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AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT PAPER FACESHEET

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7. PROJECT TITLE (Maximum 40 characters)
Enhancing S&T Capabilities in LDC's

8. ESTIMATED FY OF PROJECT COMPLETION
FY 80

9. ESTIMATED DATE OF OBLIGATION
A INITIAL FY 77 B QUARTER 4
C FINAL FY 79 (Enter 1, 2, 3 or 4)

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$) -

A. FUNDING SOURCE	FIRST FY 77			LIFE OF PROJECT		
	B. FX	C. LC	D. TOTAL	E. FX	F. LC	G. TOTAL
AID APPROPRIATED TOTAL						
GRANT	380		380	3,375		3,375
LOAN						
OTHER U.S.						
HOST COUNTRY						
OTHER DONORS						
TOTALS	380		380	3,375		3,375

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY 77		H. 2ND FY 78		K. 3RD FY 79	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) SD	750	870		380		1,745		1,250	
(2)									
(3)				380		1,745		1,250	
(4)									
TOTALS									

A. APPROPRIATION	N. 4TH FY		O. 5TH FY		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED
	P. GRANT	Q. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1) SD					3,375		MM YY 19 79
(2)							
(3)							
(4)							
TOTALS					3,375		

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 = NO
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SIGNATURE: *Henry A. Arnold* 9/15/77

TITLE: Henry A. Arnold, Director, TA/OST

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TABLE OF CONTENTS

	<u>Page</u>
1. Part 1 - Project Summary and Recommendations	1
2. Part 2 - Project Background and Detailed Description	7
3. Part 3 - Project Analysis	11
4. Part 4 - Implementation Planning	20

Annexes

- A. Initial Environmental Examination
- B. Project Design Summary: Logical Framework
- C. Critical Performance Indicator Network and Description
- D. NAS Planned Activities: First Year, Subsequent Years
- E. Sole Source Justification Statement

June 7, 1977

Part 1. Project Summary and Recommendations

A. Face Sheet (see above)

B. Recommendations

FY 77	Contract (NAS)	\$,380,000
FY 78 (FY 77 Prefunding)	Contract (NAS)	1,745,000
FY 79	Contract (NAS)	<u>1,250,000</u>
		\$ 3,375,000

C. Description of the Project

In international forums the poor countries through bloc resolutions have pressed the U.S. to share its vast technological resources, persuaded that through this resource they can achieve quantum jumps to leapfrog the evolutionary steps experienced by the industrialized countries in their development. The LDCs stress the selection, transfer and adaptation of foreign technology and the generation of appropriate indigenous technologies as factors most critical to accelerate economic growth. The State Department declared last year that the U.S., "representing the most advanced technology in the world, must be able to make a contribution to the principal way in which development will take place, namely the development of technology." It said what is needed is a "coherent strategy by which the benefits of technology that we possess can be made available in a disciplined and far-sighted manner."

Before these technologies can be acquired and utilized successfully LDCs must have scientific infrastructures capable of establishing policies and actions to apply science and technologies suited to their particular development circumstances. An essential component to promote this complex process is a U.S. mechanism capable of marshalling this nation's scientific and technical community to aid LDCs. And in furthering the use of science and technology in development, the Agency needs advice from the top levels of the U.S. scientific community on policies and programs it should adopt in seeking this objective.

With these goals in mind this project will support the National Academy of Sciences and its sister institutions the National Academy of Engineering and

the Institute of Medicine*, in a program with two broad objectives: (1) to collaborate with LDC institutions in strengthening their capability to apply science and technology to development problems and (2) provide through NAS a wide range of scientific and technical advisory services to AID.

The multi-element cooperative programs are designed to directly address LDC problems through the following objectives:

- strengthen existing LDC science and technology institutions and help establish new organizations when needed to plan and implement national policies and programs.
- assist LDCs in formulating national science policies, create linkages between scientific research and economic planning institutions, and analyze scientific and technical needs for personnel, R&D, funding, and facilities.
- identify problems with technological dimensions and devise strategies and action plans to solve them and advance national development in sectors such as agriculture, technology, industry, natural resources, or health care.
- discover and assess new or unexploited technologies which have particular promise for LDCs.
- supply information on recent and new developments in R&D and technological management relevant to LDCs.

* The National Academy of Sciences (NAS), chartered by Congress in 1893, carries a mandate that it will serve on request as an advisor to the Federal Government on questions of science and technology. The National Academy of Engineering was established under the NAS charter in 1964 to render similar advice in engineering and technology. The Institute of Medicine was created by NAS in 1970 to deal with problems associated with the delivery of adequate health services. It conducts studies of policy issues in health and medicine. The activities of all three organizations are carried out through commissions and assemblies of the National Research Council, which functions as their operating arm. AID deals through the Board of Science and Technology for International Development (BOSTID), a unit of the Commission on International Relations. (CIR) Committees and boards of NAS/NAE/IOM do not directly advise AID in policy or technical matters, but always advise and submit reports and recommendations through the contractor (NAS/NAE/IOM).

In rendering advisory services to the missions and the regional and technical assistance bureaus of AID, the Academies seek to fulfill objectives that in some respects are similar to those that guide their activities with LDCs, namely:

- planning and developing program concepts for special regional and international activities with significant scientific and technological components, such as long-range programming on certain aspects of AID's work with other nations in Sahel development.
- conducting studies on promising applications of technologies in LDCs.
- identifying implications for the foreign assistance program in forecasts of future development problems and assessments on state-of-the-art research, technology and planning/management strategies relevant to AID's needs.
- devising strategies and projects of both a general specific character dealing with scientific and technological matters.

Success of the project will depend upon the impact of the Academies' program mechanisms, most of which have been tested empirically over a 10-year period, in helping LDCs evolve the policies, institutions, manpower and attitudes that bring scientific and technical resources systematically to bear on solutions of priority development problems. The mechanisms include bilateral and regional scientific workshops with LDCs, joint steering committees, and advisory missions (requested by LDCs to assure a more permanent policy-level relationship between the Academies and their scientific counterparts) and joint study groups (which examine a complex issue in an LDC in great depth where continuing study over a period of 12-18 months is indicated on subjects that cannot be covered adequately in a joint workshop). Occasionally a long-term operational science program is sponsored with the recipient country or other donors and usually as an outgrowth of AID programs. In addition, there in-depth major studies on subjects such as remote-sensing, appropriate technology, and engineering education; discussion seminars where experts gather with AID officials for scientific updates bearing on contemporary development issues; advisory panels which focus on a geographic area or specific problems in technical assistance over an extended period; and technology innovation studies, which in the past

have treated subjects as diverse as ferrocement applications, underexploited tropical plants, technologies for arid lands, and the winged bean as a new crop for the tropics. The product of such advisory panels is, without exception, rendered to NAS and is provided to A.I.D. as recommendations from the contractor.

The Academies' project will have achieved its stated purposes if after three years the following has been accomplished: (1) there is measurably greater recognition in LDCs and throughout AID of science and technology as viable development tools, (2) there is a clear shift from the initial experimental activity to a genuinely service-oriented, better designed and structured program which provides technical advice to LDCs in support of AID's new goals and LDC development objectives, (3) that through improved utilization and management the NAS program becomes a broad Agency-wide resource which supports AID in achieving its objectives.

D. Summary Findings

The Academies represent a unique resource. Their prestige can attract the nation's outstanding manpower, a mix of talent for advice on development issues that would be costly, difficult or impossible to assemble by other means. Advice can be obtained through this mechanism at a cost significantly less than through commercial sources, were they available. To accomplish the objectives set forth in the new project will require enlightened and attentive project management on AID's part and an intense spirit of cooperation on the part of NAS.

The project is technically sound, for it makes use of well-known, empirically validated methodology for the joint formulation of national science policies and programs in LDCs. The new project incorporates a number of notable improvements on the part of both AID and the contractor that are based upon continued experimentation by NAS with various approaches during the 5-year contract and earlier programs supported by AID. These improvements can be grouped into four areas: project design, project implementation, project management, and contracting.

The project can be defended in terms of (1) its proven problem-solving potential, (2) its intended impact upon sectors such as health, family planning, education, nutrition urban development and the environment, and (3) its long-term consequences for economic growth and equitable distribution of gains. The contract is sufficiently flexible to allow for programming of workshops and special studies in important fields not presently anticipated or specifically defined.

E. Project Issues

The AID Evaluation Panel in August 1975 stated that the time has come for NAS to "provide a more defined or structured program aimed at offering technical advice directly to the LDCs in support of both AID's program goals and the LDCs development objectives and to AID itself." It suggested that "direction for specific areas of activity be derived from the legislative reforms contained in the 1973 Foreign Assistance Act, other elements of Congressional guidance to AID and AID's stated goals and objectives." Major specific recommendations were as follows:

- 1, NAS should be utilized as an Agency-wide resource rather than convey the impression of being the sole province of a particular Office or Bureau. Implementation arrangements now call for TA/OST to make the NAS project better known by describing NAS capabilities periodically to Missions, conducting joint NAS-AID/W regional conferences on the NAS activities,

arranging seminars to discuss major advisory studies produced by NAS, improving the distribution of NAS reports to Bureaus and Missions, and better informing NAS about AID and related programs involving the application of technology to development.

2. The selection of AID-funded activities by NAS should take into greater consideration AID's specific program goals and those of the LDC's own development programs. NAS in consultation with AID has identified a number of specific program objectives in each area of AID's primary program emphasis (food, nutrition, energy, environment, health, natural resources, etc.) and has future workshops, advisory studies and related activities in terms of how each directly could serve one or more of these objectives. NAS is taking steps to involve AID at the initial identification and development stages of projects, particularly overseas.

3. A policy should be adopted allowing NAS to provide advice and support to AID "graduate countries" through the centrally-funded contract. Present AID legislation has been interpreted to permit NAS to extend its services to non-AID countries only when channeled through a regional mechanism such as a workshop that would include participation from AID and non-AID countries. This is of limited value since most NAS workshops and study groups are bilateral and deal with country-specific issues. NAS also has determined that country-financed (reimbursable) technical assistance is not suited to the services principally of advisory nature that it offers to LDCs.

The unresolved issue is whether AID legislation might be amended to permit NAS to extend its bilateral programs to Middle-Income and AID graduate countries during this contract. It might be noted that the State Department has under preparation a strategy paper which will cite the need for broadened foreign assistance legislation in this regard as a result of the former Secretary of State's announced "technological initiatives".

Part 2. Project Background and Detailed Description

A. There is evidence that just as the rate of scientific discovery and technological know-how has greatly accelerated, so is our capability to share these advances with the Third World growing rapidly. Both intermediate and advanced technologies offer a considerably wider choice of approaches to development and an unrealized potential to improve the well-being of the world's poor. They promise substantial gains in crucial fields such as energy, industrialization, food production, health, natural resources, and fertility control.

AID has recognized the need to increase its level of attention as well as its competence and effectiveness in applying science and technology to development problems. It has perceived a parallel need to focus U.S. scientific and technical resources on the process of economic and social development addressed to the rural and urban poor. Since early 1970 AID has sought to increase its capability to strengthen the science and technology potential of LDCs for development through a more active contribution from the U.S. scientific community. Emphasis in the original program was to use the unique resources represented by the National Academy of Sciences and its sister institutions (NAE, Institute of Medicine) to identify and develop potential AID projects. The objective was to assist LDCs to develop their own science and technology policies, institutions and capacities and to adapt technological advances in the industrialized countries to the solution of specific development problems. It was expected that the Academies by working directly with counterpart LDC scientists would help clarify national policies and priorities, gain insights into the development process, better link innovation and research to economic development, and identify impediments to a more rapid and equitable growth. It was also understood that the NAS resource would be available to advise AID on a broad range of technical issues.

The Agency enlisted the help of the Academies to carry out this program through a Basic Ordering Agreement. Under the B.O.A. activities supporting the program's objectives were defined in a series of distinct task orders. The bulk of the activities were specified and funded under Task Order 1 managed by the Office of Science and Technology. These consisted of workshops, studies and advisory activities planned and coordinated by a small NAS professional staff. Nearly all of the scientific participants who served on panels for the workshops and studies, selected for their expertise and experience, were drawn from universities, research institutions, industry, or the state and federal governments.

In accordance with Academy practice the more than 1200 distinguished scientists and engineers involved through NAS with various AID programs during the past 10 years have served without compensation except for expenses. While the voluntary basis of service allowed for the enormous manpower resources of the U.S. science, engineering and medical professions to be involved, at the same time it naturally served to limit the contribution of each participant at most to two or three weeks service per year.

A major inter-bureau evaluation of NAS performance under the B.O.A. over the 1970-75 period was conducted by a nine-person panel during July and August, 1975. The panel was chaired by Sarah Jane Littlefield (ASIA/PIT), and included Marjorie Belcher (AA/TA), Efraim Friedman (IBRD), Sheldon Cole (AFR/DS), Donald Plunknett (TA/AGR), David Steinberg (NE/TECH), and three senior professional staff members of TA/OST. While the evaluation centered around Task Order 1, it included consideration of experience with 13 additional Task Orders funded during the 5-year period by Missions, Regional Bureaus and other TAB Offices. Questionnaires to these entities solicited feedback on the usefulness of the project. A detailed issues paper guided both the panel and the contractor in several meetings.

The evaluation report strongly recommended a new 3-year contract, but made 50 specific suggestions of ways in which NAS and AID should share in efforts to increase the project's effectiveness in the follow-up program. The recommendations, dealing with project design, performance and management, were carefully studied by NAS in preparing the new proposal and those not incompatible with the NAS charter are reflected in this PP. In summary, the evaluation recommended that:

- (a) The focus, purpose and goals be more sharply defined as an Agency-wide project covering all elements and activities of AID regardless of source and providing for more active utilization of all elements of the two Academies and the Institute of Medicine.
- (b) NAS should identify and explore innovative new mechanisms other than workshops to provide advice directly to LDCs.
- (c) Scientific advice to AID should address agreed-on globally significant issues and identify opportunities for innovative scientific or technical approaches or solutions to development problems. In this connection the design of NAS tasks should be based upon an Academy staff survey of regional bureaus to identify projects and additional task orders.

- (d) AID and NAS should reach a written agreement on the scope of work, resource commitment and schedule for each activity, providing for follow-up, utilization and evaluation indicators as an integral part of project design. An AID staff member should function as technical monitor for each definable task and should be responsible to participate in planning, review and analyze NAS reports, prepare an Agency implementation plan if called for, and supply feedback to NAS.
- (e) There should be improved involvement at all AID levels, including a yearly review meeting between NAS and AAC, more policy-level contact, more bureau-level planning meetings, and regional meetings of mission personnel abroad to identify future NAS activities and relate them more closely to AID's country programs.
- (f) NAS advisory panels should seek more participants from the private sector, LDCs, women, and minority groups, and an AID observer, if practical. Panel chairmen should be asked for greater commitments of time for preparatory and follow-up activities.
- (g) The program plan and budget for each activity should include provision for follow-up, statement of goals and purposes, evaluation indicators and a utilization component.
- (h) Greater attention by AID to follow-up should involve: (1) better circulation of reports to Bureaus and Missions, (2) information informing AID units of NAS services and publications, (3) AID/W-NAS regional conferences and (4) seminars in Washington on each major report.
- (i) NAS should consider the environmental impact of its recommendations.
- (j) AID and NAS should at the outset prepare a long-range work plan, updated at 6 month intervals, with management progress reports each three months.
- (k) The time between completion of a project activity and submission of reports should be shortened possibly through preparation of a preliminary summary report with conclusions and recommendations.
- (l) TA/OST should monitor use of NAS by other AID units, identifying Agency needs for technical advice, developing projects or tasks, and assuring utilization and implementation of NAS recommendations.

Workshop reports and advisory studies in the past have reflected high quality independent and objective analysis. LDC policy-makers usually respond favorably to advice coming from this prestigious non-government source for it permits a less restricted approach to LDC decision-makers than through normal channels.

It must be recognized that some of the recommendations made in the evaluation report propose to draw NAS into operational, evaluative and utilization activities ranging somewhat beyond the Academies' basic function of providing advice. The proposal submitted by NAS goes a long way toward incorporating many of the recommendations in its philosophy of operation and specific planning.

B. Detailed Description

(See Project Design Summary - Logical Framework
(attached))

Part 3. Project Analyses

A. Technical Analysis including Environmental Assessment

The principal instrument of the NAS overseas program to help LDCs develop the policies institutions, manpower and viewpoints that will bring scientific resources to bear on solution of development problems is the bilateral workshop. This problem-solving mechanism dominates the NAS relationship with LDCs. It remains probably the most effective technique devised from experience by the Academies to reach a consensus with LDCs on collaborative recommendations for policies and programs that will promote effective development in a subject area or resolve particular problems.

In brief, U.S. panelists drawn from the academic world, industry, research institutes and government engage in intensive joint discussions over a period of up to 10 days with host country scientists, administrators and planners on a single, multifaceted topic or set of topics. It goes far beyond the normal approach in a scientific conference of presenting and discussing papers. This problem-solving approach establishes close working relationships and seeks to change perceptions so there can be a wider, more effective choice among the technical, economic, social, and environmental options available to LDC planners. Emphasis is upon collaborative analysis of problems and formulation of recommendations for their solution. A recent workshop in Zaire is typical. Analysis was made of five sectors -- agriculture, human resources, natural resource endowment, science policy and economic plans, and food and nutrition. Other NAS workshops have taken up narrower subject matter such as aquatic weeds, agro-industrial research, or natural products.

Over 11 years of NAS experience in experimenting with various mechanisms have demonstrated that the workshop approach consistently produces results in helping LDCs construct programs that build and apply their scientific resources to development goals. Of course, one should recognize the limitations in this approach. The time of involvement and provision for follow-on participation of U.S. experts is limited because they are otherwise employed and therefore few are able to contribute more than a week or so each year to this activity.

The Academies through this medium have consistently tapped a significant source of high-quality objective analysis and recommendations which have been very favorably received by LDC decision-makers. By means of its workshops NAS has evolved an informal, but functional scientific network through which LDC

scientists are in regular contact with their colleagues in channels parallel to government contacts, thus affording broader access to U.S. problem-solving, know-how, capabilities, and facilities. The resulting scientist-to-scientist relationship not only broadens and strengthens the linkage of the LDC to the U.S., but it provides for a long-term, informal, nongovernmental exchange of technical information. NAS cites several workshops in which U.S. participants, in this case three R&D vice-presidents in leading transnational corporations, became so engrossed in specific LDC industrial research problems that each arranged to become more permanently involved under auspices of the International Executive Service Corps, a UN Specialized Agency, and a U.S. research institution.

While the value and success of the workshop mode is recognized and will continue to be the major mechanism for NAS bilateral activity, the Academies were urged to identify and explore new mechanisms and innovative approaches to render advice on science and technology to LDCs. The NAS will continue its use of other mechanisms such as joint steering groups (which meet annually to review programs and consider new directions), advisory missions (requested by host country counterpart bodies) and joint study groups (growing out of workshops composed of smaller panels of specialists charged with examining a complex issue in greater depth than is possible during a workshop).

Joint study groups have also proved effective as a follow-on device to check progress by the LDC institution in implementing earlier recommendations. By scheduling a comeback for intermittent technical assistance each few months, NAS creates precise deadlines for action by its counterpart as a prerequisite for the new joint session and replaces the need for expensive resident advisers who often fulfill this function.

NAS has sponsored one long-term operational program. It is an experiment with the Brazilian Research Council (CNPq). In order to establish a capability for high-level research in chemistry at two leading Brazilian universities, NAS awarded Overseas Research Fellowships to outstanding young post-doctoral U.S. chemists. The aim was to create a significant number of indigenous Ph.D.'s in special fields considered critical to Brazil's industrial growth.

There is evidence not only of a growing awareness in LDCs of the role of science and technology in their development, but also of increased understanding on the part of Bureaus and Missions of the NAS potential. For example, in recent months NAS has been asked to do the following:

(1) assume responsibility to manage two of the ten components in the integrated long-range Sahel Development Program, (2) provide a resident staff scientist to assist in developing a comprehensive national science and technology program in Tunisia and (3) undertake responsibility for management of a comprehensive new program of applied science in Egypt. Each request calls for a significant departure from established Academy practice. The NAS is studying each proposal to determine how to respond in a manner which would best suit the current needs of the LDCs for expertise from the U.S. scientific community and whether in accepting responsibility NAS could assure the level of scientific and technical excellence that traditionally has been associated with its foreign programs. NAS and AID are in the process of determining whether these proposed new activities as compared with traditional modes represent a methodology better suited to the problems and countries involved.

Each NAS activity will include an examination of the environmental impact of its recommendations. This assessment will consist of a report on the panel's environmental analysis. When no adverse environmental aspects are contemplated as a result of these activities or follow-up, a negative statement to that effect will be included.

From past experience one can proceed with assurance that NAS will deliver all project activities as specified in Task Order 1 during FY 1977. A professional staff of 12, all with NAS experience in excess of 6 years, is available to implement the program. Expenses for travel, materials, publication of reports, communications and other factors in the budget are well established through past experience. The expense of workshops and other overseas activities has been consistently estimated to within ± 5 percent, as are U.S. activities.

Part 3. Project Analysis

B. Financial Analysis and Plan

1. Financial Rate of Return/Viability. This section is not applicable since this project is not a revenue-producing activity.

2. Recurrent Budget Analysis of Implementing Agency.
The Academies and Institute of Medicine each administer a considerable number of contracts and grants from Federal agencies. They have demonstrated that through their operating entity, the National Research

Council, they have more than adequate fiscal manpower and physical resources to carry out their commitments. Planning is adequate and more than sufficient resources are currently available for the project. No recurrent AID expenditures for NAS will be required beyond the now-contemplated life of the project. It is expected that any utilization or follow-on activity arising from the recommendations of workshops and advisory studies will be funded under provisions of separate Task Orders, host country resources or other U.S. private or governmental sources.

3. Financial Plan Budget Tables. Total financial support of \$3,575,000 is projected in the 3-year program, all of which will be funded under a contract with NAS.

TABLE I

Summary Cost Estimates and Financial Plan

(Costs by Function)

(Sept. 1, 1977 - August 31, 1978)

<u>Type of Function</u>	<u>Amount</u>	<u>Total Percent- age of Budget</u>
Overseas Program (Workshops, Study Groups in LDCs)	205,745	20.5%
Special Studies	68,538	6.9
ACTI Advisory Committee on Tech- nology Innovation	314,585	31.4
Board Support for Board on Science and Technology for Inter- national Development and its Committees	228,222	22.8
Program Development	63,228	6.3
Follow-up & Imple- mentation	59,415	5.9
Evaluation	<u>60,267</u>	<u>6.2</u>
	\$1000,000	100.0

TABLE II

Summary of Estimated Costs

(By Object Class)

(March 1, 1977 - December 31, 1977)

Input

Personal Services	\$ 382,937
Fringe Benefits	65,099
Consultants	-
Travel Expenses - Domestic Committee	71,950
Staff	7,975
Travel Expenses - International Committee	75,868
Staff	26,054
Materials and Services	61,520
Communications and Shipping	28,000
Indirect Costs	<u>280,597</u>
Total	\$1,000,000

Expenditures for the second year of the contract are projected at \$1,125,000 and the final year at \$1,250,000. This provides for an inflation factor of roughly 12% a year over this period, accounting for increases in salary and benefit expenses, travel, publication expenses, postage and shipping, and adjusted indirect costs. It also may provide for a slightly increased level of effort in additional feasibility studies, discussion seminars and implementation activity during the second and third years of the contract.

It is anticipated that separate Task Orders will be funded by other TAB Offices, Regional Bureaus and Missions. However, these are not considered essential to the success of the project. Activities budgeted above \$50,000, even if funded by TA/OST, will be the subject of separate Task Orders or contract amendments financed as additional projects in accordance with recommendations of the AID Evaluation Panel.

4. Summary

The financial plan and budget were computed on the basis of detailed break-downs for each activity. Calculations were based in large part upon actual expenses for similar activities conducted within the NAS program during the past 5-year period. Previous estimates have been within + 5 percent for nearly all individual activities. Appendix - lists project activities currently in the planning stage for the initial year of the project.

C. Social Analysis

As has been demonstrated for 12 years in activities under this and earlier projects, NAS programs have a substantial impact in promoting beneficial innovation because they work through the organizations and individuals in the developing countries who carry the highest levels of prestige in scientific and technical activities. The organizations and individuals act as authority figures in their societies, and their acceptance of the new ideas received helps to promote their utilization.

In general, the motivations in the developing countries to adopt or at least adapt improved technologies are pronounced as evidenced by the strong statements made by national leaders in favor of the "development ethic". On the other hand, the obvious obstacles of traditional ways of thought, feelings of insecurity engendered by change, especially in the workplace, and sometimes suspicion of "imported" ideas must be taken into account. On balance, it is likely that the negative factors will slow down, but not indefinitely bar, the elements favoring progressive change.

The NAS undertakings are flexible with respect to the communication techniques, emphasizing, where practical, workshops and meetings, but including as appropriate, such additional channels as publications, one-on-one consultations, and travel both to and from the developing countries. A constant awareness is maintained of the efficacy of each type of communication in promoting adoption of the idea exchanged.

The "spread effects" sought through this project involve the putting to use of new scientific and technical information in such diverse fields as agriculture, health, education, and, particularly, where applicable to industry. The degree to which the ideas travel from those in LDC's directly involved in this project to the decision-makers in the organizations that can employ the knowledge vary from country to country. It is also a function of the simplicity with which the new knowledge can be put to work (time span needed for introduction, size of investment, degree of impact

on institutional patterns, etc.) One problem that must be faced is the danger that larger and more efficient enterprises will monopolize the use of the new knowledge, thus tending to create or perpetuate a "duality" of "traditionally and "modern" sectors in the economy and the society. NAS and AID will remain alert to reduce this risk by seeking broad participation at all levels of the developing-nation community.

Many of the new technologies will require substantial capital for their implementation, another barrier to their use. However, more and more developing countries are finding additional domestic and foreign sources of capital for this purpose. The outlook for the coming decade appears much more favorable in this respect than the past decade.

The social consequences of the adoption of new technologies are usually complex. When applied in a field such as agriculture, countries with large independent landholdings are apt to benefit from wide increases in productivity, with the additional income accruing directly to the farmers. In a field like industry, the income stream in at least its early stages tends to flow strongly toward the innovators and risk-takers. Were this not so, innovation, at least in the private sector, would probably proceed at a much slower rate.

On the other hand, the pressures of labor organizations in the developing countries, as well as the interest of the government in pressuring industrial enterprises to pay satisfactory wage levels tend to assure that after the initial rewards have been taken by the enterpriser and/or investor, the increased productivity will be largely shared with the workforce. This means that the urban poor will benefit, and as industry dispenses, benefits will also reach the rural poor.

At least as important, where innovations have cost-reducing or quality-improving potential, or both, the enterpriser will be impelled to seek broader markets. When such broader markets are sought within the country, the consumer benefits; but whether they are sought domestically or overseas, the increased output tends to promote increased employment. Although simultaneously output-per-man-hour is improving, which lowers the labor requirements per unit of output, the employment-increasing effect has in the past far outweighed any employment-reduction effect, and total employment in developing-country industrial sectors has advanced constantly.

D. Economic Analysis

The essential difference in gross national product (GNP) per capita between the developed and the presently-developing countries is a difference in the amount of technology-in-place. The figures, which range from over \$ 3,500 for Europe to over \$ 6,600 for North America versus under \$ 1,500 for the Middle East down to almost as low as \$ 200 for Asia, are basically measurements of the ability of the individual to produce goods and services.

Although the amount that an individual is able to produce is a function of the capital he is able to apply to the job, the process of development has historically consisted of supplanting one method of production by another, more technologically-efficient one. Herbicides replaced the difficult job of weed-removal, telecommunications the onerous task of transmitting information through the mails, automatic data-processing the lengthy clerical labors that preceded it.

The availability of better technological information, and the scientific information from which it is derived, are necessary, even though not of themselves, sufficient conditions for development. The development process, as a country moves from its pre-industrial stage, through economic take-off toward the advent of the mass-market phase, brings physical betterment to a constantly-expanding sector of a nation's urban and rural poor. This is particularly true if the concentration of science and technology is on the necessities sectors, including food and nutrition, energy and shelter.

Scientific and technical information can serve as a development catalyst, when coupled with a willingness on the part of the recipient country to adapt its methods and approaches to the newer techniques available which yield a greater end product from the inputs consumed. Such information is also of tremendous potential benefit when resources are available, from in-country public and private sources, as well as from investment and aid-type transfers from abroad, for the purchase of the capital needed to put new technology to work.

The preceding conditions are all met in the NAS contract. The aid-recipient countries have indicated their willingness -- indeed, in almost all cases, their eagerness -- to put new and better ideas and methods to use. They are in a position increasingly, from domestic and international resources available to them, to acquire the capital needed to modernize their production and thereby expand their GNP; and the project concentrates on those scientific and technical areas where the impact on the nations' poor is likely to be pronounced because they most closely affect the provision of necessities.

The vast amount of existing technology available to LDCs offer them a far wider choice of approaches to development. Through the application of existing technologies coupled with advanced management techniques, poor countries can often skip the stages of development that were required in most industrialized countries. By focusing on creating and strengthening the technological infrastructure of these nations, NAS assists them not only to handle the massive technological input they need from the industrialized countries, but is helping them develop the capacity to generate the technologies they will require for sustained growth.

An initial Environmental Examination is added hereto as appendix A.

E. Environmental Analysis

It is judged that none of the activities in this project will have an adverse environmental impact. As indicated earlier, each individual activity will be analyzed by NAS with respect to the possible environmental consequences of its recommendations. Reports on each activity will include a discussion of each panel's environmental analysis and relevant suggestions. If no adverse environmental aspects are anticipated as a result of the advice offered or eventual follow-on expected, a definite negative statement to this effect will be appended.

One must not overlook the fact that NAS has conducted workshops, seminars, and advisory studies dealing with environmental subjects. Since 1973, for example, there have been workshops on environmental training needs in the Philippines, aquatic weeds in Ghana, Egypt, and in the Sudan Region, and on environment and development in Central America. A NAS advisory mission on environmental policy was sent to Thailand and an advisory panel on Arid Lands of Sub-Saharan Africa has functioned from 1973 to the present. NAS is completing an Economic and Environmental Study of the Consequences of Pesticide Use in the Cotton Production System of Central America. Planned are studies on coastal zone environmental problems in Thailand, the use of ducks, geese and swans as a neglected resource for weed control in LDCs, research needs for the scientific management of national parks in Kenya, and upon ecological considerations of the Amazon and Northern Brazil.

Part 4. Implementation Arrangements

A. Analysis of the Recipient's and AID's Administrative Arrangements

1. Recipient

The primary recipient of services provided by NAS under this contract is nearly always the paramount scientific institution in the LDC, ordinarily a national research council, national academy of sciences, council for scientific and industrial research, national institute of sciences, or national science society. However, since participants in the joint workshops or continuing study groups are frequently drawn from economic planning units, industrial research institutes, agricultural research bodies, national universities and laboratories, and various other operating agencies in the LDCs, it is obvious these organizations also must be regarded as recipients of the advice and recommendations generated in these consultative mechanisms.

Selection of the collaborating host country institution and participants for each workshop or meeting are made by NAS in consultation with AID missions, Regional Bureaus and TA/OST, review and advise on LDC invitees. Some host country scientific institutions with which NAS will conduct workshops during FY 1977 are known at this time; the remainder will be selected as the project progresses. NAS does not contract with a counterpart scientific body, but reaches an informal agreement that each will cover its own expenses for joint meetings, even if they are held in the United States. In infrequent cases where third country participants are desired for the joint meetings, arrangements are made for those countries to cover the travel and support expenses of their experts.

Primary target populations--scientists, economists, planners, administrators and decision-makers--are reached either by virtue of their direct participation in these activities or through the circulation of workshop and study group reports translated in the local language. The popular and professional press often carry articles reporting the substance of the meetings and recommendations for action.

2. AID

Centrally-funded NAS bilateral workshops will be carried out in active AID countries with Missions invited to participate in preplanning, consultation, evaluation and follow-up. In many cases follow-on workshops and small study groups will be financed under separate Task Orders negotiated with NAS by or on behalf of Missions or Regional Bureaus.

An AID staff member usually will be assigned technical monitoring responsibility for each definable task. He will assist in planning the activity and, following submission of the report, will be responsible for its review and analysis. Where applicable, further responsibility may involve preparation of an Agency implementation plan and feedback to NAS.

TA/OST will make better known throughout AID/W and the Missions the potential contribution that can be made to AID objectives by the NAS mechanism. This will be accomplished by: (1) improving distribution of NAS reports to Bureaus and Missions, (2) sending an airgram periodically to Missions informing them of NAS capabilities and publications, (3) organizing joint AID/W-NAS regional conferences on Academy activities, (4) scheduling a seminar to consider the findings and recommendations of each major report and their implications for AID programs, and (5) briefing the NAS (BOSTID) staff about AID and related donor-supported research and operational programs which support the applications of science and technology to economic and social development.

3. Contractor

The AID operating relationship is with the Board on Science and Technology for International Development (BOSTID), a unit of the National Academy of Sciences situated within the Commission on International Relations (CIR). CIR is one of many commissions and assemblies of the National Research Council (NRC), the administrative arm of the two Academies. In this paper the prime contractor is referred to as NAS or "the Academies", terms used synonymously. They refer to a complex of boards, committees, panels and other advisory machinery in science, technology and medicine whose full resources are available to AID under the Basic Ordering Agreement. Under this arrangement Task Orders can be executed by any Bureau or Mission with any organizational unit of the two Academies or the Institute of Medicine. TA/OST and BOSTID serve as facilitators, coordinators and monitors for these actions. Through the B.O.A. AID has at

its disposal for advice and selected operational activities the best U.S. talent available in relevant professions for the cost of travel, per diem and staff support alone. It is in the Academy tradition that outstanding professionals donate advisory services to the Federal Government through NAS for short periods of time at no compensation other than for actual travel and living expenses incurred.

NAS has demonstrated during 11 years of association with AID a sustained capability to implement projects of this character involving scientists and engineers who volunteer their services. NAS does not enter into contracts with foreign institutions in implementing this project since counterpart national science and technological institutions follow an established practice of covering their own expenses in collaborative undertakings. Primary target populations--scientists, economists, planners, administrators, decision-makers in LDCs--are reached either by their direct participation in meetings or through the circulation of workshop and study group reports in the host country language if it is other than English. The popular press often carries articles giving the substance of conclusions and recommendations reached at these gatherings.

B. Implementation Plan

1. The NAS has learned from experience during the past decade that it is not possible to fix firm dates far in advance for workshops, study groups, advisory missions, special studies, advisory studies on technological innovation and its other activities. Too many variables in terms of negotiations with host country scientific or planning institutions, commitments from principal chairmen and advisory personnel, schedule conflicts, availability of NAS staff to manage multiple activities, required clearances for studies and reports, etc., are encountered to make it possible to work out more than a very general plan of action.

With these considerations in mind, the attached list of proposed and tentatively planned activities for the initial year of the three-year program is offered with approximate dates. Also appended for purposes of illustration is an additional list of workshops, studies and program areas identified by NAS as those likely to be the subject of BOSTID activities during the second and third years of the contract.

2. Milestones against which successful completion of the project will be measured will consist of recommendations and reports of workshops, advisory studies, discussion seminars and other activities conducted by NAS under provisions of the contract. All Task Orders will be included. Each activity, defined in writing between NAS and AID, includes a scope of work, resource commitment, output, budget, manpower, follow-up utilization, evaluation indicators and environmental assessment. A time schedule for its completion is to be mapped out with significant actions indicated. The writeup will be brief since each consists of a relatively small project. TA/OST will give specific written approval for each activity.

3. Monitoring of Task Orders will be performed by TA/OST. In all activities which take place overseas, such as workshops and study groups, Mission personnel will be invited to consult with NAS in planning before NAS personnel meet initially with host country officials. They will be invited to participate as observers in subsequent activities. NAS visits abroad are to be preceded by NAS consultation with Regional Bureaus regarding activities under consideration within their areas.

As proposed in the Evaluation, Mission personnel will be invited to participate if they wish in the following functions: (1) help NAS staff review LDC development plans, Mission Development Assistance Plans, and other relevant country documents, (2) participate in planning the specific activities, and (3) assist with project monitoring, report review and initial follow-up as appropriate. Where appropriate the Mission may be invited to contribute to the preparation of an Agency implementation or follow-up plan and feedback to the contractor (NAS).

Data that may facilitate AID's periodic evaluation and review of NAS progress toward planned targets will be: (1) formal reports on joint bilateral activities prepared by NAS and its LDC counterpart scientific body, (2) advisory reports, and (3) management progress reports submitted each three months by NAS which summarize completed, ongoing and planned activities including financial data for the reporting period and manpower utilization plans for the upcoming quarter. Other documents monitored regularly by TA/OST will include: (1) the NAS long-range work plan to be prepared immediately after the contract is signed, and updated at six-month intervals and (2) detailed trip reports submitted on each visit abroad by NAS Board and staff members.

4. Project Beneficiaries. All segments of the host country populations will benefit from the workshops through the improvement of national development plans and policies involving a significant technological component. NAS analyses and studies will refine assistance programs in general as well as LDC administration. Thus, major segments of the population will benefit. The primary beneficiaries--national scientific and technical organizations--participate fully in decision-making as they collaborate with NAS in designing the workshop, study group, advisory mission or continuing scientific committee arrangements. This involves selection of panel members, setting an agenda for meetings, consulting on implementation plans for recommendations arrived at during meetings, and on plans for publication and distribution of reports. Feedback from the beneficiaries of each project is provided by NAS personnel and by AID representatives who attend as observers.

C. Evaluation Arrangements for the Project.

A major AID evaluation of the project will be conducted at the end of two years. In assessing its overall success in meeting its stated goal and purpose, the output performance of each NAS activity conducted during the period will be weighed. Invited to serve on the Evaluation Panel will be representatives of each Regional Bureau, PPC, TAB and, as in past evaluations, one or more outside representatives from organizations such as development banks.

A detailed questionnaire will be prepared and circulated prior to the panel evaluation. Missions where NAS activities were conducted will be invited to respond as will personnel in Regional Bureaus who work with NAS during the contract period. In particular AID officers who initiated additional Task Orders under the B.O.A., will be invited to respond. An issue paper will be prepared for the panel based upon findings from the questionnaire and upon a detailed analysis of relevant NAS reports. In the evaluation there will be an effort to compare the relative success of the NAS project to activities with similar purposes supported by AID, for example, with Cornell University, NSF, and by others such as UNESCO, OECD, the U.N., Office of Science and Technology through the U.N. Conference on Science, Technology and Development in 1979.

NAS has provided for several types of internal evaluation. In response to a suggestion from AID during a major evaluation of the previous project (July/August 1975), NAS has established an Advisory Committee on Evaluation under the Board on Science and Technology for International Development. The Committee has stated that it will evaluate selected activities and the program's objectives and methodology periodically, and will share its findings with AID. Internal NAS policy review will also take place during regular semi-annual meetings of the Board which is composed of 14 men and women from universities, research institutes, private industry and international development organizations. Further review will be conducted by the Academy's Commission on International Relations during its regular meetings. Findings of these bodies are reported to AID through minutes of the meetings.

D. Conditions, Covenants and Negotiating Status.

No covenants or negotiations in the usual sense are involved. It should be recognized that NAS activities which take place in LDCs are conducted with the knowledge and approval of host governments and AID missions. Since NAS is a non-government institution, initial channels of communication often exist through host country national scientific institutions. In each instance, exploratory conversations with government officials will take place with counterpart science bodies prior to detailed discussions or commitments.

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Washington, D.C.

Project Title: Enhancing Scientific and Technological Capabilities in LDC's

Funding:

FY 1977	\$ 1,000,000
FY 1978	1,125,000
FY 1979	1,250,000

Life of Project: Three-years: \$3,375,000

IIE Prepared by: William L. Eilers Date: 8/22/77
Deputy Director, TA/OST

Environmental Action Recommended: Negative determination, see page 3.

Concurrence: Henry A. Arnold, Director *W. E. Arnold*
Office of Science & Technology

AA/TA Decision:

A. Description of the Project

The National Academies of Science and Engineering and their sister institution, the Institute of Medicine, will cooperate with LDC institutions in strengthening their ability to apply science and technology to development and to provide science and technology advisory services to AID. These objectives will be accomplished through means of bilateral workshops and working groups with LDC's, identifying and assessing new or unexploited technologies applicable to LDC's, conducting studies, and extending advice on projects dealing with scientific and technological matters. In summary, the range of activities involves meetings, sending advisory panels to LDC's, and preparing analyses, studies and recommendations to LDC's and AID. Most binational meetings take place in the LDCs. The project does not involve field experiments or research, pilot tests, etc.

B. Identification and Evaluation of Environmental Impacts

As indicated in (A) above, the activities proposed under this contract involve analyses, studies, academic research, workshops and meetings. The attached form indicates that due consideration has been given to possible significant consequences in each aspect of land use, water quality, atmospheric pollution, natural resources, and health as well as cultural and socio-economic impacts. It should be noted that as NAS proceeds with each activity, due consideration will be given by its committees, panels and professional staff to the potential environmental consequences of its recommendations for action. If no adverse impacts are anticipated in the follow-on action proposed, a negative statement to this effect will be appended.

C. Recommendation for Threshold Decision

Since the project is to consist of analyses, studies, academic research, workshops and panel meetings, it appears that none of these activities will have any significant effect on the human environment. It is clearly not an action for which an Environmental Assessment or Environmental Impact Statement is required and therefore a Negative Determination is recommended.

IMPACT IDENTIFICATION AND EVALUATION FORM

BEST AVAILABLE DOCUMENT

Impact Areas and Sub-areas 1/

Impact Identification and Evaluation 2/

A. LAND USE

1. Changing the character of the land through:

a. Increasing the population ----- N -----

b. Extracting natural resources ----- N -----

c. Land clearing ----- N -----

d. Changing soil character ----- N -----

2. Altering natural defenses ----- N -----

3. Foreclosing important uses ----- N -----

4. Jeopardizing man or his works ----- N -----

5. Other factors ----- N -----
None -----

B. WATER QUALITY

1. Physical state of water ----- N -----

2. Chemical and biological states ----- N -----

3. Ecological balance ----- N -----

4. Other factors ----- N -----

1/ See Explanatory Notes for this form.

2/ Use the following symbols: N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

C. ATMOSPHERIC

- 1. Air additives ----- N
 - 2. Air pollution ----- N
 - 3. Noise pollution ----- N
 - 4. Other factors ----- N
-
-

D. NATURAL RESOURCES

- 1. Diversion, altered use of water ----- X
 - 2. Irreversible, inefficient commitments ----- N
 - 3. Other factors ----- N
-
-

E. CULTURAL

- 1. Altering physical symbols ----- MN
 - 2. Dilution of cultural traditions ----- N
 - 3. Other factors ----- M
- Introduction of scientific advances and new technologies for application to development will conceivably change attitudes and modernize society.

F. SOCIOECONOMIC

- 1. Changes in economic/employment patterns ----- M
 MAS activities may contribute to economic advancement and job creation.
 - 2. Changes in population ----- N
 - 3. Changes in cultural patterns ----- N
 - 4. Other factors -----
-
-

G. HEALTH

- 1. Changing a natural environment ----- N -----
- 2. Eliminating an ecosystem element ----- N -----
- 3. Other factors -----
- N -----
-

H. GENERAL

- 1. International impacts Strengthen linkages with ----- M -----
U.S. scientific and engineering institutions.
- 2. Controversial impacts ----- XII -----
- 3. Larger program impacts Enhance application of ----- M -----
science and technology to socio-economic development.
- 4. Other factors -----
- N -----
-

I. OTHER POSSIBLE IMPACTS (not listed above)

Human Rights. The U.S. scientific community and in

 most cases the scientific communities of other countries

 have assumed leadership on human rights issues. The presence
 ----- actively and positively -----
 of U.S. scientists is likely to advance the cause of human
 rights that has become a policy of the present Administration.

See attached Discussion of Impacts.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: _____
 From FY _____ to FY _____
 Total U.S. Funding _____
 Date Prepared: _____

Project Title & Number: Strengthening Science & Technology Capabilities in LDCs 931-0029

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>To improve and accelerate the development of LDCs through the systematic application of science and technology to solve urgent problems of national significance.</p>	<p>Measures of Goal Achievement:</p> <p>(1) The existence of viable and active scientific organizations which exercise influence upon governmental decision-making. (2) The identifiable increase in the transfer and utilization of foreign technologies by the LDCs involved. (3) A significant increase in technology-based industry and agriculture resulting (cont'd)</p>	<p>(1) Analyze national development plans and programs to determine the impact of advice from the scientific community; discern increases in funding for science & technology; assess the strength & influence of indigenous scientific bodies. (2) Review Embassy economic and commercial reports from LDCs regarding U.S. licenses on government and private sector (cont'd).</p>	<p>Assumptions for achieving goal targets:</p> <p>(1) That LDC governments will have a continued and growing awareness of the role that science and technology play in their advancement. (2) That improved mechanisms to sustain linkages between U.S. scientific and technical institutions and those in many middle income and AID graduate countries will be developed. (cont'd..)</p>
<p>Project Purpose:</p> <p>a. Narrative Summary. (1) To strengthen the capability of LDC institutions to apply science and technology resources to solve economic development problems (2) to assist AID and LDCs in utilizing improved techniques to adapt scientific and technological advancements in the U.S. and other industrialized countries to the solution of specific (cont'd.)</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>(1) Specific science plans and program formulated by strengthened LDC institutions are incorporated in national plans and budgets. (2) The numbers of trained scientific and technical personnel are increased as scientific institutions become more active. (cont'd)</p>	<p>(1) National budgets and development progress reports of LDCs reported from American embassies and AID missions (2) statistics on increases in trained scientific personnel and increases in laboratories reported by LDC scientific bodies (3) periodic TA/OST reports on utilization of NAS recommendations as reflected in new programs and on specific field R&D problems confronted and (cont'd)</p>	<p>Assumptions for achieving purpose:</p> <p>(1) That changes in LDC governments, personnel, and policies will not adversely affect the ability of NAS to work with the scientific community in specific LDCs (2) That there will be adequate funding and continuing policy support to permit AID to apply NAS advice in initiating new programs and projects.</p>
<p>Outputs:</p> <p>(1) Specific technological innovations are proposed for application to all LDCs. (2) Recommendations are made to specific LDCs by NAS advisory missions on science policy and programs. (3) Recommendations for AID action are made in NAS advisory studies. (4) New LDC organizations are created to carry out national science policies and programs (5) New mechanisms for the exchange of scientific in-</p>	<p>Magnitude of Outputs:</p> <p>(1) 10 to 15 significant technological innovations are adopted by LDCs during the contract period (2) At least 20 recommendations are acted upon by LDCs and leads to funding (3) AID action is reflected in 5 or more funded projects. (4) A minimum of 6 new organizations are created in LDCs as a direct result of (cont'd)</p>	<p>(1) NAS quarterly management progress reports to AID (2) Questionnaires circulated to AID entities as part of the major evaluation (3) Mission follow-up reports on NAS workshops and related activities (4) Reports from the NAS Internal Evaluation Committee (5) Periodic information updates in the NAS long-range work plan. (6) Annual reports of LDC scientific reporting from UNESCO, ICSU NSF.</p>	<p>Assumptions for achieving outputs:</p> <p>(1) That other offices in TAB, Regional Bureaus and Missions will continue to utilize the NAS resource.</p>
<p>Inputs:</p> <p>(1) AID (a) Project management: TA/OST; 8 professional man months plus equivalent secretarial support. (b) Funding: \$3,205,000 in Task Order 1. Additional funding is anticipated from Regional Bureaus, Missions through other task orders. (c) Liaison assistance from Regional Bureaus, Missions, other TAB Offices.</p>	<p>Implementation Target (Type and Quantity)</p> <p>(1) AID (a) TA/OST has allotted its professional time by project cluster (b) 3-year funding planned under the S&T Institution cluster (c) Time invested for consultation; the number of AID observers who attend workshops, discussion seminars and briefings on major study findings.</p>	<p>As indicated above.</p>	<p>Assumptions for providing inputs:</p> <p>That the project is approved for 3 years at the proposed funding level.</p>

BEST AVAILABLE DOCUMENT

NO 1070-20 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORKLife of Project:
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared: _____Project Title & Number: Strengthening Science & Technology Capabilities in LDCs 931-0029

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p>	<p>Measures of Goal Achievement: from a strengthened scientific infrastructure.</p>	<p>patents applied for and received; check NTIS, NBS and other USG sources on technology supplied to the particular LDC.</p>	<p>Assumptions for achieving goal targets: (3) That there will be a reasonable degree of political and economic stability in the poor countries where AID programs function. (4) That the U.S. private sector is willing to share its technological resources with poor nations.</p>
<p>Project Purpose: development problems. (b) Objectively Verifiable Indicators: (1) Specific science plans and program formulated by strengthened LDC institutions are incorporated in national plans and budgets. (2) The numbers of trained scientific institutions become more active. (3) Physical facilities and laboratories for R&D are expanded. (4) NAS programs lead to new AID programs and projects. (cont'd)</p>	<p>Conditions that will indicate purpose has been achieved: End of project status. (3) Physical facilities and laboratories for R&D are expanded. (4) NAS programs lead to new AID programs and projects. (5) Specific development problems in LDCs are solved through AID actions prompted by NAS advice. (6) AID Missions which heretofore have not supported (cont'd)</p>	<p>solved (4) reports of Missions and Regional Bureaus on use of the NAS contract.</p>	<p>Assumptions for achieving purpose:</p>
<p>Outputs: formation are established in LDCs. (6) New and different kinds of linkages are formed between scientific institutions and personnel in the U.S. and LDCs.</p>	<p>Magnitude of Outputs: NAS recommendations (5) New science information centers are established within national scientific bodies. More than 20,000 copies of workshop reports, advisory studies, and special studies are published and circulated in more than 30 AID countries (6) Programs for the exchange of scientific personnel are set up in at least (cont'd)</p>		<p>Assumptions for achieving outputs:</p>
<p>Inputs: (2) Contractor (a) Core professional staff of 12, plus administrative and clerical support of 8. (b) Contributed advisory services of approximately 300 U.S. scientists and engineers, each providing roughly 5-10 days' consultancy. This is roughly equivalent to \$400,000 to \$500,000.</p>	<p>Implementation Target (Type and Quantity) (2) Contractor (a) Quarterly management progress reports, workshop reports, advisory study reports (b) Updated long-range work plan of NAS (c) Reports to AID by the NAS Advisory Committee on Evaluation.</p>		<p>Assumptions for providing inputs:</p>

WD 1020-20 (11-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORKLife of Project: _____
From FY _____ to FY _____
Total U. S. Funding _____
Date Prepared: _____Project Title & Number: Strengthening Science & Technology Capabilities in LDCs 931-0029

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes:	Measures of Goal Achievement:		Assumptions for achieving goal targets:
Project Purpose: (5) Specific development problems in LDCs are solved through AID actions prompted by NAS advice. (6) AID Missions which heretofore have not supported NAS activities make use of the Academy capability. (7) Units of Regional Bureaus seek greater use of NAS advisory services.	Conditions that will indicate purpose has been achieved: End of project status. NAS activities make use of the Academy capability. (7) Units of Regional Bureaus seek greater use of NAS advisory services.	(1) National budgets and development progress reports of LDCs reported from American embassies and AID	Assumptions for achieving purpose:
Outputs:	Magnitude of Outputs: 4 LDCs; cooperative research projects are formed; scientific journals and papers are regularly exchanged.		Assumptions for achieving outputs:
Inputs: (c) During one typical year of the program there will be the following types of problem-solving activities: 4 major workshops abroad or major advisory studies, 3 studies under the Advisory Committee on Technological Innovation, 4 feasibility studies, 4 discussion seminars.	Implementation Target (Type and Quantity)		Assumptions for providing inputs:

COUNTRY INTERREG	PROJECT NO. 931-1223	PROJECT TITLE ENHANCING S&T CAPABILITIES IN DEVELOPING COUNTRIES	DATE JUNE, 1977	<input checked="" type="checkbox"/> ORIGINAL <input type="checkbox"/> REVISION # _____	APPROVED
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APPENDIX C (2)

PROJECT PURPOSE (FROM PRP FACESHEET)

To strengthen the capabilities of LDC institutions to apply science and technology resources to solve economic development problems and to assist AID and LDC's in the utilization of improved techniques to adapt scientific and technological advancements in the U.S. and other industrial countries to the solution of specific development problems.

CPI DESCRIPTION

1. 9/30/Complete 1st year plan of work.
2. 9/15/77 Indonesia Workshop on Standards
3. 10/11/77 AID AAC meets with BOSTID Board members *
4. 11/15/77 Evaluation Panel Report received.
5. 12/15/77 Foreign Secretary/NAS meets with A/AID to review 3-year NAS project
6. 4/30/78 On-site meeting in one region~~x~~ is held with representatives of NAS/ AID/W, Missions and RBs/
7. 4/30/78 Bangladesh NAS Workshop on S&T in Development
8. 5/31/78 Cameroon Workshop completed.
9. 6/30/78 Reports of NAS Evaluation Panel received
10. 7/31/78 On-site meeting in another region held with representatives of NAS/AID/W/ Missions & RBs.
11. 9/30/78 Complete 2nd year plan of work.
12. 10/78 AID AAC meets with BOSTID Board members.
13. 11/15/78 Evaluation Panel Report received
14. 11/30/78 Nepa Workshop completed
15. 12/31/78 Sierra Leone Workshop completed
16. 7/31/79 Major AID Evaluation completed
17. 8/31/79 Jordan Workshop completed
18. 9/30/78 Four discussion seminars and two feasibility meetings will have been completed during the year.
19. 9/30/79 Four discussion seminars and two feasibility meetings will have been completed this year.
20. 9/30/79 Third year plan of work completed.
21. 10/30/79 Burma Workshop on science, technology and development completed.

22. 11/30/79 Evaluation Panel Report Received.
23. 1/30/80 Tanzania Workshop completed.
24. 2/28/80 AID AAC meets for annual consultation with Bostid Board. Considers possibility of any follow-up Project.
25. 4/30/80 Yemen Workshop completed
26. 6/30/80 Evaluation Panel report received.
27. 8/31/80 Bolivia Workshop completed
28. 9/30/80 Four discussion seminars and 3 ACTI studies do
29. 11/30/80 Final NAS report received on the 3-year proje

* It should be noted that the purpose of these meetings not to render advice from BOSTID to A.I.D. through this mechanism, but rather to better acquaint AID policy-level administrators with NAS/NAE/IOM resources in order that the Agency may make improved and expanded use of these capabilities.

NAS PLANNED ACTIVITIES: FIRST YEAR
September 1, 1977 - August 31, 1978

The following activities are currently in the planning stage for the initial year of the project. It is not possible to schedule individual activities within a precise time frame since each is subject to variables such as the progress of preliminary negotiations between NAS and its LDC counterpart institutions, Mission preferences, availability of key personnel both from the NAS and developing country. Political changes in LDC's often lead to postponement of meetings. In nearly all instances exploratory negotiations for the activity are well advanced. Some of the studies listed as cited as examples and have not yet been approved by AID.

A. Workshops

1. Bangladesh. Joint workshop on science and technology in the economic development of Bangladesh in cooperation with the Bengal Academy of Sciences. Probably fall, 1977.
2. Cameroon. Bilateral workshop on applied research for agricultural development with the Office Nationale de Recherches Scientifique et Techniques (ONAREST). Fall, 1977.
3. Indonesia. Workshop on Standards Policy with the Indonesian Institute of Sciences (LIPI) and its affiliated adhering bodies, mid-September, 1977.
4. Ghana Program. Twelve (12) U.S. scientific consultants in specialized fields will work with counterparts in the Ghana C.S.I.R. during the year in a cooperative activity agreed to two years ago in an NAD workshop in Accra.
5. Korea Program. Five consultant trips by members of the U.S. Korea Science Cooperation Committee during the year. This activity is not funded from this project, but from other sources since Korea is an AID graduate.
6. Other Workshops. Workshops are under discussion in Egypt with the Egyptian Academy of Scientific Research and Technology (ASRT), which may include consideration of (1) science and technology development policies and priorities for industrial research, (2) an inventory of science and technology needs and facilities, and (3) mechanisms for R&D management training. Liberia: with Liberian Agricultural Research Council, in conjunction with Liberia's first development plan. Yemen: Water Resources Development Policies. Tunisia: series of workshops or study group sessions in cooperation with GOT on subjects such as food technology and satellite applications. All expenses incurred by NAS in conjunction with planning and implementing activities in Security Supporting Assistance countries, e.g., Egypt, Jordan, are to be funded from USAID budgets in those countries and not from funding that would be provided under this contract. Examples above are cited as illustrative of the range of NAS activities conducted on behalf of AID.

B. Advisory Mission and Study Groups

1. Brazil. NAS participation in an international advisory committee on research and training in nitrogen fixation in the tropics in cooperation with CNPq (Brazilian National Research Council; Joint Subcommittee on Semi-Arid Tropics of Northern Brazil; Feasibility Study in Fine Chemicals and Drugs. Since Brazil is an AID graduate, all expenses associated with the above are drawn from sources other than current AID budgets or this project. The example is cited as illustrative of the NAS type of activities.
2. Indonesia. Cooperative consultation activities with LIPI in fields such as marine science resources, science policy development.
3. Kenya. Advisory services on research needs for the scientific management of the parts and reserves of Kenya with the Board of Trustees, Kenya National Park.

C. Special Studies and Advisory Studies

1. Working with the NAS Board on Agricultural and Renewable Resources, analysis will be made of potential technological intervention in the process of food movement from field to consumer, indicating where significant losses are known to occur and where they might be reduced at moderate cost.
2. Advisory Committee on the Sahel. With support from AFR Bureau, the Committee will review current research on the Sahel, assist in identifying future research needs and establish a system of relationships between the U.S. and Sahel states through coupling similar U.S. and Sahel institutions.
3. Advisory Committee on Biomedicine and Public Health. Tapping the new resources of the Institute of Medicine's expanded international program.
4. Study on Fuelwood in Developing Countries. To complete ongoing study on species of low-growing, dense, woody shrubs and trees that can serve family needs, especially rapidly maturing varieties. Findings are intended to guide planners and LDC administrators concerned with the critical shortage of firewood and charcoal resources in many LDC's.
5. Study on Underexploited Trees for the Tropics. A survey of tropical tree species which appear to have great potential for multiple uses--cultivation, agriculture, revegetation, slash-and-burn agriculture for soil improvement, shade and shelter.
6. Coverting Wastes to Food, Fuel and Fertilizer. Survey of a diverse group of potential approaches to the utilization of organic wastes, concentrating on biological methods.

7. Microorganisms with Promise for Improving the Quality of Life in LDC's. Identification and selection of lesser known microorganisms with potential economic value in food production, nitrogen fixation from the air and for production of fuel, industrial raw materials and pharmaceuticals.
8. Underexploited Tropical Animals. Identify little known tropical animals that with husbandry could provide significant new food and case resources for the poorest nations.
9. Study of Plants that Produce Hydrocarbons. To identify important plants that convert solar energy directly into hydrocarbons. Increasing concern over depleted petroleum reserves accords new value to such plants. Hundreds are known, but they have not been surveyed with this potential application in mind.
10. Study of the Potential Unrealized Uses of the Water Buffalo. To explore the untapped potential of the water buffalo that as yet has been underutilized in the production of meat, milk, hides and draught power in areas of the tropics and subtropics.

PROJECT SECOND YEAR ACTIVITIES

September 1, 1978 - August 31, 1979

A. Workshops (4-4)

Nepal, Sierra Leone, Jordan and Costa Rica (tentative). Funding for any activity in Jordan would be entirely from Security Supporting Assistance Funds appropriated for that country.

B. Advisory Studies

1. Discussion Seminars (4)
2. Feasibility Meetings (4)

C. Advisory Committee on Technology Innovation

Three major studies, subjects as yet undetermined, may be drawn from those on list above (for previous year) which could not be initiated.

D. Program Development

1. AID/NAS Liaison Meetings (4)
2. Follow-up (10 Man Trips)
3. Evaluation: (8 man trips involved in subpanel meetings for this purpose)

PROJECT THIRD YEAR ACTIVITIES

September 1, 1979 - August 13, 1980

A. Workshops (5-6)

Proposed tentatively for Burma, Tanzania, Yemen, Bolivia, one additional Asian country, one additional African country.

B. Advisory Studies

1. Discussion Seminars (4)
2. Feasibility Meetings (4)

C. Advisory Committee on technological Innovation

Three major studies (topics not yet selected).

D. Program Development

1. AID/NAS Liaison Meetings.
2. Follow-up Activities by Committees.
3. Evaluation Subpanel Meetings.

JUSTIFICATION FOR NON-COMPETITIVE PROCUREMENT

A recommendation that AID negotiate only with the National Academy of Sciences for the scientific and technological advisory services to AID and developing countries has been reviewed informally with SER/CM/COD in an attachment to a draft PIO/T shared with that Office. The statement was prepared pursuant to Subpart 7-3, 101-50 of the AID Procurement Regulations, with special reference to considerations set forth as criteria under part (b) which refer to informal solicitation for contracts for which one institution has exclusive or predominant capability.

It was learned that this statement was found acceptable to SER/CM/COD and that no difficulty in executing a non-competitive procurement with the proposed contractor is anticipated when the official PIO/T is forwarded to that Office for contract action.