshops, organized on a bilateral and regional basis, involving U. S. and foreign officials, scientists, and engineers to analyze broad research and development policies, programs, and priorities in selected countries and regions and to identify and assist in developing potential A.I.D. projects in these areas. The initial one or two workshops in a country or a region would be considered appropriate for central funding;

b. Functional workshops, organized on a bilateral and regional basis, to analyze specific developmental sectors in selected countries and regions and to assist in developing A.I.D. projects in these sectors. The workshop would be considered appropriate for central funding if it is of an experimental nature, demonstrates a technique of potential world-wide applicability, or requires a level of American expertise to insure the success of such an endeavor that can only be mobilized through a sustained centrally funded effort;

c. Ad hoc advisory panels to provide expert advise on selected technical issues to A.I.D. Missions or host Governments, as well as to AID/W;

d. An expanded Academy staff of experts in the general field of science, technology, and foreign assistance to provide continuing assistance to A.I.D. Missions, as well as AID/W, as appropriate;

e. Continuing analysis by Academy panels and Academy staff of problems in and opportunities for strengthening scientific and technological capabilities in the developing countries during the 1970s, drawing on the experience and expertise of AID and other organizations concerned with development as well as on a broad spectrum of the scientific and engineering communities. An initial report is expected by the end of 1971;

f. Increased attention by the Academy's Board for International Development to the major direction of scientific and technological development in developing countries; and

g. Academy efforts to strengthen the "talent bank" of qualified scientists and engineers interested in participating in foreign assistance activities.

3. These centrally funded arrangements are not intended to replace other normal contractual arrangements between A.I.D. and the Academy. For example, a continuation of the following types of arrangements is also anticipated:

AIRGRAM

DEPARTMENT OF STATE

AIRGRAM

CONTINUATION

POST	NO.	CLASSIFICATION	PAGE	PAGES
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- a. Arrangements between AID/W and the Academy on topics of particular interest to specialized offices of the Technical Assistance Bureau and standing panels and committees of the Academy for continuing support in these specialized areas;
- b. Arrangements between AID/W and the Academy on topics of particular interest to the regional bureaus and the Academy for services more appropriately funded by the regional bureau;
- c. Arrangements between A.I.D. Missions and the Academy for services more appropriately funded by the Missions;
- d. Arrangements between A.I.D. Missions and the Academy for implementation of selected scientific exchange projects.

4. Enclosure 1 describes Academy activities during the past year. Functional workshops of particular relevance to developmental problems have included:

Agriculture research priorities in Africa

Indonesian policies and priorities in food and nutrition

Organization and management of industrial research in Brazil

Opportunities and priorities in fisheries and oceanography in the Philippines

Enclosure 2 is the Academy proposal which will form the basis for the centrally funded contract. This proposal was submitted by the Academy in response to a formal request in July 1969 by the A.I.D. Administrator to the President of the Academy for a proposal embracing a considerably larger and more varied program of assistance to A.I.D. in the fields of science and technology than has existed in the past. This proposal identifies many other functional areas being considered by the Academy and AID/W, and Mission views would be particularly welcomed in this regard. Enclosure 3 is a publication of the Academy for 1968-1969 which explains its organization and lists the members of the three organizational components: National Academy of Sciences, National Academy of Engineering, and the National Research Council. Additional information about the Academies will be provided as the program evolves.

5. Steps are being taken to insure that the full resources of the National Academy of Engineering are also available to the National Academy of Sciences in carrying out these programs.

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6. The centrally funded arrangements are not intended to replace country funded projects currently being negotiated between Missions and the Academy (e.g. general workshops in India and nutrition workshop in the Philippines).

7. A.I.D./W hopes to conclude the contractual arrangements outlined in paragraph 2 by February 1970. Planning of specific activities will begin immediately thereafter. Therefore, the views of the Missions on how the Academy can participate in specific activities which will most effectively support Mission objectives and programs will be particularly beneficial if these views are received by February 15, 1970.

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UNITED STATES GOVERNMENT

Memorandum

TO : PROC/CSD, Mr. Frank Moncada

DATE: February 24, 1970

FROM : TA/OST, Gordon V. Potter

SUBJECT: PIO/T No. 931-11-995-079-73-3103002, Strengthening the Scientific and Technological Capabilities of the Developing Countries (National Academy of Sciences)

At a meeting on Friday, February 13, 1970 attended by Messrs. Todd, Meid, Krop, and Miss Ameser of NAS, you and Mrs. Buhler of AID/PROC/CSD, and myself, it was agreed that additional information would be furnished to you concerning the scope and nature of work expected of the Academy to be covered by the contract on which you are now working. After consultation with Academy representatives the following data was developed:

A. Suggested Scope of Work Language for a Basic Overall Contract between NAS and AID

The broad purpose of this contract is to utilize the unique resources of the National Academy of Sciences, National Academy of Engineering, and National Research Council to enhance the capability of the Agency for International Development in the fields of natural, social and behavioral sciences, engineering, scientific and technical education, medicine, agriculture and the applied managerial sciences to further the AID programs of international economic and social development.

The Academy bring fully to bear the resources of its staff, committees, boards, and membership to provide AID with prompt and effective response in behalf of the mutually agreed-upon Task Orders under this contract.

Under this contract, Task Orders will, as mutually agreed, provide for the Academy to undertake studies, investigations, surveys and examinations of matters and issues pertaining to increasing the scientific and technological content of AID economic and social development programs in the LDCs.

Furthermore, Task Orders may provide for the Academy to organize, conduct, staff, report about and publish the results of surveys, studies, conferences, workshops, symposia, seminars, and other comparable endeavors as AID may request and the Academy may agree to.



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

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B. Block 21, Scope of Technical Services, Task Order No. 1 - (the following language supplements that furnished in Block 21 of the worksheet PIO/T of February 6, 1970)

Continuation and Expansion of Bilateral and Regional Workshops and Study Groups

The basic objective of Academy bilateral programs in developing countries is to strengthen the scientific base of these nations to improve their problem-solving capability and their capacity to generate technological advances. Programs have been largely experimental in the past, aimed at testing various approaches to the development of effective programs, policies, and the creation of mechanisms to enlist substantial numbers of U. S. scientists, engineers, and other technical specialists in overseas development. The success of these programs warrants increasing both their number and their scope.

Two broad categories of workshops organized on a bilateral and regional basis are envisaged:

1. Analysis and Identification Workshops

Specialists from the U. S. and the developing country collaborate in analyzing the research needs of the developing country in terms of its resource base and its development goals. The joint group then attempts to map out a series of recommendations as to how those needs can best be met including consideration of the adequacy of Government policy mechanisms, educational and training institutions, and institutional arrangements for research coordination and planning. Often these workshops lead to the formation of specialized groups to study specific problems in detail. These specialized groups are particularly helpful in defining development problems which might be susceptible to solution through additional follow-on projects.

2. Functional Workshops

Workshops involving U. S. and foreign scientists, engineers, research administrators, educators, planners, and government officials may also be directed to specific development sectors. Past collaborative efforts have been directed to areas such as agriculture priorities, marine sciences, and industrial research. Whenever possible, these workshops are jointly funded by the U. S. and the host country and the meetings are usually alternated between the two countries, to enable all participants to examine at first hand the relevant institutional considerations and the relative levels of development. These workshops can also be organized on a regional basis.

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Over the last two years some 14 AID and non-AID countries have been identified by the Academy staff as having the potential for development of bilateral programs of one type or another. Currently discussions are in process with Korea, Indonesia, Thailand, Ceylon, Pakistan, Tunisia and Ghana.

During this contract period, it is anticipated that approximately four such workshops will be held. Experience indicates that the average workshop should utilize 10-12 American participants for whom transportation, subsistence and other travel expenses are required for preliminary meetings in the U. S. and the meetings abroad. (When it is possible, the Academy arranges with the host country to provide internal travel for US workshop participants in host countries. When these arrangements are applicable, the Academy supplies subsistence and internal travel for the participants from abroad attending workshops in the U. S.). Since these workshops will probably be in countries with whom the Academy does not already have on-going programs, it is anticipated that prior to two of the workshops a preliminary study will be made by a staff person to insure adequate preparations are made by the host country.

Study groups usually result from the deliberations undertaken in workshops. In practice these have included three to six persons from each country and have met anywhere from two to three times to several dozen times in order to produce a report for consideration by government agencies and subsequent workshops. It is estimated that four such workshops may be held during the contract year and that three study groups will emerge from half of these workshops. Each study group is expected to have an average of four U. S. panel members and to hold one meeting in the U. S. and one overseas per year. Of these it is envisaged there will be six study group meetings during the initial contract year.

Establishment of a Technological Assessment Advisory and Identification Unit

The Academy will initiate a systematic search for and assessment of science and technology of special relevance to the specific problems of selected developing countries in collaboration with the technical communities of these countries. Examples of some technological issues which may be studied are:

- (1) Advanced technology for the assessment and evaluation of natural resources
- (2) The effects of ecological changes and environmental pollution in developing nations

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- (3) New and conventional transportation technology
- (4) New and conventional telecommunications technology for education
- (5) Technological solutions to urban problems
- (6) Applications of new and conventional technology in the development of small and intermediate industries
- (7) The effects of new and conventional pesticides (herbicides, fungicides)
- (8) Uses of mariculture
- (9) New and conventional sources of protein-rich foods
- (10) Applications of solar energy

A special staff unit will be established to enlist the resources of the Divisions, Boards and Committees of the National Academy of Sciences (NAS), National Academy of Engineering (NAE) and the National Research Council (NRC). Among the immediately applicable groups are:

- (1) The Food and Nutrition Board (NRC)
 - (2) The Agriculture Board and the Agriculture Research Institute (NRC)
 - (3) The Division of Medical Sciences (NRC)
 - (4) The Committee on Science and Public Policy (NAS)
 - (5) The Space Science Board (NRC)
 - (6) The Environmental Studies Board (NAS/NAE)
 - (7) The Committee on Scientific and Technical Communications (NAE)
 - (8) The Committee on Remote Sensing of Environment (NRC)
 - (9) The Division of Biology and Agriculture (NRC)
 - (10) The Office of Scientific Personnel (NAS/NRC)
 - (11) The Division of Earth Sciences (NRC)
 - (12) The Committee on Oceanography (NRC)
 - (13) The Committee on Ocean Engineering (NAE)
 - (14) The Division of Technical Sciences
- 

This new unit will seek to identify and evaluate technologies of particular potential for developing countries. Potentially useful technologies which have been identified will be reviewed by interdisciplinary panels drawn from the full resources of the NAS/NAE/NRC. Possibilities which appear to be of economic and technical promise will be subjected to analysis in depth before being recommended to AID. Members of the Board on Science and Technology for International Development, as well as specialists from AID, will be invited to participate in this analysis.

As part of the program of technology assessment, a continuing attempt will be made to examine the wide range of problems associated with technological transfer and to forecast "second generation" problems arising from the diffusion of current technology and from the possible adoption of new technologies.

It is expected there may be up to eight study panels examining the technological issues noted above. Each panel will have up to six members and meet in Washington for a total of up to ten days. (For example, six of the panels might have one day meetings, two of them might have two-day meetings during the contract period.) It is also estimated that there might be four meetings at locations in other parts of the U. S. which would require staff travel to the meeting place and that during the contract period there might be overseas panel meetings estimated at two panels of up to six members each plus one professional staff member meeting for one week abroad and one panel of a similar composition meeting for two weeks abroad.

Staff for this unit will be added only as required by the specific assessment tasks identified and mutually agreed to. An initial core staff will be recruited to consult with AID and NAS committee staff members with respect to priority areas of concern and the scope and dimensions of projects to be undertaken.

Establishment of Ad Hoc Advisory Panels

At AID request the Academy will provide advice and assistance to the Technical Assistance Bureau, the Regional Bureaus and other AID offices for the scientific and technical aspects of their programs by establishing panels of specialists who can, in the tradition of Academy service to agencies of the U. S. Government

- propose new concepts and approaches
- evaluate proposed and on going projects
- perform such other advisory functions as may be requested within the terms of reference of this proposal

Panel members will be selected in consultation with boards and committees of the National Academies of Sciences and Engineering and the National Research Council.

In preliminary staff discussions between AID and the Academy the following topics were identified as meriting further examination by the Board on Science and Technology for International Development as possible areas for panel study:

- (1) The feasibility of using solar energy in remote areas
- (2) The development of techniques for using modern telecommunications (including satellites) in community development
- (3) The economic impact of environmental degradation of selected regions
- (4) Techniques for improving the capabilities of developing countries in technical information handling
- (5) Improving water management capabilities in developing countries
- (6) The application of computers and data processing techniques to the needs of developing countries
- (7) Adaptation of remote sensing techniques (excluding satellites) to the needs of developing countries
- (8) Examination of the relationship of U. S. private investment to the development of the research and development capability of developing countries
- (9) Examination of the roles of U. S. and international agencies in strengthening the research and development capabilities of developing countries
- (10) An assessment of the involvement of U. S. engineering schools in foreign assistance activity

Four panels are anticipated for this contract period. Each panel will consist of up to eight members and meet on varying schedules as determined by the topic and the urgency of given problems. Additional staff members will be recruited for these panel tasks as required. An initial core staff will be recruited to make the preliminary feasibility studies that will permit the Board and AID to select priority panels to convene.

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Support of the Board on Science and Technology for International Development

The Board, consisting of up to 16 members, will at AID request: advise AID with respect to the technological and scientific components of the AID program; evaluate AID-supported programs and projects; and evaluate proposals received by AID.

The Board will oversee the activity of all panels and staff units and review the reports made to AID.

The Board will meet up to four times per year for one or two day meetings. It will require professional, clerical and research staff support.

Feasibility Study of the Future Role of Science and Technology in Development

This task order provides for a four day meeting during 1970 of a panel of up to ten specialists to examine the feasibility of a study of the future role of science and technology in development. Staff time will be assigned to research and review the past and current scientific and technological assistance programs in the developing countries, review science policies in LDC's and coordinate the meeting. The agenda for this meeting will focus on selected high priority problem needs and opportunities resulting from scientific and technological change in development over the next decade. The feasibility meeting would consider if a study could reasonably be expected to:

- (1) Recommend ways in which science and technology can contribute to economic and social development;
- (2) Identify useful technologies and the "second generation" problems that can be anticipated if these technologies are adapted and disseminated;
- (3) Take stock of the current status of research and development in selected countries; and,
- (4) Appraise scientific and technological needs in relation to long-term goals in selected countries.

If the feasibility committee considers a detailed plan for the study within the realm of scholarly publication it will attempt to identify possible chapter contributors and prepare a detailed plan as a proposal for a specific task order.

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Program Support Activity

In addition to the staff and other costs related to the five specific areas developed above, members of the Board and staff will undertake individual international and domestic travel in support of the overall program.

Special studies designed by the Board will be undertaken to:

- (1) Provide essential background information for participants in bilateral country programs;
- (2) Provide the data base for ad hoc panels convened at the request of AID to assess particular areas of interest; and,
- (3) Provide data for advisory panels evaluating the potential of a specific technology.

Such studies may require the use of consultants, part-time staff, computer time, the development of specialized information by contracted research, foreign and domestic travel, the augmentation of library resources of the Board, the attendance at professional, and specialized national and international meetings, consultation with staff of international organizations and foreign based institutions, and the payment of travel, subsistence, and consulting fees for the time and presence in Washington of experts from abroad.

The contract should provide that Task Orders financed with funds from USAID Missions and other AID Washington organizations (see paragraph No. 11, page 8 of the PIO/T) may be executed to run concurrently with Task Order No. 1.

If I may be of further assistance in the contract development effort please call on me.

cc:

✓ Mr. K. Levick, TA/PM

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DATE SENT 12/8/71

FROM - KABUL

SUBJECT - AID/W - USAID Regional Meeting on Science & Technology

REFERENCE - AIDTO CIRC A-2208

Planned regional meeting would be of interest this Mission and timing is agreeable. Primary Mission interests and suggested areas of concentration are:

- a. Industrial development: Appropriate industry for a low skill, cheap labor, high transport cost environment.
- b. Science Education: Development of management, practical engineering research and training appropriate to developing industry and agriculture.
- c. Export promotion: Identification, processing, packaging and marketing of specialty agricultural products.
- d. Natural Resources: Resource identification, assessment of land, mineral and energy resources.

If conference proceeds and agenda looks fruitful, Mission will nominate Chiefs of Private Enterprise and Education and Program Officer.

NEUMANN *118*

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DRAFTED BY <u>George Flores</u>	OFFICE <u>AD/DP</u>	PHONE NO.	DATE <u>12/7/71</u>	APPROVED BY: <u>Bartlett Harvey, Director</u>
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AID AND OTHER CLEARANCES

ED:A Lanza (phone)
AD/DP:CHUyehara *du*

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AIRGRAM

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DATE REC'D.

TO - AID/W TOAID A- 1384 X

FROM - BANGKOK

DATE SENT 12-14-71

SUBJECT - AID/W-USAID Regional Meeting on Science and Technology in East Asia

REFERENCE - AIDTO Circular A-2218

DISTRIBUTION ACTION

INFO.

1. With reference to Item 1 - Industrialization, and at the risk of disagreement with the premise that what is wrong with industrialization in SEA is a lack of scientific approach to the problem, RED believes that a significant input of technology is not the most important means of stimulating industrialization. The techniques of better sciences and technology might be of some considerable benefit to this part of the world, but the greatest deterrent to industrialization seems to be the restrictions of the local governments in the areas of who can engage in industry and under what circumstances and to what degree. Further, the "rules" for investment are so subject to change that the always-timid investment capital is reluctant to engage in industry lest the investment be harassed and even lost by governmental policies.

2. Recent activity in SEA in the field of industrialization has been notably low, and it is fashionable to assume that industrial investment does not flourish simply because the local people are not familiar with the great possibilities of the techniques in use in the developed countries. This is not necessarily so. Before the techniques can be applied, there must be a climate conducive to industrialization -- by private enterprise usually. The fact is that this climate does not exist in most countries, but where it does -- notably in Taiwan and Singapore among very few countries -- industrialization takes off in leaps and bounds. In countries with even lower wage scales, industrialization languishes, and the problem does not lie in techniques but in the investment climate and the philosophic stability of the government

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DRAFTED BY RED:PWRuppert:pgs	OFFICE RED DD AD/EDI AD/AG	PHONE NO. 245	DATE 12/13/71	APPROVED BY: Lee St. Lawrence, RED AD/PA
AID AND OTHER CLEARANCES RED:HJPetrequin (Draft) RED:RHalligan		AD/F AD/ED LA	DIST: AMB, DCM, MC, ECON, UNCLASSIFIED AD/PA USOM & RED'S FILES AD/PA	

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which makes the "rules".

3. The point is that a favorable investment climate is necessary before an industry can even be organized to utilize the new techniques of science and industry. Since any discussion of industrialization will inevitably bring out these facts, it would be the better part of discretion if the number of nationals to be invited to any such conference should be limited lest the nationalistic feelings of these people be wounded unnecessarily.

4. The exploitation of natural resources is, of course, a recognized means by which a country may improve its economy, and such activity is to be encouraged. But, before the exploitation must come a long series of exploration, negotiation, and a search for investment capital. Such exploitation is a long-term project -- as much as seven years is the time between positive identification of a promising deposit and the eventual production of a marketable product. The activity is very capital intensive and, by definition, the investor must be assured of getting his money back plus a profit. Such an investor must be a very brave entrepreneur in many countries in this part of the world if only because his rights to his enterprise depend upon rules and practices which are at considerable variance from what he is used to in other parts of the world. For instance, mineral rights in many of these countries are and will remain the property of the national government. There is little beyond a scrap of paper that assures that an investor will be permitted to exploit the natural resource to its ultimate without the government delimiting his efforts by one means or another. Such a simple expedient as limiting the numbers of aliens who would direct the enterprise on behalf of the investor, are sufficient to effectively delimit a successful operation.

5. Again, the presence of nationals from the countries who, perhaps unconsciously, want to have their natural resources exploited and resent the presence of the investor simultaneously, may be embarrassing to any wide-open meeting.

6. The United States is much taken with the wish to improve the ecology of its country. It is most admirable that this is so and the United States is in a position to support and finance such an effort. This is not so in the LDC's. Their priorities are far beyond ecology in that their needs are for food and shelter and population control before they can address themselves to problems of ecology. The plain fact is that these countries simply don't have the money to do the things they should to clean up their own countries, and they -- like the United States has endured for many years -- will have to live with less than ideal conditions until they can afford to devote effort and presently nonexistent money to problems of ecology. It is obvious that if many of the techniques of control of water and the atmosphere are used that they would be able to save money in the long run -- but the money is not available to elaborate on the enterprises that do not succeed in getting off the ground -- so the pursuit of ecology in this part of the world is limited not only by the lack of techniques and knowledge but by something as simple as money.

7. In the area of infrastructure, the need usually precedes the ability to meet the need and again the lack of capital to do the optimum is sadly lacking. It does little good to urge a better infrastructure in the LDC's unless the wherewithal to do the construction is in sight -- and it seldom is -- except on an ad hoc basis. To be sure, some assistance in establishing priorities in new structures would probably save a lot of money over the long period, but when there isn't enough money to do an adequate job of maintaining what is already in existence, it does little good to try to establish any priorities. It is probably true that much of the progress in infrastructure in these countries comes from foreign loans or grants, but the latter are becoming a burden on all of the LDC's and a halt must be called in further lending or some other means found to finance the admittedly much-needed infrastructure.

8. Consideration should be given in any plans such as those proposed to the singularly futile efforts of UNESCO in the SEA region. A technician specifically charged with the promotion of science and technology in the area has been here for almost two years, and has accomplished absolutely nothing -- not even controversy. His efforts are usually ignored in the conversational approach to SEA programs that is characteristic of his organization and there has been no urgency expressed by the countries concerned that his services are indispensable. In effect, someone has thought of this approach before -- and the result has been a big nothing.

9. While the above is a quite negative approach to the proposal in the airgram, it has been purposely aimed in this direction to avoid any confrontation with local representatives who would be: (1) offended by any expression that impediments to industrialization, etc., lie within the countries themselves; and (2) encouraged to snatch at some phase of scientific solution as an easy way to make money without considering the basic problems of investment climate and capital development. In other words, what we mean is that the basics of science and technology are useful -- but after the fact of establishment of a firm basis for investment. Something which is not universal in SEA.

10. There is a great need -- here and now -- to increase per capita income and improve the balance of payments in SEA. Two ways which have been urged upon the people of this area have been processing their agricultural products -- the chief result of a primarily agricultural society -- and exploiting natural resources. We have suggested that the latter is impractical in the short term -- and the need is here and now. But, if an effort were made to upgrade the exports of agricultural goods to a higher utility, it would pay off more quickly and would attack the ever-growing and serious problem of unemployment and underemployment.

11. It is relatively easy to identify the chief exports of any of these countries and if the virtues of science and technology were applied in full strength to these products, it would be a good test, if the applications were successful, of the principles of science and technology to improve the economic conditions of SEA. In a word, let us tackle the

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known and immediate problems without a display of all of the knowledge gained in the foremost industrial nations.

12. RED does not have the logistical facilities to support this meeting and would have to defer to USOM for such support. If the meeting is to be held, RED has no objection to the date suggested in refair. RED has no suggestion for any length of meeting.

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