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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON 20, D.C.

OFFICE OF
GENERAL ADMINISTRATION

AUG 11 1971

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Dr. Dale R. Corson
President
Cornell University
Ithaca, New York 14850

Dear President Corson:

I am pleased to inform you that pursuant to the authority contained in Section 211(d) of the Foreign Assistance Act of 1961, as amended, Grant No. AID/csd-5158 in the amount of \$580,000 is hereby made to Cornell University. This Grant is for the purpose of implementing the project "Policies for Science & Technology in Developing Nations," as set forth in the Final Proposal, dated May 24, 1971, and agreed to by the Agency for International Development and Cornell University.

The Grant funds are obligated as of the date of this letter, and shall apply to costs incurred in furtherance of the project for five years.

This Grant is made to Cornell University on condition that the Grantee shall administer the funds provided under this Grant in accordance with the terms and conditions set forth in the Final Proposal (including Budget), the Standard Provisions, and Appendix "A", attached hereto and made a part hereof. To the extent of any inconsistency between the Proposal and the Standard Provisions, and any other provisions which are made a part of this Grant, by reference or otherwise, the Standard Provisions shall control.

FUNDS AVAILABLE

Date Sept 22 1971
Project No. 931-11-995-137-73
Obligation No. 3121037
Direct Cl. 259
Allotment 254-31-099-00-34-21
Amount \$580,000.00
by (initials) JAB
AID/CSA/ACC/WAB

Please acknowledge this Grant by signing the original and six (6) copies of this letter and one copy of the Statement of Assurance of Compliance. Please return all documents to the Grant Officer.

Sincerely yours,

John A. Hannan
(For) John A. Hannan

Attachments:

1. Assurance of Compliance
2. Final Proposal & Budget
3. Standard Provisions
4. Appendix "A"

ACCEPTED:

BY

Thomas R. Rogers
THOMAS R. ROGERS, Director
Office of Sponsored Research

PROPOSAL FOR SUPPORT UNDER THE
AGENCY FOR INTERNATIONAL DEVELOPMENT
INSTITUTIONAL GRANTS PROGRAM

Name of Applicant: CORNELL UNIVERSITY, Ithaca, N. Y. 14853
Date of Application: May 24, 1971
Title: Policies for Science and Technology
in Developing Nations
Duration: 5 years from date of Grant
Amount of the Grant: \$580,000 (5 years)

SUMMARY

Cornell University proposes, with support from the Agency for International Development, to strengthen its present capacity to apply an interdisciplinary approach to issues of public policy relevant to the application of science and technology to problems in the developing countries. The goal would be reached through a program of graduate studies and faculty seminars, curricular and library development in this subject field. It would embrace also an evolving system of contacts and working relationships with scholars and policy makers in this field in selected developing countries. The effort would center on engineering and the physical sciences, but have strong supporting ties to the social sciences and to such other applied sciences as agriculture, industrial and labor relations, and urban studies. The approach would be to study the potentialities, the policies and practices which influence the development of indigenous science and technology in developing countries. It would include also examination of policies and procedures for making more effective adaptation of science and technology imported from the more developed countries. Emphasis would be given to establishment of analytical bases and procedures for setting science development priorities, including analysis of the interplay between strategies for overall science and technology and sectoral and sub-sectoral science and technology development investments. Studies will be included on the application of science policies and strategies to such specific needs and problems of the countries as industrialization, use of technical manpower, natural resource and land use evaluation, housing, water management, education of scientists and engineers, etc. Cornell-IDC linkages will be established through collaboration in research and case studies. Workshops for officials and specialists from the U. S., developing countries and development agencies will further enhance this interaction. The University will consequently be better prepared to be of greater future service to A.I.D., the developing countries, and other organizations and institutions concerned with accelerating the development of these countries.

I. INTRODUCTION

Recent emphasis in technical assistance to developing countries has introduced a new element to earlier U. S. assistance programs in such fields as agriculture, medicine and health, administration, transportation and education. This emphasis is:

- A. A heightened concern with national policies, strategies, and networks of governmental and private organizations for the development and utilization of indigenous scientific and technological capabilities.
- B. A movement toward a second generation of technical assistance in which the somewhat "tutelary" relationship inherent in the early institution-building stage is being succeeded by increasing mutual interdependence among the scientists, technologists and administrators from industrial and developing countries.

This Grant incorporates these two directions for they are especially compatible with both the institutional capabilities at Cornell University and the interests and commitments of its faculty and administration. To a strong infrastructure of applied science and engineering and sustained concern with problems of development, Cornell can bring the resources of its interdisciplinary Program on Science, Technology and Society (STS). This program associates Cornell's physical and biological scientists and engineers with social scientists to study the social and economic implications of technology and the role of scientific and technological factors in public policy. This Grant will be under the joint direction of Cornell University Program on Science, Technology and Society, College of Engineering and Center for International Studies. An interdisciplinary faculty committee will meet regularly to review problems in science policy, particularly the relationship of scientific and technological factors to international development.

II. PRINCIPAL OBJECTIVES, SCOPE AND PRIORITIES

Cornell University proposes to increase its competence and breadth of interest on problems of science, technology and public policy relevant to developing nations through a program of applied research, graduate training, and curricular and library development. The effort would be an interdisciplinary one, centered in engineering and the physical sciences but with strong ties to the social sciences and to such other applied sciences as agriculture, industrial and labor relations, and urban

studies. The expectation is that this Grant will produce a body of trained people, knowledgeable in the application of science and technology to societal problems and desirous of working with groups within developing nations on these efforts, and a body of new research-based knowledge relevant to this subject.

In a broad sense, the Cornell program, supported by the Grant, will study the policies and practices which influence the development of indigenous science and technology in developing countries, and the ways in which this as well as imported science and technology can, by appropriate adaptation, be applied to the social and economic development of these countries. Of particular interest will be development of a rational base for analysis of procedures for the establishment of science program priorities, including the analysis of the interplay between strategies for overall science and technology with sector and subsector science and technology development strategies, and with economic planning and total national investment decisions. Although the program will emphasize the development of policy and strategies for the use of science and technology, it will be necessary in the studies to consider the derivation of these policies and strategies in the specific needs and problems of the countries, as for example: industrialization; use of technical manpower; natural resource and land use evaluation; housing; water management; education of scientists and engineers.

The program will make in-depth research and case studies, involving the joint participation of personnel from both Cornell and the developing nations. These partnership arrangements will be established with selected universities or governmental institutes within the developing nations which desire to cooperate in this fashion with Cornell University. Thus, a two-way flow of people will result in continuing intensive interrelations, fostering analyses of science and technology policy issues of general application to developing countries. The interaction will be further enhanced by workshops for officials and specialists from the U. S., developing countries and development agencies.

In making in depth research and case studies, Cornell's initial analytical and research emphasis will be to identify areas where the lack of information or analysis is a crucial limiting factor to establishment of rational policies by the less developed countries for their development of an indigenous scientific and technological capability, and/or for the effective importation and adaptation of such knowledge from the more developed countries. This will lead to selection of priority topics for further analytic studies. Some of these will be undertaken within the Grant, others will be done outside the Grant by scholars whose interests will be stimulated by the Grant programs. The Grant program will provide for a "core faculty" and coordinating center around which expanding efforts will arise and attempts will be made to solicit support for and

to maintain a common, coordinated approach to problems of science and technology policy.

The less developed countries confront the coming decades of development through technological growth from a far different base than did the countries which are already two hundred years into the industrial revolution. Time and circumstances will not permit them the "natural evolution" of the past. Investments in science and technological development are necessarily large; they tend to be reversible only at great cost; they are far-reaching in impact. They are not always appropriate to the country's budget capabilities, its resource base, or its development requirements. Often, they are fragmented or unbalanced. Thus it is essential that the best analysis and information possible be employed at the national and regional levels so that policies and strategies will be promptly and truly effective.

A central issue in science policy involves the governmental policy choices for the development of indigenous scientific and technological infrastructure in their relationships with science and technology developing institutions in the world at large. Effective approaches in dealing with infrastructure questions will vary with the stages of modernization and institutional development envisaged for individual countries, possibilities of adopting or adapting science and technology outputs from other countries and possibilities of developing more effective participation in the worldwide communities of scientists and scientific institutions.

Cornell will analyze the current state of knowledge and identify a number of propositions that it would examine critically: (1) over a range of comparative data that already exists or would be obtained from AID, OECD, UN, East-West Center, University of Sussex and other agencies with which Cornell would establish continuing flows of information, and (2) intensively in a few less developed countries where Cornell would establish research relationships and exchange with local academic centers, governments, or other agencies working in the science and technology policy area.

The following topics are illustrative of national science and technology problem areas which Cornell will consider and from which it will select specific topics for more intensive study:

1. What criteria are likely to prove most useful in governmental resource allocation decisions regarding investment in science and technology infrastructure as against other national goals?
2. What are the likely differential consequences of public investment in (a) government operated R&D

laboratories, (b) university based R&D, (c) subsidized industrial R&D in the private and public enterprise sectors? How are these likely to vary over such different fields of activity as industry, agriculture, health care, communications or transportation?

3. What alternative kinds of governmental structures equipped with what authority and staffed by what kinds of people are likely to be able to (a) exert real influence in the definition of public policy and the allocation of public funds on matters relating to scientific and technological activities (b) reinforce the disciplines that will be instrumental to the difficult policy choices inherent in question 1, above and (c) enhance communication between disciplines and between domestic and foreign scientists, engineers and industrialists, and between domestic and foreign scientific institutions?
4. What incentives, sanctions and rewards are available to induce local scientists and technologists (a) to work on the really important problems relevant to the needs of their own societies as defined by public policy and (b) to reduce the incidence of talent migration (brain drain), to maintain an attractive working environment for technically trained people, and to maintain effective working relations with persons or institutions in other countries working on similar problems?
5. What adjustments can be made in public education at all levels (a) to develop and reinforce attitudes favorable to appropriate roles of science and technological innovation in social and economic development, (b) to educate competent scientists and engineers in appropriate numbers at appropriate skill levels in appropriate fields to conform with manpower needs for national development?
6. What methods and criteria are most suitable for the on-going evaluation of developing countries' investments and activities in science, technology, scientific and technological education, research, development and applications and their social and political consequence?
7. What types of research and development are best suited to the industrialization of developing countries so that (a) close coupling with societal needs occurs (b) a spectrum of activities is introduced to account for

advancing stages of industrialization and for developed countries. How can the science and technology infrastructure be brought in line with those of other less developed and of the more developed countries?

8. What are the crucial relationships between research and development, industrialization, agriculture modernization and unemployment in developing countries?

Funds from this Grant will be used to support a number of Cornell faculty and graduate students who will participate in analytical and field work. The students will provide necessary participation in course and curricular development and reorientation activities. Other graduate students who are studying at Cornell from LDC's will also be actively involved in the new courses and workshops.

Supported in part by funds from the Grant, Cornell will develop a central library collection of reference material on science policy. This should result in Cornell becoming a national information source in this subject area.

III. UNIVERSITY CAPABILITIES

Two major on-campus activities concerned with problems of science, technology and development are the Program on Science, Technology and Society and the Center for International Studies. These efforts include teaching, research and case studies. Both activities have full-time staffs with high level leadership, enjoy the enthusiastic support of the University administration, and share faculty with a number of University schools and departments.

In addition to its major professional schools and colleges, Cornell is heavily involved in a number of relevant high quality area and problem oriented international programs, including: Faculty Committee on International Science and Technology, Southeast Asia Program, Latin American Program, International Population Program, International Agricultural Development Program, Rural Development Program, Program in Participation and Labor Managed Systems, International Development (Business and Public Administration), and International Legal Studies Program. Through research, service activities, and the training of students from LDCs, these programs have resulted in an unusually strong and comprehensive network of overseas relationships with universities, government institutes, individuals and multinational corporations. For example, in the College of Engineering approximately forty percent of the faculty have had overseas experience, with several in LDC's, while in the College of Agriculture one-third of the faculty have had experience in LDC's.

Many courses in the subject area of this Grant are currently being taught at the University. Examples are "Science and Technology Relations Among Industrialized Countries," "Social Implications of Technology," "Science, Technology and Public Policy," "Transfers of Science and Technology from Industrialized to Developing Countries," "Seminar in International Business and Economic Policy," "Administration of Public Operations Abroad." A large number of technical courses with subject content in science and technology devote substantial emphasis to special applications to less developed countries.

IV. UNIVERSITY CONTRIBUTION

Funds provided by this Grant will not replace existing funds for any current activities. Also, activities carried out under this Grant will be additive to existing and planned programs of the University. In direct support of this Grant, the University will provide:

1. Administrative costs, including time of the Dean and other senior officers of the University.
2. Laboratories, field research facilities, and libraries including laboratory equipment, greenhouses, growth chambers, and land.
3. Office, classroom and auditorium space for faculty, students, and special meetings or symposia related to this program.
4. Consultation with members of the faculty not directly associated with the program.

V. ADMINISTRATIVE ORGANIZATION

The University will administer the Grant through its normal administrative channels and in accordance with its normal policies and operating procedures. The Grant will be administered by a senior faculty member specialized in the subject field and with substantial administrative experience, who will be designated Program Director. The Program Director will be appointed by the Provost of the University upon the nomination of the Program Executive Committee. The Program Executive Committee will consist of senior faculty members and will (a) provide a continuing, high-level review and evaluation of the program, and (b) assist in establishing policies and providing guidance in their implementation. Although this

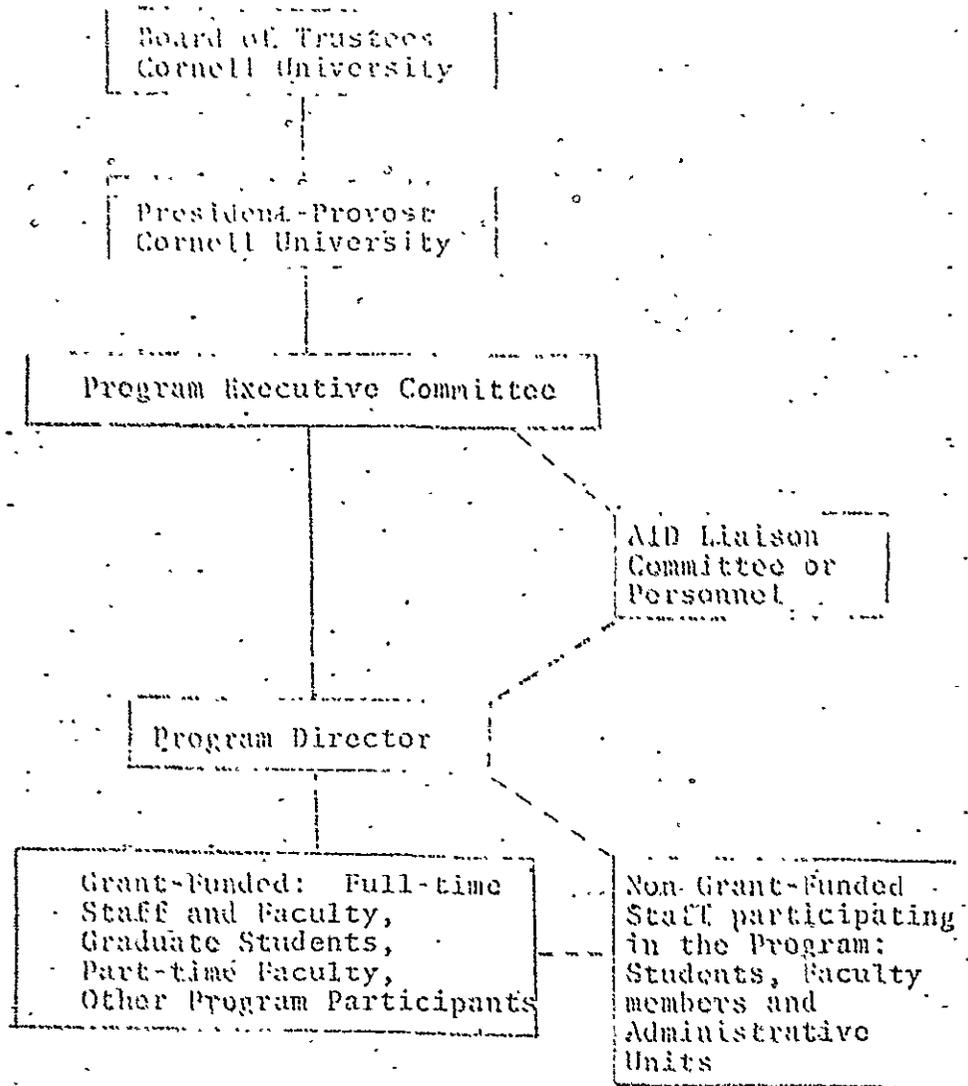
Committee may change during the duration of the Grant as events indicate, its character can be inferred from its make up as currently planned:

1. Director, Science, Technology and Society Program (Committee Chairman).
2. Program Director, (Ex-officio).
3. Dean, College of Engineering.
4. Assistant Director, Science, Technology and Society Program.
5. Director, Center for International Studies.
6. Associate Director, Center for International Studies.
7. Professor of Economics.
8. Professor of Organizational Behavior.

Faculty with special qualifications will be drawn upon as deemed appropriate for participation in specific functions of the Executive Committee. Similarly, specially qualified faculty members will also be drawn into the Grant program and will assist the Program Director to locate program participation talent and interest among the faculty, especially in linking the core program activities with critically important related University program and disciplinary areas. Special workshops involving Cornell, other U.S. and foreign scholars, may be used as contributors to the program.

The Executive Committee and Program Director will participate as appropriate with such liaison committee or personnel as AID may designate with the objective of optimizing communication between Cornell University and AID relating to activities under the Grant.

A flow-chart of these relationships follows:



VI. PROGRAM IMPLEMENTATION

To the extent feasible, activities will be initiated on all program categories promptly upon receipt of the Grant. Some staff and program administration appointments must, however, of a necessity precede activities in other categories. It is anticipated that the Grant program will be operating at approximately two-thirds its full level by the end of the first year, and at full level by the end of the second year of the Grant.

Staffing

The program expects to recruit, as early as possible, two full-time equivalent faculty members with strong credentials and commitments in the broad area(s) of science and technology policy, strategy, and transfer. Most of the faculty will be recruited from existing Cornell staff, although it is planned to add at least one new faculty member and to bring visiting academics and practitioners to Cornell from the U. S. and overseas. Recruitment includes negotiation with departments and schools for the partial release of these faculty for this program.

Course Development

The program plans to develop several new courses and to modify the content and orientation of some existing courses. Among these new courses, at least one will be designed with students from the less developed countries particularly in mind. Another will focus on the issues in science policy, strategy and organization. (The direct costs of developing a new course ranges from \$500 to \$6,000 per course, depending upon extent of curriculum development, availability of materials, the need for outside lecturers, basic research needed, summer support, and the number and level of students. The cost of restructuring an existing course also varies widely from case to case.)

Research Activities

The research activities supported by the Grant will involve study efforts based at Cornell University and projects based on study within LDC's. The latter will be expedited by the explicit development of linkages between Cornell and specific academic or governmental institutions within a few selected LDC's. Some of the research will be of the character to permit it to be done by graduate students in fulfillment of their thesis or project requirements; other studies will be shorter-range interdisciplinary efforts on policy decisions and implementation which involve science and technology activities

in developing nations. Some of the research participants will be from LDC's either as registered Cornell graduate students or as short-term visitors from collaborating LDC institutions.

The principal costs associated with conducting research as outlined in the table are for engaging faculty full or part-time, for visiting specialists, for graduate students, for secretarial assistance, and for materials (special books, documents, microfilming, Xerox).

Graduate Fellowships

The program expects to make training of an applied nature a key feature of its activities. This training will typically include working with faculty and visitors on research and teaching projects as well as possible research periods overseas in an internship capacity with a counterpart institution.

Travel

Travel support will be provided for both Cornell, other U.S., and cooperating foreign faculty and students. An early task for Cornell will be to visit several countries with the best prospects for collaboration, for some detailed fact-finding, and for discussion. More "routine" travel will be required to develop and conduct research activities, for mutual visits, for individual and group advisory efforts, and for workshops/symposia to be held both in the field and in this country.

Grant funds will also be used by Cornell to bring in officials and academics from countries and institutions of special concern to the program. These visits may be for the purpose of attending symposia/workshops, as orientation or as ad hoc teaching/research resources. In addition, the program will develop regular contacts with selected institutions in the more developed countries and with individuals who have special competence in this problem area, such as OECD, the University of Sussex Development Institute, UNDP, and others.

Library and Data Support

One feature of the current Cornell program is the existence of a small but well functioning library on science and technology presently housed in the STS program. Funds provided by the Grant will be used to expand acquisitions of materials for this specialized library capability. This in combination with the excellent general library system at Cornell should create the leading library and data center in the subject area of the Grant.

VII. REPORTS AND REVIEW

As a minimum, there will be provided to AID an annual report and, at the initiative of AID an annual review of activities under the Grant. This will include an evaluation of progress, administrative and financial considerations, plans for the following year in detail and for the remaining years of the Grant in more general terms, and discussions of possible utilization of the evolving University competence by AID and others -- under separately financed contracts or other arrangements.

* * * * *

The Program on Policies for Science and Technology in Developing Nations, with support from this Grant, will develop the capacity at Cornell University to provide assistance, under separate financing arrangements, to developing countries in a number of ways and through a variety of channels. This assistance, which would be arranged for and negotiated separately from this Grant, may be in the form of technical assistance, advisory service, training, research and information exchange, etc. It will be available to appropriate U.S. government agencies, to international agencies, to Foundations, and directly to the less developed countries. Most especially, this added special competence will inevitably become incorporated through the processes of scholarship and education, into the competence of U.S. and foreign scholars and institutions concerned with this topic of great significance to the developing and the more highly developed countries alike.

BUDGET

Salaries	\$353,000
Stipends for Graduate Research Assistants	61,000
Tuition and Fees for Graduate Research Assistants	53,000
Travel and Allowances	77,000
Equipment, Supplies and Materials	17,000
Library Development	19,000
TOTAL	<u>\$580,000</u>