

AN INTERIM EVALUATION  
OF THE  
BOSTID RESEARCH GRANTS PROGRAM

REPORT TO THE BOARD ON SCIENCE AND TECHNOLOGY  
FOR DEVELOPMENT, OFFICE OF INTERNATIONAL AFFAIRS,  
NATIONAL ACADEMY OF SCIENCES/NATIONAL RESEARCH COUNCIL

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## I. INTRODUCTION

Since early last year we have been conducting, at the request of the Board, an evaluation of BOSTID'S Research Grants Program. We have read thousands of pages of grant proposals, reviewers' comments, minutes of meetings, administrative documents, auditors' reports, and files. We have talked individually with some CRG members and have had numerous conversations with the Research Grants staff, singly and collectively. We also have had contact with operations in the field. Claudia Carr traveled with Mike Greene--staff director--to visit a variety of grantees in Kenya and a coordinating meeting in Thailand for grantees in the biological nitrogen-fixation program. Bob Burris attended a coordinating meeting of amaranth grantees at the Rodale Research Center in Pennsylvania, and Bill Krebs observed one of the early formal audits in the program, as well as research operations underway in the ARI, REA, MVR, and amaranth programs during a week's visit to Guatemala accompanied by Tresa Bass of the staff.

What has emerged is our collective judgment that the Research Grants Program is soundly conceived, well-managed, and likely to make substantial progress toward achieving its principal objectives. Later in this report we present observations which, after much more intensive analysis than we have been able to provide with the time at our disposal, might lead to a few constructive changes, but we believe that no major shifts in either policy or administration are called for at this time.

## II. BACKGROUND

The Research Grants Program is succinctly described in the formal announcement of the availability of grants, revised from time to time. We summarize from the edition of September 1, 1984:

The Research Grants Program of the U.S. National Research Council's Board on Science and Technology for International Development (BOSTID) offers grants to developing country institutions for research in selected areas of science and technology important for economic development. The program, which began in 1981, is guided by a Committee on Research Grants which selects research areas and approves grants. Funds for the research grants program are provided to the National Research Council by the Office of the Science Advisor, U.S. Agency for International Development.

Proposals are solicited in each research area; unsolicited proposals outside the selected areas are generally not considered for funding. Many of the grants may involve field studies as well as basic research. Periodic meetings of grant recipients are held to encourage communication and cooperation among institutions working within a particular research area.

For each approved research area, an announcement of detailed objectives and research priorities is available. These objectives and priorities are the product of an initial organizational meeting of expert scientists from developing countries, international organizations, and U.S. institutions. The meetings also recommend the type of international collaboration that seems most useful for each area.

Proposal budgets must be directly related to research project activities. Funds may be used for salaries, travel, equipment, and research expenses. The purchase of vehicles with grant funds is not normally considered. The total amount of most grants ranges from \$50,000 to \$150,000; the research may be carried out over a period of 2, 3, or 4 years. The institution receiving a grant will contribute to the research staff, laboratory and/or field testing facilities, vehicles, and administrative services.

Although the research program is aimed primarily at the less developed countries, grants may also be made in middle-income developing countries if the research involves collaboration with research institutions in less developed countries or provides a strong scientific contribution of general interest to developing countries. Scientists from the U.S. and other industrialized countries may participate in grant-supported research through collaboration with the grant recipients but may not receive grants themselves. Optional collaborative mechanisms may include periodic visits of scientists to the grantee institution and

short-term training of investigators in the United States and elsewhere.

The following research areas have been selected for grant awards:

#### GRAIN AMARANTH

Amaranth is a broadleaf plant that has small seeds with a high content of good quality protein; its leaves are consumed in many parts of the world. Used as a staple grain of the pre-Colombian civilizations in South and Mezo America, this hardy plant employs the efficient  $C_4$  pathway mechanism for photosynthesis, like maize and sugarcane. The grain amaranth project aims to select the most promising varieties for different soils and climatic zones and carry out breeding and selection for increased quality, yield, and stress tolerance; germ plasm of local varieties will be collected and shared. An amaranth research newsletter has been established to communicate grant project results, and grantees in the amaranth project meet periodically to coordinate activities. Special attention is given to testing the use of amaranth in traditional foods and to studying its socioeconomic implications.

#### TROPICAL TREES

The tropical trees project supports research on multiple-use species of importance to developing countries. These include fast-growing nitrogen-fixing species and others useful for agro-silvo-pastoral systems, species for environmental rehabilitation, fuel-wood, fodder, and commodity production. Grantees meet periodically to exchange information and coordinate trials.

#### BIOLOGICAL NITROGEN FIXATION

The biological nitrogen fixation project addresses the use of this technology to increase productivity of food and forage in developing countries. Areas of interest include nitrogen fixation in cropping systems with legumes, legume inoculation problems, the contribution of mycorrhizae to nitrogen fixation, improvement of host plants by breeding or genetic manipulation, and the use of Azolla. Among the cooperative activities sponsored within this project are training in  $^{15}N$  experiments and serology, and arrangements for  $^{15}N$  and serological analysis.

#### MOSQUITO VECTOR FIELD STUDIES

The project for mosquito vector field studies aims to define the natural history of mosquito vector populations, especially vectors of malaria and important arboviruses, and to identify vulnerable aspects of the life cycle which may lead to the development of sound control strategies for the reduction or

prevention of disease. Research areas include incrimination of vectors, population dynamics, transmission dynamics, identification of natural predators or pathogens, and evaluation of vector control methods.

#### RAPID EPIDEMIOLOGIC ASSESSMENT

The project to develop rapid epidemiologic assessment methods for health planning and decision making seeks to develop or validate more efficient or innovative epidemiologic methods for making timely decisions about health problems and programs for health care or disease control. The research focus may be on diagnostic instruments, survey techniques, sampling methods, data collection and presentation or data analysis.

#### DIAGNOSIS AND EPIDEMIOLOGY OF ACUTE RESPIRATORY INFECTIONS IN CHILDREN

This project seeks to elucidate the etiology and epidemiology of acute respiratory infections, the second greatest cause of child mortality in developing countries. The research emphasis is on adaptation and development of rapid diagnostic methods, or population based studies to assess the incidence and severity of infections and to describe clinical and radiological features associated with specific pathogens. The studies should contribute to development of protocols for diagnosis and treatment in clinical and community settings. Cooperative activities include collaboration on data processing and preparation of a laboratory manual and training courses for viral and bacteriological diagnoses.

The full text of the announcements which describe in detail the six research areas within which project proposals will be considered is presented in Appendix A.

AID is making available, through contract with BOSTID's parent organization, the National Research Council, a total of \$24 million for the program to be provided over the period 1981-1988. About \$16 million of this amount is to be expended in the form of grants for research, with the balance of \$8 million committed to networking/training (defined in Section IV) and program management. The ratio of grants, including networking/training, to management costs is targeted to be in the range of 85:15, a goal that seems likely be reached, on the basis of performance to date (see financial data in Appendix B).

Present policy is to manage the program so that it achieves a steady state of about 30 research grants per year, maintaining a portfolio of about 70-80 active grants at any one time. This policy, and the fact that, as noted above, grants range in size from about \$50,000 to \$150,000 and are active for 2 to 4 years, has important implications for the character of the entire activity, including the work level and size of the CRG and the staff.

### III. ORGANIZATION AND STAFFING

Within NAS/NRC responsibility for the Research Grants Program is vested in BOSTID which is contractually required to establish and maintain a standing committee of the Board, the Committee on Research Grants, "to oversee the grants activities." The CRG acts with power to select research areas and award grants, albeit with constraints spelled out in the basic contract with AID.

The AID/NRC contract is silent as to the size of the CRG and the qualifications of its members except to require that the Chairman of the CRG will also serve as a member of BOSTID. Thus the established mechanisms and policies of NRC apply. They have been exercised in such a way that the CRG is currently comprised of 19 members, appointed for fixed terms by the Chief Executive of NAS/NRC in consultation with the BOSTID staff, the BOSTID Chairman and the management of NRC's Office of International Affairs. Six of the nineteen are citizens (or former citizens) of LDC's. Eight are either present or former Board members.

The present CRG consists of:

Frederick Seitz, President Emeritus, Rockefeller University; former president, National Academy of Sciences, CHAIRMAN.

David Pimentel, Professor, Department of Entomology and Section of Ecology and Systematics, Cornell University, VICE CHAIRMAN.

Francisco Aguirre B., Director, Central American Research Institute for Industry (ICAITI), Guatemala.

George A. O. Alleyne, Director, Area of Health Programs Development, Pan American Health Organization (PAHO).

M. Anandkrishnan, Senior Officer, Policy, Analysis and Research Division, United Nations Centre for Science and Technology for Development (UNCSTD).

Samuel P. Asper, President, Educational Commission for Foreign Medical Graduates.

Adnan M. Badran, President, Yarmouk University, Jordan.

Teresa Salazar de Buckle, Food Technologist, United Nations Industrial Development Organization (UNIDO), Austria.

W. Ronnie Coffman, Professor of Plant Breeding and International Agriculture, Department of Plant Breeding and Biometry, Cornell University.

Carl Djerassi, Professor, Department of Chemistry, Stanford University.

Elmer L. Gaden, Jr., Professor, Department of Chemical Engineering, University of Virginia.

Ann M. Hirsch, Associate Professor, Department of Biological Sciences, Wellesley College.

J. Laurence Kulp, Vice President, Research and Development, Weyerhaeuser Company.

Aklilu Lemma, Senior Scientific Affairs Officer, United Nations Centre for Science and Technology for Development (UNCSTD).

Adel A. F. Mahmoud, Chief, Division of Geographic Medicine, Department of Medicine, Case Western Reserve University.

Robert P. Morgan, Professor, Department of Technology and Human Affairs, Washington University.

Daniel A. Okun, Kenan Professor/Emeritus, Department of Environmental Sciences and Engineering, School of Public Health, University of North Carolina.

Hugh Popenoe, Director, International Programs in Agriculture, University of Florida.

John G. Torrey, Professor of Botany, Harvard University.

The demanding day-to-day work of the research grants program is carried out by a six-member professional staff committed to it. The chief executive is an Associate Director of BOSTID staff who reports to the BOSTID Staff Director, John Hurley. Present staff includes:

Michael P. Greene, Associate Director, BOSTID  
Judith R. Bale, Professional Associate  
Tresa A. Bass, Administrative Officer  
Karen N. Bell, Professional Associate  
Jeffrey A. Gritzner, Professional Associate  
Dolores A. Morales, Staff Assistant

Brief biodata, illustrating the background and specialties of the staff, appear as Appendix C. Additional services are provided by other BOSTID staff, consultants, and the NRC system as a whole, when necessary.

#### IV. PROGRAM OPERATIONS

The operation of the Research Grants Program involves a variety of activities. In this section we briefly summarize the major operational tasks. Figure 1 is a flow chart of CRG operating procedures.

##### A. Selection and Review of Program Areas

One of the principal tasks assigned to the Committee on Research Grants was the selection of the technical areas in which the grants are awarded. The original January 1981 Grant\* agreement between AID and the National Academy of Sciences provided for selection of 12-14 areas. About 10-12 grants would be awarded in each area to run concurrently and all would terminate by 1988. Each grant area also would be approved by AID, and AID formed an NAS Advisory Committee and directed its newly formed Sector Councils to study and comment on the CRG project area selections.

The first two areas selected by the CRG in August, 1981 were grain amaranth and fast-growing, nitrogen-fixing\* trees. They were chosen to complement active programs of the BOSTID Advisory Committee on Technology Innovation (ACTI). A series of monographs on fast-growing, nitrogen-fixing trees was under preparation, including Tropical Legumes: Resources for the Future, Firewood Crops: Shrub and Tree Species for Energy Production, and Leucaena: Promising Forage and Tree Crop for the Tropics. A panel to study grain amaranth had just been formed and was scheduled to meet in September, 1981. CRG members were polled by mail to select these areas--an unusual procedure which was never repeated--in order to begin to award grants as quickly as possible. At the same time, the documentation was sent to AID, and official concurrence was received in January, 1982.

In August, 1981 the CRG staff produced an implementation plan for the initial development of the program. In it, 14 potential grant areas were described. In a mail preference vote the CRG eliminated 8 of them, and the remaining 6 were discussed by the CRG at the December, 1981 meeting. Three areas were approved at that meeting, and 5 additional areas were approved in December, 1982. All areas which were presented in full documentation for decision to the CRG are listed in Table 1. A list of the areas approved by both CRG and AID, showing the time required to establish a new project area appears in Table 2.

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\* Grant capital G refers to AID-NAS Grant; small g to BOSTID research grants.

Figure 1  
 FLOW CHART OF  
 COMMITTEE ON RESEARCH GRANTS  
 Operating Procedures

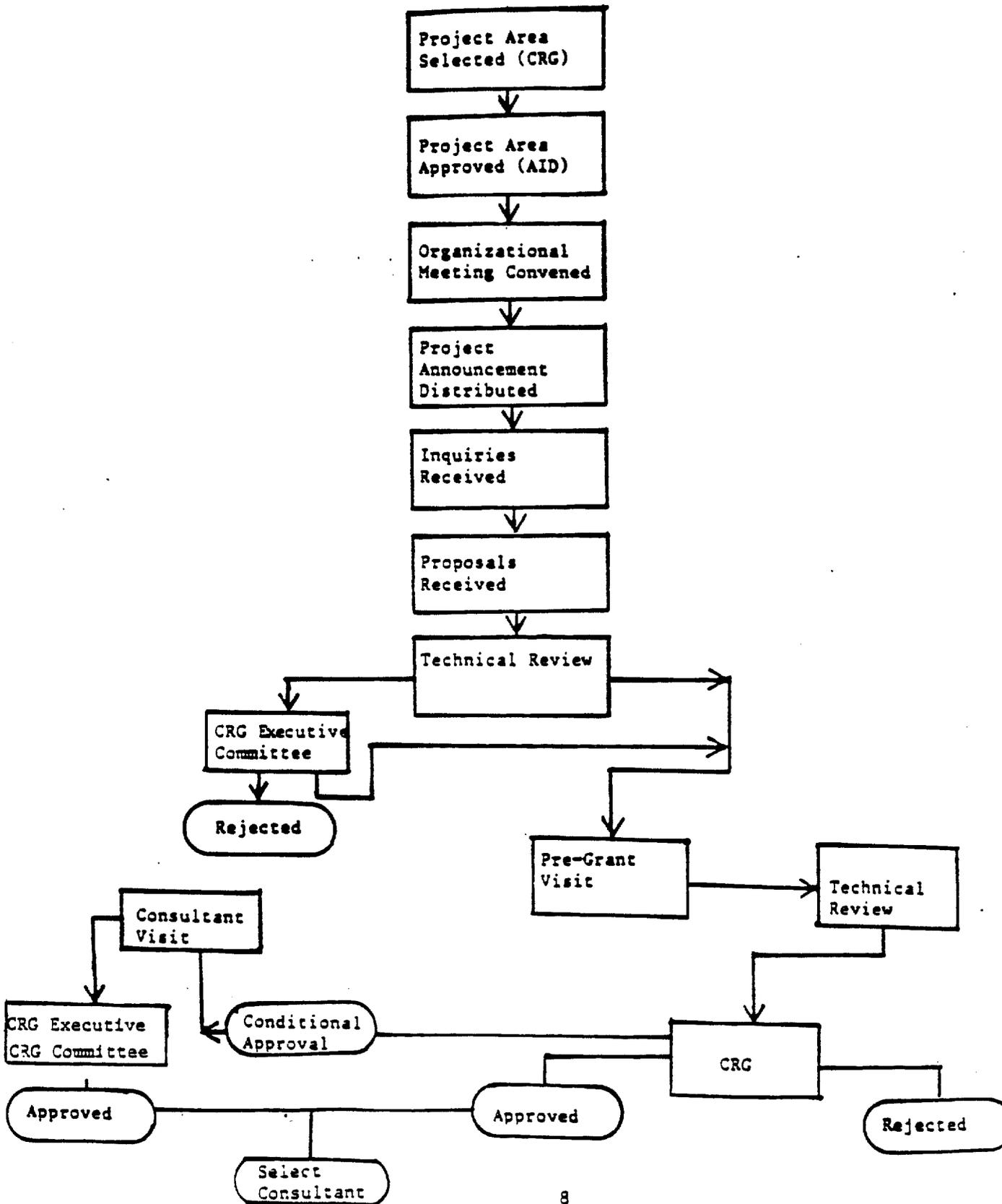


Table 1

TITLES OF POSSIBLE PROJECT AREAS CONSIDERED BY THE FULL CRG

<u>Title</u>	<u>Date Considered</u>
<b>Agriculture &amp; Biological Resources</b>	
Grain amaranth (AMA)	mail, 8/81
Fast-growing, nitrogen-fixing trees (FGT)	mail, 8/81
Integrated pest management	12/81, 12/82
Exploration for legumes in Andean forests	8/81*
Biological nitrogen fixation (BNF)	12/81
Post-capture technologies for fish	9/82**
Monitoring the effects of environmental degradation on fish stocks	9/82**
Animal production	12/82
Halophytes	12/82
Aquaculture	12/82
Shrimp production	12/82
<b>Technology and Mineral Resources</b>	
Tropical soils geochemistry for detection of ore deposits	8/81*
Charcoal production from agricultural wastes	8/81*
Monsoon modeling and prediction	8/81*
Small hydroelectric power plants	8/81*
Alcohol production from waste fruit	8/81*
Farm-scale fertilizer plant	12/81
Marine hydrocarbon pollution in the Caribbean	12/81
Application of remote sensing	9/82**
Ferrocement	9/82**
Nondestructive evaluations	9/82**
Essential oils and resinoids	9/82**
Liquid fuels from biomass	12/82
Energy from grasses	12/82
Sanitation and water supply	12/82
<b>Health and Nutrition</b>	
Guinea worm control	8/81*
New epidemiological techniques for rapid assessment and evaluation (REA)	12/81
Arthropod vector research (MVR)	12/81
Dietary energy requirements	9/82**
Infant mortality in the first year of life	9/82**
Pharmacological research	9/82**
Acute respiratory infection in children (ARI)	12/82
Blindness due to trachoma	12/82
Benefits and risks of contraceptives	12/82

\* included in implementation plan, eliminated by mail ballot

\*\*included in straw poll, eliminated by mail ballot

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Table 2  
 TIME REQUIRED FOR ESTABLISHING  
 CRG PROJECT AREAS

<u>Project Area</u>	<u>Date Selected by CRG</u>	<u>Date Presented to AID</u>	<u>Date Approved by AID</u>	<u>Date of Organizational Meeting</u>
Grain Amaranth	August 1981 (mail)	August 1981 (Implementation Plan)	January 18, 1982	September 21-23, 1981
Tropical Trees	August 1981 (mail)	August 1981 (Implementation Plan)	January 18, 1982	October 5-7, 1981
Biological Nitrogen Fixation	December 7, 1981	December 23, 1981	January 22, 1982	March 24-26, 1982
Mosquito Vector Field Studies	December 7, 1981	December 23, 1981	January 22, 1982	April 19-21, 1982
Integrated Pest Management	December 7, 1981	December 23, 1981	Withdrawn by CRG December 12, 1982	--
Rapid Epidemiologic Assessment	December 7, 1981	December 23, 1981	July 27, 1982	January 5-7, 1983
Acute Respiratory Infection	December 12, 1982	January 12, 1983	March 7, 1983	May 18-20, 1983

In the agriculture and biological resources and technology and mineral resources field, the CRG staff selected and prepared the documentation for grant areas to be considered by the CRG. Staff consulted with CRG members, BOSTID and AID staff, developing country scientists, staff of other development and scientific agencies, and others. In the health field, project area recommendations were made by the Advisory Committee on Health and Biomedical Research and Development (ACHBRD), a joint committee of IOM and BOSTID, which had recently been established to advise the CRG and to carry out health-related studies and workshops.

Before the December, 1982 CRG meeting, a second preference poll was held by mail to eliminate from the discussion areas which had little support by the Committee. For the remaining project areas, documentation prepared for the meeting included scientific background and state-of-the-art, proposed project objectives, examples of the sort of research activities which might be supported, and lists of LDC institutions which were thought to have the capability to participate. AID staff received the documentation and contributed actively to the debate, but did not participate in the final CRG decisions. For those topics which were selected by the CRG, full documentation was sent to AID for concurrence.

Subsequent to the December, 1982 CRG meeting, a meeting was held among Frederick Seitz, Chairman of the CRG, Nyle Brady, Senior Assistant Administrator for Science and Technology, Walter Rosenblith, Foreign Secretary of the NAS, and other NAS and AID staff. The motivation for the meeting was to expedite the process of AID concurrence in the newly approved areas, but the result was quite different.

At this meeting, Dr. Brady proposed a new timetable for the CRG program. In the implementation plan, the CRG had proposed to award grants in 14 areas with a timetable allowing for completion of the last grant by late 1988. Dr. Brady argued that a more rational approach would be to schedule grant awards as though the program would continue beyond 1988, thus allowing for renewals and a roughly constant number of active grants. The economics of this approach, which was enthusiastically embraced by the NAS participants, allowed at most only six operational grant areas. It was decided then that only one of the new areas selected by the CRG in December, 1982, acute respiratory infections in children, would be added, with the result that BOSTID Research Grants Program has had since early 1983 three grant areas related to agriculture and three related to health.

#### B. Soliciting Proposals

For each of the six project areas approved by the CRG, before the availability of grants was announced and proposals solicited, an organizational meeting was held to define and organize the research program. (In the case of REA, a preliminary meeting was held first to clarify the goals and set terms of reference before the organizational

meeting.) Each organizational meeting involved developing and developed country researchers active in the particular field, representatives of international organizations, AID officials, and at least one CRG member. Given the general goals approved by the CRG for the particular area, they were asked to fill in the details: What are the most urgent research needs in this area in developing countries? Which techniques or methodologies should be stressed? What mechanisms for collaboration among grantees would be appropriate? Which institutions in developing countries have the capability to participate?

The products of these organizational meetings were the first drafts of the project announcements. After approval by CRG, the announcements were disseminated by various mechanisms, including direct mailing to scientists identified at the organizational meeting or known to the CRG or BOSTID, distribution to members of appropriate professional societies, and to U.S. researchers for distribution to their LDC colleagues and contacts, and through international organizations. Announcements were published in selected scientific journals and newsletters. Proposal preparation guidelines have been developed by the CRG staff and made widely available (see Appendix D). By the end of 1984, over 1,400 direct contacts had been made in the six areas, and 264 proposals had been received. An analysis of proposals received appears as Appendix E.

### C. Proposal Review and Site Visits

Each proposal received is assigned a number reflecting the grant area, e.g., AMA-29, and acknowledged. Those that appear to respond to the project announcement are sent to two or three experts, usually in the U.S., for review. At this stage, the reviewers are asked not whether the proposal should be funded, but whether a pre-grant visit is warranted, and what improvements in the proposal are recommended. Proposal review criteria are shown in Appendix F.

Those proposals which the reviewers feel are inadequate are presented to the CRG Executive Committee for probable rejection. Rejected investigators are informed of the reasons for the Executive Committee decision, and they receive unattributed copies of the reviewers' comments.

Pre-grant visits are made by CRG staff or consultants to the institutions that have submitted promising proposals which are to be seen by the full CRG. (See Appendix G, Pre-grant Visit Kit.) The pre-grant visit has three purposes. The first is to share unattributed reviewers' comments and advise the investigator on the preparation of a revised proposal or written response to reviewers' comments where required. The second objective is to gather additional information about the proposed research, the institutional capability,

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and the financial management systems used by the institution.\* The CRG does not consider financial management capability in deciding upon grant awards, but may suggest technical assistance or alternate arrangements for fiscal management depending upon the institution's capability. The third purpose of the pre-grant visit is to acquaint the investigator and administrative officials with CRG requirements and procedures.

In a majority of cases, the initial technical reviews provoke a proposal revision or letter of explanation. This new material is sent again to reviewers. The complete documentation--revised proposal, all reviews, comments of the U.S. Embassy or AID mission, and pre-grant visit report--is presented to the CRG for decision.

#### D. Advisory Groups

The CRG monitors the progress in all research areas, both through in-depth staff presentations at CRG meetings and during the review of new proposals and renewal proposals. In five of the six areas, the CRG decided at one point to ask an ad-hoc expert advisory group to review the grants and the project guidelines in the area and recommend changes in orientation or practice where appropriate. These will be described below by area. In addition, the grantees of the ARI and FGT programs, at their first coordination meetings, themselves requested that certain manuals and advisory material be provided by ad-hoc committees of experts.

Grain Amaranth. After the circulation of the initial issues of the CRG-funded Amaranth Newsletter, a large number of amaranth proposals was received. However, the CRG considered most of them uninspired and eclectic, and few were funded. An advisory group met on September 19, 1983 to help the CRG set priorities within the area and organize a promotional program to identify possible grantees. The amaranth project announcement was revised to reflect the recommendations of the group.

Fast-Growing, Nitrogen-Fixing Trees. One of the first grants in the Fast-Growing, Nitrogen-Fixing Trees (FGT) project was to the International Council for Research on Agroforestry (ICRAF) based in Nairobi, Kenya. Under this grant, ICRAF was to prepare a draft field manual for discussion of the grantees at their January 1983 coordination meeting to facilitate agreement on a coordinated research plan. However, at the coordination meeting, held at ICRAF headquarters in Nairobi, grantees felt the draft manual was too comprehensive and detailed, and decided to prepare a field manual themselves, appointing one of the grantees to lead the effort. An

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\* The visitor interviews the institution's financial officer together with the principal investigator using a questionnaire designed by the CRG auditor.

advisory group chaired by grantee Dr. Fred Owino met in December, 1983 to prepare a short field manual for nitrogen-fixing tree trials. The manual was later reviewed and revised at the second coordination meeting in October, 1984 in Mexico.

During 1983, few new grantees were added in the fast-growing, nitrogen-fixing trees area. The CRG asked that the area be broadened to embrace other multi-purpose species, and that the project goals be reconsidered. A small advisory group met at the Weyerhaeuser Research Center in Tacoma, Washington on February 1, 1984 to make recommendations. As a result, the name of the area was changed to Tropical Trees and the announcement was radically modified to include other multipurpose trees and give new emphasis to food and commodity production.

Biological Nitrogen Fixation. At its September, 1983 meeting, the CRG reviewed the grants and proposals in biological nitrogen fixation, and decided that some grantees and many proposals being submitted were not utilizing the most effective technologies for BNF research, and consequently their results would not have wide applicability. An advisory group met in Washington on December 19-20, 1983, and recommended that CRG encourage grantees to use  $^{15}\text{N}$  and serologic techniques and that the focus of the announcement be changed. The revised announcement approved by the CRG directly reflected these views.

Rapid Epidemiologic Assessment. As of the January 1984 CRG meeting only seven proposals of 34 received had been funded in rapid epidemiologic assessment (at the end of 1984 the number was eight of 56), and many of the rejected proposals involved only descriptive studies. The CRG requested a modification of the announcement to emphasize development of epidemiologic methods, and asked for an analysis of the literature and some case studies to help find possible reasons for the small number of viable proposals from developing countries, and to identify some reference material for potential grantees. Two consultants were engaged to study these questions; they reported to an advisory group meeting on May 11, 1984. The group agreed that the REA project goal is a valid one, and suggested important modifications in the announcement, which now includes illustrative themes for REA research.

Acute Respiratory Infections. Because of its special needs, the acute respiratory infections area has been the most active in terms of advisory groups and manuals. The CRG Executive Committee expressed concern at its February, 1984 meeting about three aspects of the program: (1) should the CRG program focus on development of a core of comparable data rather than seeking more innovative studies; (2) is it feasible to carry out these technically demanding studies in countries with the highest childhood mortality which may have less technical capability; and (3) can the ARI program as presently conceived succeed in establishing which viruses or bacteria are responsible for the most

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severe conditions? The advisory group that met on May 4, 1984 declared that the answers to these questions were basically affirmative, and the project orientation and announcement were not changed.

The following month, the first coordination meeting of ARI grantees was held in Washington. The grantees agreed with the conclusion of the advisory group, some of whose members were present. But the grantees requested certain additional assistance in carrying out ARI studies. They adopted common research protocols for community and hospital-based studies, and for laboratory diagnostic tests. But, to ensure conformity to the protocol, they felt that laboratory manuals and training courses in virology and bacteriology were required. In addition, they asked for advice on data management, including the selection of appropriate microcomputer hardware and software.

On December 17-18, 1984, advisory groups met to prepare and revise the required virology and bacteriology manuals, with the assistance of consultants. The manuals will be completed prior to the training workshops, scheduled for May and June at the the University of Michigan (virology), and at Johns Hopkins University (bacteriology), respectively. The data management advisory group met on January 7-8, 1985 and recommended certain hardware and software packages, plus a set of rules and annotations for adapting the common protocol for computerized data management.

#### E. Support Services, Networking, and Accountability

The CRG staff provides two types of supporting services to grantees: direct services to individual grantees and networking/training activities. See Appendix H for a summary.

The direct services include procurement and shipment of scientific equipment and supplies, including chemical reagents which are evaluated by a cooperating laboratory in Sweden and kept chilled during shipment. All international travel by researchers, consultants and advisors is arranged by CRG staff, including ticket purchase, reservations, subsistence payments and, where needed, appointments for researchers to see appropriate investigators in the U.S. or in other countries. The staff arranges for U.S. or international consultants for all grants, visits grantees periodically, makes library searches, and performs many other services upon request. All grants are monitored by a CPA for financial accountability, and field audits are performed each year on a certain percentage of eligible grants. A statement of CRG audit policy appears as Appendix I.

Networking/training activities currently require about 20 percent of the total annual research grants program budget. These feature periodic coordination meetings of grantees and invited experts in each project area to report on research results and discuss common problems. Some meetings have included workshop sessions on new

techniques. Others have resulted in common agreement on research protocols. The staff has also assisted in the production of four field and laboratory manuals and organized two training courses for grantees referred to in sub-section D above. A list of research protocols and manuals prepared by the CRG staff to assist principal investigators appears as Appendix J. In one area, amaranth, a newsletter was established to enhance communication among researchers.

F. Current Status of the Program

At the end of February, 1985, 72 grants had been approved by the full CRG. A listing appears as Appendix K. The program has thus reached its planned steady state.

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V. EVALUATION CRITERIA AND INDICATORS

Our evaluation seeks to determine, on the basis of our observations of performance to date, how well the Research Grants Program is moving toward achievement of its objectives. These objectives, derived from those formally stated in the grant agreement between AID and BOSTID under which the program's funds are provided, are:

1. Research Support

To stimulate and support high quality research and development of LDC's on development-related problems of priority concern.

2. Capability Development

To strengthen the research capability of developing country institutions.

3. Encouragement of Participation from Outside the Developing Countries

To encourage participation of the U.S. and international scientific community in research in developing countries.

4. Conduct of Efficient and Effective Operations

To operate an efficient and effective research grants program in developing countries.

For each of these objectives we have selected indicators of performance to which we have directed our attention during evaluation activities. These are:

1. Research Support

Clarity of definition of project areas  
Dissemination of announcements  
Guidance in proposal preparation  
Documentation and evaluation of proposals  
Criteria for selection of grantees  
Correlation of grantee objectives with project area research goals.

2. Capability Development

Resources provided  
Networking: coordinating meetings, exchanges organized  
Advisors and consultants provided  
Supporting activities: training, central facilities, manuals  
Grantee visits to U.S. labs and international meetings.

3. Participation

Participation of U.S. and other non-developing country scientists in designing projects, reviewing proposals, visiting grantees, and other joint activities.

4. Operations

Financial procedures and control  
Monitoring, follow up, and problem solving  
Response time and administrative efficiency  
Coordination with other international donors.

We have not attempted to evaluate the quality of the research supported by the program, for several reasons.

The first, and controlling, reason is that, at the time our work began, none of the research projects in the program was yet complete and, at this writing, only one has reached the final stage. Moreover, judgments of quality and significance of research results require the participation of technical peers of the principal investigators. With the exception of Dr. Burris, none of the three evaluation team members is qualified in this respect in any of the specific fields in which the program operates.

We have therefore focused on forming opinions around the indicators of performance listed above. Our comments on performance toward objectives after examination of each of these indicators are presented in the next section.

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## VI. COMMENTS ON PERFORMANCE TOWARD OBJECTIVES

1. Is the program stimulating and supporting high quality research and development in LDC's on development-related problems of priority concern?

With the reservation just stated that it is still too early to attempt an evaluation of research results, our answer is clearly "yes".

The CRG has uniformly rejected the few proposals that are not related to the solution of a development-related problem. Moreover, the definitions of the fields within which proposals will be received (see Section I and Appendix A) themselves guarantee that only priority problem areas are eligible targets. The CRG has carefully formulated, and in some cases, reformulated, the definitions of eligible fields, convening advisory committees of experts to assist in this critical activity (see Section IV). The announcements which invite proposals (Appendix A) are disseminated initially as described in Section IV. While this has resulted in some concentration of applicants and grantees, by country or even institution (see Appendices E and K), this dissemination policy seems a necessary "marketing" tool in the early years of this kind of program. Continual attention to broadening the outreach of the dissemination activity is, of course, needed; the CRG and staff have indicated their appreciation of this need.

The program's objective of supporting high quality research has brought into play a range of activities designed to assist principal investigators that we believe are very nearly unique. These are described in Section IV and include pre-grant and interim visits by staff or consulting specialists in almost all cases, assistance in proposal revision, supply of specialized talent at times when needed in the course of a project, access to training and visits by investigators to relevant other institutions and projects, as well as, in particular, the regularly scheduled coordination meetings of grantees in each of the six program areas. These activities appear to us to be crucial factors in support of quality.

Peer review in the process of proposal evaluation is, of course, the cornerstone of quality control in a program of this sort. We have reviewed enough proposal files to be assured that this process is being applied rigorously. We also have tested the reactions of some grantees to this rigor and have the clear impression that it is not only accepted but welcomed--even though, in some cases, the critique of a reviewer has been energetically challenged by a principal investigator (as noted in Section IV reviewers' comments are always transmitted, without attribution, to the proposal's author, whether a grant is made or denied).

Clear criteria and peer review would be meaningless, of course, unless the CRG itself applies them in its decision-making. Our observation of CRG meetings and records gives us confidence that these important

quality controls are being applied in the decision making process, not slavishly but with discretion and intelligence.

2. Is the program strengthening the capability of research institutions in developing countries?

If this question could be answered by a simple listing of program elements aimed at strengthening capability, the answer would note that:

- o supporting the performance of quality research itself contributes to capability--by providing replicable models;
- o the panoply of networking and training--including the links with other scientists, other institutions, the site and interim visits by staff (see Appendix H)--brings into focus additional replicable models;
- o the supply of equipment, some of which will outlast the project itself, will be a contribution to institutional strength; and
- o the discipline imposed and the examples of good institutional practice provided through the program's reporting, financial system and auditing requirements is likely to have lasting effects on institutional structures and management in many cases.

We observe, therefore, that there are many elements of the program that contribute to institutional development. Going further, to attempt to measure increased institutional capability is, as with judgments about research quality, premature at this point in the life of the program. Also, we are not confident that, even later, much more than highly subjective opinions on this program objective will be available.

Relevant to these observations about capability development is a special comment we believe it important to make about the significance of the networking activities in the CRG program. While we are not familiar with all programs in support of S&T in the LDC's, we have seen enough of them to believe that the emphasis in the CRG program on building personal and institutional networks is virtually unique--at least in scale and quality. In particular the use of periodic coordination meetings coupled with thoughtful training is likely to have far-reaching positive effects on the capability of both institutions and individual scientists as well as on the quality of the research results of the program.

3. Is the program encouraging participation of U.S. scientists and others from the international scientific community?

This objective is being attained largely--we think--because of the outreach to the U.S. scientific community that the National Academy mechanisms provide. A brief description of such participation is provided in Section IV; statistics are in Appendix H.

4. Are operations efficient and effective?

In our opinion this is a well-managed program with high standards of performance. The operation of the program is summarized in Section IV. As always, its quality and effectiveness depend fundamentally on the capabilities of those involved. A glance at the credentials of the CRG itself (Section III) and the brief biodata on staff in Appendix C will lend credence to our view that they constitute a highly competent and appropriate professional cadre for this program. Our interaction with both committee members and staff over the course of our evaluation complements this opinion.

Financial procedures and controls are balanced between the rigor required in a far-flung, LDC-based grant program--placing substantial sums in the hands of sometimes inexperienced and, as everywhere, potentially corrupt channels--and the flexibility needed to accommodate to fiscal and management systems of a wide variety and less than ideal composition. Financial controls and audit policy conform both to AID requirements and to those of the National Research Council. Substantial effort is made, beginning with the pre-grant site visits, to make certain that such requirements are understood by grantee institutions (see Pre-Grant Visit Kit, Appendix G and Audit policy, Appendix J). The first four field audits have recently been completed; one of these was itself "audited" from beginning to end by an evaluation committee member in the field who has expressed satisfaction with both the rigor and the tact of the auditor during the week long field operation.

Our examination of response time--whether to proposals, requests for assistance, complaints (fortunately few), documentation of formal meetings and actions, or other administrative requisites--give no cause for concern.

There is substantial coordination between this program and those of others in similar fields--notably those of AID--with staff liaison active and open. Contact is also maintained at the staff level with bilateral research and support programs of a number of other countries.

## VII. LOOKING AHEAD: THINGS TO THINK ABOUT

In view of our positive findings about the Research Grants Program and its management to date our basic advice to the Board and the CRG is to continue along present lines. There are, nevertheless, some issues which we think it is timely to raise. Most of these have already been recognized by staff and at least some members of the CRG. We present them here primarily, therefore, as a check list of questions worthy of further thought as the program moves into its mature phase.

1. Can more emphasis be put on linking research to utilization of research results?

One of the basic criteria for all grants in this program is that they finance research that is clearly related to important problems of economic development, and we have observed strict adherence to this principle by the CRG. We are not entirely confident, however, that this policy, by itself, will accomplish all that might be accomplished. Our observation of research in a number of LDC environments suggests that the links to potential users need to be forged at the conception stage so that the users' interests and requirements influence the research design itself. Such early involvement can then lead naturally to continuing liaison during the conduct of the project, shaping and reshaping it as knowledge grows.

It may well be that this process occurs spontaneously in many of the research projects of the CRG/BOSTID. We speculate, however, that ways can be found to insure that it is likely to occur. For example, we wonder if a requirement that all research proposals present an explicit statement of how links to users will be created and maintained would be practical and effective. Coupled with the existing requirement for an explicit statement of the need that would be served by the research outcome (see Appendix D, page 5: "...a brief discussion of the importance of the specific topic...to national or regional development problems..."), this might go far toward increasing the probability that CRG-sponsored research will have solid impact on development problems.

2. Are there ways to expand the participation, as advisers, reviewers, and consulting specialists, of scientists of high repute from the LDC's themselves?

As noted elsewhere, the CRG itself includes a number of distinguished scientists from the LDC's and it is clear that coordination meetings provide substantial opportunity for communication among principal investigators from LDC's. It is also true that the objectives of the research grants program include explicitly the promotion of participation by scientists from the U.S. and other developed countries and say nothing about

promoting such participation by LDC scientists other than the principal investigators themselves. A likely result of these conditions is that the program is infused with some bias toward the point of view of developed country science. This may be inevitable and certainly not entirely undesirable. In our view, however, there may be long-term value in adjusting the balance gently. We think that LDC scientists may have some unique contributions to make in particular cases. An effort to bring these resources more fully into the program by taking initiative to involve them more extensively as reviewers, advisors, and consultants seems worthy of exploration.

3. Are there ways to strengthen the institution-building emphasis in the research grants program?

In an earlier section of this report we noted the many measures being taken in the research grants program to give it an institution-building effect. Because, in the long-run, achievement of this objective is so important for liberating the talent that lies latent in so many LDC research institutions, we have speculated about ways to give additional emphasis to it, balancing the essential but shorter-range goal of achieving high-quality research.

Moving much beyond what is now being done involves taking some risks--for example, by financing some less-than outstanding research in the hope that involving relatively weak institutions could ultimately pay dividends on the institution-building side of the equation. Another example: Could more effort be put into "organizational networking"? By this we mean explicitly promoting links at the organizational or management level among LDC research institutions and not just among principal investigators (a direction in which the program recently appears to be moving)? Could training opportunities be made available to others than principal investigators, including technical assistants and even management personnel? Is it conceivable that the valiant efforts of CRG staff to provide support services could actually inhibit the development of self-reliance and the growth of institutional competence, in some cases? Perhaps the staff could put some emphasis on teaching grantees or the support staff of these institutions how to perform some of the tasks now taken on by the staff itself.

4. Would it be timely and productive for CRG itself to carry out a thoughtful review of its own structure, procedures, and basic policies?

A number of aspects of the operation of the CRG itself place a heavy burden on the busy people who constitute its membership. For example,

- o the sheer volume of papers documenting the proposals which must be disposed of at each meeting of the full committee;

- o the technical complexity and variety of the issues presented in many of the proposals;
- o The limited time at regular meetings to focus on anything but disposing of the proposals presented.

The use of a small Executive Committee to screen proposals has been helpful but the ponderous agenda of the full committee remains, in our view, a burden and possibly a limiting factor on decision quality. A number of options might be considered:

- o Giving the Executive Committee power to award grants as well as to screen;
- o Organizing CRG standing subcommittees to specialize by technical field, geographic region or policy area;
- o Creating panels of specialists for each principal research area who would participate in proposal review as well as, possibly, in networking activities, on a continuing basis.

Each of these options would have costs as well as benefits and we have not been in a position to weigh them in even a preliminary way. However, we think they are worthy of systematic examination and that sufficient experience has now accumulated to provide a basis for judgment.

One way of going about an exploration of such matters has proved to be useful for BOSTID itself: the annual "retreat" when attention is focused on the longer-range, underlying issues and shifted away from the press of regular business. An occasion of this sort for CRG, preceded by thoughtful staff work, might turn out to be as valuable as have the similar recent meetings of BOSTID.

5. Is it timely to re-open the question of inviting proposals in research areas other than the six which are now authorized?

This is a far-reaching issue of great difficulty but we believe it deserves a reprise. The process by which CRG and AID have defined the six eligible areas has been a rational and careful one (see Section IV.A) and we believe that it has served the program well. Nevertheless it leaves out of the eligible class many important research areas and institutions. Moreover, it may not elicit the creative and innovative ideas we believe may be latent in the minds of some potential grantees and may overly concentrate the program's geographic impact.

A modest step to open up present policy would be to make operational the principle embodied in the AID/NRC contract that up to 10% of grant funds (i.e., \$1.6 million) can be expended on grants outside the specified six project area. This has been considered, we understand,

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but has not yet been implemented, in part because of concern for the additional burdens it might impose on the already heavily burdened staff of CRG. There is sentiment, however, for experimenting with it, perhaps by inviting proposals for small, innovative projects in the range of \$5,000-25,000, without regard to field (including the possibility of such projects within the presently authorized areas).

Limited expenditures in this range, coupled to careful proposal guidelines and selection procedures, could eliminate the necessity for site visits by CRG staff and consultants, thus avoiding excessive new pressures on staff and CRG.

The more far-reaching step of considering one or two completely new research areas could well then be the subject of the self-re-examination we have suggested above. It obviously would need to be preceded by careful staff work and use of outside expert talent to lay a solid foundation for the basic policy decision.

APPENDIX A

ANNOUNCEMENTS OF RESEARCH AREAS  
WITHIN WHICH PROPOSALS WILL BE CONSIDERED

# NATIONAL RESEARCH COUNCIL

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January 23, 1984

### Announcement of Grants for Research in Grain Amaranth

The Committee for Research Grants of the Board on Science and Technology for International Development of the National Research Council is interested in supporting a limited number of research projects in developing countries on grain amaranth. Several projects are already underway, and a newsletter published in Guatemala is also supported by this program. Funds are provided by the Office of the Science Advisor, U.S. Agency for International Development.

The Committee is interested in exploring the performance and use of amaranth in two types of areas: areas where grain amaranth varieties are presently grown and used by farmers for subsistence, or as a specialty or cash crop, particularly Central and South America and South Asia; and regions where grain amaranth is unknown but potentially adaptable, such as Sahelian Africa and other zones having 500-1000 mm rainfall per year. Projects involving vegetable varieties will not be supported at this time.

In areas where amaranth is currently used, the program seeks to develop and provide technology to increase productivity and improve usage of the grain. The Committee wishes to support germplasm screening, variety trials, and plant selection for grain yield and adaptability, particularly including carefully designed and controlled on-farm trials where farmers participate in the growing and evaluation of the cultivar. Studies on processing and preparation of the grain for local consumption or commercial use will also be supported. Of particular interest is development of new uses of amaranth grain itself as well as for extending or supplementing other foods.

In the Sahel and other semi-arid regions, the Committee wishes to promote coordinated variety trials in several different sites. Food preparation and acceptability studies, including the introduction of products used in other regions, would also be supported.

Collection of local amaranth germplasm may be a small part of a project, but should not be of primary emphasis because extensive international collections are already in existence, and accessions will be made available to participants upon request.

A socio-economic study of the role of amaranth in the economy, of its comparative potential as a cash crop or subsistence source of protein, would be of interest. Proposals on nutritional composition of amaranth or projects on the physiology of the amaranth plant are not being sought at this time.

All grantees will be expected to participate in periodic coordination meetings and exchanges of germplasm and data, and to contribute to the amaranth research newsletter.

Careful attention will be paid to experimental design and the design and control of field trials in the evaluation of proposals. It is important that sufficient technical detail be provided to enable reviewers to understand precisely the goal and methodology of each experiment.

For more information and proposal preparation guidelines, please contact Dr. Michael P. Greene, Associate Director, Board of Science and Technology for International Development.

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## Announcement of Grants for Research on Tropical Trees

The Committee on Research Grants of the Board on Science and Technology for International Development of the National Research Council supports research by developing-country institutions on selected scientific questions of wide applicability. The Committee proposes to fund a small number of projects designed to identify, preserve, and enhance the productivity of promising species of tropical trees. While proposed projects should be of demonstrated local importance, the research should be of general interest to other developing countries and not restricted to the solution of a local problem. Funds for the grants program are provided by the Office of the Science Advisor, U. S. Agency for International Development.

The program on tropical trees will support studies directed toward the preservation and enhancement of the useful characteristics of species of importance to subsistence or developing economies. Trees of interest include multiple-use species, particularly nitrogen fixers, of relevance to agro-silvo-pastoral systems and efforts in environmental rehabilitation, trees adapted to saline environments, and underexploited species which might be grown commercially in plantations. Projects involving existing commercial horticultural species will not be supported.

Areas for investigation may include:

- o Germplasm collection and evaluation. This would include seedling characterization and detailed species description and evaluation, as well as comparative species and provenance trials.
- o Research on the propagation of tree species by seed and vegetative methods. This would include tissue culture, especially as applied to tree propagation and improvement, and studies of breeding systems and pollination biology. Studies are also sought on problems related to the production and storage of seeds; however, the establishment of new long-term storage facilities will not be supported.

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- o Silvicultural studies to improve the productivity of multiple-use trees and agro-silvo-pastoral systems. The development of more effective techniques is needed for the sustainable management of multiple-use trees capable of providing construction materials, food, fodder, fuel, and other products for rural populations. The studies should include local varieties as well as promising exotics.
- o Silvicultural technology is also needed to establish and manage commercial plantations on a scientific basis for wood products such as fuelwood, pulp, lumber, and veneer, as well as for non-ligneous products, such as food, fodder, wildlife, honey, gums, and resins, for local and/or export markets. Species of interest include both native and exotic trees that are potentially valuable, but which have not yet been evaluated in the proposed research environment.
- o Methods for improving the productivity of tropical forests, in humid regions as well as in low-rainfall areas, are also needed.
- o Studies to quantify and evaluate overall commodity production and the environmental costs and benefits of trees in natural ecosystems, agro-silvo-pastoral systems, and plantations.

Grantees in the tropical trees project meet periodically to exchange information and coordinate activities. A special field manual for the tropical trees research projects has been developed by grantees, and is available to all participants.

The Committee on Research Grants would be pleased to communicate with developing-country institutions interested in participating in research directed toward the objectives of this program.

For more information and for proposal formats and procedures, please contact Dr. Michael P. Greene, Associate Director, Board on Science and Technology for International Development at the letterhead address, or call Mr. Jeffrey A. Gritzner at (202) 334-2675.

June 15, 1984

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February 28, 1984

### GRANTS FOR RESEARCH ON BIOLOGICAL NITROGEN FIXATION

The Committee on Research Grants, Board on Science and Technology for International Development, National Academy of Sciences, supports research in developing country institutions on selected scientific questions of wide applicability. The Committee proposes to fund a limited number of research grants on biological nitrogen fixation (BNF) aimed at increasing productivity and use of food and forage in developing countries. Proposed projects should deal with questions of general applicability to developing countries related to nitrogen fixation by legume-rhizobial symbiosis, interaction of mycorrhizal fungi with crops, or use of azolla. The Committee considers the following areas to be of high priority and encourages innovative studies that address the gaps in knowledge for important crops.

#### Nitrogen Fixation in Cropping Systems with Legumes

- o Quantity and fate of nitrogen fixed in cropping systems (monocultures, alley cropping, sequential cropping, intercropping, and pastures).
  - o Effect of environmental stresses related to soil type, moisture, temperature, shading, etc. on the plant and/or rhizobia.
  - o Selection of plant species and varieties for optimal nitrogen fixation.
- The use of <sup>15</sup>N techniques for quantitative measurements of BNF is encouraged.

#### Legume Inoculation Problems

- o Rhizobial survival and competition in the field.
- o The infection process and nodule development.
- o Development of inoculum formulations and field inoculation methodologies that enhance inoculation success.

In the system proposed for study, nitrogen should first have been demonstrated to be the limiting factor. The use of antibiotic resistant and/or serologically marked strains for ecological studies of Rhizobium is encouraged where appropriate. Assistance is available for securing marked strains and antisera.

#### Mycorrhizae and Nitrogen Fixation

- o Estimation of mycorrhizal contribution to nitrogen fixation by a given legume.
- o Greenhouse evaluation of mycorrhizal species to select for maximum improvement of growth and/or BNF of the legume.
- o Field evaluation of nursery inoculated woody legumes to determine the competitiveness of the inoculum with indigenous mycorrhizae.
- o Effect of practices such as crop rotation, intercropping, low-till cultivation, and other management techniques to increase soil populations of effective mycorrhizae.

Improvement of Host Plant by Breeding or Genetic Manipulation

- o Development of varieties that nodulate with several effective microbial strains or with a specific effective strain.
- o Development of varieties that fix sufficient nitrogen to meet the total plant requirement.
- o Development of varieties that fix nitrogen in the presence of soil nitrogen or unfavorable environmental conditions.

Use of Azolla in the Tropics

- o Methods to culture, maintain, and propagate Azolla under tropical conditions.
- o Development of tolerance to environmental stresses.

Capability for successful laboratory culture of Azolla is required.

Other Areas

Proposals on BNF unrelated to the above priority areas will be considered where an innovative approach is taken.

Cooperative activities of grantees in this BNF research program provide additional collaboration and training, for example:

- o Meetings of grantees, sometimes in conjunction with an international meeting, to discuss BNF topics of general importance.
- o Collaboration with scientists from developed countries, encouraged by the support of travel to grantee institutions for consultation on funded projects.
- o Short-term training in  $^{15}\text{N}$  experiments, serology, or other methods related to project activities.
- o Arrangement of regional facilities for  $^{15}\text{N}$  and serological analyses.
- o Encouragement of participation in other appropriate networks.

Grant funds may be used for research expenses, purchases of project-related equipment, short-term training, travel, and salaries of scientists and technicians. Long-term training and purchase of vehicles should not be included.

Only institutions and public and private agencies in developing countries are eligible for grants. Institutions in middle income countries may participate if the proposal contributes a unique scientific capability not otherwise included in the program or involves collaboration with other grantee institutions. Grants are awarded for a period of three to four years with total funding of \$50,000 or more, depending on the research proposed. (Analytical cost for  $^{15}\text{N}$  is expected to be in the range of \$5-10 per sample and  $^{15}\text{N}$  labelled chemicals of the order of \$1,000-2,000 per field experiment.) Funds for the BOSTID research grants program are provided by the Office of the Science Advisor, U.S. Agency for International Development.

For further information and proposal preparation guidelines, please write to Dr. Michael P. Greene, Associate Director, Board on Science and Technology for International Development at the letterhead address, giving a brief description of your area of interest, or call Dr. Judith Bale at (202) 334-2675.

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January 20, 1984

### Announcement of Grants for Mosquito Vector Field Studies

The Committee on Research Grants, Board on Science and Technology for International Development, National Academy of Sciences, supports research in developing country institutions on selected scientific questions of wide applicability. The Committee proposes to fund a small number of field research projects that relate to the following general goal: investigate the ecology and genetics of mosquito vector populations in order to identify vulnerable aspects of the life cycle which may lead to the development of sound control strategies for the reduction or prevention of disease. Vectors of important arboviruses and malaria are of special interest. Collaborative work with U.S. scientists is encouraged by the support of travel to grantee institutions for consultation and training in connection with funded projects. Funds for this program are provided by the Office of the Science Advisor, U.S. Agency for International Development.

The Committee would be pleased to hear from investigators in developing country institutions interested in carrying out basic and applied field research on mosquito vectors within any (or a combination) of the following areas:

#### A. Vector Ecology

1. Incrimination of vectors (characterization and taxonomy of vector and pathogen in relation to human population at risk)
2. Population dynamics (colonization, artificial feeding, life tables, field studies, behavior)
3. Transmission dynamics (vector capacity, competence, animal models)

#### B. Vector Control

1. Identification and assessment of natural predators and/or pathogens of vectors (population interactions, collection, bioassays, toxicological evaluation)
2. Evaluation of new vector control methods or agents (laboratory and field trials)

3. Development of innovative ecologic or genetic means to prevent or hinder the rapid appearance of insecticide resistance in mosquito vector populations. Some approaches that might be investigated include testing combinations of biological and chemical controls, testing combinations of different chemicals employed simultaneously or in sequences that prevent cross-resistance, testing of genetic means of preventing resistance, and relating frequency and rates of exposure to insecticide experienced by a mosquito population to the probability of appearance of resistant strains.

The Committee is particularly interested in proposals that address aspects of vector ecology in areas where agricultural practices and human settlement patterns are changing rapidly. For example, large-scale irrigation projects may alter ecological conditions for vectors of human disease, in addition to attracting a new population of susceptible persons. Proposed projects should be of general interest to developing countries and not restricted to the solution of local problems.

For further information and proposal preparation guidelines, please write to Dr. Michael P. Greene, Associate Director, Board on Science and Technology for International Development, giving a brief description of the area of interest, or call Ms. Karen Bell at (202) 334-2675 for more information regarding grant procedures or international collaboration.

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June 8, 1984

### Announcement of Grants in Rapid Epidemiologic Assessment (REA) for Health Planning and Decision Making

The Committee on Research Grants, Board on Science and Technology for International Development, National Academy of Sciences, supports research in developing country institutions on selected scientific questions of wide applicability. The Committee proposes to fund a small number of projects that test innovative applications of epidemiologic techniques for assessing important public health problems in developing countries or monitoring the effectiveness of health interventions.

The collection, analysis, interpretation, and use of epidemiologic data can present special difficulties in developing countries. Morbidity and mortality information may be unreliable, because of under-reporting and diagnostic inaccuracies. Household surveys can be expensive and time-consuming to carry out in remote rural areas. Yet large quantities of health data often are compiled in formats that are not readily useful for program decisions or evaluations. Simpler, more reliable, approaches for disease surveillance, and health problem assessment are needed to assist decision makers to design effective interventions, monitor health programs, and evaluate their outcomes in terms of health status improvement or utilization of services.

The Committee would be pleased to communicate with developing country institutions interested in conducting research that involves innovative and/or simpler ways of collecting, interpreting or using epidemiologic data on major public health problems. The approach being tested should offer significant advantages over more conventional means, such as low cost, speed, and accuracy.

Proposals will be judged according to the degree with which the approach used for obtaining epidemiologic information meets various of the criteria listed below:

- o It concerns a problem of major public health importance and therefore would be widely applicable in developing countries.

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- o It involves public health decision-makers
- o It represents an innovative, simple and accurate method of assessing the relative contribution of selected important health problems to the burden of illness in a population
- o It provides an improved means of identifying high risk individuals for disease control programs.
- o It provides timely information for assessment of the effectiveness of a health program.
- o It utilizes relatively simple indicators of health status or disease in a given population.
- o It makes maximum use of existing data bases and information available from other sources within a particular region or country. For example, clinic and hospital data collected routinely might be utilized in new ways.

Grant funds may be used for salaries of scientists and technicians, purchases of project-related equipment, research expenses and travel. Long-term training and purchase of vehicles should not be included. Appropriate safety procedures must be followed in work with pathogens, and appropriate safeguards applied in securing the cooperation of human subjects.

Only institutions and public and private agencies in developing countries are eligible for grants. Institutions in middle income developing countries may participate if the proposal involves collaboration with other grantee institutions or contributes a unique scientific capability not otherwise included in the program. Collaborative work with scientists from industrialized countries is encouraged by the support of travel to grantee institutions for consultation and training in connection with funded projects. Grants average about \$100,000 for two or three years. Funds for this program are provided by the Office of the Science Advisor, U.S. Agency for International Development.

For further information and proposal preparation guidelines, please send a letter with a brief description of your area of interest and proposed project objectives to Dr. Michael P. Greene, Associate Director, Board on Science and Technology for International Development at the letterhead address.

# NATIONAL RESEARCH COUNCIL

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February 28, 1985

### Announcement of Grants for Research on Diagnosis and Epidemiology of Acute Respiratory Infections in Children

The Committee on Research Grants, Board on Science and Technology for International Development (BOSTID), National Academy of Sciences, supports research in developing country institutions on selected scientific questions of wide applicability. The Committee proposes to fund a small number of projects that seek to elucidate the etiology and epidemiology of acute respiratory infections in children (ARI). These studies may be based on children requiring care for acute respiratory illness (e.g., hospital-based studies) or children selected to be representative of a defined population (community-based studies). In more developed countries, preference is given to community-based studies that contribute information on development of specific acute respiratory infections in different populations with different levels of health care. Proposals should describe any features in the social and ecological setting that may make the population particularly worthy of study. Proposals for innovative ARI research such as development of rapid diagnostic techniques are also encouraged.

Hospital- and community-based research should cover the following aspects:

- o identification of bacterial and viral respiratory pathogens
- o description of clinical and radiological features, treatment and outcome
- o identification of important risk factors

Where appropriate, research should also include assessment of the incidence, severity, and fatality rates associated with infections caused by specific pathogens.

These studies may lead to the development and testing of alternative methods of management and to evaluation of vaccines and other strategies for prevention.

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Grantees participate in annual coordination meetings and collaborate in adoption of common procedures to facilitate collection of comparable data on different populations. Agreement has been reached by current grantees on the following:

- o procedures for viral diagnosis including choice of cell lines
- o procedures for bacterial diagnosis
- o procedures for rapid diagnosis of respiratory viruses and bacteria
- o basic information to be collected on factors such as social and medical background and clinical symptoms of participating children.

Procedures for diagnosis are described in detail in laboratory manuals prepared by grantees and other experts. Short term training in these procedures and epidemiologic methods is available.

Diagnostic reagents and other supplies not locally available are ordered by BOSTID staff. In some cases, reagents are provided from lots that have been tested for quality by a consulting laboratory.

Grant funds may be used for salaries of scientists and technicians, purchases of project-related equipment, research expenses, short-term training, and travel. Long-term training and purchase of vehicles should not be included. Appropriate safety procedures must be followed when working with pathogens.

Only institutions and public and private agencies in developing countries are eligible for grants. Institutions in middle income countries may participate if the proposal involves collaboration with other grantee institutions or is of general interest to developing countries. Collaborative work with scientists from industrialized countries is encouraged by the support of travel to grantee institutions for consultation and training in connection with funded projects. Most grants range from a total of about \$100,000 to \$200,000 for a two- to three-year period. Funds are provided by the Office of the Science Advisor, U.S. Agency for International Development.

For further information and proposal preparation guidelines, please write to Dr. Michael P. Greene, Associate Director, Board on Science and Technology for International Development at the letterhead address, giving a brief description of your area of interest, or call Dr. Judith Bale at (202) 334-2675.

APPENDIX B

BOSTID RESEARCH GRANTS PROGRAM  
EXPENDITURES THROUGH CY 1985

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BOSTID RESEARCH GRANTS PROGRAM

EXPENDITURES

Start up (1/81-12/83)	Percent of Total	CY 1984 Actual	Percent of Total	CY 1985 Estimated	Percent of Total
Administration     \$ 830,000	39.8	\$ 537,000	25.8	\$ 475,000	11.7
Networking             560,000	26.8	476,000	22.9	795,000	19.5
Grant Payments <u>697,000</u>	33.4	<u>1,067,000</u>	51.3	<u>2,800,000</u>	68.8
<b>\$2,087,000</b>		<b>\$2,080,000</b>		<b>\$4,070,000</b>	

2/15/85

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BOSTID RESEARCH GRANTS PROGRAM

EXPENDITURES

Start up (1/81-12/83)	Percent of Total	CY 1984 Actual*	Percent of Total	CY 1985 Estimated*	Percent of Total
Administration \$ 830,000	39.8	\$ 537,000	25.8	\$ 450,000	11.5
Networking:					
Grain Amaranth		45,590		12,600	
Tropical Trees		84,765		115,400	
Biological Nitrogen Fixation		149,750		154,500	
Mosquito Vector Research		58,655		46,500	
Rapid Epidemiologic Assesment		48,590		86,200	
Acute Respiratory Infections		<u>88,650</u>		<u>249,800</u>	
560,000	26.8	476,000	22.9	665,000	17.0
Grant Payments <u>697,000</u>	33.4	<u>1,067,000</u>	51.3	<u>2,800,000</u>	71.5
<b>\$2,087,000</b>		<b>\$2,080,000</b>		<b>\$3,915,000</b>	

\*Staff costs for networking activities have been apportioned to the project areas according to the ratio of the program expenditures of each project to total networking expenditures.

8/6/85

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APPENDIX C

BIO-DATA OF CRG STAFF

## Appendix C

Michael Greene, associate director of BOSTID responsible for the research grants program is a physicist by training, with a PhD in theoretical physics from the University of California, San Diego. He taught at the University of California, Davis, Brown University and the University of Maryland. He also taught at several universities in Latin America on Fulbright and OAS grants. He left academia in 1974 to join Volunteers in Technical Assistance (VITA) as technical director. From 1976-80, Greene was deputy director of the Department of Scientific and Technological Affairs of the Organization of American States. In 1980-81 he worked as a consultant to the OAS and UNEP on oil spill protection for the Caribbean, and joined BOSTID in July 1981. He speaks Spanish fluently.

Tresa A. Bass, Administrative Officer for the research grants program, has been with BOSTID since 1971. Prior to the inception of the research grants program, she was responsible for BOSTID's fiscal projections and reporting, travel and conference planning, and report review and distribution. Following completion of a B.A. in political science at the University of Washington, in 1968, she spent two years as a Peace Corps volunteer in the Philippines working in teacher training programs in mathematics. During her BOSTID service, she has taken courses in accounting and business law.

Judith Bale was born in New Zealand. She received an undergraduate degree in food science before coming to the United States, where she completed an MS at Iowa State University and a PhD in biochemistry from the University of Wisconsin. In 1974 she joined the chemistry faculty at Montana State University as assistant professor. The following year she was awarded a fellowship in the Hart, Lung, and Blood Institute at NIH. There she studied enzyme mechanisms and kinetics and became a senior staff fellow. In 1979 she joined the Food and Nutrition Board of the National Research Council, and directed the Committee on International Nutrition Programs with its several subcommittees and the Committee on Dietary Allowances. In 1982 she joined the CRG staff with responsibility for Biological Nitrogen Fixation and Acute Respiratory Infection programs.

Karen Bell has been with NAS complex since 1977. Before joining BOSTID in 1981, she was study director for the Institute of Medicine study on U.S. Health Goals for the Year 2000, and worked on the Study of Health in Egypt. She has taught at Columbia University and directed maternal and child health studies in Santiago, Chile. She has also worked in Brazil and Colombia. She has Masters of Public Health degrees from Columbia University and from the University of Chile and a B.A. in biology and history from Harvard College (magna cum laude). She is fluent in Spanish and Portuguese.

Jeffrey Gritzner studied at the University of California Berkeley (AB honors) and the University of Chicago (AM, PhD. candidate). He has been a Peace Corps agronomy instructor in Iran, director of the gum-arabic monopoly in Chad, and has taught and worked with Indian communities in the Southwestern United States. He has been the recipient of Fulbright, NDEA, Ford Foundation and Swedish International Development Authority Grants. He joined BOSTID in 1978 and has been responsible for the Sahelian and Common Property programs among others. He is fluent in French.

Lola Morales, Administrative Assistant of the CRG program, worked for 12 years with the departments of Science and Technology and of Education of the Organization of American States before joining BOSTID. An Ecuadorean native, she was trained as a bilingual secretary in Quito. She has studied business at Montgomery College and the University of Maryland.

APPENDIX D

GUIDELINES FOR PROPOSAL PREPARATION

Revised 1/22/85

NATIONAL ACADEMY OF SCIENCES  
BOARD ON SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT (BOSTID)  
Research Grants Program

Guidelines for Proposal Preparation

INTRODUCTION

The BOSTID Research Grants Program supports research carried out by developing country institutions in areas important for economic development. Grants are made for specific research projects in selected areas--grants of a general support nature are not considered. The Committee on Research Grants (CRG) determines project areas and approves grants.

Grant awards are available in the following areas:

1. Grain Amaranth
2. Tropical Trees
3. Biological Nitrogen Fixation
4. Mosquito Vector Field Studies
5. Rapid Epidemiologic Assessment for Health  
Planning and Decision Making
6. Causes of Acute Respiratory Infections in Children

A specific announcement relating to each area identifies the research objectives and terms of reference for grants in the area, and should be consulted before a proposal is prepared. Most grants conform to the guidelines in the announcement, but different and unconventional approaches are also considered. The total amount of most grants range from \$50,000 to \$150,000 for a period of 2, 3, or 4 years. Research activities may involve basic research, as well as pilot projects and field testing.

Unsolicited proposals not pertaining to approved project areas are not considered for funding.

Proposals are submitted for independent technical review prior to consideration by the CRG. The CRG meets three times annually to act on proposals. All proponents receive summaries of the comments of the Committee and the technical reviewers regardless of the decision on their proposals.

Requests for announcements and completed proposals may be directed to:

Associate Director/Research Grants  
Board on Science and Technology for  
International Development (BOSTID)  
National Academy of Sciences  
2101 Constitution Avenue, NW  
Washington, D.C. 20418  
Telex: 353001 BOSTID WSH

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### ELIGIBILITY

Although the BOSTID Research Grants Program is aimed primarily at the less developed countries, grants can be made within middle-income countries if the project is of general interest to less developed countries and is of high scientific quality. U.S. and other industrialized country scientists may participate in the research work through collaboration with the developing country grant recipient, but cannot receive grants themselves.

Grants are made only to institutions--specifically, institutions of higher learning, governmental and nongovernmental research institutions, regional research institutions, private organizations, and international research institutions permanently headquartered in developing countries. The research supported by the grant must be carried out in developing countries.

### PROPOSAL PREPARATION

Proposals must be submitted in English, although other correspondence may be in French or Spanish. The cover page must be signed by the person responsible for the proposed research and by an official authorized to sign on behalf of the institution. It is assumed that signature of the latter official implies approval of the technical and financial components of the proposal, and compliance with all local and national requirements.

The institution submitting the proposal is responsible for securing any necessary authorization for the receipt of funds, and for compliance with local and national laws.

The following proposal outline and budget guidelines provide additional details needed to prepare a proposal.

### RENEWALS

At the end of the grant period, a new proposal may be submitted for consideration. Each proposal or renewal is treated as a separate project by the CRG, and must have its own verifiable objectives which can be achieved within the grant period. Decisions on grant renewal will depend upon achievement of objectives in the first grant.

### FINANCIAL ADMINISTRATION AND REPORTING REQUIREMENTS

Grant funds for local expenses are usually paid in installments of approximately one-fourth of a year's budget. An initial payment is made upon acceptance of the grant, and thereafter transfer of funds is made at the request of the Grantee. The Grantee must maintain these funds in a separate bank account, and keep all records and receipts for expenditures.

Budget items that must be paid directly in U.S. dollars, such as international consultants, air fares and equipment purchased abroad, are normally administered by the National Academy of Sciences in consultation with the Grantee.

An expenditure report (using the forms to be provided) is required for each payment. Brief activity reports are prepared at half year intervals. Comprehensive annual progress reports are due on the anniversaries of the grant award. A final report is prepared upon completion of the grant period. Regular payment of grant funds depends on timely and satisfactory submission of these reports.

Sample Cover Page

NATIONAL ACADEMY OF SCIENCES  
BOARD ON SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT  
RESEARCH GRANTS PROGRAM

NAME OF PROPOSING INSTITUTION  
Mailing Address:

Cable Address:  
Telex Number:  
Phone Number:

Title of Proposed Research  
(not more than 12 words)

Project Area  
(from project announcement)

Institutional Administrator:  
(must be an official authorized to  
sign on behalf of institution)

Research Project Director:  
(person who is responsible for  
conducting research project)

Signature: \_\_\_\_\_  
Typed name of signing individual  
Title of of signing individual

Signature: \_\_\_\_\_  
Typed name of signing individual  
Title of signing individual

Date

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## Outline for Grant Proposal

(total length should not exceed 20 pages  
equivalent, typed double-spaced)

### BODY OF PROPOSAL

#### Abstract

Prepare a summary of about 200 words describing the proposed research work and its relationship to the CRG project objectives. This summary should be informative for other scientists in the same or related fields. Include total amount of funds requested from the NAS and proposed duration of project. If the proposal is approved, this summary may be included in international data registries.

It is often a good idea to prepare the abstract last to insure its consistency with project objective.

#### Background

Write a brief technical description of the subject that is understandable to other scientists, and that includes discussion of the scientific and technological background. Since the CRG supports research in only six selected areas, it may be assumed that the global importance of the area is recognized by the CRG, and a lengthy justification is not required. However, a brief discussion of the importance of the specific topic of the proposal to national or regional development problems should be included. Where appropriate, provide an environmental description of the proposed research sites. In this section the specific problem to be addressed should be clearly stated, with an explanation of how the proposed research will lead to a solution of the problems or problems.

#### Scientific Antecedents

Provide a description of present status of scientific knowledge relevant to the proposed research, with explicit references to earlier or ongoing work. This is important to demonstrate applicant's familiarity with the scientific literature in the field. A description of earlier work by the applicant related to the problem will be helpful.

#### Objectives

- o General, related to the problem defined in the background discussion
- o Specific objectives of the proposed research, related to the different stages of the project. Specific objectives should be expressed in verifiable terms, for example, using words like "determine" or "identify" rather than "study" or "investigate."



## Research Plan

This is the heart of the proposal, and discussion in this section should be directed to specialists in the field. For each phase of the project, please provide the following information.

a. Hypothesis to be tested. This should provide a clear statement of the purpose of this phase of the work and what question(s) will be investigated.

A valid hypothesis is often most clearly presented as a deniable statement, for example, "The purpose is to determine whether yield of seed per hectare of [species] may be increased by optimizing plant spacing."

b. Methodologies to be used. Here experimental procedures, including designs of field plots or clinical trials, where appropriate, should be fully described in detail and in technical terms.

c. Activities to be carried out. The number and purpose of trips to the field, samples to be tested, cultivars to be grown, apparatus to be constructed, etc. should be indicated. In some cases it may be reasonable to combine this section with (b) above.

d. Inputs required. List and describe the purpose and function of the equipment or material to be purchased, laborers to be hired, experts brought, etc. with grant funds.

e. Timetable and duration of this phase. Dates should be given if possible. A chart of activities over the proposed time period may be useful.

f. Ethical considerations. All projects in which human subjects are involved or where research workers are exposed to elevated personal risk of injury or disease must be approved by the National Academy of Sciences Committee to Review Human Studies. In general, ethical decisions should be governed by local or institutional procedures, and these should be briefly described where appropriate. If the proposed project will be monitored by an institutional review board, please provide details of its constitution, function, and procedures, and whether it has approved the proposed research protocol.

In cases where human subjects will be used in the research, the following information must be provided:

1. Description of procedures for obtaining informed consent of individual human subjects, including forms to be signed or verbal statement to be read in the presence of a witness. Such a statement should indicate that participation in the research is voluntary, explain the purpose of the research, and describe risks to the subject, if any. If local conditions or experimental requirements prevent this type of procedure, please explain and indicate how the cooperation of human subjects will be obtained.

2. If blood is to be taken from human subjects for experimental purposes, describe procedures for obtaining blood, including details about condition of subjects (e.g. pregnant women, young children), quantity of blood, site and method of extraction, frequency, needle sterilization and possible cultural taboos.

#### Resources

- o Information about the proposed Grantee institution, including legal and administrative status in the country, sources of financial support, existing regional and/or international linkages, research facilities (including equipment and vehicles available for use in this project).
- o Details about education and experience (or curriculum vitae) of the personnel who will conduct the research. The curriculum vitae for any individual must include education, positions held, and references to published works relevant to the work proposed. Describe previous research experience related to the proposed project.

#### Follow-up

Describe future actions or programs, whether included in the grant proposal or not, which may lead to implementation, use, or dissemination of the research results. Examples are government programs policies, or services which may utilize research results.

#### BUDGET

##### General Instructions

The budget must be calculated in U.S. dollars. If inflation factors are used to calculate costs for years following the first, they must be stated. A detailed budget for each year of the project must be prepared, as well as a summary budget, using the attached sample formats.

##### Salaries

- o Existing staff. For those persons who will be paid from grant funds, indicate name, title, annual salary and the fraction of work time to be spent on grant-supported work. Others who will allocate time to grant-supported work but will not receive salary from grant funds can be included with zero salary contribution, and should also be listed in the Grantee Contribution section (see below). Honoraria are permitted in conformance with institutional policy and practice, and should be so labelled.

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- o Proposed new staff. Provide proposed title, duties, annual salary, and fraction of time to be spent on grant-supported work. After the individual has been identified, a copy of his or her curriculum vitae must be sent to NAS. Casual or field labor must not be included in the salaries section, but below as a research expense.

#### Fringe Benefits

Fringe benefits (such as social insurance, medical insurance, unemployment insurance, vacation time, etc.) required by local law or institutional policy may be paid from grant funds where a portion of an employee's salary is paid from the grant. Indicate the cost and the basis for calculation.

#### Consultants

Consultants are short-term advisors who assist with specific aspects of the research work, generally on areas in which the permanent staff may lack special expertise.

- o Consultants from Grantee country. Provide the name and curriculum vitae, a short description of the work to be performed, the number of days required, and the proposed daily rate. Local consultants are to be contracted by the Grantee according to its own institutional policy.
- o Consultants from other countries. Provide a short description of the work to be performed, name and curriculum vitae (if known), the number of days required, and the estimated total cost. International consultants are contracted by NAS on mutual agreement with the Grantee and are administered by NAS according to NAS policies. In many instances the NAS can arrange for services of consultants or advisors without fee, but travel costs for them should be included. NAS staff can assist with selection of consultants after the grant is approved.

#### Travel

- o Travel within Grantee country. Provide the purpose of travel, name of the traveller, the number of trips, and the estimated cost of trips. Such travel is administered by the Grantee according to the Grantee's institutional travel policy. Include trips of local consultants and trainees in these travel costs.

- o International Travel. This includes travel by a major investigator, trainee, or international consultant. Identify the traveler, purpose of travel, destination, duration of travel, and estimated cost of fare and subsistence. Travel is at economy or excursion fare and must be on U.S. carriers whenever possible. International travel is administered by NAS according to NAS travel policy, unless otherwise agreed by the Grantee and NAS.

#### Materials and Services

- o Training materials or fees. Indicate the purpose of training, the proposed location and duration, and the estimated cost. (Salaries for trainees or trainers should be included in "Salaries" or Consultants" sections as appropriate. Travel costs for trainees or trainers should be included in "Travel.") Training materials or fees to be paid within the Grantee country are administered by Grantee. Training outside the Grantee country is arranged and administered by NAS. Normally no long-term degree training (such as pursuing a Master of Science or Doctorate degree) is funded from the grant.
- o Research expenses. Materials and services needed for research are to be included here. Provide a list of items needed and the estimated cost for each. Examples of items that might appear in this category are:

Expendable supplies (items that usually have a useful life of less than 1 year). These need not be itemized.

Casual, contract, or field labor

Information services, reference materials

Computer services

Vehicle operation and maintenance

Equipment maintenance and insurance. NAS regulations require that equipment purchased with grant funds be insured for the duration of the grant.

Land, equipment, or vehicle rental

Overhead charges, where required by institutional regulation (state the method of calculation)

Items to be purchased abroad by NAS should be distinguished from items to be purchased locally. To facilitate the purchasing process, full details are required for items to be purchased abroad, including number and type of item, specification of options, quantity or capacity needed, description of its use, and possible suppliers.

- o Publications. Indicate the number of publications/reports to be published by the Grantee and the approximate cost of each. If publications are to be produced by other institutions, indicate the number and approximate cost of each. Page charges for publishing research results in scientific journals may be included.

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## Equipment

Grant funds may be used to purchase equipment specifically for grant-supported research, but not to purchase standard items to establish new laboratories. In the proposal budget, list type of equipment, its specific function in the proposed research, the proposed source if known, and the approximate cost of each item, including shipping charges.

Please separate items to be purchased within the country from items to be purchased abroad by NAS. Items to be purchased within the country with grant funds must be available locally (shelf items) or ordered from the United States. Items not available locally will be purchased by NAS from the United States or from other free world countries. Funds for purchase of such items will be maintained in dollars and administered by the NAS.

For items to be purchased by NAS, please include as many details about each item in the proposal as possible. This should include the catalog name and model number, if such information is available. Because model numbers change frequently, please also include in the proposal the following types of information about each item in the event another model must be substituted for the one requested. If catalog information is not available, include the following descriptive information in the proposal for each equipment item:

- o basic description of item needed
- o description of any optional extras needed
- o the number of samples to be processed or analyzed
- o describe any size requirements for the item
- o local companies that can provide service for specific brands or models, if available
- o full details of electrical requirements including voltage and cycles

An example of such a description for a flow hood might read as follows:

"Four-foot, free-standing, horizontal laminar flow hood for aseptic transfer of rhizobia (no protection for workers necessary), UV lamp required to maintain sterile conditions. 110 volts, 50 cycles per second."

This information will enable NAS staff to check that adequate funds are provided for purchase and shipment of the items, and to make the purchase promptly upon signature of the grant document.

Restricted items. The following are examples of items that may not be purchased with grant funds: military equipment, including surveillance equipment; commodities and services for support of police or other law enforcement activities; abortion equipment and services; luxury goods and gambling equipment; weather modification equipment; or office equipment and facilities including, but not limited to, buildings, typewriters, calculators, copying machines, and motor vehicles. Use of such items in connection with the research project should be included in the Grantee contribution.

Items requiring advance approval. Prior written approval from NAS is required prior to purchase of pharmaceuticals or pesticides. Generally, pharmaceuticals not approved by the U.S. Food and Drug Administration may not be purchased with grant funds. Similarly, pesticides banned in the United States by the U.S. Environmental Protection Agency may not be purchased with grant funds. NAS has lists of approved pharmaceuticals and banned pesticides and can advise whether specific items may be purchased with grant funds.

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Sample Budget Format

Please prepare a separate detailed budget for each year of the proposed grant using the format below. Indicate details of salaries, consultants, travel, materials and services, and equipment as discussed in the preceding pages. Then combine the amounts for each item into a Summary Budget for the entire proposed grant using the format on the next page.

DETAILED BUDGET  
(U.S. Dollars)

Year \_\_\_\_\_

Salaries

Existing staff	Name	Title	Annual Salary	% of work time devoted to project	Salary charged to project, if any
1.					
2.					
3.					
..					

Proposed new staff	Title or Function	Annual Salary	% of work time devoted to project	Salary charged to project

Fringe benefits

Benefits covered; method of calculation

Consultants	Name	Function	Number of Days	Proposed daily rate	Total cost
Local					
International					

Travel	Name of Traveler(s)	Number of Trips	Purpose	Cost per trip	Total cost
Local					
International					

Materials and Services

Training	Name	Purpose	Location	Cost
Research Expenses	Description			Cost
Publications	Number	Cost of each	Total Cost	

Equipment	Item	Purpose	Cost
Purchased locally			
Purchased inter-nationally			

Sample Budget Format

Please combine the detailed yearly budgets into one summary budget for the entire proposed grant using the format below.

SUMMARY BUDGET  
(U.S. Dollars)

---

	Year 1	Year 2	Year 3	Year 4	TOTAL
Salaries					
Existing staff					
Proposed new staff					
Fringe benefits					
Consultants					
Local					
International					
Travel					
Local					
International					
Materials and Services					
Training					
Research expenses					
Publications					
Equipment					
Purchased locally					
Purchased inter- nationally					
TOTAL					

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GRANTEE CONTRIBUTION

Items and services which the Grantee will contribute to the proposed research work. Dollar equivalents are not required.

Salaries and fringe benefits

Name, title, and percent of time devoted to project each year of scientific staff and technicians involved in the project whose salaries are not paid from grant funds.

Materials and Services

Training, research expenses and publications contributed by Grantee.

Equipment

Use of institution-owned equipment such as laboratory equipment, vehicles, office equipment, etc.

Facilities

Use of laboratory space, test plots, office space, utilities, administrative services, etc.

### CHECKLIST

The following items, all described in the previous pages, are essential for technical review and evaluation of the proposal to proceed. Proposals lacking these items will be delayed until the information is supplied.

1. Title page signed by research project director and responsible officer of institution. Where obtaining signatures causes serious delay, a draft proposal may be sent early, and the signed title page forwarded as soon as possible. See page 4.
2. Research plan clearly described so that a scientific reviewer, in most cases a senior U.S. scientist in the field, may understand exactly what technical procedures are proposed, and see the justification for each item in the budget. See pages 5 and 6.
3. Biographical data for each member of the research team, including publication list and evidence of experience related to research topic. See page 7.
4. Complete description of each budget item. See pages 7-11 and sample format pages 12-13.

### MOST FREQUENT CAUSES FOR REJECTION OF PROPOSALS

1. Does not fit within one of approved project areas as described in the announcements.
2. Does not have clearly stated hypothesis or question to be investigated. There must be implicit in the proposal an answer to the question, "What is the problem, and how does this proposal address it?"
3. Does not contain detailed research plan that includes methods and materials to be used for each proposed experiment.
4. Does not indicate previous experience or sufficient familiarity of the principal investigator with the proposed research topic.
5. Does not show familiarity with the published information on the subject proposed for investigation.

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APPENDIX E

ANALYSIS OF PROPOSALS RECEIVED  
THROUGH FEBRAURY 28, 1985

COMMITTEE ON RESEARCH GRANTS  
ANALYSIS OF PROPOSALS  
Received Through February 28, 1985

AMA=Grain Amaranth  
FGT=Tropical Trees  
BNF=Biological Nitrogen Fixation  
MVR=Mosquito Vector Research  
REA=Rapid Epidemiology Assessment  
ARI=Acute Respiratory Infections

PROPOSALS  
(R = Received; A = Approved)

	<u>AMA</u>		<u>FGT</u>		<u>BNF</u>		<u>MVR</u>		<u>REA</u>		<u>ARI</u>		<u>TOTALS</u>	
	<u>R</u>	<u>A</u>	<u>R</u>	<u>A</u>										
<b>AFRICA</b>														
Congo			1	1									1	1
Ethiopia					1								1	0
Gambia											1		1	0
Ghana									1				1	0
Kenya	3	1	3	2	1	1	1	1	3		1	1	12	6
Madagascar							1						1	0
Malawi	1		1										2	0
Mali					1								1	0
Morocco					1								1	0
Nigeria	1		4		3		2		5		2	1	17	1
Senegal			1	1	2	1	1	1					4	3
Sierra Leone	2												2	0
Sudan			1	1	1		1						3	1
Tanzania	2		1		1		2		1				7	0
Uganda							4	2					4	2
Zaire							1						1	0
Subtotal	9	1	12	5	11	2	13	4	10	0	4	2	58	14
<b>ASIA</b>														
Bangladesh			2		1		4		1		3	1	11	1
India	5		4	1	3		1		3	1	2	1	18	3
Indonesia					1	1	1		1				3	1
Korea			2										2	0
Malaysia					3	1	2	2			1		6	4
Nepal	2												2	0
Pakistan					2	1	1				3	1	6	2
Papua New Guinea											1	1	1	1
Philippines	4		18	1	12		4		4	2	1	1	43	4
Sri Lanka	2		2		1		1	1					6	1
Tahiti							1						1	0
Taiwan	1												1	0
Thailand	2	2	2	1	6	2	3	2	6		2	1	21	8
Vanuatu							1						1	0
Subtotal	16	2	30	3	29	5	19	5	15	3	13	6	122	24

	<u>AMA</u>		<u>FGT</u>		<u>BNF</u>		<u>MVR</u>		<u>REA</u>		<u>ARI</u>		<u>TOTALS</u>	
	<u>R</u>	<u>A</u>	<u>R</u>	<u>A</u>										
LATIN AMERICA							2				1	1	3	1
Argentina									1				3	0
Bolivia	2						4	1	6	1	2		16	3
Brazil					4	1	1						1	0
Cayman Islands					2				1	1	4	1	10	4
Chile	1		2	2	2		5	2	4		1		11	2
Colombia			1										8	0
Costa Rica	2		4		2								3	0
Dominican Republic			2				1						2	1
Ecuador									2	1			14	8
Guatemala	4	3	1		2	1	2	1	3	2	2	1	1	1
Haiti					1	1							5	0
Jamaica			1		2		1		1				10	4
Mexico	4	1	1	1	2	1	2	1	1		1		5	2
Panama			1		1	1	2	1					2	0
Paraguay							1		1				13	4
Peru	3	2	2		2		2	1	3	1	1		2	0
Trinidad					2						1	1	5	1
Uruguay	1		1		2								1	0
Venezuela							1							
Subtotal	<u>17</u>	<u>6</u>	<u>16</u>	<u>3</u>	<u>21</u>	<u>5</u>	<u>24</u>	<u>7</u>	<u>23</u>	<u>6</u>	<u>13</u>	<u>4</u>	<u>114</u>	<u>31</u>
MIDDLE EAST/NORTH AFRICA									2	1	1		8	2
Egypt					5	1							2	0
Morocco			1		1								1	0
Tunisia			1											
Subtotal	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>6</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>11</u>	<u>2</u>
Grand Total	42	9	58	11	68	13	56	16	50	10	31	12	305	71

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APPENDIX F

EVALUATION CRITERIA FOR TECHNICAL REVIEWERS

NATIONAL ACADEMY OF SCIENCES  
BOARD ON SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT  
RESEARCH GRANTS PROGRAM

EVALUATION CRITERIA

The accompanying proposal was prepared in response to the enclosed project announcement. The research area was selected and approved by the BOSTID Committee on Research Grants, and normally only proposals related to an approved research area are considered for support. The project guidelines set forth in the announcement were proposed at an organizational meeting at which both developing country and U.S. experts participated. Although it is not mandatory that every proposal conform to the guidelines, those that do not must be judged more carefully for:

- a) relevance to research area
- b) scientific importance of the proposed research
- c) application to developmental goals

In short, we expect that most grants will be awarded for work conforming to the announced guidelines, but we do not wish to overlook the inspired researcher who follows a novel path. In any case, the project guidelines themselves are not in question here, although we welcome your comments, and it is to be supposed that most proposals attempt to reflect the priorities set forth there.

Below are some evaluation criteria which we hope will be helpful in formulating your review.

1. Hypothesis  
Does the proposed work conform to the project guidelines? To the extent it does not, would the work be a valuable contribution to the project, or to the field in general? Has previous work been taken into account?
2. Methodology  
Is the line of inquiry well chosen? Is the best use made of available resources, including international links? Are the costs reasonable? Will the expected data permit reasonable conclusions to be drawn? Would you recommend any additional activities; are any of the proposed activities superfluous?
3. Institutional capability  
Does the institution possess the necessary resources to complete the project? Is the research team (including international experts and collaborators) of sufficiently high caliber? Would you recommend any special training, including visits to other institutions, in initial phases of the project? To what extent will the institution increase its capability to perform follow-up or similar research on national or regional problems?

APPENDIX G

PRE-GRANT VISIT KIT

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PROPOSAL NUMBER \_\_\_\_\_

DATE OF VISIT \_\_\_\_\_

---

PRE-GRANT VISIT KIT

COMMITTEE ON RESEARCH GRANTS  
BOARD ON SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT  
NATIONAL ACADEMY OF SCIENCES

OCTOBER 1, 1983

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## GENERAL INSTRUCTIONS

### PURPOSE

The pre-grant visit has three basic purposes:

1. To assist the potential grantee with the elaboration and revision of his proposal, taking into account the comments of the technical reviewers.
2. To acquaint the prospective grantee with the technical and financial requirements and operational procedures of the BOSTID Research Grants Program.
3. To evaluate the facilities, resources, and capability of the host institution, both technically and financially.

In addition, the visit will include a briefing of the local AID Mission or U.S. Embassy to inform them about the CRG program, the proposal, and institution being visited.

Before the pre-grant visit, reviewers are asked to evaluate the proposal and recommend modifications or improvements. These comments should be transmitted to the PI without revealing the identity of the reviewers. It should be emphasized that these are recommendations of independent reviewers, and that the CRG may not agree with the suggestions. The only certainty is that the CRG will see the review comments, and the PI may be well advised to modify his proposal or respond to them in a letter, or to ignore them as he sees fit. The visitor also may make suggestions, while making it very clear that the CRG is not bound to respect the suggestions made by staff. The ultimate responsibility for the proposal rests with the PI, and he must be sure it reflects accurately his scientific judgement and is consistent with the resources of his institution.

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## PRE-GRANT VISIT REPORT FORMAT

The following report format and discussion points should be used. Information which is clearly presented in the written proposal should be referred to but need not be repeated. This report plus the summary page of the financial data collection instrument will be presented to the CRG.

Please see the attached sample for heading format to be used on the first page of the report. Other headings and the kinds of information to be included under each are described below.

### Institutional Background

Describe the juridical status of the institution, including its dependency on other national or international organizations. Approximately what percentage of the institution's budget will be provided by the grant? Does it represent a relatively major or minor project of the research group involved?

What are other sources of research support? What other projects will be undertaken by the same research team during the course of this project? To what other funding agencies has this proposal been sent?

Discuss procedures for dealing with ethical questions where appropriate.

### Technical Capability

Describe the physical facilities to be dedicated to the project. Do laboratories appear to be well equipped and functioning? Try to talk to all laboratory heads who will work on the project. Are they knowledgeable and enthusiastic about it? If agricultural fields are to be used in the project, try to see them. Do they appear to be cleared, drained and ready for use?

Does the equipment requested for the project appear to be a reasonable supplement to existing facilities? What does the laboratory head feel is his greatest need? Will this project give him greater capability in the future?

### Proposal and Budget

Is the budget adequate and reasonable for the work proposed? What modifications did you or the reviewers suggest which were accepted/rejected? It is important not to insist on changes in the proposal which would be pleasing to the Committee on Research Grants but not to the institution; all changes must be consensual. Are there any changes you particularly would recommend to the CRG, such as additional consultants, or visits to overseas laboratories? Is all equipment to be purchased justifiably essential to the objectives of the project?

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Does the proposed local contribution--staff time, physical facilities, support services--indicate sufficient institutional commitment to the proposed research? It is important that these be listed and discussed carefully; they will be included in the grant document. Are salaries requested reasonable? Do they represent salary payments for work done, or honoraria to supplement salaries? (Either is permissible but the distinction must be made.) Is time dedication by researchers clearly stated? Are CVs of all researchers included?

#### Agreement

What action will be taken by the institution or by you before the proposal is presented to the CRG.

#### Visit to AID Mission or U.S. Embassy

See the appropriate USAID health or agriculture officer; if there is no USAID mission, see the AID representative or the Embassy economic counselor. Describe the CRG program; leave a brochure, a list of approved grants, and other material.

Solicit the views of AID or Embassy officials regarding a research grant to the institution. Will the proposed grant duplicate or hinder existing U.S. assistance efforts? When necessary, explain that their comments and evaluation of technical aspects of the project are not required. The Mission Director should be encouraged to cable his approval to AID/Washington. Include the names and titles of your USAID contacts in the report. Advise USAID that letters will be sent to the Ambassador and/or Mission Director 45 days prior to the next CRG meeting formally inviting their comment.

Point out that all grants awarded will be administered directly by the NAS, and that no assistance or resources will be required of the Embassy or Mission. Projects will be visited by staff annually, and each visit will include a briefing of the Embassy or Mission.

#### FINANCIAL DATA COLLECTION INSTRUMENT

This is a questionnaire which should be administered orally to the financial officer of the proposing institution, preferably in the presence of the principal investigator. It has been designed by the accounting consultant to the CRG staff, and she will use the results to determine which institutions require assistance to set up the project accounting system and to program a schedule of audits. It will not be seen by the CRG, with the exception of the summary, and thus will not influence the decision on award of the grant. The interviewees should be reassured on this point.

Your summary should reflect your subjective impression of the compatibility of the financial management system of the institution with grant requirements. You may recommend the visit of a financial consultant in the event a grant is awarded, if necessary.

This questionnaire and instructions should not be handed to the officers being interviewed. Your subjective impressions of their responses are important (and will not affect the decision on award of a grant), and should be recorded and summarized.

B

BOARD ON SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT

COMMITTEE ON RESEARCH GRANTS

Pre-grant Visit Report

---

VISIT BY: (Name, title)

DATES OF VISIT:

---

Institution:

Project Area:

Title of Proposal: (include proposal number)

Principal Investigator: (name, title)

Other contacts: (names, titles)

Objectives:

Institutional Background:

FINANCIAL DATA COLLECTION INSTRUMENT

GENERAL INFORMATION

PROPOSAL NO: \_\_\_\_\_ DATE RECEIVED: \_\_\_\_\_ CRG DATE: \_\_\_\_\_

INSTITUTION: \_\_\_\_\_

CITY: \_\_\_\_\_

COUNTRY: \_\_\_\_\_

TITLE: \_\_\_\_\_

PRINCIPAL INVESTIGATOR: \_\_\_\_\_

BUDGET AMOUNT: U.S. \$ \_\_\_\_\_

DATE OF VISIT \_\_\_\_\_ Staff Member \_\_\_\_\_

INSTITUTION PERSONNEL INTERVIEWED:\*

(name)	(title)	(date)
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\*A copy of CRG/BOSTID's "Memorandum of Grant Provisions" and "Grantee's Budget and Expenditure Report" will be left with each institution visited.

FINANCIAL DATA COLLECTION INSTRUMENT

A. SUMMARY: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

B. The following areas require resolution (include action to be taken:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
(signed) (date)

(This page will be presented to the CRG.)

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FINANCIAL DATA COLLECTION INSTRUMENT

OPENING STATEMENT

Explain to the interviewees that the purpose of this visit and the completing of this questionnaire is twofold. The first is to enable us to understand the present financial system of the organization and to identify those within the organization who would be interacting with us on this project in the event a grant is awarded. The second is to ensure that the officers of the institution understand the requirements of the grant agreement, the expected project performance, and the operational characteristics of the CRG program.

The information given in completing the form will not have any influence on whether or not the grant is approved. It is designed to be complete, and may ask about services which are not part of the institution's financial management system. Where an incompatibility exists between the institutional financial system and the CRG system, technical assistance or other means will be found to facilitate compliance with CRG regulations.

GENERAL

- 1. Please outline the procedure within the institution for accepting grants from international donors. (i.e., who must approve, etc.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

How long does it normally take for acceptance and approval? \_\_\_\_\_

- 2. Are there any laws or policies that could interfere with this proposed grant?  
(e.g., are there any requirements that the proposal be approved by another body or the government?) \_\_\_\_\_

- a. Please describe problem.

- \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- b. How will the problem be solved?

- \_\_\_\_\_

- 3. What are the major obstacles to research in the country/institution, in general. (e.g., outdated equipment, lack of trained personnel, etc.)

\_\_\_\_\_  
\_\_\_\_\_

*m*

BUDGET PREPARATION

1. Who in the institution has prepared, approved and reviewed budget portion of the proposal?

_____	_____
(prepared by)	(title)
_____	_____
(approved by)	(title)
_____	_____
(reviewed by)	(title)

2. Who in the institution has prepared, approved and reviewed program portion of the proposal?

_____	_____
(prepared by)	(title)
_____	_____
(approved by)	(title)
_____	_____
(reviewed by)	(title)

\*3. Is there a charge in the proposal budget for indirect costs? \_\_\_\_\_

a. If yes, how is the charge for indirect cost/overhead calculated? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b. If by a percentage rate, has the rate been audited? \_\_\_\_\_

c. If yes, please indicate who did the audit and when.  
\_\_\_\_\_  
(auditor's name) (date done)

d. If a grant is awarded could CRG get a copy of the latest audit establishing the rates? \_\_\_\_\_

e. What services does the overhead charge include? \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\*CRG staff member to ask this question only if there is a charge for indirect costs or overhead included in the proposal budget.

\*4. Does the institution's proposal budget include fringe benefits? \_\_\_\_\_

a. If yes, please describe what is covered \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b. If yes, how are they calculated? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\*CRG staff member to ask this question only if there is a charge for fringe benefits included in the proposal budget.

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ACCOUNTING, AUDITING AND RECORDS

1. Who within the organization has the authority to initiate purchase requests?

\_\_\_\_\_ (name)

\_\_\_\_\_ (title)

2. Who within the organization has the authority to approve financial transactions, other than personnel?

\_\_\_\_\_ (name)

\_\_\_\_\_ (title)

3. Please describe the type of documentation that must be furnished prior to a payment being made for expenditures other than salaries.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Who approves documentation for payment?

\_\_\_\_\_ (name)

\_\_\_\_\_ (title)

5. Who is responsible for maintaining documentation?

\_\_\_\_\_ (name)

\_\_\_\_\_ (title)

6. Who within the organization is responsible for certifying that goods and services have been received?

\_\_\_\_\_ (name)

\_\_\_\_\_ (title)

7. Who within the organization has the authority to hire personnel?

\_\_\_\_\_ (name)

\_\_\_\_\_ (title)

8. Please describe the type of documentation that must be furnished prior to paying individuals receiving salaries (e.g., time sheets).

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Who approves salary documentation for payment?

\_\_\_\_\_ (name)

\_\_\_\_\_ (title)

10. Who is responsible for certifying that the person being paid has worked the hours/days/weeks covered?

\_\_\_\_\_ (name)

\_\_\_\_\_ (title)

\_\_\_\_\_ (name)

\_\_\_\_\_ (title)

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11. How do the individuals responsible for the authorization, initiation, approval and payment of expenses know how much money is available in the project by budget category? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

12. Who within the organization has the responsibility for recording the accounting transactions?

\_\_\_\_\_  
(name) (title)

a. at what intervals are recordings made? \_\_\_\_\_

b. who supervises this activity? \_\_\_\_\_

\_\_\_\_\_  
(name) (title)

13. Does your budget and accounting office have a reporting system which provides financial reports on a regular basis? \_\_\_\_\_

a. If so, how often? \_\_\_\_\_

b. Are these reports prepared for each project? \_\_\_\_\_

c. Do these reports compare for each project the approved budget and the actual expenditures for each budget category? \_\_\_\_\_

d. Would this project be included in the budget and accounting system? \_\_\_\_\_

e. Under normal conditions who would prepare, approve and review such reports? \_\_\_\_\_

\_\_\_\_\_  
(preparer) (title)

\_\_\_\_\_  
(approved by) (title)

\_\_\_\_\_  
(reviewer) (title)

14. Who within the organization has the responsibility for reviewing/auditing all financial activities?

\_\_\_\_\_  
(name) (title)

15. Does the institution have an annual audit performed? \_\_\_\_\_

a. If yes, is it performed by an independent public accountant (or the equivalent)? \_\_\_\_\_

b. In the event a grant is awarded, would the CRG grant be included in such an audit? \_\_\_\_\_

c. If yes, would it appear as a separate identifiable project? \_\_\_\_\_

d. Would it be possible for CRG to get copies of the annual audits of the CRG project during the period of the grant? \_\_\_\_\_

Is it in English? \_\_\_\_\_

e. Please give name and address of independent auditors. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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MATERIALS, SUPPLIES AND EQUIPMENT

1. Does the institution maintain a control system for equipment which:
  - a. will permit its ready identification and location? \_\_\_\_\_
  - b. requires that equipment periodically be compared with the accounting records to determine whether they agree? \_\_\_\_\_
  - c. Please describe system of security for equipment \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
2. Does the institution as a regular practice insure equipment? \_\_\_\_\_  
If yes, could a copy of insurance policy covering equipment purchased for the purposes of this grant be made available to CRG? \_\_\_\_\_
  
3. Will a vehicle be assigned or available when needed for this project?  
\_\_\_\_\_

DISCUSSION OF GRANT REQUIREMENTS

Some of the major requirements of CRG/BOSTID grant program are:

<u>GENERAL</u>	<u>Describe any problem anticipated</u>
1. No funds may be spent or obligated prior to the signing of grant document by both CRG and the grantee.	_____
2. No costs other than those listed in approved budget can be paid.	_____
3. Written approval is required prior to making expenditures which increase any "budget category" by more than 10%.	_____
4. No increase in the total grant amount can result by adjustments among budget categories.	_____
5. Written approval is required prior to increasing any individual's salary rate above what is in the proposal.	_____
6. Written approval is required prior to making any changes in researchers whose CVs were included in proposal.	_____
7. Any proposed changes that would increase the total approved budget are treated as <u>new proposals</u> .	_____
8. The project budget will be divided into two parts--one grantee-administered and the other NAS-administered. The grantee-administered part will be transferred to the country to pay for local expenses. the NAS-administered part is maintained in dollars in Washington to pay for international travel, equipment purchases abroad, etc.	_____
9. The CRG will make arrangements for any international travel outside grantee's country. U.S. carriers will be used as far as possible.	_____

CB

GRANT PAYMENTS

Describe any problem anticipated

- 1. Grantees are required to establish a separate bank account for each CRG/BOSTID grant. \_\_\_\_\_
- 2. CRG disburses all grant funds to grantees in U.S. dollars. \_\_\_\_\_
  - a. Grant payments are sent to the bank account, established in 1. above, by wire transfer, unless check or bank draft is requested. \_\_\_\_\_
  - b. Must U.S. dollars received in your country be converted immediately to local currency rather than maintained in the account in U.S. dollars until spent? \_\_\_\_\_
  - c. When a grant payment is sent, the CRG sends a cash advance form detailing the funds by budget category, and advising you when to expect the transfer. Should the transfer not arrive it is important to contact your bank to follow up and to notify the CRG. \_\_\_\_\_
  - d. Can the transfer and exchange to local currency be handled without problems? \_\_\_\_\_
- 3. All disbursements for this grant are to be made from the separate bank account. \_\_\_\_\_
- 4. Will the separate bank account for this grant be an interest-bearing or non-interest bearing account? If interest is earned, it must be refunded to NAS. \_\_\_\_\_

NOTE: Under normal circumstances, who within your organization would sign checks on such an account?

_____	_____
(name)	(title)
_____	_____
(name)	(title)

- 5. CRG makes the first payment automatically upon receipt of signed grant documents; all other payments are made only upon request from grantee. \_\_\_\_\_
  - o In addition, the third and all remaining payments are made only if CRG has received the required expenditure, activity and annual progress reports. The expenditure report from the first payment is required before third payment can be made, report of second payment before fourth payment can be made, etc. \_\_\_\_\_

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FINANCIAL REPORTS

1. Grantees are to submit all expenditure reports (example to be given to grantee at this time) in U.S. dollars. \_\_\_\_\_

o Please describe any problems that might arise in submitting expenditure reports in U.S. dollars. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Grantee's expenditure reports are to be signed by the person within the institution responsible for administration of funds. \_\_\_\_\_

Please furnish name and title of such individual(s).

\_\_\_\_\_  
(name) (title)  
\_\_\_\_\_  
(name) (title)

ACTIVITIES AND PROGRESS REPORTS

1. Activity reports are normally required at each half year interval. \_\_\_\_\_

2. Annual progress reports are due on each anniversary of the effective date of the grant. \_\_\_\_\_

NOTE: Requested payments will be withheld until all activity and annual reports due have been received. \_\_\_\_\_

Please indicate individuals responsible for furnishing these reports.

\_\_\_\_\_  
(name) (title)  
\_\_\_\_\_  
(name) (title)

gfs

MATERIALS, SUPPLIES AND EQUIPMENT

1. Equipment and supplies purchased within grantee's country with grant funds must be either items readily available (shelf items) or items made in the U.S. \_\_\_\_\_
2. All other equipment and supplies will be ordered, purchased and paid for by CRG staff upon instruction from PI. \_\_\_\_\_
3. All customs arrangements and any duty owed are the responsibility of the grantee. \_\_\_\_\_
4. Duty charges cannot be paid from CRG grant funds. \_\_\_\_\_

NOTE: Do you anticipate any problem with the custom arrangements or duty owed? \_\_\_\_\_  
If yes, please describe \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Grantee is to insure and keep in good repair all equipment purchased with grant funds. \_\_\_\_\_
6. Title to any equipment purchased with CRG funds shall be retained by CRG until completion of the project. (U.S. Government regulation) \_\_\_\_\_

GL

ACCOUNTING AND AUDITING AND RECORDS

1. All accounting documentation (vouchers, invoices, journals, ledger, etc.) must be maintained for a minimum of three years from the date of final payment from CRG to grantee. \_\_\_\_\_
2. All expenditure data must be by budget category and separate accounting records must be maintained to provide such data for expenditure reports and audit purposes. \_\_\_\_\_
3. CRG may conduct on-site reviews of grantee's records. Suitable advance notice will be given. \_\_\_\_\_
4. A sample of the type of documentation expected is:

For salary expenditures

- Time sheet/other documentation showing time spent on the grant project.
- Receipt/cancelled check signed/endorsed by person receiving pay.

Other expenditures

- Requisition/Purchase Order
- Receiving Slip
- Invoices/Billings
- Cancelled checks

CRG/BOSTID PROCEDURE FOR GRANT AWARDS

Briefly discuss the:

- steps taken to this point--Proposal reviews, visit \_\_\_\_\_
- steps remaining to make award. Further reviews if proposal modified, AID mission informed, CRG meeting, preparation of draft/final grant documents. \_\_\_\_\_

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APPENDIX B

SUMMARY OF SUPPORTING ACTIVITIES, 1981-84

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## SUPPORTING ACTIVITIES

PROJECT AREA/ NO. GRANTS APPROVED (through 6/85)	ORGANIZATIONAL AND COORDINATION MEETINGS	NON-STAFF TRAVEL FOR PROPOSAL PREPARA- TION ASSISTANCE	VISITS OF EXPERTS/ ADVISORS TO GRANTEE	TRAVEL BY GRANTEES FOR TRAINING, ADVICE, INTERNATIONAL CONFERENCES
Grain Amaranth 9 (\$948,936)	9/81 Organizational Mtg. Washington, D.C. 11/82 Coordination Mtg. Rodale Research Center, PA 9/83 strategy session Washington, D.C. 9/84 Coordination Mtg. Rodale Research Center, PA 4/85 Advisory Group Mtg. Washington, D.C.	Kauffman to Peru 4/82 Saunders to Mexico 5/82 Mnzava (Tanzania) to Rodale 11/82 Kauffman to India, Nepal 11/83	Kauffman to Peru 4/83, 4/84 Kauffman to Thailand 11/83 Saunders to Mexico 2/84 Graham to Peru 11/84, 1/85 Kauffman to Kenya 1/85 Martineau to Peru 4/85	Gupta, Chuckree & Sumar to Rodale 11/82 Sanchez-Marroquin & Maldonado to Guatemala, Peru & Bolivia 3/83 Jimenez to Guatemala 5/83 Maya to Peru 8/83 Sumar to Rodale 10/83 Gupta to India 12/83 Panas to Rodale Conference 9/84 Soonthorn, Chuckree, & Panas to U. of Fla. 9/84 Gupta to U.C. Davis and NPI, 9/84 Sumar to Mexico AMA Conference 10/84 Gupta & Pal to India & Nepal, 8/85 Espetia to Rodale & Colorado, 9/85 Gupta to Arizona & Rodale, 10/85
Tropical Trees 13 (\$1,248,809)	10/81 Organizational Mtg. Washington, D.C. 1/83 Coordination Mtg. Nairobi, Kenya 12/83 Working Group on Field Manual, Washington, D.C. 2/84 Advisory Group Meeting, Tacoma, WA 10/84 Coordination Mtg. INIREB, Jalapa, Mexico 11/85 Coordination mtg. TISTR, Bangkok & Hua Hin, Thailand	Brewbaker to Philippines 4/82 Felker to Chile 12/82 Felker to Sudan 1/83 Maghembe (Tanzania) at ICRAF 1/83 Halliday to India 11/83	Brewbaker to Thailand 8/82 Felker to Chile 12/82 Brewbaker to Malawi 1/83 Van Den Beldt to Philippines 4/83 & 2/84 Roskoaki to Mexico 6/83, 7/83, 2/84, 7/84 McDicken to Thailand 8/83 Silvester to Chile 8/83 Durzan to Chile 7/84 Van den Beldt to Mexico 7/84	Huxley to U.K., Italy 5/82 Narong to Bellagio 9/82 Narong to Hawaii 11/82 Kovith to Hawaii, Taiwan, Singapore 11/82 Diangana to ORSTOM, Senegal 2/83 & 12/83 Torres to U.S. 6/83 Lim & Owino to Netherlands 8/83 Suthijet to Indonesia 5/84 Diangana to Kenya 7/84 Delgado to Hawaii 8/84 Torres, Aguirre & Balboa to Texas 10/84 Ittirit to Mexico coordination meeting 10/84 Jordan to U.S. & Canada 11/84 Balboa, to U.S. 4/85 Parraguez to Argentina 7/85
Biological Nitrogen Fixation 15 (\$1,663,885)	3/82 Organizational Mtg. East-West Center, HI 12/83 Advisory Group Meeting, Washington, D.C. 7/84 Coordination Mtg. Chiang Mai University, Thailand 8/85 Coordination mtg., Maui, in conjunction with 10th N.A. Rhizobium Conference	Hubbell to Jamaica 2/82 Elkan to Indonesia 2/83 Schroder to Haiti 6/83 Halliday to Thailand 10/83 Schenck to Philippines 3/85 Fried to Brazil 3/85	Focht to Panama 1/84 Elkan in Malaysia 5/84 Schmidt to Egypt 12/84 Beck to Indonesia 2/85 Schenck to Malaysia 3/85 Fried to Brazil, Haiti, Panama 3/85 Burria to Pakistan, Thailand 3/85 Peters to Thailand 4/85 Schroder to Haiti 4/85	Rerkasem to Australia 3/83 Herandez to U.S. 6/83 Keya to Netherlands 8/83 Malik to Netherlands, U.K. 8/83 Seldin to U.S. 3/84 Rerkasem to U.S., U.K. 4/84 Malik to Finland, U.S., Philippines 9 & 10/84 Bilal to U.S., U.K. 9-12/84 Rojare in Australia 8/84 Hernandez to Brazil 10/84

## SUPPORTING ACTIVITIES

PROJECT AREA/ NO. GRANTS APPROVED (through 10/84)	ORGANIZATIONAL AND COORDINATION MEETINGS	NON-STAFF TRAVEL FOR PROPOSAL PREPARA- TION ASSISTANCE	VISITS OF EXPERTS/ ADVISORS TO GRANTEE	TRAVEL BY GRANTEES FOR TRAINING, ADVICE, INTERNATIONAL CONFERENCES
Biological Nitrogen Fixation (continued)				Felix to University of Florida 8/84 De Leon to U.S. 12/84 Prayoon to China 3/85 Indonesian trainees to Thailand 4/85 Saali to Oregon, Hawaii 8/85 Qureshi to Wisconsin, Oregon 7/85, 8/85 Somporn to U.S. and Philippines 6/85-8/85 Felix & Moawad to Univ. Minnesota 8/85
Malaria Vector Field Studies 16 (\$1,892,500)	4/82 Organizational Mtg. Washington, D.C. 8/84 Coordination Mtg. U. of Panama; Panama (Latin American & African grantees) 4/85 Coordination mtg. New Orleans, in conjunction with AMCA meeting	Mouchet to Senegal 12/82	Barr to Malaysia 3/83, 1/84; 6/84 Andre in Thailand Service to Kenya, Senegal 2/84 Seymour to Mexico 2/84; 6/84; 9/84; 1/85; 6/85 Reisen to Pakistan, Sri Lanka 4/84 Edman to Colombia 6/84 Service in Kenya 7/84 Barr to Sri Lanka 2/85 Hayes, Harrison to Peru 2/85 Briggs to Mexico 6/85 Hayes to Peru 6/85 Peterson to Mexico, Guatemala 8/85	Mukwaya at Notre Dame 5/84-10/84 Natal to U.S. 7/84 Mukwaya to Fla., Wash. D.C. 8/84 Amerisinghe to U.S. 8/84 Hii to Canada 9/84 Faye to Italy 9/84-11/84 Lopez to U.S. 10/84, 9/85 Hii to Thailand 3/85 Visut to Malaysia 4/85 Peiris to U.S., Malaysia 4/85 Coluzzi to Senegal 8/85 Hii & Vun to Indonesia 9/85 Quinones & Monje to U. Fla. 9/85-11/85 Mukiama to Italy, U.K. 10/85-11/85
Rapid Epidemiologic Assessment 10 (\$1,186,770)	1/83 Organizational Mtg. Washington, D.C. 5/84 Advisory Group Mtg. Washington, D.C. 9/85 Coordination mtg. Washington, D.C.	Galler to Thailand 2/84 Laukaran to Canada 8/84 (promotion)	Belizan to Guatemala 1/84 Cook, Beard to Ecuador 3/84 Stroh, Black to Peru 9/84 Rittenbaugh to Egypt 9/84 Villar to Chile 7/84 West to Philippines 7/84 Villar to Guatemala 11/84 Harrison to Egypt 12/84 Habicht in Chile 6/85	Gawad to Atlanta 6/85 Flores to India 10/85

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## SUPPORTING ACTIVITIES

PROJECT AREA/ NO. GRANTS APPROVED (through 10/84)	ORGANIZATIONAL AND COORDINATION MEETINGS	NON-STAFF TRAVEL FOR PROPOSAL PREPARA- TION ASSISTANCE	VISITS OF EXPERTS/ ADVISORS TO GRANTEE	TRAVEL BY GRANTEES FOR TRAINING, ADVICE, INTERNATIONAL CONFERENCES
Acute Respiratory Infections  14 (\$2,347,300)	5/83 Organizational Mtg. Chapel Hill, N.C. 5/84 Advisory Group Mtg. Washington, D.C. 6/84 Coordination Mtg. Washington, D.C. 12/84 Advisory Mtgs. on Virology & Bacteriology, Washington, D.C. 1/85 Advisory Mtg. on Data Management, Washington, D.C. 5/85 Virology Training Workshop, U. of Michigan 6/85 Bacteriology Training Workshop, Johns Hopkins U. 7/85 Coordination Mtg., Washington, D.C.	Monto to Brazil, Chile, Uruguay, Argentina 11/83 Monto to Nigeria, Kenya 3/84 Monto to Egypt, Pakistan, Bangladesh, Thailand 7/84 Monto to Int'l meetings on ARI (Australia 8/84) & Virology (Japan 9/84) (promotion) McIntosh to Thailand 1/85 Charache to Brazil 9/85	Monto to Philippines 8/84 Monto to Papua New Guinea 8/84 McIntosh to Pakistan, Bangladesh 1/85 Monto to Nigeria, Kenya 8/85 Charache to Argentina, Uruguay, Chile, Colombia 9/85	Cruz to Arizona 4/83 Chiperelli to Brazil 10/84 Torres to Finland & Sweden 12/84 De Leon to U.S. 12/84 All virologists to U. Michigan, 5/85 All bacteriologists to Johns Hopkins U. 6/85 Potocnjak to New York, Atlanta 7/85 Haque to Johns Hopkins, 10/85

Total Grants Approved

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(\$9,288,200)

Revised 8/21/85

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APPENDIX I

CRG AUDIT POLICY

NATIONAL RESEARCH COUNCIL  
BOARD ON SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT  
COMMITTEE ON RESEARCH GRANTS

AUDIT POLICY  
November 1, 1983

A. GENERAL

The funds for the Board on Science and Technology for International Development's (BOSTID) Committee on Research Grants (CRG) program are received from the Agency for International Development (AID) under Grant No. DAN-5538-G-SS-1023-00, dated January 19, 1981.

Consistent with the grant terms, AID grantees are "responsible for providing adequate audit coverage of their programs as an aid in determining whether funds have been applied efficiently, economically, effectively, and in a manner that is consistent with program objectives and the underlying agreements."

In order to fulfill these objectives, the CRG audit policy is based on the following principles:

1. CRG shall require non U.S. sub-grantees to maintain books, records, documents and other evidence, accounting procedures and practices sufficient to reflect properly that funds provided by the CRG were expended exclusively for the purposes of the subgrant agreement. This documentation is to include evidence to reflect the extent to which the program proposed in the approved subgrant application was actually accomplished. CRG shall require subgrantees to maintain such records for three years following the expiration of the subgrant agreement.

2. CRG shall include in each agreement a provision by which the CRG asserts the right to audit at any time during the course of the project and up to 3 years after its termination or completion. CRG's subgrant agreement shall also require that the subgrantees make available any information relating to the project requested by the auditor.

3. CRG shall establish a system of continuous review of technical progress and financial management of each project; every project will receive an interim visit by a member of the CRG professional staff; every project in which there is an indication of difficulty with financial management will receive an audit from an independent CPA; no

less than 20 percent of all projects, selected on the basis of certain criteria will receive a final audit from an independent CPA. Some of these will be selected at random using a well defined procedure.

B. ORGANIZATION

The audit of subgrants under the BOSTID Research Grants Program will be carried out by a Certified Public Accountant who has extensive experience in auditing and developing audit policy for federal agencies and organizations which receive funding from federal agencies. This person is engaged on a consultant basis, and is not a regular staff member of BOSTID. The CPA will personally supervise and direct all financial audit activities. Reports and recommendations will be submitted to BOSTID Associate Director/Research Grants, who will organize a schedule of audits. Any discrepancy between the recommendation of the independent CPA and the audit schedule carried out must be approved by the Office of the Comptroller.

C. AUDIT SELECTION AND AUDIT PLAN

Every Subgrantee

1. Prior to award of any subgrant a BOSTID staff member will make an on-site visit to the potential subgrantee institution. At that time the staff member will secure information:

- a. about any program-related questions identified by the reviewing panel or staff;
- b. about the subgrantee's accounting procedures, practices, systems, and internal controls;
- c. as to whether the subgrantee normally maintains appropriate accounting records, books, documents, and other evidence from which the propriety and necessity of expenditures can be determined; and
- d. as to subgrantee's awareness of and ability to comply with CRG subgrant requirements.

The results of the above will be documented as required in the CRG Pre-Grant Visit Kit.

2. Once a subgrant is approved by the CRG all of the documentation mentioned in (1) above will be reviewed by the Certified Public Accountant to determine if, from a financial standpoint, the subgrantee's accounting procedures, systems, and practices appear to be in order. In the event they do not, an on-site survey/audit of the subgrantee will be performed and technical assistance given, if needed.

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3. At about the half way point of the subgrant agreement, but no sooner than the end of the first year:

a. The Certified Public Accountant will:

review all the activity, annual progress, and expenditure reports and all correspondence received by CRG; and

prepare list of items needing clarification, documentation, and correction.

b. There will be an on-site visit of each subgrantee by a BOSTID staff member or consultant.

c. Upon recommendation of the CPA, an interim audit will be performed concurrently where there are questions relating to financial management.

d. The results of the on-site visit will be documented in the Interim Grant Visit Report.

e. All of the documentation will be reviewed by the independent CPA. The CPA will advise the Associate Director of any problem areas identified and corrective actions to be taken.

4. At any time prior to the end of the project, whenever there is an indication that there is a problem with a particular subgrantee, a review as outlined in (3) will be conducted.

5. At the end of the subgrant agreement:

a. a review will be carried out as in 3a above.

b. there will be a determination as to whether an on-site audit is to be conducted. The selection of subgrantees to be audited or surveyed will be recommended by the Certified Public Accountant after consideration of the following factors:

i. Specific requests from CRG staff members or NRC Office of the Comptroller;

ii. AID, GAO, or other outside inquiries;

iii. Results of analysis 5a;

iv. Number of grants held by each subgrantee institution; and

v. Whether subgrantee institution has periodic audits, and whether such audits are useful in regard to specifics of CRG subgrant funds.

Based on the above criteria, the Certified Public Accountant will prepare an annual audit plan. No fewer than 20 percent of the projects will be audited. At least half of these will be selected at random by the CPA, in the presence of the Associate Director, by drawing lots, by project area, to complete the audit program for each year.

D. AUDITS

1. Auditing Standards -- Audits will be performed in accordance with the General Accounting Office's (GAO) "Standards for Audits of Government Organizations, Programs, Activities and Functions" which include the Generally Accepted Auditing Standards prescribed by the American Institute of Certified Public Accountants. Program aspects of the audit will be carried out by CRG staff or consultants.

2. Audit Objectives -- The principal objectives of a full scope audit are to determine:

- a. Whether the subgrantee is maintaining effective control over, and properly accounting for, subgrant project related revenues, expenditures, assets, and liabilities in accordance with generally accepted accounting principles and terms of the subgrant agreement.
- b. Whether the total project costs (direct and indirect) claimed on financial reports submitted by the subgrantee were reasonable, allocable and allowable under applicable cost principles and other terms of the subgrant agreement.
- c. Whether the subgrantee is complying with the requirements of applicable laws and regulations.
- d. Whether the subgrantee is managing or utilizing its resources in an economical and efficient manner.
- e. The extent to which the program proposed in the CRG approved subgrant application was effectively accomplished.

3. Audit Reports -- Significant findings, conclusions and recommendations resulting from audits will be presented in reports to the BOSTID Associate Director/Research Grants and the Office of the Comptroller.

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APPENDIX J

MANUALS AND RESEARCH PROTOCOLS  
PREPARED BY STAFF

Protocol or Manual	Source	Document
<u>AMA</u> Protocols for Field Testing, Nutritional Tests	Grantee Coordination Meeting, Nov. 1982	Summary, Coordination Meeting, Grain Amaranth Project. November 8-10, 1982
<u>FGT</u> Manual for Nitrogen-Fixing Tree Research	Commissioned by staff of ICRAF, Grant FGT-KE-1-82-19	"Methodology for the Exploration and Assessment of Multipurpose Trees" (6 volumes)
Protocols for Field Testing Fast-Growing Trees	Coordination meeting, January, 1983	Summary, coordinating meeting, Fast-growing Nitrogen Fixing Tree Project, January, 1983
Field Manual for Tropical Trees Research	Requested by Coordination Meeting, January, 1983, Elaborated by Working Group Washington, December, 1983. Reviewed by Coordination Meeting, October, 1984	In draft
<u>ARI</u> Questionnaires for Hospital and Community Based Studies	Coordination Meeting, June, 1984	Summary, Coordination Meeting, Acute Respiratory Infection Project, June 1984
Manual for Virologic Studies	Requested by Coordination Meeting, Elaborated by Working group, Dec. 1984	"Laboratory Procedure for Diagnosis of Viral Respiratory Tract Infections" (in Draft)
Manual for Bacteriologic Studies	Requested by Coordination Meeting, Elaborated by Working group, December, 1984	"Procedures for Diagnosis of Respiratory Bacterial Pathogens" (In Draft)
Protocol on Data Management	Requested by Coordination Meeting, Elaborated by Working Group, January, 1985	In Draft
Handbook for Grantees	Staff, March 1984	

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Protocol on Data Management	Requested by Coordination Meeting, Elaborated by Working Group, January, 1985	In Draft
Manual for Epidemiologic Studies	Prepared by grantee Dr. C. Oyejide, June 1985	"Field Manual for Community Based Epidemiologic Studies of ARI" (In Draft)
<u>GENERAL</u>		
Handbook for Grantees	Staff, November 1982 Revised April 1983, March 1984, September 1985	"Handbook for Grantees"
Manual on Proposal Preparation	Staff, June 1985	"Elements of the Successful Scientific Research Proposal"

August 20, 1985

APPENDIX K

GRANTS APPROVED THROUGH FEBRUARY, 1985

GRAIN AMARANTH

## GRANTS APPROVED

through February 1985

<u>NO./TITLE</u>	<u>INSTITUTION/COUNTRY</u>	<u>PRINCIPAL INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PERIOD</u>
AMA-GT-1-82-18 Development of Basic Information on Guatemalan Amaranth Germ Plasm	Institute of Nutrition of Central America & Panama (INCAP), Guatemala	Ricardo Bressani	\$118,793	2/15/85 6/30/85
AMA-GT-2-83-21 Grain and Vegetable Amaranth Newsletter	Archivos Latino-americanos de Nutricion, Guatemala	Ricardo Bressani	\$ 50,000	1/28/85 1/27/85
AMA-GT-7-84-32 Limiting Factors for Nutritional Quality of Raw and Processed Grain Amaranth	Institute of Nutrition of Central America and Panama (INCAP) Guatemala	Ricardo Bressani	\$137,300	11/7/85 11/6/85
AMA-KE-4-83-22 Selection and Introduction of Grain Amaranth for Dryland and Semi-arid Climates	Dept. of Crop Science University of Nairobi, Kenya	V. K. Gupta	\$ 94,000	1/5/85 1/5/85
AMA-MX-1-82-51 Agronomic and Industrial Studies of Amaranth Grain	Instituto Nacional de Investigaciones Agrícolas (INIA), Mexico	A. Sanchez Marroquin	\$110,900	1/3/85 1/2/85
AMA-PE-1-82-50 Grain Amaranth: Selection, Nutritional Analysis, and Agronomic Comparison of Andean Varieties	Centro de Investigacion de Cultivos Andinos (CICA), Peru	Luis Sumar Kalinowski	\$118,508	7/5/85 7/4/85

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AMA-PE-3-84-19 Human Digestibility and Utilization of Grain Amaranth Protein and Carbohydrates	Nutrition Research Institute, Peru	Enrique Morales	\$138,000	3/19/84- 3/18/87
AMA-TH-2-83-9 Yield Improvement, Agronomy, and Local Use of Amaranth	Dept. of Agronomy Chiang Mai University, Thailand	Chuckree Senthong	\$ 95,140	11/25/82 11/25/85
AMA-TH-4-83-18 Species Selection and Potential Uses of Grain Amaranth as an Introduced Crop	Thailand Institute of Scientific and Technological Research, Thailand	Soonthorn Duriyaprapan	\$ 87,900	1/11/83- 1/10/86
<u>Total funds committed</u>			<u>\$950,541</u>	

BIOLOGICAL NITROGEN FIXATION

GRANTS APPROVED

through February 1985

<u>NO./TITLE</u>	<u>PRINCIPAL INSTITUTION/COUNTRY</u>	<u>INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PERIOD</u>
BNF-BR-1-83-30 Nitrogen Fixation by Plant-Bacteria Association in Tropical Grasses and Cereals	Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA), Brazil	Johanna Dobereiner	\$114,430	6/9/8 6/8/8
BNF-EG-2-84-20 Competitive Relationships Between Indigenous and Inoculant Rhizobia Nodulating Broadbeans and Lentils	National Research Centre, Egypt	Hassan Moawad Abdel Al	\$ 81,000	5/23/ 5/22/
BNF-GT-3-84-5 Production and Field Testing for Effective Strains of <u>Rhizobium</u> <u>phaseoli</u>	Central American Research Institute for Industry (ICAITI), Guatemala	Roberto de Leon	\$135,800	2/7/8 2/6/8
BNF-HT-1-84-3 Field Assessment of Need to Inoculate of Pigeon Pea and other Legumes	State University of Haiti	Jean Fenel Felix	\$ 50,000	1/30/ 1/29/8
BNF-ID-1-83-33 Improved Grain Legume Production by Enhanced Biological Nitrogen Fixation	Sukamandi Research Institute for Food Crops, Indonesia	Omar Hidayat	\$150,000	7/17/ 7/15/
BNF-KE-2-83-14 Effects of Environ- mental Factors on Nitrogen Fixation	Department of Soil Science University of Nairobi, Kenya	S.O. Keya	\$113,715	12/3/8 12/3/
BNF-MX-4-84-33 Genetic Manipulation of <u>Rhizobium phaseoli</u> for Increased Bean Production	National University of Mexico, Mexico	Rafael Palacios	\$147,900	8/20/ 8/19/

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BNF-MY-2-84-4 Improved Soil Fertility by Inoculation of Cover Legumes with Rhizobia and Mycorrhiza	Rubber Research Institute, Malaysia	E. Pushparajah	\$109,800	4/3/84 4/2/88
FGT-PA-1-83-26 Factors Limiting Biomass Production and Biological Nitrogen Fixation in <u>Leucaena leucocephala</u> in Acid Soils	University of Panama, Panama	Blanca C. de Hernandez	\$ 98,685	5/4/81 5/4/86
BNF-PK-1-83-15 Associative Biological Nitrogen Fixation in Grasses Growing in Saline Environments	Nuclear Institute for Agriculture and Biology, Pakistan	Kauser A. Malik	\$106,155	12/23/ 12/23/
BNF-SN-2-84-21 Improving the Yield and Biological Nitrogen Fixation of Bambarra Groundnut	National Agricultural Research Centre (CNRA); Institute of Agricultural Research (ISRA), Senegal	Mamadou Gueye	\$ 64,000	5/15/8 5/14/8
BNF-TH-3-83-16 Interactions in Legume-Nonlegume Intercropping Systems	Department of Agronomy Chiang Mai University, Thailand	Benjavan Rerkasem	\$100,200	12/2/8 12/1/8
BNF-TH-7-85-42 Culture, Maintenance and Propagation of <u>Azolla</u> Under Tropical Conditions	Department of Agriculture, Thailand	Nantakorn Boonkerd	\$115,200	1/31/8 1/30/8
<u>Total funds committed</u>			<u>\$1,391,885</u>	

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TROPICAL TREES

GRANTS APPROVED

through February 1985

<u>NO./TITLE</u>	<u>PRINCIPAL INSTITUTION/COUNTRY</u>	<u>INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PERI</u>
FGT-CG-1-83-27 Selection of FGNFT Species for Large-Scale Biomass Production in Savannah Zones	Centre Technique Forestier Tropical (CTFT), People's Republic of the Congo	Daniel Diangana	\$ 75,330	3/15/ 3/14
FGT-CL-1-83-13 Evaluation and Testing of Fast-Growing, Nitrogen-Fixing Tree Species for Semi-Arid Regions	Instituto de Investiga- ciones Tecnologicas (INTEC), Chile	E. Maria Elena Torres	\$110,185	11/30 11/30
FGT-CL-2-83-31 Vegetative Propa- gation and Improved Breeding Systems for <u>Prosopis</u> species	Pontificia Universidad Catolica de Chile, Chile	Orlando Balboa	\$117,600	4/12/ 4/11/8
FGT-IN-2-84-34* Alley Cropping Systems in Coconut and Cassava Production Systems	Center for Water Resources Development and Management, India	V.K. Vamadevan	\$ 63,000	4 year
FGT-KE-1-82-19 Technical/Scientific Back-up	International Council for Research in Agroforestry (ICRAF), Kenya	Peter A. Huxley	\$ 57,024	3/9/82 1/31/8
FGT-KE-3-83-17 Selection and Testing of FGNFTs for Use in Farm Woodlots and Agroforestry Combinations	Department of Forestry University of Nairobi, Kenya	Frederick Owino	\$163,770	11/23 11/22

\* Pending Government of India approval.

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FGT-MX-2-83-12 Native FGNFTs in Upland and Lowland Sites as a Source of Fodder, Fuelwood and Soil Enrichment	Instituto Nacional de Investigaciones Sobre Recursos Bioticos (INIREB), Mexico	Enrique Pardo Tejeda	\$113,100	2/15/8 2/14/8
FGT-PH-1-83-11 Nitrogen Fixation and Multiple Uses of <u>Albizzia falcataria</u> , <u>Gliricidia sepium</u> , and <u>Sesbania grandiflora</u>	Visayas State College of Agriculture (ViSCA), Philippines	Rudolfo G. Escalada	\$116,170	1/10/8 1/9/8
FGT-SD-1-83-32 Collection and Nursery Trials of <u>Acacia</u> Species for Biomass in Non- Irrigated Drylands	University of Gezira, Sudan	Mahdi Beshir	\$ 45,800	6/16/8 6/15/8
FGT-SN-3-84-22 Selection of Root Endophytes to Increase Tree Productivity in Semi-Arid Regions	National Forestry Research Centre (CNRF); Institute of Agricultural Research (ISRA), Senegal	Claude Bailly	\$ 85,000	4/27/8 4/26/8
FGT-TH-1-82-20 Field Trials and Testing of Selected Species of Fast-Growing, Nitrogen-Fixing Trees	Thailand Institute of Scientific and Technological Research (TISTR), Thailand	Kovith Yantasath	\$102,630	2/11/8 2/10/8
<u>Total funds committed</u>			<u>\$1,049,609</u>	

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MOSQUITO VECTOR FIELD STUDIES PROJECT

GRANTS APPROVED

through February 1985

<u>NO./TITLE</u>	<u>PRINCIPAL INSTITUTION/COUNTRY</u>	<u>INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PER.</u>
MVR-BR-2-84-6 Relationships of Mos- quito Feeding Patterns to Vectorial Capacity in Diverse Ecological Settings	University of Sao Paulo, Brazil	Oswaldo Paulo Forattini	\$107,500	1/1/ 12/3
MVR-CO-1-84-24 Genetic Variation among <u>Anopheles</u> <u>albimanus</u> Populations and Relationships to Vector Competence, Ecology and Geographic Distribution	Malaria Eradication Service (SEM), Colombia	Marco F. Suarez	\$117,400	4/27/ 4/26
MVR-GT-4-84-26 Assessment of <u>Salvinia</u> <u>auriculata</u> as a Plant Larvacide for Malaria Control	Universidad del Valle, Guatemala	Margaret Dix	\$140,600	4/2/84 4/1/84
MVR-KE-5-84-7 The Ecology and Possi- ble Control of Malaria Vectors with Extracts of <u>Melia</u> <u>volkensis</u>	University of Nairobi, Kenya	Titus K. Mukiama	\$106,000	1/9/84 1/8/87
MVR-LK-1-84-12 Vector Biology and Vector Competence of Man-Biting Mosquitoes in an Urbanized Envi- ronment and an Area Under Agricultural Development	University of Peradeniya, Sri Lanka	J.S.M. Peiris	\$162,480	1/20/ 1/19/84
MVR-MX-3-84-8 Isolation and Identi- fication of Potential Pathogens for Anopheline Mosquitoes	Malaria Research Center, Mexico	Jorge F. Mendez Galvan	\$ 88,600	1/9/84 1/8/84

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MVR-MY-1-83-28 Bionomics of Two <u>Mansonia</u> Species and Their Response to Insecticides	Vector Control Unit, Medical Department Sarawak, East Malaysia	Chang Moh Seng	\$ 93,600	3/22/83- 3/21/86
MVR-MY-3-84-23 Genetic Variation of the <u>Anopheles</u> <u>balabacensis</u> Complex and its Relationship to Malaria Transmission	Tropical Disease Research Center, Dept. of Medical Services Sabah, East Malaysia	Jeffrey Hii	\$116,000	6/13/84- 6/17/87
MVR-PA-2-84-10 Relationships of Mosquito Vectors and Waterbirds in the Potential for Transmission of Two Arboviruses	University of Panama, Panama	Abdiel J. Adames	\$116,100	1/24/84- 1/25/86
MVR-PE-4-84-35 Dynamics of Malaria Transmission in a New Settlement Zone	National Institute of Health, Peru	Guillermo Calderon	\$102,500	9/6/84- 3/5/86
MVR-SN-1-84-11 Ecology of Malaria Vectors in a Zone Undergoing Desaliniza- tion and Agricultural Development	University of Dakar, Senegal	Samba Diallo	\$101,700	1/23/84- 1/22/87
MVR-TH-5-83-29 Studies on the Bionomics of <u>Anopheles</u> <u>maculatus</u> and its Role in Malaria Transmission	Faculty of Science, Mahidol University, Thailand	Suchart Upatham	\$127,600	3/22/83- 3/21/85
MVR-TH-6-84-25 Development of DNA Probes to Differ- entiate Sibling Species of <u>Anopheles dirus</u> and <u>An. maculatus</u>	Faculty of Science, Mahidol University, Thailand	Sakol Panyim	\$163,600	3/20/84- 3/19/87

MVR-UG-1-84-13 Taxonomy and Population Genetics of <u>Aedes simpsoni</u> Complex	Uganda Virus Research Institute, Uganda	L.G. Mukwaya	\$ 13,800	12/30/8 12/29/8
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Subtotal funds committed \$1,557,480

Proposals approved in February 1985,  
grant documents in process:\*

MVR-UG-2-85-48 Complexes of <u>Aedes</u> <u>simpsoni</u> and <u>africanus</u> in East Africa: Vector Competence, Genetic, and Ecological Differentiation	Uganda Virus Research Institute (Uganda)	Louis G. Mukwaya	\$158,700	4 years
MVR-CO-3-85-47 Dynamics of Anopheles- Human Interaction in Endemic Malaria Areas of Colombia	University of Antioquia (Colombia)	Rafael Valderrama	\$128,400	3 years

Subtotal, grants in process \$287,100

Total, funds committed and in process \$1,844,580

\* Titles of projects and budgets are subject to change.

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RAPID EPIDEMIOLOGIC ASSESSMENT

GRANTS APPROVED

through February 1985

<u>NO./TITLE</u>	<u>PRINCIPAL INSTITUTION/COUNTRY</u>	<u>INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PERIOD</u>
REA-CL-3-84-14 A Malnutrition Risk Assessment Instrument for Infants	Institute of Nutri- tion and Food Technology (INTA), University of Chile, Chile	Francisco Mardones Restat	\$ 44,570	12/27/83- 12/26/84
REA-EC-1-84-15 Positive Predictive Value of Hemoglobin Measures for Program to Control Iron Deficiency Anemia	Center for Planning and Social Research (CEPLAES), Ecuador	Wilma Freire	\$104,700	2/15/84- 2/14/86
REA-EG-1-84-16 Risk Assessment: Identification and Monitoring of Fetal Malnutrition	Nutrition Institute, Egypt	Osman Galal	\$146,500	3/1/84- 2/28/87
REA-GT-4-84-2 Risk Assessment: Development of an Instrument to Detect Pregnant Women at High Risk: Delivery Low Birthweight Infants	Guatemala Social Security Institute (IGSS), Guatemala	Edgar E. Kestler	\$114,500	12/27/83- 6/26/86
REA-GT-8-84-36 Determination of the Value of School Children's Height Measurements as a Tool for Nutritional Surveillance	Institute of Nutrition of Central America and Panama (INCAP), Guatemala	Victor Valverde	\$ 90,300	9/27/84- 9/26/85
REA-IN-1-84-27* Assessment of Rapid Survey Techniques for Ophthalmic Health Planning and Monitoring	Aravind Eye Hospital, India	G. Venkataswamy	\$128,700	2 years

\* Pending Government of India approval

REA-PE-2-84-17 Development of Survey Methodology to Assess Childhood Health Status and Service Utilization	Nutrition Research Institute (IIN), Peru	Claudio Lanata	\$160,200	1/12 7/11
REA-PH-2-84-18 Standardization of Simple Method for Identifying Infants at Risk of Becoming Hepatitis-B Carriers	University of the Philippines	Ernesto O. Domingo	\$104,400	2/3/ 2/2/

Subtotal funds committed \$893,870

Proposals approved in February 1985,  
grant documents in process:\*

REA-PH-4-85-50 Water, Sanitation, and Diarrhea: Comparing Case-Control and Prospective Methodologies	Nutrition Center of the Philippines (Philippines)	Jane Baltazar	\$133,300	2 ye
REA-BR-3-85-49 Innovative Procedures for the Rapid Assessment of Inade- quate Vitamin A Nutriture	Universidade Federal de Pernambuco (Brazil)	Hernando Flores	\$150,000	2 yea

Subtotal, grants in process \$283,300

Total, funds committed and in process \$1,177,170

\* Titles of projects and budgets are subject to change.

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ACUTE RESPIRATORY INFECTION

GRANTS APPROVED

through February 1985

<u>NO./TITLE</u>	<u>PRINCIPAL INSTITUTION/COUNTRY</u>	<u>INVESTIGATOR</u>	<u>AMOUNT</u>	<u>PERIOD</u>
ARI-AR-1-84-29 Etiology of Lower ARI: Relation to Clinical Features and Environmental Variables	National Research Council (CONICET), Argentina	Mercedes Weissenbacher	\$114,300	5/8/84- 5/7/87
ARI-BD-1-84-43 Causes of Acute Lower Respiratory Tract Infections in Hospitalized Children	International Center for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), Bangladesh	Thomas Butler and Farida Huq	\$205,400	3 years
ARI-CL-4-85-45 Development of the Inhibition of Idiotype- anti-Idiotype Interaction Assay for Rapid Identifi- cation of Pathogens Associated with ARI in Children	Institute of Nutrition and Food Technology (INTA), University of Chile, Chile	Pedro Potocnjak	\$105,500	2 years
ARI-GT-5-84-30 Epidemiology and Etiology of ARI in a Low-Income Urban Population: Identification of Nutritional and Other Risk Factors	Institute of Nutrition of Central America and Panama (INCAP), Guatemala	Jose R. Cruz	\$167,500	3/27/84- 3/26/87
ARI-IN-3-84-39* Etiology, Risk Factors, and Transmission of ARI in Rural Children	Christian Medical College and Hospital, India	T. Jacob John	\$216,600	3 years
ARI-KE-6-84-41 Clinical and Familial Study of ARI in a Rural Area	University of Nairobi, Kenya	E.M. Wafula	\$150,300	8/3/84- 2/3/87

\* Pending Government of India approval.

ARI-NG-1-84-38 Etiology of ARI in Low Income Urban Children: Hospital and Community Studies	University of Ibadan, Nigeria	C. O. Oyejide, W. I. Aderele	\$238,200	10/3/ 10/2
ARI-PG-1-84-28 Viral and Bacterial Pathogens Responsible for ARI in Young Children	Papua New Guinea Institute of Medical Research	Michael Alpers	\$197,000	5/29/ 5/23
ARI-PH-3-84-37 Etiology of Childhood Acute Respiratory Infections: Hospital and Community Based Studies	Research Institute for Tropical Medicine, Philippines	Thelma Tupasi	\$173,600	8/10/ 8/9/8
ARI-PK-2-85-44 Determination of the Etiology of Acute Respiratory Infections in Children Attending Outpatient Clinics	National Institute of Health, Islambad, Pakistan	Jamila Iqbal	\$115,600	2 ye
ARI-UY-1-84-31 Identification of Etiology and Risk Factors of Childhood ARI in the Community	Central Public Health Laboratory, Ministry of Public Health, Uruguay	Maria Hortal de Peluffo	\$120,100	8/8/ 8/7/8

Subtotal funds committed \$1,804,100

Proposals approved in February 1985,  
grant documents in process:\*

ARI-TH-8-85-51 Acute Respiratory Infection in Thai Children Under 5 Years	Mahidol University (Thailand)	Subharee Suwanjutha	\$271,700	3 yea
ARI-SE-1-85-52 Quality Control of Diagnostic Reagents and Reference Laboratory Services for Grantees	National Bacteriology Laboratory (Sweden)	Monica Grandien	\$133,000	3 ye

Subtotal, grants in process \$404,700

Total, funds committed and in process \$2,208,800

\* Titles of projects and budgets are subject to change.

Total funds committed, all project areas \$8,622,585

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Appendix L

Estimated Voluntary Contributions of U.S. and  
Other Non-Grantee Scientists  
to BOSTID Research Grants Program  
July, 1981 - July 1985

Members of CRG	9 meetings	430 person-days
Proposal Review	360 proposals	360 person-days
Organizational and Advisory Meetings	15 meetings	430 person-days
Coordination Meetings	9 meetings	300 person-days
Visits to Grantee Institution by Consultants	65 visits	325 person-days
Training; Visits by LDC Researchers to U.S. Centers	112 visits	<u>560 person-days</u> 2,400 person-days

These estimates are based on the actual numbers of individuals participating in the meetings and actual lengths of meetings, plus estimates of average time for proposal review and training services.