

UNCLASSIFIED

PD-AAK-023
3910



**AGENCY FOR
INTERNATIONAL
DEVELOPMENT**

ANNUAL BUDGET SUBMISSION

FY 1984

OFFICE OF THE SCIENCE ADVISOR

MAY 1982

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
WASHINGTON, D.C. 20523

UNCLASSIFIED

Table of Contents

	Page
I. Office Narrative Statement	1
A. Overview	1
B. Program Management	5
C. Distribution of SCI-funded Research by Country	7
D. Justification for (Table V) Rankings	8
II. Tables III, IV, V.	11
III. Project Data Sheets	14
IV. Preliminary Results of the FY 1982 Competitive Grants Program.	17
A. Listing of Proposals for Funding Under the Innovative Scientific Research Project.	17
B. Listing of Additional Proposals Currently Under Review for Possible Funding Under the Innovative Scientific Research Project.	24
C. Listing of Activities Under Consideration for the Strengthening S&T Capacity Project.	26
V. Proposed National Academy of Sciences Program for 1982.	29

Office of the Science Advisor FY 1984 ABS

I. Office Narrative Statement

A. Overview

In FY 1981, Congress established a new Program for Scientific and Technological Cooperation to encourage AID to take a more innovative and collaborative approach to the problems and processes of development research and technology transfer. The funds provided were in addition to those made available for research and technical assistance under other AID accounts. The mandate included both research to explore the potential uses of the emerging technologies for development and innovative approaches to strengthen the capacity of less developed countries to take advantage of these new technologies. (For FY 1982, there is an earmarking of Section 106 funds for this program.)

In FY 1981, a relatively straight forward, two-pronged strategy was pursued in carrying out this mandate. Through a system of highly competitive research grants, we provided broad access to both LDC and U.S. scientists to submit their most innovative ideas for funding. In addition, under a five year grant to the National Academy of Sciences (NAS), we took advantage of their extraordinary scientific resources to identify underexploited technologies of potential economic value and to establish and fund networks of LDC research institutions to explore and improve those technologies.

In total, this Program for Scientific and Technological Cooperation provides AID with a very modest opportunity to support new ideas whose ultimate pay-off may be somewhat longer term and less certain than traditional research projects. It affords a chance to explore promising new leads for a short period before making a more sustained and substantial program commitment. It enables field missions to

recommend the support of good LDC research opportunities. In addition, it permits some administrative flexibility to experiment with innovative approaches to the solution of recognized obstacles to development.

Our initial 15 months experience has taught us several lessons which we have begun to incorporate in FY 1982. These are summarized below:

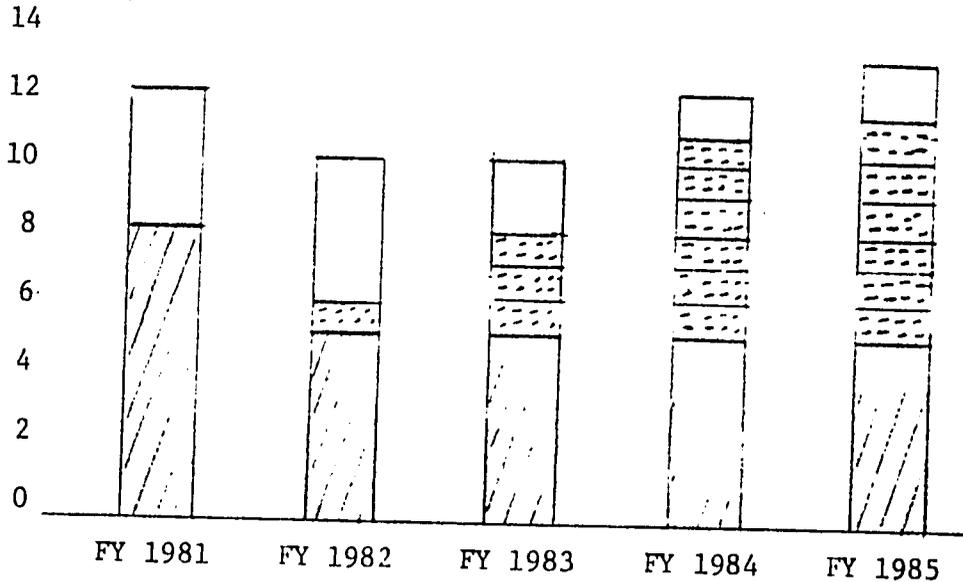
1. Focus Research on a Handful of Selected Topics.

Given the modest size of SCI resources, we believe that it makes sense to concentrate these resources on no more than six research areas or Research Modules at a time. However, it is not recommended that we establish such Research Modules all at one time. Instead, we would establish our specific research priorities (Modules) incrementally and as a consensus develops in AID on what they should be. Nevertheless, since we are an experimental program, research priorities will turn over perhaps every three years. For example, plant tissue culture, vaccine development, aquaculture/marine resources and agroforestry have already emerged as initial foci during FY 1981 and FY 1982. Beginning in FY 1983, biotechnology and either male fertility regulation or snail vectors of schistosomiasis will be added. These priorities will apply primarily to the competitive grants program, but also can impact on the NAS program. In FY 1984, we expect to add some aspect of modern agrochemistry (to be selected after the second international conference on Chemical Research Applied to World Needs (CHEMRAWN II) in Manila December 1982). Up to \$1.0 million a year will be earmarked for each priority. The balance of funds will be available competitively for research in other areas. Eventually, we would expect all our funds, except for perhaps \$1 million, to be definitively earmarked for specific Research Modules. Each Module will be evaluated at the end of three years to determine its appropriateness for incorporation into AID's mainstream R&D. In the outer years Research Modules may require more than \$1 million each to stay even with inflation.

The following chart illustrates the relationship of these Research Modules to the total program:

AID/SCI PROGRAM

(\$ millions)



Legend: NAS /////
 Research Modules :::::
 Unearmarked Balance

2. Differentiate between innovative research which is mainly appropriate for advanced U.S. institutions and that which is appropriate for less-experienced LDC institutions

Our target under the competitive grants program is to have LDC institutions be the direct recipient of at least two thirds of our grants. In FY 1981, LDC institutions received 10%. In FY 1982, it looks as if they may receive 35-40%, and we want this trend towards increasing LDC participation to accelerate. Overall, however, 85% of the grants will involve LDC institutions. Of course, under the NAS agreement all research funds go to LDC institutions.

There is, however, an apparent conflict in our mandate

both to focus on LDC research institutions and concurrently to explore the more experimental and less-widely known technologies which are so often found mainly in the US. Although the focus on LDC institutions remains our primary concern, we think it is appropriate for this program to support highly innovative research at U.S. institutions which may initially have no immediate LDC institutional involvement. Consequently, we are prepared to consider including among our research Modules up to two topics that might generate predominantly U.S. proposals, although every effort to include LDC participation will be made. Male fertility regulation may be one such example. However, the remaining topics should be designed for maximal LDC participation.

3. Offer a number of alternative measures for strengthening LDC institutions.

We start from the premise that supporting LDC research capacity is the best way to strengthen LDC research capacity. Under the NAS grant, we are supporting the concept of networking as a means to exchange information and to propagate recent developments in the field to researchers. In addition, we have authorized this year the NAS to provide, when appropriate, short-term training to LDC scientists at either more experienced LDC institutions or at U.S. institutions. In addition, under the competitive grants program, we are seeking to provide in FY 1982 up to five \$5,000 - 10,000 technical assistance grants to LDC investigators whose proposals hold promise in the judgement of the review committee, but were in need of a much more fully designed research plan for further AID/SCI consideration. We also support the selective participation of LDC scientists at highly relevant international scientific conferences. However, we are essentially dropping as a general category major technical assistance projects to strengthen LDC research capacity as we supported in FY 1981. Now, before an institution can receive technical assistance from us, it first must demonstrate the commitment and minimal ability to carry out a competitive research project that meets our guidelines.

4. Be more aggressive in bringing U.S. and LDC private sector, including university, views to

bear on identifying the new technologies that AID and LDC governments ought to investigate.

Beginning in FY 1982, we intend to support two outstanding junior scientists under the American Association for the Advancement of Science (AAS) Fellowship Program for Science, Engineering, and Diplomacy. Each of these fellows is up-to-date on the state of-the-art in his or her field and will spend one year with AID investigating the feasibility of AID and LDC programs incorporating the newest developments in their respective fields. This office also had tried unsuccessfully in 1981 to bring an Indonesian scientist to work with our office. The effort failed due to the problem of security clearances. However, in FY 1983, we expect to begin consulting with our growing network of U.S. private sector contacts to explore the possibility of traineeships for selected LDC scientists. We are also exploring the idea, based on a specific Cameroonian scientist who is about to return to country without an appropriate position for his research skills, of providing transitional support for an LDC scientist not only to help his research, but also to demonstrate to this host government the value of nurturing his kind of recently honed research skills.

B. Program Management

The office requests one additional full-time AID position for the Science Advisor. Through FY 1982, the Science Advisor has encumbered a reimbursable position from the Office of International Health, Department of Health and Human Services. The reimbursable position is tentatively scheduled to be abolished at the end of FY 1982. While there is a possibility that it may be extended during most of FY 1983, it certainly will be abolished by the end of FY 1983. Based on discussions with the S&T Bureau, the office will be able to meet its additional workforce requirements as follows: 2 full-time AID positions within AID/SCI's ceiling for the secretary and the competitive research program manager; two shared S&T positions for program support and NAS project management; and one transferred S&T part-time position for grants administration/secretarial work.

With the exception of the NAS project and the grant with the American Association of Engineering Societies to sponsor international competitions for specific development technologies, this office does not manage the activities funded under this program. AID field missions or other Washington-based AID offices assume the responsibility for managing the activities to ensure the closest possible adherence to overall AID objectives. Last year's experience of 18 out of 20 (90%) approved competitive grants being managed in AID/W (with most managed in S&T) alarmed some S&T office managers with the prospect of being overwhelmed within two years with an unacceptable workload for SCI activities. This year about 16 out of 32 (50%) anticipated grants will be managed in AID/W; for FY 1983, about 12 out of 32 (38%) and about 15 out of 40 (38%) in FY 1984.

The S&T Offices of Agriculture, Nutrition, Health, and Population have indicated that they are prepared to manage proposals that they supported during the internal reviews. The Latin America and Caribbean Bureau also prefers to manage projects in its region. We further expect that Missions will manage most if not all in-country projects. Accordingly, there no longer appears to be the same specter of an overwhelming SCI-generated burden. Moreover, SCI and the S&T Program Office are jointly developing a project monitoring system which should simplify the administrative tasks of project management.

With regard to the proposed Research Modules, management on behalf of the Agency would begin with the Module Manager. But early in the life of the module, consideration would be given regarding not only the future of the Module as a technical entity, but also the ultimate assumption of its management by the Agency. This could result in a straight forward integration with other programs, in dispersal to different Bureaus, to outside contractual arrangements, etc. The point is that provision for future management within or without AID should be an integral and early consideration along with technical content.

This year's experiment to use the Sector Councils to review both preproposals and final proposals asked too

much of the Councils. Accordingly, we suggest that Councils be asked in the future to review only preproposals and only for relevance to development. Full proposals invited as the result of this internal review will be reviewed primarily by external peer panels, although any Sector Council make call up for their own review any item they may wish to examine again at the full proposal stage.

C. Distribution of SCI-funded Research by Country.

The office believes that a large number of countries where there are AID field missions have good research opportunities for support under this program. Below is a table showing the countries that are participating in or have a strong possibility of participating in the program this year. There is a definite correlation between level of information available in country about our program, either through our TDYs or active mission interest, and the submission of good LDC proposals.

Distribution of Country Focus of Competitive Grants Program

Region/Countries	FY 1981 (Actual) (\$000) # Activities		FY 1982 (Under final consideration) (\$000) # Act	
<u>AFRICA</u>				
Cameroon	-		25	1
Liberia	120	1	-	
Sierra Leone	120	1	10	1
Somalia	-		168	1
South Afr. Reg.	-		169	1
Zambia	-		150	1
Subtotal	<u>240</u>	<u>2</u>	<u>522</u>	<u>5</u>
<u>ASIA</u>				
Burma	-		163	2
India	-		291	2
Indonesia	-		303	2
Philippines	4	1	406	4
South Pacific	198	1	-	
Sri Lanka	-		60	1
Thailand	-		530	3
Subtotal	<u>202</u>	<u>2</u>	<u>1,753</u>	<u>14</u>

<u>IAC</u>			
Brazil	185	1	
Caribbean Reg.	700	2	270 2
Costa Rica	377	3	598 4
Dominican Rep.	-		-
Ecuador	50	1	150 1
Guatemala	-		171 1
Honduras	-		329 3
Jamaica	50	1	530 2
Peru	150	1	325 2
			247 2
Subtotal	1,512	9	2,615 17
<u>NE</u>			
Egypt	-		
Lebanon	-		148 1
Tunisia	100	1	142 1
			-
Subtotal	100	1	290 2
Totals	2,054	14	
Level of Program	3,898		5,180 38
			5,000

Notes: Table excludes world-wide and US only grants. For purposes of simplicity, all funds are charged against country where research takes place. The total number of activities exceeds the number of grants because some grantees operate in more than one country.

D. Justification for the Rankings in the Proposed FY 1984 Budget. (Table V)

The office proposes to fund all its activities through its existing three projects. As they currently function, they permit maximum flexibility in considering

new ideas for funding. The Innovative Scientific Research and the Strengthening S&T Capacity in LDC's Projects operate as PVO basket-type projects where each sub-activity is approved separately. The NAS project, approved before this office started to function, represents a major Agency commitment to a cluster of interrelated S&T activities. As our program has gained experience and focus, we have guided the NAS project along new lines consistent with our evolving priorities. An analysis of the project during the past few months resulted in a decision to: reduce planned annual obligations to no more than \$5 million a year, stretch the project an additional two years through FY 1987, and delete activities which are not directly supportive of the objective to identify under-exploited technologies of potential economic value and to establish and fund networks of LDC research institutions to explore and improve these technologies.

The first funding increment will cover one year's costs of eight on-going and three new NAS research networks, four new ACTI studies, and three workshops. This project has a mortgaging problem with the research networks. While the NAS budgets \$1.2 million for each network to cover the costs of eight to ten subgrants over a three to four-year period, the NAS commits only a year's funding at a time. Thus at the beginning of 1984, the eight on-going networks will require \$9.7 million in additional funds, including associated research support costs.

The second funding increment will support 32 research grants averaging \$140,000 each over a three year period. About 26 of these proposals will be in our evolving priority areas. The remaining six will be highly recommended mission-supported proposals which fall outside the five priority areas. These 32 successful proposals will represent the outcome of a competition among over 250 proposals.

The third funding increment represents various mechanisms for identifying new S&T areas for incorporation in LDC program and in providing technical assistance for improving research design. These funds would support the third and last year of the AAAS fellowship program, technical assistance to five LDC

institutions, three private sector internships for LDC scientists, six "transitional" research grants to LDC scientists just returning home after U.S. training, and LDC scientist participation in selected international conferences.

The fourth increment will provide \$1,000,000 to fund six to eight grants under a new priority research area where the competence is found mainly in U.S. institutions, possibly in vaccine development through biotechnology. We believe there will be strong pressure within AID to start new, exploratory investigations in this area as a result of increased interest in tropical disease control program. In addition, \$700,000 would be used to underwrite the costs of facilitating networks between LDC and U.S. institutions for two of the three new research areas beginning in FY 1984 and for up to six years during which SCI-funded research in these two areas would be active. The remaining \$300,000 would be used to support for another two years the small grants program of the International Foundation for Science. We made a two-year, \$450,000 contribution in FY 1981 and expect that an evaluation of this grant in 1983 will strongly support continuation of this initiative. The IFS is a multi-donor sponsored research grant program which makes grants in the range of \$10,000 to \$25,000 to support the research interests of selected LDC scientists rather than in support of institutions. These funds often are used to buy overseas equipment. IFS membership consist of national academies of sciences or their equivalent.

TABLE III - PROJECT OBLIGATIONS BY APPROPRIATION ACCOUNT
FY 1982 TO FY 1984 (\$ THOUSANDS)

OFFICE: ST/SA

APPROPRIATION ACCOUNT: SD

PROJECT: PROJECT TITLE

		FY 1982 OYB-REVISED	FY 1983 REVISED	FY_84 PROPOSED
935-5538.	APPLYING S AND I TO DEVELOPMENT	\$5,000	\$5,000	\$5,000
935-5542.	INNOVATIVE SCIENTIFIC RESEARCH	\$4,500	\$4,500	\$6,500
935-5543.	STRENGTHENING S+T CAPACITY	\$500	\$500	\$500
TOTALS FOR SD		\$10,000	\$10,000	\$12,000
* * OFFICE TOTAL:		\$10,000	\$10,000	\$12,000

1-11

21

PROJECT NUMBER AND TITLE	OBLIG G DATE L INTT FIN	-TOTAL COST- AUTH PLAN	OBLIG THRU FY 81	FY 81 PIPE- LINE	ESTIMATED U.S. DOLLAR COST (\$000)				FY 84 AAPL	FUNDED THRU	FY 85 OBLIG	FY 86 OBLIG	FY 87 OBLIG	ITEM NO
					---FY 1982--- OBLIG- ATIONS	EXPEND- ITURES	---FY 1983--- OBLIG- ATIONS	EXPEND- ITURES						
SELECTED DEVELOPMENT ACTIVITIES														
024533	APPLYING S AND T TO DEVLPMNT (NAS) - I													
G 81		36000 36000	8000	8000	5000	6000	5000	6000	5000		5000	5000	3000	1059
024534.01	Applying S & T For Development-II													
G 84 C		--- 23000	---	---	---	---	---	---	---	---	---	---	2000	1119
0245342	INNOVATIVE SCIENTIFIC RESEARCH													
G 81 C		2740 ---	2740	2718	4500	1500	4500	3000	6500		7500	7500	9000	603
0245343	STRENGTHENING S AND T CAPACITY													
G 81 C		1154 ---	1154	1154	500	500	500	1000	500		500	500	1000	604
APPROPRIATION TOTAL		39896	59000	11896	11874	10000	8000	10000	10000	12000		13000	13000	15000
GRANT		39896	59000	11896	11874	10000	8000	10000	10000	12000		13000	13000	15000
LOAN		---	---	---	---	---	---	---	---	---		---	---	---
PROGRAM TOTAL		39896	59000	11896	11874	10000	8000	10000	10000	12000		13000	13000	15000
GRANT		39896	59000	11896	11874	10000	8000	10000	10000	12000		13000	13000	15000
LOAN		---	---	---	---	---	---	---	---	---		---	---	---

18-

TABLE V - FY 1984 PROPOSED PROGRAM RANKING
05/19/82

OFFICE 015 SI/SA

RANK	DECISION PACKAGES/PROGRAM ACTIVITY	TERM/ NEW/ CONT	LOAN/ GRANT	APPROP ACCT.	PROGRAM FUNDING (\$000)		ITEM
					INCR	CUM	
DECISION PACKAGE - PROPOSED (50)							
1	9365538						
2	9365542						
3	9365543						
4	9365542 *						
	APPLYING S AND T TO DEVELOPMENT	0	G	SD	5000	5000	3587
	INNOVATIVE SCIENTIFIC RESEARCH	0	G	SD	4500	9500	3590
	STRENGTHENING S+I CAPACITY	0	G	SD	500	10000	3593
	INNOVATIVE SCIENTIFIC RESEARCH	0	G	SD	2000	12000	3636

ITEMS RETRIEVED

-13-

PROGRAM: CENTRALLY FUNDED

ACTIVITY DATA SHEET

PROJECT OFFICER: JOHN DALY

CP 81-05 (8-79)

TITLE Applying Science and Technology to Development		FUNDS Sel. Deve. Problems - S&T	PROPOSED OBLIGATION (In thousands of dollars)		LIFE OF PROJECT 36,000
NUMBER 936-5538			FY 84 5,000		
GRANT <input checked="" type="checkbox"/>	LOAN <input type="checkbox"/>	NEW <input type="checkbox"/>	PRIOR REFERENCE APC December 30, 1980		ESTIMATED FINAL OBLIGATION FY 87
		CONTINUING <input checked="" type="checkbox"/>	INITIAL OBLIGATION FY 81		ESTIMATED COMPLETION DATE OF PROJECT FY 87

Purpose: To identify underexploited technologies of potential economic value to developing countries and fund networks of research institutions to explore and improve these technologies.

Background and Progress to Date: This project takes advantage of the extraordinary scientific resources of the National Academy of Sciences to formulate a program of workshops, conferences, studies, publications, and research to carry out the project purpose. The project initially included a broader range of activities, including S&T capacity assessments, but a review in 1982 indicated that the project should focus its efforts more closely to research than to S&T in general.

Most of the project funds support a research program which is directed by a committee of scientists from both the U.S. and developing countries. The project will support research in up to twelve research areas for research to be done in developing countries - not in the U.S. Work has already begun in four topics -- grain amaranth; fast-growing nitrogen-fixing trees biological nitrogen fixation; and mosquito vector research. Two other areas are under active consideration -- rapid epidemiological assessments and pest control.

The studies focus on innovative applications of technologies relevant to major development problems. These reports bring together the latest information on the state-of-the-art and specific work under way on a topic. The workshops and conferences supported under the project are useful in establishing research priorities in selected technical fields. For example the Academy is organizing a major workshop to develop a research agenda in the new field in biotechnology.

Host Country and Other Donors: Host country counterparts will contribute to workshops and research. The U.S. scientific community is also expected to donate services and advice. Complementary funds from the private sector and other donors will be sought.

Beneficiaries: Researchers and S&T policy makers in LDCs working on development problems keyed to improving the status of the poor inhabitants of their countries will be the immediate beneficiaries. Ultimate beneficiaries will be the poor whose lives will be improved by the research.

FY 1984 Program: four new studies, three workshops, and three new research networks will be started. In addition, eight on-going research networks involving over 60 LDC institutions will be supported.

Major Outputs

Research Grants	100
Study Reports	26
Major Workshops	15
S&T Capacity Assessment	1
Publication Program	

<u>AID-Financed Inputs</u>		FY 84
Meetings/conferences		300
Studies		778
Research/research support		3,342
Publications/general costs		580
		5,000

U.S. FINANCING (In thousands of dollars)					
	Obligations	Expenditures	Unliquidated	Funding Period	Principal Contractors/Agencies
Through September 30, 1981	8,000	-	8,000		
Estimated Fiscal Year 1982	5,000	6,000			
Estimated through September 30, 1982	13,000	6,000	7,000	7/1/82-6/30/83	National Academy of Sciences
Proposed FY 1983	5,000	6,000		7/1/83-6/30/84	
Estimated through FY 1983	18,000	12,000	6,000		
Proposed FY 1984	5,000				
		Future Year Obli.	Est. Total Cost	7/1/84-4/30/85	
		10,100	33,100		

PROGRAM:CENTRALLY FUNDED

ACTIVITY DATA SHEET

PROJECT MANAGER: Irvin Asher

TITLE Innovative Scientific Research		FUNDS Sel. Dev. Problems - S&T	PROPOSED OBLIGATION (in thousands of dollars) FY 84 6,500		LIFE OF PROJECT (Auth) 2,740
NUMBER 936-5542	NEW <input type="checkbox"/>	PRIOR REFERENCE APC July 27m 1981	INITIAL OBLIGATION FY 81	ESTIMATED FINAL OBLIGATION FY continuing	ESTIMATED COMPLETION DATE OF PROJECT FY continuing
GRANT <input checked="" type="checkbox"/>	LOAN <input type="checkbox"/>				

Purpose: To encourage the expansion of innovative scientific research in support of development.

Background and Progress to Date: This project uses a system of highly competitive research grants to encourage LDC and U.S. scientists to submit their most innovative ideas for funding. The initial guidelines for the competitions invited proposals relevant to broad development problems such as increased food supplies; health, population, and nutrition; energy, terrestrial resources and physical sciences; and communications and education technology. While these general concerns remain key to the research program, experience has shown that a more specific level of problem, as well as a more limited number of topics to address in any one year, will improve the chances of impact of this experimental program.

The program now proposes to emphasize up to six research modules each year with each module turning over perhaps every three years in view of the experimental nature of the program. There will also be some funds available competitively for research in other areas. Modules identified to date are: biotechnology (including tissue culture), forestry/agroforestry, and male fertility regulation or snail vectors of schistosomiasis. Research modules are selected with the view of enabling LDC research institutions to compete equally with U.S. institutions for at least two-thirds of the grant awards. Each module will be evaluated at the end of three years to determine its appropriateness for incorporation into AID's mainstream R&D.

Proposals undergo internal and external scientific peer review and are evaluated for: scientific merit, relevance to development; new and innovative character; and LDC capacity building aspects. The project does not support the continuation of existing research activities. Funding periods normally will not exceed three years and most approved proposals will not exceed \$150,000.

In FY 1981, 13 proposals were funded including: tissue culture improvements of plantain, a vital food source of the rural poor in Central America which is currently threatened by plant disease; assessment of the use of the Azolla plant as a source of nitrogen for rice systems in tropical developing countries; and a program to stimulate inventions of specific development technologies through international competitions sponsored by the Association of American Engineering Societies. In FY 1982, 38 proposals out of 240 initial

proposals have survived the review process and are under final consideration. Sixteen of these come directly from LDC institutions.

Host Country and Other Donors: Host country institutions will contribute facilities and some administrative support. Complementary funds from the private sector and other donors will be sought.

Beneficiaries: Researchers who are working on development problems keyed to improving the status of the poor inhabitants of LDCs will be the immediate beneficiaries. Ultimate beneficiaries will be the poor inhabitants of LDCs whose lives will be improved by the research.

FY 84 Program: \$5,500 will fund an estimated 34 grants awarded in response to competitions in six research modules and six grants awarded competitively for research in other areas. The new modules introduced in FY 84 are likely to be a modern aspect of agro-chemistry (to be selected after the international conference on applying chemistry research to world food needs in Manila December 1982) research on snail vectors of schistosomiasis if it is not started in 1983 and possibly an energy topic. For two of these modules, \$700 will fund contracts for facilitating networks among participating institutions during the six years of research under the modules, including workshops, exchange of scientists, a newsletter and other dissemination efforts. \$300 represents a second two-year contribution to the small grant research program of the International Foundation for Science. This is a multi-donor organization whose members are national academies of sciences and which awards grants to individual LDC scientists in the range of 10 - 25 thousand dollars, particularly for scientific equipment.

Major Outputs: Research reports, practical inventions, innovations introduced into major long-term development research efforts, and demonstrated feasibility of new research areas.

AID-Financed Inputs	FY 84
R&D grants and contracts	6,500

U.S. FINANCING (in thousands of dollars)				Funding Period	Principal Contractors or Agencies
	Obligations	Expenditures	Unliquidated		
Through September 30, 1981	2,700	-	2,740		Various LDC and U.S. Institutions
Estimated Fiscal Year 1982	4,500	1,500			
Estimated through September 30, 1982	7,200	1,500	5,700	3 year grants	
Proposed FY 1983	4,500	3,000			
Estimated through Fiscal Year 1983	11,700	4,500	7,200	3 year grants	
Proposed FY 1984	6,500				
		Future Year Obligations continuing	Estimated Total Cost continuing		

PROGRAM: Centrally Funded

ACTIVITY DATA SHEET

PROJECT MANAGER: Dr. Irvin Asher

TITLE Strengthening Scientific and Technological Capacity		FUNDS Sel. Dev. Problem - SET		PROPOSED OBLIGATION (In thousands of dollars)		LIFE OF PROJECT		ESTIMATED COMPLETION DATE OF PROJECT	
NUMBER 938-5543		PRIOR REFERENCE		FY 84 500		1,156		FY continuing	
GRANT <input checked="" type="checkbox"/> LOAN <input type="checkbox"/>		NEW <input checked="" type="checkbox"/> CONTINUING <input type="checkbox"/>		APC July 27, 1981		ESTIMATED FINAL OBLIGATION FY 81		ESTIMATED COMPLETION DATE OF PROJECT FY continuing	

Purpose: To strengthen LDC Scientific and Technological Capacity to undertake the research and experimentation necessary for development.

Background and Progress to Date: In 1981 this project funded seven proposals of which most were two to three year technical assistance efforts. In 1982 this general category of major technical assistance was essentially dropped. This project now will focus mainly on identifying LDC leadership potential in science and providing some of the resources necessary to realize a fuller development from such leadership. Toward this end the project will:

- provide grants to train scientists and supporting technicians;
- encourage the development of scientific curricula and facilities at the university and high school levels;
- foster the exchange of U.S. scientists and other technological experts with developing countries;
- develop LDC capacity for the repair and maintenance of scientific equipment;
- and gather, analyze and disseminate information relevant to the scientific and technological needs of developing countries.

There will be a close relationship between technical assistance needs identified through the competitions under the Innovative Scientific Research Project (938-5542) and activities funded under this project.

Beneficiaries: Scientists and technical support staff working in development fields key to improving the status of the poorer inhabitants of LDCs will be the immediate beneficiaries. Ultimate beneficiaries will be the poor inhabitants of LDCs who are recipients of the improved scientific and technological capacities of these countries.

Host Country and Other Donors: Host country institutions will contribute facilities, salaries and administrative support. Complementary funds from the private sector and other donors will be sought.

FY 1984 Program: Technical assistance to LDC research institutions, private sector internships for LDC scientists, transitional research support for recently returned U.S. trained LDC scientists, final year of three-year fellowship program with the American Assoc. for the Advancement of Science.

Major Outputs: Improved design of LDC research proposals, better utilization of selected LDC scientists' research skills, special LDC-US institutional agreements for the promotion of science, innovative arrangements with the private sector to contribute experts to science development in LDCs, capacity strengthening in such areas as scientific equipment maintenance and food contamination studies, and information exchange.

A.I.D. Financed Input: Grants and contracts FY 84
500

-9/-

U.S. FINANCING (In thousands of dollars)				Funding Period	Principal Contractors or Agencies
	Obligations	Expenditures	Unliquidated		
Through September 30, 1981	1156		1156		Various
Estimated Fiscal Year 1982	500	500			
Estimated through September 30, 1982	1656	1500	1156		
Proposed FY 1983	500	1000			
Estimated through Fiscal Year 1983	2156	1500	656		
Proposed FY 1984	500				
		Future Year Obligations continuing	Estimated Total Cost continuing		

Listing of Proposals for Funding Under the
Innovative Scientific Research Project

<u>PROPOSAL/GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
AGRICULTURE		
Role of Mycorrhizae in the Phosphorous Nutrition of Economic Leguminous Crops Grantee: Kasetsart University (Thailand)	\$150,000	To improve the phosphorus nutrition of soybeans, mungbeans and peanuts in Thailand through symbiosis with phosphate absorbing mycorrhizal fungi.
Tissue Culture for Virus-free Potato Propagation Grantee: Lembang Research Institute for Food Crops (Indonesia)	152,640	To produce and maintain virus-free white potato nuclear stock, using tissue culture techniques, as a means to produce virus-free seed for distribution to farmers.
Screening Varieties and Lines of Corn and Mungbean for tolerance to Acid Soil Conditions Grantee: University of the Philippines	135,577	To select varieties and lines of corn and mungbean which have adapted to acidic soil conditions.
Hybrid Rice Project for Indonesia Grantee: Agency for Agricultural Research and Development (Indonesia)	150,500	To produce hybrid rice seed in commercial quantities in order to optimize rice production.

- 4 -

<u>PROPOSAL/GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
Use of Azolla for Nitrogen Fixation in the Egyptian Rice Cultures Grantee: University of Hawaii in conjunction with the Alexandria University	148,000	To test heat tolerant azolla species (a plant substitute for petroleum-based fertilizer) under Egyptian conditions and subsequent trials in rice plots.
Seed Vigor Influence of Nitrogen Fixation of Field Bean Grantee: Ohio State University Research Foundation in conjunction with Instituto Superior de Agricul- tura (Dominican Republic)	150,000	To determine the influence of seed vigor on nodule initiation, nodule numbers, nodule distribution, and nitrogen fixation of field bean (<i>Phaseolus vulgaris</i>)
-18- Chemistry of the Bitter Principles of <u>Chenopodium quinoa</u> Grantee: Purdue University	157,093	To isolate and characterize the undesirable toxic/bitter ingredients of quinoa seed which is a native food grain that grows under difficult agricultural conditions in Andes mountains.
Redox Chemistry of the Acid Sulfate Soils of Thailand Grantee: Louisiana State University in conjunction with Thai Department of Land Development	179,784	To study the chemistry of oxidation/reduction of Thai soils and plant responses under controlled conditions.
A genetic Engineering Approach to the Improve- ment of the Rhizobium for Tropical Legumes Grantee: University of Hawaii	54,530	To improve the effectiveness of symbiotic nitrogen fixation through genetic manipulation of the bacterial partner, Rhizobium.

<u>PROPOSAL/GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
ENERGY AND ENVIRONMENT		
Peach Palm Germplasm Bank Grantee: National Research Institute for Amazonia and the National Center for Genetic Resources (Brazil)	127,835	To collect and evaluate a significant sample of the genetic diversity of the Peach Palm populations in the Amazon Basin, select the best germplasm for cultivation and immediate use in breeding programs in the participating countries of Brazil, Costa Rica, Colombia, Peru, Bolivia and Ecuador.
Earthen Buildings in Seismic Areas Grantee: Pontificia Universidad Catolica del Peru	138,765	To study the shear and flexural strengths of adobe walls with particular attention to the degree of unity between bricks and mortar.
19- The Conversion of Lignocellulosics to Ethanol and/or Microbial Biomass Product: The Intermediate Acid Approach Grantee: Institute Centro Americano de Investigacion y Tecnologia Industrial (Guatemala)	169,460	To try to make lactic and acetic acids and ethanol from wood fiber using a bacterial acidogenic fermentation process.
Exploiting Unique Germplasm Resources of Leguminous Trees: Prosopis, Leucaena and Acacia Grantee: Texas A&I University in conjunc- with Caribbean research insti- tutions	149,318	To improve the usefulness of three species of fast growing trees which have major potential as firewood sources. For example, one of the objectives will be to develop unique Prosopis germplasm capable of rapid growth in full seawater.

<u>PROPOSAL/GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
<p>Acquisition, characterization and dissemination of germplasm of potentially useful nitrogen-fixing trees</p> <p>Grantee: University of Hawaii in conjunction with local research institutions in seven countries</p>	150,000	<p>To assemble seed stocks of less-well known nitrogen fixing tree species with agroforestry potential and compile information on their geographic origin and characteristics. A network of institutions in Indonesia, Taiwan, Thailand, Kenya, Senegal and Costa Rica will play a major role in this effort.</p>
<p>Cooperative Monsoon Research Program</p> <p>Grantee: Florida State University in conjunction with the Indian Institute of Technology (Kanpur, India)</p>	146,508	<p>To develop a weather prediction capability based on computer models at the Indian Institute of Technology Kanpur.</p>
<p>Design and Development of a Small-scale Producer Gas Generator-engine System Using Rice Husks</p> <p>Grantee: University of California, Davis in conjunction with the International Rice Research Institute (Philippines)</p>	147,799	<p>To develop a cheap engine using rice husks as the source of fuel for use in rice growing areas to power irrigation pumps, rice processing units, and electrical generating equipment.</p>
<p>Testing the BELBOUY wavepowered seawater desalting system in Caribbean countries</p> <p>Grantee: University of Delaware in conjunction with Jamaican institutions</p>	166,528	<p>To support the first sea trials of a water desalination system that uses wave action as the source of energy and proven reverse osmosis technology to purify the water. The goal is to produce fresh water at a cost affordable for agriculture</p>

<u>PROPOSAL/GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
<p>The Potential for Utilizing Seagrasses to Restore Environmentally Damaged Caribbean Nearshore Areas</p> <p>Grantee: Florida International University in conjunction with the Natural Resources Conservation Department (Jamaica)</p>	158,000	To test whether tropical Jamaica is capable of restoring its offshore fisheries nurseries through rehabilitating its seagrasses.
HEALTH		
<p>New Approach in Design of Antimalarials Selectively Toxic to the Parasite</p> <p>Grantee: Uniformed Services University of the Health Sciences in conjunc- tion with the National Institute of Research on Amazonia and the Institute of Tropical Medicine at Manaus (Brazil)</p>	142,000	To test compounds (lipophilic chelators) which are selectively toxic to intracellular malaria parasites that have become drug resistant to quinine and chloroquine.
<p>Development of a Defined Diet for <u>In Vitro</u> Mass Rearing of the Tsetse Fly</p> <p>Grantee: Southern Region Veterinary Toxicology and Entomology Research Laboratory of USDA in conjunction with the Inter- national Atomic Energy Agency Pest Control Division</p>	171,451	To develop a diet which will permit the mass rearing of tsetse flies for use in suppression programs using sterile male tsetse flies.

<u>PROPOSAL/GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
<p>Specific Circulating Antigens in Malaria and Schistosomiasis</p> <p>Grantee: Uniformed Services University of the Health Services in conjunction with the Tropical Disease Program Center (Zambia)</p>	150,000	To develop sensitive and specific assays to qualify and quantify malarial and schistosomal circulating antigens.
<p>Production of Shiga-Like Toxin by Escherichia Coli</p> <p>Grantee: Uniformed Services University of the Health Sciences</p>	147,611	To obtain information on the pathogenicity and epidemiology of enteropathogenic E. Coli for use in future studies on development of effective measures against this diarrhea agent.
<p>Pathogens of Viral Diarrhea</p> <p>Grantee: Uniformed Services University of the Health Sciences</p>	151,160	To apply the methods which have been used successfully in studying bacterial diarrheas to the study of two important groups of diarrhea viruses: rotaviruses and coronaviruses.
<p>Purific action of Mycobacterial Antigens for Potential Use in the Serological Diagnosis of Tuberculosis</p> <p>Grantee: Eastern Virginia Medical School in conjunction with All India Institute of Medical Sciences</p>	143,981	To develop an enhanced serological test to screen for human tuberculosis. Such a test would be more rapid and more sensitive than existing skin-testing techniques.

-22-

<u>PROPOSAL/GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
NUTRITION		
Development of Appropriate Weaning Foods Grantee: Department of Medical Research, Ministry of Health (Burma)	150,000	To develop a range of feeding options for infants and weaning children using appropriate, acceptable, safe, and nutritionally balanced weaning recipes from locally available inexpensive food items.
Biochemical and Nutritional Studies of Philippine Indigenous Food and Forage Legumes Grantee: University of the Philippines	117,700	To provide a comprehensive biochemical and nutritional assessment of the edible parts of indigenous food and forage legumes in the Philippines
Energy and Protein Stores in Stunted Children Grantee: U.S. Centers for Disease Control in conjunction with the Institute for Nutrition Research (Peru)	103,400	To study body fat stores and lean body mass in growth stunted children in Peru to better understand the roles of energy and protein deficiency in their retarded growth.
COMMUNICATIONS AND INFORMATION SYSTEMS		
Feasibility and Planning Studies for Low-Cost, Educational Television Systems Adapted to Less-Developed Countries Grantee: Institute for Telecommunication Sciences, U.S. Department of Commerce, in conjunction with the Battelle Memorial Institute	99,985	To determine the feasibility of a single channel TV receiver that would cost \$5-15 at retail and require no more than 5-15 watts of power.
	TOTAL	\$4,009,625

Listing of Additional Proposals Currently
Under Review for Possible Funding Under
Innovative Scientific Research Project

PROPOSAL/GRANTEE	AMOUNT	PURPOSE
AGRICULTURE		
Improvement of Tomato Production in Somalia Grantee: Somali National University	168,000	To transfer resistance to the white fly from the indigenous cherry tomatoes to other tomato varieties introduced into Somalia. Tomatoes are an important part of the Somali diet.
Pilot Program for Use of Traditional Agricultural Technologies to Improve Present Agricultural Practices Grantee: Escuela Technica de Arqueologia de la Escuela Superior Politecnica del Litoral (Ecuador)	171,200	to examine how ancient abandoned, raised agricultural fields in the Guayas River Basin flood plain are suitable for modern agriculture.
ENERGY AND ENVIRONMENT		
Growth and Site Relationships of Caribbean Pine Plantations Grantee: Institute of Tropical Forestry, USDA Forest Service (Puerto Rico)	150,000	To determine soil, topographical, and climatological variables which exert the greatest influence on the growth and yield of the Caribbean pine tree.
Volcanic Zonification and Risk in the Republic of Guatemala Grantee: National Institute for Seismology Volcanology and Meteorology (Guatemala)	150,000	To obtain a zonification and seismic risk map of Guatemala and to optimize the use and benefits from the current seismic instrument network.

PROPOSAL/GRANTEE

AMOUNT

PURPOSE

A Classification of the Upland Pine Forests of Central Honduras for Site Quality and Productivity

\$ 355,319

Develop a forest site classification system for the management of the pine forests of Central Honduras.

Grantee: National School of Forest Sciences (Honduras) in conjunction with the University of Idaho

Bonding of Portland Cember with Honduran Wood Biomass for Structural Materials

174,940

To determine whether Honduran tree species might provide a breakthrough in the problems of cement bond formation when mixed with wood particles.

Grantee: National School of Forest Sciences (Honduras) in conjunction with the University of Idaho

Coastal Pollution Control Strategies and Water Quality Modelling of Bays and Harbors in the Eastern Caribbean

149,800

To analyze the pollution susceptibility of island bays and harbors as a tool for planning for the control of pollution in the Eastern Caribbean.

Grantee: Island Resources Foundation (Virgin Islands)

HEALTH

The Use of the Annual Fish Nothobranchius Guentheri 60,000 for Mosquito Control

Grantee: National Aquatic Resource Agency (Sri Lanka)

To determine the feasibility of using a small East African annual fish to control mosquito breeding in gem mining pits in Sri Lanka. The initial stage may require a preliminary study of the fish in its native Kenya habitat.

TOTAL \$1,379,259

-25-

Listing of Activities Under Consideration for
the Strengthening SST Capacity Project

<u>PROJECT / GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
TECHNICAL ASSISTANCE TO STRENGTHEN RESEARCH DESIGN		
Crop Storage Systems in Sierra Leone Recipient: University of Sierra Leone	\$10,000	To provide technical assistance under the cooperative agreement with Kansas State or University of Idaho to develop a more specific research plan.
Volcanic Zonification and Risk in the Republic of Guatemala Recipient: National Institute for Seismology and Meteorology (Guatemala)	10,000	To permit the principal researcher to tap scarce U.S. skills in risk and zone mapping for developing a detailed plan of action. Two possible sources of U.S. talent are the U.S. Geological Survey and the University of California at Santa Cruz.
A Study of the Dynamics of Ascaris Infections in a Village Community Recipient: Parasitology Research Division Ministry of Health, Burma	10,000	To send a distinguished U.S. scientist to help the principal investigator incorporate in the proposal proper research procedures and a clearer understanding of the disease.
Genetics of Schistosoma and its Vector Snail Recipient: The University of the Philippines and the University of California, San Diego	4,000	To underwrite the costs of an American scientist to respond to an invitation from Philippine institutions to go to the Philippines to develop a collaborative research program focusing on controlling schistosomiasis.

- 26 -

<u>PROPOSAL/GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
<p>TRANSITION RESEARCH GRANTS FOR U.S. TRAINED LDC SCIENTIST TO START RESEARCH IN HOME COUNTRY</p> <p>The Physiology of Gamete Production in Malaria</p> <p>Grantee: Samuel Martin (Cameroonian)</p>	25,000	<p>To encourage the Cameroonian Government to continue Mr. Martin's research on malaria. Mr. Martin left for training in the U.S. in 1967. AID funded a B.A. and an M.D. The NIH International Fellowship Program funded an MPH. Mr. Martin has been employed by the Department of Hematology, Walter Reed Army Institute of Research, since 1979, but must return to his country this summer</p>
<p>OTHER ACTIVITIES</p> <p>Strengthening of Southeast Asian Aquaculture Institutions</p> <p>Grantee: University of Michigan in con- junction with Kasetsart University (Thailand)</p>	200,000	<p>To initiate a practical plan of research and training to help Southeast Asian institutions address systematically the problems of low fish-pond productivity.</p>

<u>PROJECT/GRANTEE</u>	<u>AMOUNT</u>	<u>PURPOSE</u>
Mobile MPH Program for Southern Africa Grantee: Tulane University	168,524	To test the feasibility of developing a mobile certificate and Masters of Public Health degree program in the Southern Africa region, serving Zimbabwe, Botswana, Lesotho, Swaziland and Malawi.
Strategies for Curriculum Development in Science and Mathematics Grantee: American University of Beirut	142,100	To identify enhanced policies and practices for the development of scientific capacity.
Science, Engineering, and Diplomacy Fellows Program Grantee: American Association for the Advancement of Science (AAAS)	80,000	To bring two outstanding junior scientists to work one year with AID and IDC institutions investigating the feasibility of AID and IDC programs incorporating the newest developments in their fields. The fellows are finalists in a country-wide competition sponsored by the AAAS. The two fields are water and sanitation and rural development.
TOTAL	\$629,624	

Proposed 1982 NAS Program

Projects in Progress (letters of agreement signed)

- 1 Production of Study Reports (partially completed)
- 2 Underexploited Village Resources of Southeast Asia
- 3 Supplement to Firewood Report
- 4 Casuarina Species Study
- 5 Amaranth Study (staff costs only)
- 6 Interciencia Symposium on Biomass Substitutes
- 10 Study on Marine S&T in Developing Countries
- 13 Workshop to Examine Manpower Needs and Career Opportunities in the Field Aspects of Vector Biology
- 14 Update of Jojoba (staff costs only; in negotiation)
- 16 Opportunities for Guinea Worm Disease Control
- 17 Science and Technology Assessment in Ecuador
- 18 Feasibility Meeting to Discuss a Study on Coastal Zone Management Assistance for Developing Countries

-
- 19 Workshop/Conference on Biotechnology Research

Projects in Progress (letters of agreement submitted but waiting for AID signature)

- 20 ACTI Study on Water Pumping for Developing Countries
- 21 ACTI Study on Mini-hydro Technology for Developing Countries

Projects Being Planned

Seminar to Examine Existing Mechanisms for Short-Term Specialized Training for Scientists and Technicians for Developing Countries

Workshop on Micro-Electronic Communication

Workshop on Coastal Zone Management

ACTI Study on Construction Research

ACTI Study on Waste Water Treatment

ACTI Study on Draft Power

Research Grants to Developing Country Institutions

Program areas developed with ongoing grants:

Grain Amaranth: A broadleaf plant that has small seeds with a high content of quality protein; its leaves are consumed in many parts of the world. Used as a staple grain of the pre-Colombian civilization in South and Mezo America, this hardy plant employs the efficient C₄ pathway mechanism for photosynthesis like maize and sugarcane. At the organizational meeting, participants from India, Guatemala, Peru, and the U.S. agreed that the 12 most promising varieties of amaranth should be selected, comparative trials should be performed in different countries and climatic zones, and seeds of local varieties should be collected and preserved. They also suggested establishing an amaranth research newsletter to communicate grant project results, holding a periodic meeting of grantees in the amaranth project to coordinate activities and avoid duplicative research, testing the use of amaranth in traditional foods and studying its socioeconomic implications. It was expressed that the projects, with their elements of multinational cooperation, would be more valuable than the sums of the individual research grants.

Grants already awarded:

<u>TITLE</u>	<u>INSTITUTION/COUNTRY</u>	<u>PRINCIPAL INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PERIOD</u>
Development of Basic Information on Guatemalan Amaranth Germ Plasm	Institute of Nutrition of Central America & Panama (INCAP), Guatemala	Dr. Ricardo Bressani	\$118,793	2 years
Grain Amaranth	Centro de Investigacion de Cultivos Andinos (CICA), Peru	Dr. Luis Sumar Kalinowski	119,451	3 years
Agro-nomic & Industrial Studies of Amaranth Grain	Instituto Nacional de Investigaciones Agricolas (INIA), Mexico	Dr. A. Sanchez Marroquin	180,171	3 years

proposals received and being reviewed:

<u>TITLE</u>	<u>INSTITUTION/COUNTRY</u>	<u>PRINCIPAL INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PERIOD</u>
Introduction & Germ-plasm Development of Grain Amaranths for Different Ecological Zones in Kenya	Dept. of Crop Science, University of Nairobi, Kenya	Prof. V.K. Gupta	\$117,000	3 years

Additional proposals anticipated:

<u>INSTITUTION/COUNTRY</u>	<u>PRINCIPAL INVESTIGATOR</u>
Tamil Nadu Agricultural University and Horticultural Research Station, India	Dr. C.R. Muthukrisnan and Mr. M. Kader Mohideen
Department of Agronomy, Chiang Mai University, Thailand	Dr. Chuchree Senthong
Institute of Plant Breeding, University of the Philippines at Los Banos Philippines	Dr. Eufemio T. Rasco, Jr.
Thailand Institute of Scientific and Technological Research (TISTR), Thailand	To be determined

Fast-Growing, Nitrogen-Fixing Trees: At the organizational meeting, participants from Costa Rica, Sudan, and Thailand as well as the U.S., recommended a two-phase project: (1) an inventory of lesser-known native species, and (2) comparative field testing of selected species to provide a basis for tree selection and development of management techniques for different purposes. Economic and social assessments will form an integral part of the second phase. Grantees will meet periodically to exchange information and coordinate trials.

Grants already awarded:

<u>TITLE</u>	<u>INSTITUTION/COUNTRY</u>	<u>PRINCIPAL INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PERIOD</u>
Technical/Scientific Back-up	International Council for Research in Agroforestry (ICRAF), Kenya	Dr. Peter A. Huxley	\$ 57,024	1 year
Field Trials & Testing of Selected Species of Fast-Growing, Nitrogen-Fixing Trees	Thailand Institute of Scientific & Technological Research (TISTR), Thailand	Dr. Narong Chomchalow	100,000	3 years

Proposals received and being reviewed:

<u>TITLE</u>	<u>INSTITUTION/COUNTRY</u>	<u>PRINCIPAL INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PERIOD</u>
1. Selection of High Yielding Hardwoods for Energy Biomass Production	College of Agriculture Seoul National University, Korea	Dr. Don Koo	\$ 54,704	3 years
2. An Examination of the Compatability and Productivity of Mixed Fast-Growing, Nitrogen-Fixing Tree Species	Manila Seedling Bank Foundation, Inc., Philippines	Dr. Primo P. Andres	\$236,000	3 years
3. An Inventory of Indigenous Forest Resources of Sudan: Spatial Extent, Utilization, and Germ Plasm Characteristics	University of Gezira, Sudan	Dr. Mahdi Beshir	\$ 74,400	
4. Silvicultural Uses of Nitrogen-Fixing <i>Alnus jorullensis</i> and <i>Inga</i> in Colombian Highlands	Reserva Natural de Merenberg, Colombia	Dr. Paul Carlson	\$ 76,644	3 years
5. Preliminary Study on the Potential Uses of Promising Nitrogen-Fixing Trees	Visayas State College of Agriculture, Philippines	Prof. Rodolfo G. Escalada	\$124,319	5 years
6. Proposals for a Survey of Nitrogen-Fixing Woody Legumes of the West African Sub-Humid Savanna Region	Dept. of Zoology University of Ife, Nigeria	Dr. A.M.A. Imevbore	\$290,880	4 years
7. Nitrogen Fixation Potential of Some Woody Chilean Plant Species	Laboratorio de Botanica Instituto de Ciencias Biologicas, Pontificia Universidad Catolica de Chile, Chile	Dr. Orlando Balboa	\$110,618	3 years

8. The Reforestation and Fuelwood Potential of Nitrogen-Fixing Trees in the Philippines	Forest Research Institute, Philippines	Dr. Saturnina C. Halos	\$119,082	5 years (workplan) 3 years (budget)
9. Inventory, Growth Evaluation and Improvement Nitrogen-Fixing Indigenous Trees	Dept. of Forestry, University of Nairobi, Kenya	Dr. Frederick Owino	\$109,880	3 years
10. Technical Service to Fast-Growing, Nitrogen-Fixing Trees Project	Thailand Institute of Scientific and Technological Research (TISTR), Thailand	Dr. Narong Chomchalow	\$ 50,000	3 years

Additional proposals anticipated:

INSTITUTION/COUNTRY

PRINCIPAL INVESTIGATOR

1. International Council for Research in Agroforestry (ICRAF), Kenya (Resubmission of Part C of proposal from 11/81)	Dr. Peter Huxley
2. Centro Agronomico Tropical de Investigacion y Ensenanza, Costa Rica	Dr. Gerardo Budowski
3. Tropical Science Center, Costa Rica	Dr. Joseph A. Tosi
4. National Research Council, Malawi	Mr. T.D. Thawale
5. Department of Forest & Hydrobiology Research Senegal Institute of Agricultural Research, Senegal	Dr. M. Olivier Hamel
6. University of Piura, Peru	To be determined

New Program areas being developed are:

C. Biological Nitrogen Fixation: There is some controversy about the way nitrogen-fixing organisms and plants contribute nitrogen to the agricultural system. It is not clear, for example, whether cereals grown together with legumes can benefit directly from the fixation that is taking place by the latter or whether the contribution of legumes to the soil is through decomposition of old nodules, dead roots, and leaves from earlier plant growth. Clearly, however, a crop of legumes leaves behind residual nitrogen which can contribute to the nitrogen requirements of a subsequent crop. Until the advent of chemical fertilizers, legumes were the only

source of nitrogen circulating in biological systems apart from the nitrogen fixed in electrical discharges of lightning and residual nitrogen compounds from nitrogenous explosives. Because in many countries the use of chemical fertilizer is still confined to the relatively wealthy farms, BNF is likely to receive increasing attention as a less costly alternative. The challenge is to identify ways in which its use can be optimized. An organizational meeting is currently being held at the East-West Center, with participants from Senegal, Indonesia, Kenya, Pakistan, Peru, Costa Rica, and Thailand, as well as from the U.S.

D. Mosquito Vector Research: In many tropical areas of the world, arthropod-borne diseases, such as malaria and dengue, have experienced a resurgence, as have the mosquito species responsible for their transmission. Resistance to DDT and other insecticides, discontinued spraying programs, and relaxed public health vigilance have all contributed to increases in populations of mosquito. Concern exists in the United States about the recurring epidemics of dengue fever (an influenza-like virus) in the Caribbean and Central America because the mosquito vector, Aedes aegypti, is prevalent in the southern states. No vaccine is currently available for the four major strains of dengue, including an exceedingly virulent hemorrhagic type occurring mainly in Southeast Asia.

Eradication of mosquito vectors has never been achieved, and experts accept the fact that eradication is impractical. Rather, they advocate development of more effective methods of long-term reduction of mosquito populations, which will permit the containment of the disease. Such long-term control requires continuous monitoring of vector populations, and increased knowledge of the vectors and vector-parasite relationships. Unfortunately, since the massive public health campaigns against yellow fever and malaria early in this century, expertise in the field aspects of medical entomology has dwindled, leaving very few countries with effective research capabilities. Pooling or coordinating resources on a regional basis might facilitate research on new methods of arthropod vector control. Medical entomologists believe that vector control must rely on combinations of chemical and biological agents varied according to local ecological conditions and the changing characteristics of insect species. The ability to use control agents effectively, and at optimal cost, will depend upon knowledge of mosquito population dynamics in locally endemic areas. Such knowledge can be generated only through field studies which characterize the role of insect species in disease transmission and assist in the prediction of pesticide-resistant strains.

There is an urgent need for field research to be conducted in developing countries by resident scientists, in conjunction with the search for and testing of biological control agents.

An organizational meeting is planned for April with participants from Indonesia, Thailand, Uganda, India, Mexico, and the West Indies, as well as from the U.S.

Rapid Epidemiologic Assessment and Evaluation: Epidemiologic research can play an important role in promoting health and combatting disease in developing countries. Epidemiologic research, assessment, and evaluation are central to strengthening the planning capability of the health ministries of developing

countries. However, the epidemiologic or population-based statistical approach is not usually used in developing countries. As technological solutions to endemic diseases of the tropics become available, developing country health authorities must increasingly weigh alternative technologies and costs against the potential health benefits to their populations.

Recent methodological advances have simplified rapid epidemiologic assessment techniques, making them practical for developing countries. The chief goal of this project area is to develop simplified methods for health problem identification and program evaluation in developing countries. The principal components are rapid assessment and evaluation, which can be applied to important preventable or treatable health problems. Like any set of tools, they require testing and refinement according to the particular problems addressed and the needs, limitations, and expectations of the users.

An organizational meeting is planned for May with participants expected from Trinidad, Brazil, Philippines, Zambia, Chile, and Malaysia, as well as from the U.S.

F. Integrated Pest Management: Integrated pest management (IPM) is a strategy that shifts pest control from a purely chemical approach to a combination of chemical, biological, cultural, and mechanical techniques. This strategy is based on the life cycle of the pest and its natural enemies: predators, competitors, and parasites. The use of combined nonchemical pest control practices can prevent the adverse environmental impacts that occur with pesticide use alone. The goal of IPM is to decrease pest populations to acceptable levels. Proper employment of a natural enemy, often in conjunction with minimal amounts of chemical agent, has the advantage of reducing pesticide use and unwanted side effects such as pesticide resistance.

Development of these strategies remains research intensive. Not only must the natural enemy be identified, but its life cycle must be understood to ensure that it will not become or generate a new pest. New technologies must be developed for utilizing beneficial control agents. Since each beneficial control agent is specific to the pest and local environment, there is no substitute for carrying out experiments and field trials in developing countries. Currently, little IPM work is under way in developing countries, which have the most to gain from such techniques.

An organizational meeting is being planned for May with the usual non-U.S. participants from such countries as Costa Rica, Peru, Colombia, Sudan, Indonesia, Liberia, Senegal, Malaysia, and the West Indies, as well as from the U.S.