AGENCY FOR INTERNATIONAL DEVELOPMENT
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SUMMARY OF CONTRIBUTIONS

Our objective is to develop and consolidate a core staff of soil scientists and students with supporting facilities to assist an international effort to increase food,fiber production in the tropics.

In working toward these goals, the following contributions have been made to the over-all university capability.

Teaching

We have prepared and submitted for approval a graduate program in tropical soils leading to a Master of Science Degree. To substantiate this program the undergraduate curricula in plant and soil science have been upgraded and revised. A Resource and Enrichment Center of Tropical Soils is being developed to supplement traditional teaching practices with audio-tutorial methods and to provide resource materials on all aspects of tropical agriculture. Presently, the audio-tutorial equipment has been installed and functioning and a substantial amount of resource material acquired.

There is a feeling of esprit-de-corps and high morale among the graduate students and staff because of their involvement in pertinent research and teaching. This attitude is becoming more evident in the undergraduates.

Research

Our research is oriented to problems bearing on savanna ecology. Two staff projects deal with pesticide retention and degradation in prairie soils, and another concerns correlation of soil properties

between savanna-prairie soils of diverse tropical areas.

A comprehensive project in rural development by personnel in different disciplines has been started and supported indirectly by the 211(d) grant. It concerns improving the quality of urban and rural life through intensive agriculture on small acreages near urban centers.

Other University Resources

The college has contributed space for a new soils laboratory and the Resource and Enrichment Center for tropical soils. New collections have been acquired by the library to enrich the literature in Plant and Soil Sciences. The Science Department has made available instruments which we lack to carry out analysis of plant and soil samples.

Personnel

In developing our research and teaching programs, six consultants have given seminars on subjects dealing with teaching of soils and research in tropical agriculture. Our staff attended ten conferences on diverse topics related to the objectives of 211(d).

Two senior staff were added to the soils faculty and five graduate students, three American and two Foreign, were enrolled in the Master Science program. All personnel are presently involved in soils and plant research dealing with soil mineralogy, lime and Al - P interactions, degradation and retention of pesticides, and intensive culture of truck crops on prairie soils.

GOALS

The general objective of the strengthening of the Soil Science capacity of Prairie View under the Grant will be to develop and consolidate a

core staff, supporting library, other facilities, and student support to assist in the international development program on food and fiber.

The focus of this general objective is to provide the man and brainpower required to define and help resolve soil fertility problems of tropical soil by means of research, technical assistance, and manpower training. Under the general objectives, specific objectives of the Grant Program are:

a. To build a capacity to deal with soil fertility problems of the sub-humid tropics particularly with respect to nitrogen, phosphorus, organic matter, micro and other relevant nutrients.

b. To develop a basic curriculum on priority soil fertility problems of sub-humid tropical soils.

c. To recruit additional staff, and to draw upon consultant and other advisory services to structure a comprehensive research and technical assistance program relative to priority soil fertility problems in the sub-humid areas of developing nations.

The ultimate objective of this grant is to assist in the development of food and fiber production in the humid tropics. Under this program specific attention will also be given to typical and soil fertility problems under ecological conditions associated with the development of Prairie vegetation.

To this end Prairie View A&M College will collaborate with the other participating institutions for mutual sharing of competencies and resources, for strengthening weaknesses common to all, for the application of the pool of available resources to the ultimate objective.

Within the scope of the specific objective, priority emphasis will be given to increasing soil science staff and related competence and to train the manpower necessary for the ultimate purpose of the Grant.

At Prairie View this Grant will provide funds for increased competence in teaching and research on Savanna-Prairie soil fertility problems. Combined, the elements of the grant program will provide for:

1. A strong undergraduate-graduate program which will be developed in coordination with and supported by Texas A&M University. This training will include Americans for technical assistance programs and foreign nationals for service in their own countries. It will provide for formal undergraduate and graduate programs and for non-degree short courses for foreign nationals.

   The plan is to work with countries and missions to select foreign students to enter the program under mission or country financing and to conduct workshops and seminars, as well as providing research training on soil fertility problems of the Savanna-Prairie region.

2. Library holdings in Soil Science and related disciplines will be increased.

3. A basic soil science program and curriculum will be developed.

4. Teaching materials such as visual and audio aids will be acquired.

5. Consultants for development of the basic program and curriculum will be brought in. An urgent need exists to strongly reinforce undergraduate research and training in the area of responsibility assigned to Prairie View A&M College under the Grant.

   The professional positions of project leader and visiting professor will enter the second year of the program. The first year will be devoted to program planning, consequently, staffing will consist of present staff and guest lecturers and consultants to strengthen the undergraduate and graduate programs. One of the present senior

staff or new staff will serve as Prairie View project leader on the Grant Program.

6. The Grant Program at Prairie View will be developed consistent with and in cooperation with the Grant Programs of the other participating institutions. The project leader will be responsible for working with the other institutions and incorporating the policy and program guidance of the coordinating committee into the Prairie View Grant Program.
7. Visiting professors, research associates and other talent as available will be used in the strengthening process. In the long run, Prairie View will depend upon full time staff at the professional and research associate levels.
8. The Grant will provide opportunities for graduate students to develop competencies by doing some of their work at other Grant institutions.
9. The Grant will provide an opportunity for Prairie View to identify problems in the field, to assist in institutional building, and to provide consultant assistance to AID.

PROGRAM OBJECTIVES 1970-71

To achieve the goals elucidated in the beginning of this report, our program objectives for 1970-71 under AID Grant 211(d) for Prairie View A&M College are listed below in order of highest priority:

1. The initiation and development of a graduate program in the School of Agriculture leading to a Master of Science degree in Tropical Soils.

2. The development of a Tropical Soils Resource and Enrichment Center in which both graduate and undergraduate students of Plant and Soil Science will have access to auto-tutorial equipment under the tutelage of professors trained in these methods. In the latter aspect, the equipment and personnel of the Resource Library of the College has been made available to our staff to assist us in the preparation of educational material used in auto-tutorial teaching.

MAJOR PROGRAM ACCOMPLISHMENTS

Teaching

1. The proposal for a Master of Science Degree in tropical soils was prepared and submitted to the appropriate committees for approval. Curriculum changes were made in the existing graduate program and new courses were introduced for the master of science program that emphasized tropical agriculture and soils in a world context.

2. The undergraduate curriculum in soil science has been updated to meet the educational requirements of a general agriculturist and to provide instruction prerequisite to the master of science program in tropical soils.

3. Two additional staff members were employed to teach graduate and undergraduate courses, conduct soils research and direct student research programs. One secretary was also added to the program.

   Currently, five graduate students have been enrolled in the program and one undergraduate will enter next term. The graduate students have been assigned to a graduate committee and a major professor has been selected for each. They are actively engaged in their research projects. These projects were carefully designed, not only to train students in field and laboratory techniques in research, but the results are applicable to the country from which each came and to which he will return to serve.

   We are particularly fortunate to have graduate students of several tropical countries, two from the Dominican Republic and one from India. We plan to conduct part of their research here and part in their own country, publishing the results jointly. This will provide a valuable link between their

country and ourselves and enhance the flow of foreign students into our program.

4. The Tropical Soils Resource and Enrichment Center has been located in a large, air conditioned, well lighted room in the Plant and Animal Industry Building. It has been partly sectioned into office spaces for four graduate students and has been equipped with calculators and typewriters for their use. Shelving for books, journals, articles, and display areas for soil monoliths (several have been completed) agricultural tools of different countries have been provided. Four auto-tutorial carrells, with auxiliary equipment have been installed. Beside the carrel equipment, available for immediate use are the following:

   3 Microfiche Readers

   1 Microfilm Reading Library

   2 16mm Projectors

   Files for microfilm, microfische, filmstrips

   1 Over Projector

   1 Opaque overhead projector

   1 Recorder with built-in synchronizer for sound production of slides-tape documentaries

   2 Tape Recorders (Cassette)

PLANT AND SOILS COURSE OFFERINGS FOR THE PROPOSED MASTER OF SCIENCE DEGREE IN TROPICAL SOILS

Agro. 514. Soil Microbiology (3-0) Credit 4. Soil microorganisms and their effects on soil physical and chemical characteristics, nitrogen fixation, organic matter decomposition, nitrification and denitrification.
PREREQUISITE: 9 hours of soil and 6 hours of biology or consent of instructor.
FALL 1971 - Kirkwood

Agro. 523. Plant Nutrition and Soil Fertility. A study of the most important elements for plant growth derived from the soil; their sources and availability in the soil and their functions in plant metabolism. Emphasis will be placed on nitrogen, phosphorus, potassium, calcium, sulfur, iron and magnesium, including the cause and correction of copper, aluminum, and manganese toxicity in plants.
PREREQUISITE: 9 hours of soil and 3 hours of plant physiology.
FALL 1971 - Brams

Agro. 603. Soil Mineralogy in Relation to Soil Formation (3-0) Credit 3. A study of weathering processes and products in relation to pedogenic processes and soil formation, and the effect of mineralogical composition on soil properties, and on profile characteristics.
PREREQUISITE: 9 hours of soil and 3 hours of physics or consent of instructor.
SPRING 1972 - Collins

Agro. 614. Soil Physics (3-3) Credit 4. Study of the most important physical properties of soil such as; soil structure, texture, seration, soil water and thermal relationships.
PREREQUISITE: 2 semesters of physics, 9 hours of soil or consent of instructor.
FALL 1971 - Collins

Agro. 623. Tropical Soils (3-0) Credit 3. The physical and chemical properties of tropical soil; their fertility status and effect of cultural practice on soil properties. Soil conservation and management will be considered for different soils under diverse environmental conditions and farming practices. Special consideration will be given to the yield of tropical crops and their response to cultural practices, including control of soil-borne disease, pest and weeds.

Agro. 703. Soil Fertility Problems on Savanna-Prairie Ecology (3-0) Credit 3. A consideration of management practices on Savanna-Prairie soils in relation to yield of pasture and row crops and soil properties. Particular attention will be given to the effect of lime and rotational systems on efficiency of fertilizer utilization and yield of pasture crops under varying rainfall and temperature situations.

FALL 1972 - Brams

Agro. 714. The Physical Chemistry of Soils (3-3) Credit 4. A study of the physicochemical properties of soil with particular emphasis on methods and instruments employed in characterizing clays and clay minerals, soil acidity, ionic absorption and adsorption; nutrient fixation and release and plant uptake. PREREQUISITE: 9 hours of soils 9 hours of Chemistry and 3 hours of Physics.
FALL 1971 - Mangaroo

Agro. 743. Fertilizer Technology and Usage (3-0) Credit 3. Study of problems in fertilizer manufacture, storage, use and application. Chemical reactions of fertilizer when applied to soil. Fertilizer recommendation according to soil type.
SUMMER 1972 - Mangaroo

Agro. 802 Special Problems: (3-0) Credit 3 Staff

a. Soil Plant Relation
b. Clay mineralogy
c. Micro pedology
d. Chemistry of soil organic matter
e. Thesis
f. Environmental quality
g. Soil Survey and Photographic interpretation

Agro. 800 Research Credit (1-6) Staff

Agro. 801 Seminar Credit (1) Staff

COURSES IN RELATED AREAS

Plant Science 543. Advanced Pasture and Range Management. (3-0) Credit 3. Types of pasture and range vegetation, methods of establishment and improvement. At least 3 field trips to pasture and range areas will be required.
1st SUMMER TERM - Staff

Plant Science 733. Grain and Fiber Crop Production (3-0) Credit 3. Study of grain and fiber ecology, utilization, physiology and morphology, cultural practices.
2nd SUMMER TERM - Smith

Plant Science 563. Disease of Field Crops. (2-2) Credit 3. Common diseases found in field crops and the best methods of control.

Biology 613. Advanced Plant Physiology. (3-0) Credit 3. Study of chemical composition of plants and processes involved in plant nutrition; photosynthesis, respiration, transpiration, solute and nutrient absorption, etc.

UPDATED UNDERGRADUATE CURRICULA IN PLANT AND SOIL SCIENCE

The curricula in Plant and Soil Science are designed to be flexible enough to meet the needs and interests of the students. They allow students to prepare for either direct entry into industry or international agriculture, and agricultural education at the Bachelor of Science level or proceed into graduate training.

A student's program may be adapted so that he may put major emphasis in Agronomy, Horticulture or Soil Science. Electives are chosen from a list approved by the Plant and Soil Science Faculty Committee. To qualify as a Soil Scientist under Civil Service requirements, 15 credit hours of technical soils are required.

AREA OF PLANT AND SOIL SCIENCE
(Soil Science Emphasis)

Freshman Year

First Semester	Second Semester
English 113	English 123
Mathematics 113, 115 or 173	Mathematics 123, 125 or 183
Nursing 111	Nursing 121
Biology 134	Biology 114 or 115
Animal Science 113	Plant Science 103
Physical Education 111	Physical Education 121
Military Science 112	Military Science 122
17 hours	17 hours

Sophomore Year

First Semester

English 213
History 173
Political Science 113
Chemistry 114 or 115
Agronomy 323
Physical Education 211
Military Science 212

19 hours

Second Semester

English 223
History 183
Political Science 123
Chemistry 124 or 125
Agronomy 443
Physical Education 221
Military Science 222

19 hours

Junior Year

First Semester

Chemistry 314
Mathematics 433
Agri. Economics 223
Civil Engineering 353
Electives (4)

17 hours

Second Semester

Chemistry 214 or 434
Agronomy 423
Biology 334
Agri. Engineering 123
Electives (4)

18 hours

Senior Year

First Semester

Agronomy 403
Sociology 263 or 273
Agronomy 433
Electives (7)

16 hours

Second Semester

Agronomy 454
Civil Engineering 323
Plant Science 401
Electives (5 - 8)

17 hours

1. Electives will be chosen from a list approved by Plant and Soil Science Faculty Committee.

2. To qualify as a Soil Scientist under Civil Service requirements, 15 credit hours of technical soils are required.

AREA OF PLANT AND SOIL SCIENCE
(Agronomy or Horticulture Emphasis)

Freshman Year

First Semester

English 113
Mathematics 113, 115 or 173
Nursing 111
Biology 134
Animal Science 113
Physical Education 111
Military Science 112

17 hours

Second Semester

English 123
Mathematics 123, 125 or 183
Nursing 121
Biology 114 or 115
Plant Science 103
Physical Education 121
Military Science 122

17 hours

Sophomore Year

First Semester

English 213
History 173
Political Science 113
Chemistry 114 or 115
Agronomy 323
Physical Education 211
Military Science 212

19 hours

Second Semester

English 223
History 183
Political Science 123
Chemistry 124 or 125
Agronomy 443
Physical Education 221
Military Science 222

19 hours

Junior Year

First Semester

Chemistry 314
Biology 254
Agricultural Econ. 223
Electives (7)

18 hours

Second Semester

Chemistry 324 or 434
Biology 464
Agri. Engineering 123
Electives (3)

17 hours

Senior Year

First Semester	Second Semester
Entomology 323	Agri. Economics 423
Biology 334	Sociology 263 or 273
Mathematics 433	Plant Science 401
Agronomy 400	Electives (9)
Electives (3 - 6)	
17 hours	17 hours

1. Electives will be chosen from a list approved by Plant and Soil Science Faculty Committee.

COURSE DESCRIPTIONS FOR UNDERGRADUATE CURRICULA IN PLANT AND SOIL SCIENCE

(Including new courses)

1. Agronomy 303 --- Grain and Fiber Crops

   Study of geographical distribution and economic importance; classification and physiology; and principles of production of grain and fiber crops. (First semester, alternate years beginning 1971).

2. Agronomy 323 --- Soils

   Nature and properties of soils including origin, formation and biological, chemical and physical aspects. (First semester every year.)

3. Agronomy 400 --- Special Problems in Soil-Plant Relationships

   For individual research by advanced undergraduates on topics not included in established courses but chosen so as to demonstrate the use of the scientific approach in problem solving. (First and second semesters every year beginning 1971.)

4. Agronomy 403 --- Soil Management

The profitable management of soil with respect to the use of drainage and irrigation, organic matter content, tillage and conservation practices, cropping sequences, soil reaction and liming, fertilizer and micro-nutrients, and geographical distribution. (First semester, alternate years beginning 1971.)

5. Agronomy 413 --- Forage Crops

Production, utilization, adaptation and identification of major forage plants in grassland regions. (First semester alternate years beginning 1972.)

6. Agronomy 423 --- Soil Conservation and Land Use

Soil resources of the United States and methods and plans for soil conservation including control of erosion, interpretation of soil survey maps and land evaluation for farm crops, fruits, forestry engineering and wildlife. Soil judging. (Second semester every year beginning 1971.)

7. Agronomy 433 --- Soil Classification and Morphology

Field study of morphological features of soil profiles and the morphological characterizations of soils. Interpretation of profiles in relation to land utilization. Preparation of land use reports based upon soil maps. (First semester, alternate years beginning 1972.)

8. Agronomy 443 --- Soil Fertility and Fertilizers

Influence of soil chemical, physical and microbiological properties on crop production. Fertilizer preparation and usage. Assessment of the fertility of soils and the alteration of fertility by the use of fertilizers lime, manure and cropping systems. (Second semester, every year, beginning 1971.)

9. Agronomy 454 --- Soil Chemistry

Chemistry of mineral weathering and soil formation, ion activities, ionic exchange equilibrium relations, soil pH, specific elements and their chemical analysis and availability of nutrients to plants. (Second semester, alternate years beginning 1972.)

10. Agronomy 473 --- Agricultural Chemicals

Study of the fundamentals underlying the economical use of fertilizers, herbicides and other agricultural chemicals. Emphasis will be given to relationships with soils properties and plant growth with respect to their selectivity and fate. (First semester, alternate years beginning 1972.)

11. Agronomy 483 --- Range and Pasture Management

Adaptation and management of pasture plants in permanent and temporary pastures. Ecology and management of grass and range lands. (Second semester, alternate years, beginning 1972.)

12. Agronomy 498 --- Principles of Field Crops

Distribution, morphology, identification, physiology, management and utilization of field crops for food and fiber, for hay silage, and pasture, for livestock and for soil improvement and conservation. (First semester, alternate years beginning 1971.)

13. Plant Science 103 --- Introductory Plant Science

Science of crop and horticultural plant production; relation of environment to plant physiology; botany of crop and horticultural plants; plant structure in relation to cultural practices. (First and second semesters every year, beginning 1971.)

14. Plant Science 313 --- Landscape Design

Appreciation and use of ornamental plant materials. Fundamental principles underlying the use of these materials in urban, suburban and rural planning. (First semester, alternate years beginning 1971.)

15. Plant Science 323 --- Vegetable Production

An introduction to the growth habits, soil and climatic requirements, storage, varietal characteristics and pest control of vegetable crops. (Second semester, alternate years beginning 1972.)

16. Plant Science 343 --- Floricultural Crop Production

Scientific principles and practices involved in production, distribution, marketing and use of flowers. (Second semester, alternate years beginning 1972.)

17. Plant Science 403 --- Plant Breeding and Improvement

Genetic and cytological variations in crop plants, the production and control of such variations in developing varieties and hybrids, and the maintenance of high quality seed stocks. (First semester, alternate years beginning 1971.)

18. Plant Science 423 --- Plant Pathology

Introduction to fundamental principles of plant pathology including isolation, diagnosis of the cause, and control of plant diseases. (Second semester, alternate years beginning, 1972.)

19. Plant Science 443 --- Orchard Management

Planting, maintenance and management of orchards (Second semester, alternate years beginning 1971.)

20. Plant Science 453 --- Plant Propagation

Propagation of plants, nursery development. (First semester, alternate years beginning 1971.)

21. Plant Science 463 --- Ornamental Plant Management

Planting maintenance and management of ornamentals. (Second semester, alternate years beginning 1971.)

22. Plant Science 473 --- Nursery and Greenhouse Crops

Production, harvesting, grading and distribution of plants grown in nurseries and green houses. (First semester every year, beginning 1971.

23. Plant and Soil Science 401 --- Seminar

Presentation and discussions led by senior graduate students and staff on topics of individual research. (Second semester every year beginning 1971.)

CLIMATE OF LEARNING

There is a definite feeling of enthusiasm by all personnel about the new programs in Plant and Soil Science. This is particularly evident in the graduate students who are now participating in pertinent research projects and classroom discussion. This attitude is always conducive for better learning. The prospects for better positions in all phases of agriculture as indicated by visiting lecturers in agriculture industry and U.S. governmental agencies have intensified the motivation for better training. This attitude is filtering to the undergraduate students as evident by an increase in inquiries concerning careers in agri-business particularly in soil and plant sciences.

Research

Staff research projects approved by Texas Agricultural Experiment Station (TAES Cooperative State Research Service (CSRS) and Agricultural Research Service (ARS) and initiated during 1970-71 in Plant and Soil Sciences are listed:

A. Interaction of Pesticides with Soil Microorganisms and Subsequent Effects in The Ecosystem.

B. Mineral Nutrition of Soybeans in Relation to Fertilization and Plant Growth Regulation.

C. Movement of Pesticides in Soil and Water as Related to Rainfall Runoff and Infiltration.

D. The Adsorption and Strength of Bonding Zinc in Texas Soils.

In addition to the above research projects a documentary entitled, "The Culture of Sierra Leone, West Africa" was prepared with the cooperation of Dr. Mercedes Sandoval, Anthropologist, Miama-Dade-Junior College from materials (slides, music, conversation) obtained in that country during the past three years.

Graduate research projects that have been initiated this year are listed as:

1. Responses of Different Grass Species to Diverse Levels of Fertilization on Fine Sandy Soils of Texas Coastal Prairie.

2. Influence of Lime on Aluminum saturation and phosphorus Availability of Fine Sandy Soils of The Texas Coastal Prairie.

3. Microbial Degradation of Certain Herbicides in Sandy Soils.

4. Protein Level of Soybean as a Function of Age and Soil Fertility.

Involvement of University Resources

The library of Prairie View A&M has ordered the publications* at our request in order to support research and development activities in soils.

The library facilities of Texas A&M were made available to us for duplicating journal articles and microfilms of texts and dissertations.

*Acta Botanica Neerlandice

*Advances in Agronomy

Agronomy Journal

American Journal of Botany

*Annual of Botany

*Annual Review of Plant Physiology

Archives Biochemistry and Biophysics

*Australian Journal of Agricultural Research

*Australian Journal of Biological Science

*Australian Journal of Botany

*Beitrage Zur Mineralogic and Petrographie

Biochemical Journal

*Biochem. Biophy. Acta

*Biometrics

*Botanical Gazette

Botanical Review

*Canadian Journal of Agricultural Science

*Canadian Journal of Botany

Canadian Journal of Plant Science

Canadian Journal of Soil Science

Crop Science

International Congress of Soil Science

*Journal of Agricultural Research

*Plant and Soil

*Tropical Soils

*Tropical Grassland Farming

*Journal of Agricultural Science (London)

Journal of Bacteriology

*Journal of Botany

Journal of Biol. Chem.

*Journal of Cell Biol.

*Journal of Experimental Biology

*Journal of General Microbiology

*Journal of General Physiology

*Journal of Soil Science

*Netherlands Journal of Agricultural Science

*New Zealand Journal of Agriculture

*Physiologia Planatarum

Phytopathology

*Plant and Cell Physiology

Plant Physiology

Science

Soil Science

*Soil Fertilizers

*Soviet Soil Science

* The American Mineralogist

* Zeitschrift Fur Kristollographie

*Zeischrift Fur Pflanzem., Dung., Bodenkunde

Journal of Food and Agricultural Chemistry

*Proceeding of Soil Science Society of America

The college has released space and is now constructing a second soils laboratory for teaching and research of soils from different tropical areas of the world.

The Science Department has made equipment available to us for use in the dialysis of soil tissue. This equipment is used for student training in soil and plant research.

Personnel

Senior faculty added to present Soil Science staff at Prairie View A&M College.

Dr. Johnnie B. Collins, Ph.D. Assistant Professor of Plant and Soil Sciences; Soil Genesis, morphology, classification, and soil mineralogy. In addition, he has had considerable experience in soil survey and interpretation and participated in a tropical soil workshop in Puerto Rico and the Virgin Islands.

Dr. Eugene Brams, Ph.D. Assistant Porfessor of Plant and Soil Science, Plant Nutrition and Soil Fertility. Dr. Brams served as Soil Specialist and Research Coordinator for Njala University College in Sierra Leone, West Africa, under University of Illinois/AID Contract.

Supporting Staff: Secretary, Miss Dorothy M. Davis. Bachelor of Science degree in Business Education; a graduate of Prairie View A&M College. Her job experiences include: working as a Tutor-Counselor for the Upward Bound Project 1967; Junior Manager of the Women Resident Hall, 1966-69. She is a member of the Texas State Teacher's Association.

During the past year, staff members of Soil and Plant Science attended workshops and seminars. The following is a list of the participants and the conferences they attended:

Oliver E. Smith	Use of Computers in Biological Science Texas A&M University, College Station Texas
Oliver E. Smith	Plant Roots and Their Environment, Virginia Polytechnic Inst. Blacksburg, Virginia
Arthur S. Mangaroo	Conference for AID sponsored research on Soils and Fertilizer in Latin America. North Carolina State, Raleigh, North Carolina
Arthur S. Mangaroo	Modern Fertilizer Technology, T.V.A. Muscle Shoals, Alabama
James I. Kirkwood	Role of Soil Science in Improving Tropical Agricultural Systems, Texas A&M University College Station, Texas
James I. Kirkwood	Courses in Tropical Soils and Inter-University Research and Training in Tropical Soils - Puerto Rico
James I. Kirkwood	Tropical Soils Teaching Workshop by 211(d) University of Hawaii, Honolulu
Eugene Brams	American Society Agronomy Convention, New York. Paper: "Yields in Response of Residual Phosphorus in Tropical Alluvial Soils under Sustained Cultivation."
Eugene Brams	Conference on Auto-tutorial Techniques - Kodak Company, Houston, Texas

Prairie View A&M College invited several consultants to discuss special problems in agriculture with our staff and graduate students. The following is a list of consultants who visited the campus last year:

	Area of Interest
Dr. A. Burger, University of Illinois	Auto-tutorial Methods in Agronomy

Dr. J. Collins, Michigan State University	Soil Classification in the Tropics
Dr. Murray Milford, Texas A&M University	Development of Soil Resource Center
Dr. Hollis Bowen, Texas A&M University	Cultivation of Orchard Crops in Subtropical Environments
Dr. Eugene Brams, University of Illinois	Soil Problems in Agricultural Development of the Humid Tropics of Africa
Dr. Gordon McKee, United States Department of Agriculture	Problems of Soil Conservation of Prairie Lands

PLAN OF WORK FOR NEXT YEAR

Teaching

1. Formal approval of the graduate program for a Master Degree in Tropical Soils.

2. Inclusion of five more graduate students, preferably foreign nationals from tropical areas, into our program under the student assistantships provided for in 211(d) for ten students in tropical soils.

3. Interchange of staff personnel between the universities of the consortium in workshops and seminars of tropical soils. We plan to involve one or two staff members as contributors in the Institute for Soil Scientists scheduled for August 1972 in Puerto Rico.

4. Exchange of graduate students between member institutions of the consortium for study periods of at least one semester or longer, if possible.

5. Continual expansion of the Tropical Soil Resource and Enrichment Center particularly, the production of documentaries of soils in agriculture and films of techniques in the research and study of soil science.

6. An increase in the collection of agricultural publications in the college library.

Research

A comprehensive, integrated, and vital soils research program in savanna-prairie ecology involving the following areas of investigation has been instigated:

A. The mineralogy of the clay colloids of savanna-prairie soils. A correlation of the mineralogical properties of savanna-prairie soils of diverse tropical areas.

B. Management of soil fertility under grassland farming as it affects soil properties, forage yields and quality.

C. Residual effects of herbicides and insecticices on forage yields, and production of organic matter and microbial populations in surface soils.

D. The influence of soil treatments such as, herbicides, clay amendments, lime, fertilizer, and manure on availability of soil Al, Fe, P, and micro-nutrients as they affect nutrient uptake, plant yield and quality.

E. Evaluation of tropical legumes under savanna ecology.

F. Development of cropping systems for prairie-savanna soils and their effects on crop yields, soil properties, fauna and flora of the ecosystem, and finally the economics or influence on human resources.

To enrich these projects, we plan to rotate staff for short-term overseas assignments with research institutions or universities in tropical countries, particularly Africa.

Supporting research to Grant 211(d) (see above) will come under an encompassing project funded by a Special Grant of 1890 Colleges, entitled: "The Economic Potential of Intensive Farming On Small Acreage Near Large Urban Centers: An Incentive for Rural Stabilization and Immigration."

Three lines of investigation will be pursued under this project:

1. Evaluation of Peach Culture

2. Evaluation of Blueberry Culture

3. Evaluation of Vegetable Culture in the field with emphasis on sweet corn and tomatoes.

It is hoped this work will yield information which will enable some people now living under depressed economic conditions in urban centers to achieve better living conditions and earn higher incomes from intensive farming of 5-10 acres on the periphery of the large urban market. Of importance is the productivity of the Gulf Coastal Prairie soils under such an intensive agricultural system.

Staff and equipment committed to the 211(d) project will be used to implement the above project of rural development. It is through the input of the 211(d) Grant staff that made it possible to go ahead on this project. The results obtained here can feed-back to the 211(d) mission and significantly contribute to our understanding and use of savanna-prairie soils.

Involvement with University Resources

To strengthen our research capabilities in Plant and Soil Science, the college has arranged for the acquisition of 3 green houses to conduct our studies in plant physiology. The description of the installation, which is an institutional input to 211(d) follows. The cost approaches $120,000

The basic concept of the complete design is to provide three separate greenhouses, one for Faculty-Research Activities, one for tropical propagation and display, and one for student practice and teaching activities. Student activities are planned in the Greenhouse nearest the campus with the Faculty-Research Greenhouse located on the opposite end for maximum separation of the two functions, and the tropical propagation and display Greenhouse between these for accessability by both groups. Exterior walks are provided interconnecting all green houses at both ends. This arrangement separates the three functions of the facility, while allowing

the necessary traffic flow between the areas without interruption or interference.

The Greenhouse facilities are furnished complete with a separate step control system for each greenhouse, complete with humidity control for automatic control of heating, cooling, and humidity of each greenhouse. A future central fertilizer injected automatic watering system was considered in the design, and capped stub-ups located at each bench but the system is not included at this time. Redwood and wire potting benches are included in the greenhouses base bid.

The headhouse facilities are planned to be constructed in the future because of the directed budget limitations and the lack of sanitary facilities in the vicinity of the site at present, and are not included in this presentation or estimates of costs.

We propose to become involved in the education and training of Peace Corps volunteers in the principles of soil science as they relate to the utilization of tropical soils. Although this program is under the auspices of Agricultural Education, the staff under 211(d), with the resources available, will contribute to this training program.

A liaison has been established with the Soil Conservation Service and this organization is cooperating with us in the location of typical pedons of several soil series that have been selected for study. The results of this study will be extended to other subtropical and tropical countries of the world.

In addition to the library acquisitions of texts and journals, the college office of publication is assisting us in developing a depository of

printed materials of work done of the staff under 211(d) which shall be available for distribution to members of the Consortium as well as outside institutions. Presently, three papers are in preparation, one, the characteristics of the prairie soils at Prairie View A&M, Texas Agricultural Experiment Station and, two, the correlation of properties of savanna soils from different tropical locals and three, the feasibility of maze as a second crop for the upland soils of Sierra Leone, West Africa.

International Travel

We plan to visit the International Institute of Tropical Agriculture group in Nigeria next year for the purpose of discussion and direction planning for the study of cropping systems in the tropics. Dr. James Kirkwood and Eugene Brams plus a graduate assistant have tentatively been selected.

This will enable our research program to fit into the overall plan for tropical cropping systems.

The itinerary planned will permit visits to several West African countries where consultation with ministries of agriculture, treks into the interior, examination of research facilities will greatly enhance our understanding of the plant-soil problem in agriculture of the tropics.

SUMMARIZED FISCAL REPORT

June 30, 1970 - August 31, 1971

DESCRIPTION	BUDGETED AMOUNT	TOTAL EXPENDITURES	BALANCE
Personnel Services	$ 51,438.00	$ 25,352.77	$ 26,085.23
Travel	9,332.00	3,404.00	5,928.00
Communications	1,650.00	195.10	1,454.90
General Supplies	3,803.00	2,066.04	1,736.96
Computer Time	2,025.00		2,025.00
Library Acquisitions	7,000.00	6,244.68	755.32
	$ 75,248.00	$ 37,262.59	$ 37,985.41

ITEMIZED FISCAL REPORT

June 30, 1970 - August 31, 1971

1.	Assoc. Prof. Soil Sci.	100%	$ 2268.00
2.	Assoc. Prof. Soil Sci.	100%	2268.00
3.	Res. Assoc. Soil Sci	100%	6945.66
4.	Secretary	100%	918.40
5.	Consultants Short term		928.00
6.	Graduate Fellowships $300/mo./ea.		1900.00
7.	Undergrad. Asst. 15/hr/wk/$1.60/hr		2512.00
8.	Irregular Labor		4356.41
9.	Personnel Benefits		1483.49
10.	Travel (Domestic)		3559.70
11.	Communications		1655.91
12.	General Supplies a) Teaching, Demonstration b) Lab and Greenhouse		1943.21
13.	Library Acquisitions 1. Microfiche Reader 2. Microfilm Reader 3. Movie Projector 16mm 4. Ultrafische Reader 5. Books, Journals, Microfilm Tapes, transparencies		6523.81
	GRAND TOTAL		$ 37,262.59

PROJECTED ITEMIZED BUDGET

FISCAL YEAR September 1, 1971 - August 31, 1972

PERSONNEL SERVICES:

1.	Assoc. Prof. Soil Sci., Dr. Johnny B. Collins	100%	$ 16,008/12
2.	Professor, Soil Sci., Dr. James I. Kirkwood	50%	10,056/12
3.	Assoc. Prof. Soil Sci., Dr. Eugene Brams	100%	16,008/12
4.	Research Assoc., Mr. Y. P. Chang	100%	8,100/12
5.	Secretary	100%	4,476/12
6.	Consultants (short term) 8 U.S., ave. 3 days @ $100/da		2,400
	2 Int. ave 3 days @ $100/da		600
7.	Grad. Fellowships, 7 @ $300/mo/ea	25%	25,200/12
8.	Undergrad. Assts. (10) 15 hr/wk/for 52/wks @ $1.60/hr		12,480
9.	Wages, for irregular laborers		3,582
10.	TOTAL SALARIES		$ 98,910
11.	Personnel		7,790
	TOTAL PERSONNEL SERVICES		$ 101,700
12.	Travel		
A.	8 U.S. @ $250/ea		2,000
	2 Int., @ $600/ea		1,200
	Per diem 30 da @ $17/da		510

B. Program Representative	
2 trips via air @ $250/ea to go to other Grant Institutions + per diem, 3 da/trip @ $17/da.	702
C. Project Director	
I. 2 trips via air @ $250 ea + per diem, 3 da/trip @ $17/da to go to other Grant Institutions	702
II. 4 Int. trips via air @ $600/trip + per diem, $17/da to Carribean, S. Amer., Africa, for min. of 5 days	2,740
III. 6 trips via auto @ 100 miles + per diem, $14/da., to Texas A&M Univ.	138
D. Soils Staff	
4 Int. trips via air @ $600/trip + per diem, $17/da to Carribean, S. Amer., Africa, for min. of 5 days	2,740
E. Texas A&M Consultants	
6 trips via auto, 100 mi. + per diem of $14/da., to Prairie View	138
F. Student Assistants	
I. 2 trips via air @ $250/ea + per diem, 3 da/trip @ $17/da to other Grant Institutions	702
II. 4 trips via air @ $600/trip + per diem, $17/da to Carribean, S. Amer. Africa, for min. of 5 days	2,740
G. In-state Auto travel + per diem by personnel to laboratory supply houses, experiment stations, field trips	500
TOTAL	14,812

13.	Communications	1,650
	Expendable office supplies postage, telephone, printing	
14.	General supplies	3,000
	Teaching supplies and laboratory	
15.	Computer time	2,025
16.	Library Acquisitions	7,000
	8 Carrells, Auto-tutorial	
GRAND TOTAL		$ 130,187