PD-AAC-568-B1 931/0127-(2)

23p.

Proposal for Continuing Support under

the Agency for International Development

Institutional Grants Program

Applicant:	Cornell University
Date:	August 1975
Grant Title:	Potential of Soil Resources in the Tropics and Biological Nitrogen Fixation
Amount and Term of Original Grant plus Amendments:	June 30, 1970 to Nov.1, 1975 $500,000
Amount and Term of Proposal:	$500,000 extended to Nov. 1, 1977
AID Sponsoring Technical Office:	Office of Agriculture, Bureau for Technical Assistance

Grant Project Statement

211(d) Institutional Grant

Cornell University

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Institutional Grant Project Statement

Extension/Revision

Cornell University
AID/csd 2834

Potential of Soil Resources in the Tropics

I. Relevance of Problem and Need for Expertise

In view of the continuing need to expand world food production despite the successes of the green revolution, it is essential to tap the world's available unutilized and underutilized soil resources. Best available estimates indicate that there are about 800 million hectares (2 billion acres) of land in the tropics which are not now under cultivation but which are potentially arable. This is a larger area than is now being cultivated. Much of this uncultivated land has a favorable topography and there is evidence that a substantial acreage has good potential for agricultural production at relatively modest costs provided that adequate soil, crop, and water management practices are used including the application of fertilizer nutrients in proper balance and amounts.

In addition to the extensive areas in the tropics which are not now under cultivation, most of the soils which are cultivated have produced rather poorly. There are large areas of traditional agriculture where the introduction of modern technology can increase production substantially. This includes the judicious use of applied nutrients along with improved soil and crop management practices, including water conservation and control, use of improved seed, and the application of pesticides.

Soils of the tropics pose unique problems for the development of agriculture in LDCs. In light of the continuing problem of increasing food production and the potential of doing so in tropical LDCs, it was in the interests of the U. S. to increase its capabilities in the application of soil science to the tropics. The aggregate of U. S. expertise in this area of knowledge is substantial but it is incomplete. Knowledge of the varied facets of the subject is distributed unequally among U. S. institutions. AID has recognized the need to develop among U. S. universities a coordinated resource of knowledge about soils of the tropics and their use. Institutional grants were made to five Universities including Cornell to strengthen their capabilities and develop complementary centers of knowledge in five different areas of soil science as applied to the tropics. It was expected that as these competencies developed, the grantees would respond to requests by AID and other agencies for consulting, technical assistance, research, training, and other services within the limitations imposed by their institutional obligations.

II. Grantee Performance and Results to Date

Cornell University activities under the original grant have been consistent with the purposes of the grant and substantial progress has been made in fulfilling its objectives. The objective of the original grant was to develop greater competence in the faculty for teaching, research, technical assistance, and advisory services in soils of the tropics with a major focus on cultural systems. To meet this objective required the integration of many subject-matter areas in soil science as applied to the tropics: soil characteristics and classification; plant nutrient-soil relationships; soil-water-plant relations; and conservation and protection for sustained

production. In addition, supporting inputs were required to help understand the impact of climatic conditions on soil and crop behavior; water management; crop management; and economic and social environments within which cultural systems must operate and knowledge and technology applied.

It was recognized that to implement the grant objectives, a course of action had to be taken in the context of the wide range of soils, climates, crops, and socio-economic conditions that prevail in the tropics and the consequent diversity of cultural systems that are valid for farmers under different combinations of these conditions. Contrary to the belief commonly held, diversity among soils is greater in the tropics than in temperate regions. Climates range from continuously wet, through seasonal rainfall patterns, to desert conditions. The range of crops is large and requirements for their production are extremely varied. The range of socio-economic conditions is great. Thus, the diversity of practical cultural systems that would accommodate the needs imposed by the wide range of conditions is indeed very large.

In deciding on a course of action to implement the grant objectives a choice had to be made either to develop expertise in detail for a limited region in the tropics or to develop expertise in lesser detail over a broad range of soils and environments of the tropics. The latter alternative was chosen and although it has not prepared Cornell to provide details of alternative cultural systems for farmers under specific situations without further study, it has given Cornell faculty the general understanding and principles necessary to interpret the available information in a given situation and to develop additional information if needed for improving soil management systems. This approach has also provided a perspective of

the broad range of soils, climates, crops, and socio-economic conditions of the tropics necessary to teach principles and direct the research of the many students at Cornell from tropical countries.

While building of expertise as envisioned in the grant is not complete, it has helped prepare many of the faculty to respond to requests from AID and other technical assistance agencies for a broad variety of assignments on soils in the tropics and cultural systems for them. This expertise is not temporary; it represents a resource for long-range objectives specified in the grant document. Cornell is committed to respond to proposals by AID for training, research, and consulting services under appropriate funding arrangements within the limitations imposed by Cornell's obligations as an educational institution.

The specific accomplishments under the grant are included under six main categories: (1) teaching, (2) research, (3) publications, (4) consultation, (5) library and reference, and (6) linkages and contacts.

Teaching soils of the tropics has been augmented by the addition of two new courses. Eleven others including two interdepartmental offerings have been substantially revised to incorporate subject matter relevant to the tropics. These courses reach about 700 students annually. Approximately 75 graduate students having career commitments to LDCs have been candidates for advanced degrees including 52 from 25 LDCs. Faculty expertise has been strengthened by close association with seven visiting professors and scientists who are authorities on soils and cultural systems of diverse tropical environments. These individuals were brought to Cornell under the grant to lecture and consult with faculty and students for a period of three to six months. In addition, six visiting scientists were invited

to the campus for short periods for seminars and consultation.

Research has concentrated mainly on problems raised by work of an AID-supported soil fertility research contract for the humid tropics. During the grant period, twenty problems have been investigated largely with grant funds and sixteen of these dealt with questions raised by the research contract but not strictly within the scope of its objectives. They were undertaken to elaborate or explain results of that research. An additional fourteen problems were investigated under outside funding except for portions of salaries from grant funds for several of the faculty who directed graduate student research.

Publications resulting from research and consultant activities include fifteen published articles, ten manuscripts accepted for publication, twenty processed articles and Master's theses catalogued in libraries, and twenty typescript reports for internal use. Fifteen of the processed articles have been reproduced in quantity for distribution to AID and selected institutions and individuals. One of the most noteworthy is a 434 page document prepared by Visiting Professor Claude Charreau on "Soils of Tropical Dry and Dry-Wet Climatic Areas of West Africa and Their Use and Management."

Consultation by Cornell personnel under the grant involved about 700 man days in the LDCs, about 100 in conferences in the LDCs and about 100 in domestic consultation on soils of the tropics and related subjects. These are exclusive of consultation with members of the University Consortium on Soils of the Tropics and exclusive of consultation directly related to the AID-supported soil fertility research project.

Library holdings on soils of the tropics and closely related topics have increased by over 400 volumes in the Agronomy reference library as an adjunct to the extensive holdings of the University library. A consultant

under Cornell's direction and funded from 211(d) grants by the five members of the University Consortium on Soils of the Tropics is assembling some 12,000 references held by the Soil Conservation Service for publication in a series on Geography of Soils of the Tropics. The first volume on Africa and general references for the tropics has just recently been published.

Linkages involving cooperation on activities related to the subject of the grant have been established with 13 institutions in nine LDCs and with six institutions of developed nations devoted to agricultural development in LDCs. In addition, Cornell has established firm contacts but without collaboration on activities with 10 other institutions in 12 LDCs, exclusive of the contacts with 14 others through graduate students. During the past year active collaboration has been maintained with most or some support from 211(d) funds with the following international agencies: Institute of Tropical Agriculture (IITA), International Center for Tropical Agricutlure (CIAT), International Center for the Improvement of Maize and Wheat (CIMMYT), and the Interamerican Center for the Integral Development of Water and Land Resources (CIDIAT) in Venezuela.

Cornell is one of the five institutions associated with the University Consortium on Soils of the Tropics and has participated directly in joint activities with the other institutions (North Carolina State University, University of Hawaii, University of Puerto Rico, and Prairie View (Texas A&M University). These joint activities have included several seminars and workshops, research activities, training programs for LDC participants, development of a directory of soil scientists for the tropics, and sponsorship of visiting professors and scientists. Contact has been maintained with members of the AID-supported Water Consortium, formerly CUSUSWASH, now

Council for International Development (CID) and joint meetings have been held of the two Consortia. The Rockefeller and Ford Foundations have provided support for activities directly related to the 211(d) program mainly for graduate students and their overseas thesis research. Also, the African American Institute and FAO have provided support for graduate students whose research related to 211(d) objectives.

Some 80 man-days of Cornell faculty time have been spent during the past year in consultation with LDC institutions on soils problems in the tropics exclusive of conferences, seminars, and training institutes. An additonal 50 man-days were spent in consultation with or for AID on soils problems of LDCs at no expense to AID except travel. One Assistant Professor, one Research Associate, and two Graduate Assistants were stationed overseas during the past year on an AID-supported soil fertility research project. This project, though funded independently of the 211(d) grant, uses institutional expertise for solution of soil fertility and management problems of LDCs in the tropics. Seven graduate students, in addition to the five supported by the grant, conducted research in five LDCs on soils problems in the tropics under the direction of Cornell professors.

III. Grantee Commitment to Long-Term Involvement

Cornell University has had a long tradition of involvement in international agriculture. In 1900 two staff members traveled to China to assist one of the provincial governments. A graduate of the class of 1873 was named president of the College of Agriculture at Piracicaba, Brazil in 1908. From 1924 to 1931 a cooperative plant improvement program was conducted by Cornell University and the University of Nanking with financial support from the International Education Board. A Cornell soil scientist, Richard Bradfield, helped plan the Rockefeller Foundation program to improve Mexican food crop varieties and agronomic practices and later served as Regional Director for Agriculture of the Rockefeller Foundation in the Far East. When the Inter-American Institute of Agricultural Sciences was established in Turrialba, Costa Rica in 1942, several distinguished Cornell agricultural scientists became involved in this program.

Over a period of eight years, 1952 to 1960, a cooperative educational and research program was conducted by the University of the Philippines College of Agriculture at Los Banos and the College of Agriculture and Life Sciences at Cornell. A total of 51 American professors, including 35 from the Cornell campus, participated in the project serving from one to three years at Los Banos. Subsequently, from 1963 to 1972, a collaborative University of the Philippines-Cornell University Graduate Education Program in the agricultural sciences was conducted, financed largely by the Ford Foundation. Thirty-two visiting professors and twenty-three graduate assistants from Cornell participated in the program at Los Banos as working colleagues with their Filipino counterparts in teaching, research, and extension. In addition, 26 short-term visiting professors, consultants, and administrators were involved.

On the Cornell campus a program in International Agricultural Development was established in 1963 with a full-time Director. The State of New York has accepted a commitment to the program and now provides funds for the Director's Office and the salary of nine full-time professors in seven different departments whose major responsibilities are in international agriculture. Of particular significance is the recent appointment of Dr. Armand Van Wambeke to the position of Professor of World Soils in the Department of Agronomy who will join the faculty next year. This insures continuity of commitment to soils problems in LDCs if support can be maintained for overseas work not only of the Professor of World Soils but also for the 1.5 to 2.0 full-time professional equivalents of other faculty who currently contribute to the program. To maintain a viable program for overseas work and special on-campus international activities will require continued support from sources such as AID, foundations, and other national and international agencies.

Alternate sources of funding have supported specific activities related to the objectives of the grant: graduate student stipends and overseas thesis research have been supported in part by grants from the Ford and Rockefeller Foundations and it is anticipated that some support for this purpose will continue; shared cost arrangements have been made with international institutes (IRRI, CIAT, CIMMYT, IITA, CIDIAT) for research and training activities. It is estimated that the University contribution for support of the 211(d) grant is approximately equal to that of the grant. This is based on the average cost for salaries, fringe benefits, and support per faculty equivalent.

IV. Rationale for Revision/Extension

It has become increasingly apparent that in order to apply improved soil management practices to specific areas in the tropics, more complete information is needed to evaluate the potential of the soil resources in these areas. Therefore, for the two-year revision/extension of the grant it is proposed to shift the focus to an assessment of the soil resource potential in the tropics under different cultural systems and levels of technology. This is an area which has been given insufficient attention and yet should have a high priority. The Chief of the Soils Resources Division of FAO, Dr. Dudal, at a recent (February, 1975) AID-sponsored workshop on Soil and Water Management recommended that AID give top priority to accelerating the appraisal of potential arable land on a world-wide basis.

AID has recognized the need to give priority attention to evaluation of soil resources in the LDCs and has received requests for technical assistance for this. Unfortunately, much of the information on potentially arable land in the tropics is based on broad generalizations from a limited amount of information. For most of the tropics soil resource inventories are not available for making an adequate assessment of the agricultural potential of the soils under various cultural systems and different levels of technology.

The recently compiled FAO-UNESCO small scale (1:5 million) soil map of the world indicates that systematic soil surveys have been completed on only a small fraction of the tropics. Where soil surveys have been made, interpretations often are lacking on how best the soils can be utilized, what crops are most adapted, and what the alternative management practices are which can be recommended. A reliable assessment of the soil resource and crop production potential of most of the tropical regions will require

substantially more data than are now available on the properties and areal distribution of the many different kinds of soils. Interpretations of soil maps and supplementary laboratory data will be needed to identify the more promising soils for efficient crop production and soil management practices.

Many of the LDCs have recognized the need for strengthening their capabilities for inventorying and evaluating their soil resource potential and have looked to U. S. institutions and elsewhere for assistance. AID has been aware of the need for increased support to this activity and has sought to encourage and support U. S. institutions to increase their response capabilities in providing advisory and training services to the LDCs for the assessment of their soil resources. Cornell has substantial expertise in soil resource appraisal in the United States and to a limited extent in the LDCs. There is need to develop greater breadth and depth in utilizing this expertise in the LDCs in the tropics by expanding the collaboration and linkages already established and by developing a broader understanding of how some of the newer techniques and procedures for evaluating soil resources can be applied.

Other than the Universities, the major sources of expertise in the U. S. for soil resource inventory and assessment are the U. S. Department of Agriculture and the U. S. Department of Interior both of which have a large number of qualified personnel. However, their availability is contingent upon release from their regular assignments. There is some expertise in consulting firms but they usually recruit University or U. S. agency personnel to fulfill contract commitments.

The long-term commitment to international agriculture, the potential of enhancing the response capability of a high qualified staff in soil resource evaluation in LDCs and the demonstrated interest and capacity for education and training of students from tropical countries merit grant support by AID for the utilization of Cornell's expertise. The original grant has helped prepare at least twelve of the faculty to undertake a broad range of assignments that might be requested for soils of the tropics and cultural systems for them. A revision/extension of the grant as described below would assist in utilizing Cornell's response capability in a high priority area. Without this support it would not be possible to respond adequately to requests by AID for consultation and technical assistance which are normally outside of regular faculty duties and obligations. Additional staff would be required in order to provide for release time for senior experienced staff. Maintaining established linkages with LDCs and developing new ones, preparing state-of-the-art documents, and strengthening select research and training capacities will all require additional funding.

V. Revised Grant Project Design

The revised grant will focus on methodologies and technologies for obtaining, maintaining, and assessing inventories of soil resources in the tropics and determining the crop production potential under different levels of technology and different cultural systems. It is designed to be utilization oriented in accordance with the recommendations of the AID comprehensive review team.

The primary objective of the revised grant is to utilize Cornell University's competence to appraise land resources for assessing crop production

potential of soils of the tropics under different levels of technology and thereby helping in a systematic and efficient agricultural development of the LDC lands with a focus on the small farmer's well-being.

Cornell University has substantial expertise in soil resource appraisal in the United States and to some extent in the tropics. The utilization activities would further develop its expertise for LDC use. The University will expand the collaboration and linkages already developed in the LDCs, thereby building a broader knowledge base and strengthening the capabilities for research, training, and advisory services.

The expected outputs generated by the grant extension can be grouped in the following categories:

1. Broadening the knowledge base of the present status of inventories and appraisals of soil resources in the LDCs in the tropics. Surveys will be made of what information is available, what kinds of maps have been or are being produced, what procedures and techniques are used in getting the data, how the data and maps are interpreted, and what kinds of soil interpretations are used to identify soil productivity potentials under different levels of technology. A critical analysis of the current knowledge will be made, major gaps in soil resource information will be identified, and recommendations will be made for needed technical assistance, training programs, and research. This state-of-the-art review and analysis will constitute an important component of the grant operations.

The information required for this study will come from many sources. In addition to published information, there is substantial unpublished material available in the files of FAO, UNESCO, international institutes, U.S. and European institutions as well as LDC institutions. The proposed

seminar at ICRISAT in January, 1976 on "The Uses of Soil Survey and Classification in Planning and Implementing Agricultural Development in the Tropics' will provide an excellent opportunity for exchanging ideas on the subject with knowledgeable personnel in attendance from the participating institutions.

2. Strengthening the advisory capacity and providing for a greater response capability in soil resource inventories in LDCs and assessment of the potential of the soils for increased agricultural production. The Department of Agronomy has substantial strength in these areas on which to build a better understanding of LDC needs. Every effort will be made consistent with on-going commitments of professional staff to respond to LDC requests through AID or other technical assistance agencies under mutually acceptable arrangements. The grant will also fund a small amount, not to exceed $10,000 per year, for consultancy time to be provided in emergency situations where individuals are needed on very short notice and when other instruments cannot be used without causing unacceptable delay. In the Department of Agronomy there are at present two staff members, Drs. Arnold and Olson, with international experience whose primary domestic responsibilities are concerned with inventories and utilization of soil resources. A third faculty member with an extensive international background, Dr. Armand Van Wambeke, will soon join the Department faculty in a permanent position with full-time commitment to world soils. His career specialization has been soil classification and survey and soil resource evaluation for crop production. He is fluent in English, French, Dutch, Spanish, and German. A recently retired staff member, Dr. Marlin Cline, is an emeritus professor and continues to participate actively in matters

related to his professional interests in soil classification, morphology, and genesis and their application to land use. He has made significant contributions to soil science which have been widely recognized both in the U.S. and abroad and has had considerable interest and experience in the tropics. Competent personnel in the Division of Atmospheric Sciences in the Department are available for consultation on the climatic environment related to soil use in the tropics.

In addition to the potential response capability of the Department of Agronomy, there are other Departments in the University with closely related interests and with expertise which could be tapped to assist in the evaluation of the potential of the soil resources in the tropics. The Departments of Agricultural Engineering, Natural Resources, Civil and Environmental Engineering, Agricultural Economics, and Rural Sociology all have highly competent personnel with substantial international experience in land use and farm management, soil and water management, and photo interpretation and remote sensing techniques for land use inventories.

3. Developing a training capacity for the assessment of soil resources and potential for crop production under different levels of management. The capacity for training LDC technicians and officials in the appropriate methodology for assessing the soil resource potential for crop production would be greatly enhanced under the proposed grant revision. In the process of preparing and analyzing the current status of this subject and in consultation with responsible LDC officials and personnel of other cooperating institutions, priorities can be established for the kinds of training required to meet country or regional needs. Cornell's increased competence could be tapped to assist in the implementation of these training programs. Emphasis will be placed on the development of non-degree training

programs although degree programs will be arranged to meet particular needs. Workshops, seminars, and special courses could be arranged with national institutions and/or international agencies. Short courses could include such tropics as "Principles and practices in developing mapping legends for soil resource inventories", "Principles guiding interpretation of soil surveys", "Field mapping and assessment of landscapes for soil patterns", etc.

4. Strengthening research capability. New techniques and methods are being developed in the advanced countries for inventorying soil resources and determining their potential for agricultural, rural community and urban uses. Much of this new technology has application to LDCs in the tropics and some research is being done to adapt this technology to LDC situations. Much more research could be done, for example, in the utilization of improved techniques for photo interpretation, use of remote sensing and ERTS imagery, and modification of soil interpretations for use in LDCs. Collaborative research on how to catalogue land forms by remote sensing should be important. Less time-consuming methods will need to be developed for getting the necessary information for assessing the crop production potential in the relatively inaccessible areas in the tropics where ground surveys are not feasible. Staff research capability of the kind indicated above can be increased through involvement with graudate students in their M.S. and Ph. D. thesis research which would be done mostly in the field in tropical countries. Expanded contacts by the Cornell staff through travel and consultation with colleagues in the LDCs will provide a greater insight into the research priorities.

5. Expanding and deepening linkages and collaboration with national and international institutions in the LDCs. Linkages already established through the initial 211(d) grant, the AID-supported soil fertility research

contract, and projects funded from other sources will be strengthened and reoriented to put more emphasis on developing cooperative programs related to soil resource inventories and assessment in the LDCs. Attention has already been given to this subject in the LDCs by several of the Cornell staff. A project cooperative with IITA in Nigeria during the past year and partially supported with 211(d) funds has involved a study of the potential for food-crop production on a soil climosequence of West Africa. Two Cornell staff members participated as instructors this spring (1975) in a training program conducted by CIDIAT in Venezuela for Latin American professional personnel in soil classification and soil mapping and interpretation of soil surveys for agricultural and non-agricultural purposes. One of the Cornell staff consulted with Brazilian Agricultural Research Organization personnel on the use and interpretation of soil maps. Plans are being developed for some preliminary research on the use of ERTS imagery for soil resource inventory. This work will be in cooperation with the University of Puerto Rico.

Emphasis will be placed on the development of linkages with LDC institutions interested in strengthening their capabilities in soil resource assessment. This will be done through scientist exchange and visiting scientist programs, student training, consultation, etc. Special effort will be made to bring younger staff members from LDC institutions to work with the Cornell staff.

Present linkages and collaborative work with CIMMYT, CIAT, IRRI, and IITA can be broadened and strengthened under the proposed grant. New linkages can be developed with International Institutes such as ICRISAT where Cornell plans to participate in a seminar in January 1976 on "Uses of Soil Survey and

Classification in Planning and Implementing Agricultural Development in the Tropics."

To maximize subject field utilization in LDCs the University will spend at least 2 man-months per year (2 people, a month each) with AID/Washington to: a) sufficiently understand AID's short term and long term goals, b) explain updated institutional response capabilities to the Bureaus, and c) establish smooth personal linkages with the Bureau people.

The proposed budget for a two year period is outlined below by inputs and outputs based on the proposed activities in soil resources (described above) and in the biological nitrogen fixation program (presented separately).

November 1975 to November 1977

Inputs	
Salaries and Benefits	340,000
Travel	80,000
Supplies and Equipment	20,000
Publications	50,000
Other Direct Costs	10,000
TOTAL	$500,000

Outputs	Soil Resources	Biological N-fixation
Broadening Knowledge Base	100,000	40,000
Strengthening Advisory Capacity	80,000	45,000
Developing Training Capacity	60,000	30,000
Strengthening Research Capacity	40,000	50,000
Expanding Linkages	40,000	15,000
TOTAL	$320,000	$180,000

It is anticipated that financial support from sources other than AID will be generated during the grant extension period. The subject-matter area of the proposed grant is of particular interest to FAO. Dr. Dudal, Chief of the Division of Soil Resources of FAO, in a recent visit to Cornell (February, 1975) expressed interest in exploring possibilities for collaboration with funding support from FAO. As response capability develops, cooperative arrangements with financial support from national and international agencies will undoubtedly be made. This is evidenced by the financial support provided this spring by CIDIAT in Venezuela for the two Cornell staff members who participated as instructors in a training program for Latin American professional personnel in soil classification, mapping, and interpretation. It is expected that the substantial University contribution for the support of the initial grant will continue at the same level for support of a grant extension/revision which is an amount approximately equal to the amount of the grant.

VI. Complementary Actions and Management Considerations

The subject-matter area in the proposed grant revision complements those areas of concentration on which other members of the University Consortium on Soils of the Tropics will put primary emphasis in their revised grant proposals. Cornell will continue to collaborate with the Consortium institutions as well as other Universities in the organization of workshops, seminars, training programs and other activities related to the purposes of the grants.

The current AID-supported soil fertility research contract with Cornell on problems of acid soils in the humid tropics is providing useful information in relating soil management practices to crop production potential of soils

representative of extensive areas in the tropics. The AID-funded soil research contracts with North Carolina State University, University of Hawaii, and the University of Puerto Rico relate closely to the proposed grant revision and continued close contact will be maintained with these institutions.

Training grants are being provided by FAO to four graudate students from the Philippines to further their training in soil survey operations. These students have professional positions in soil survey in the Philippines. Two graduate students on leave from their positions in Venezuela are receiving support from their government for specialized training in soil classification, soil survey, and soil interpretations.

Close interaction between University officials and TA/AGR will be required on all activities of the grant. In addition to an annual report, there will be an annual review to assess progress and determine if targets established are being accomplished. TA/AGR will assist with linkages necessary to develop the state-of-the-art reviews and will give professional advice on subject matters of these papers.

The focal point within AID for technical, substantive, and managerial aspects of this grant will be the Soil and Water Management Division, Office of Agriculture, Technical Assistance Bureau (TA/AGR). Liaison with Cornell University will be through the Grant Project Officer, Dr. Tejpal Gill. Contacts with AID missions will be handled through the appropriate bureaus, and the University will initiate and sustain contacts with other research and educational institutions, both within the U.S. and abroad, on a direct basis.

Demand imposed on AID offices, other than TA/AGR, by management of

the grant should be quite limited. Regional Bureau and field personnel will, however, be contacted for advice and consultation on research, state-of-the-art, and training aspects and invited to participate in grant-sponsored activities.

The grant is supportive of a large package of AID centrally and field funded activities in soil and water management. There is, then, a need to have a central bank of expertise looking at soils problems on a worldwide scale. Successful techniques are undoubtedly transferable along climatic lines but this transferability cannot be known unless the problems is viewed globally. The grant should continue to be centrally funded and managed to take advantage of cooperative relationships with the related centrally funded and managed programs, to permit a global sphere of influence and study, to allow for interregional coordination and cooperation among agencies and international centers, and to facilitate management within AID.

TA/AGR:8/15/75