

AGENCY FOR INTERNATIONAL DEVELOPMENT  
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Soil fertility under savanna prairie ecology, report, 1973/1974

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(101) Prairie View A&M Univ. Dept. of Plant and Soil Sciences

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9. ABSTRACT

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## REPORT OF PRAIRIE VIEW A&amp;M UNIVERSITY

FOR THE PERIOD

JULY 1, 1973 TO JUNE 30, 1974

A. **TITLE:** A Grant to Strengthen the Capabilities of Prairie View A&M University in Relation to Soil Fertility Problems Under Savanna-Prairie Ecology (Grant AID/CSD 2836)

B. **GRANTEE:** Prairie View A&M University

C. **DIRECTOR:** Dr. James I. Kirkwood

D. **STATISTICAL SUMMARY**

1. Period of Grant: June 30, 1970 to June 30, 1975

2. Amount of Grant: \$500,000

3. Expenditures:

3.1 For report period : \$134,215.00

3.2 Accumulated : \$395,929.00

3.3 Anticipated for next year : \$104,071.00

E. **NARRATIVE SUMMARY**

Prairie View A&M University has strengthened its capabilities in soils of the tropics under the Foreign Assistance Act of 1961, (amended in 1966) through a grant from the Agency for International Development (AID). Efforts have been directed toward increasing the competency of the soils staff of Prairie View A&M University in the utilization of the soils of the tropics, with emphasis on soil fertility problems under savanna-prairie ecology. This is a report of accomplishments in achieving the purposes of the grant for this year.

Expansion of the graduate program in soils and supporting disciplines involved the approval of the curricula of the graduate program in

soils by the Texas Coordinating Board of Higher Education. In addition four (4) graduate students were added to the program. The graduate research efforts have been enlarged through four (4) projects dealing with problems of agricultural development. The international aspect of the grant program has given impetus to the total program in agriculture, including recruitment of undergraduates. The Resource Center has acquired approximately 150 new volumes including books, periodicals, and journals dealing with agricultural technology. The French literature acquired through our linkage with agricultural stations in Frankophone, Africa, and with IRAT and ORSTOM in Paris, is being translated into English and compiled into a reference file deposited in our resource center.

Staff increased their participation in professional meetings. This year, an active part was taken in the fourth year 211(d) grant review, two (2) seminars, two (2) consultations, four (4) professional meetings, and four (4) international work-study tours and conferences.

With the cooperation of graduate students and staff from within and outside the College of Agriculture three (3) M.S. Theses, and three (3) papers dealing with soils, agricultural development, and education were published.

The information retrieval project involving the programmed acquisition, storage, and recall of soil and plant scientists world-wide has been expanded to cover more areas and more scientists.

Personal contact has been established with scientists and institutions in South and Central America and Africa. It is planned to develop these contacts into linkages where student and/or staff exchanges are

promoted or cooperative research conducted.

Future plans include the utilization of the competencies to deal with a delivery system which will bring the fruits of modern technology to the grassroot farmer in such a manner that the innovations will be accepted and utilized within the constraints of his eco-system. This new direction was promoted by the need to utilize the staff competencies developed through the 211(d) grant for the University Consortium on Soils of the Tropics.

#### F. DETAILED REPORT

##### 1. General Background and Purposes of the Grant:

People the world over are becoming increasingly aware that limited food production is a real and dangerous problem. When the grant was initially funded, the Agency for International Development was aware that population growth, political and economic unrest and weather conditions could worsen the food output everywhere, particularly in the LDCs. By hastening the U.S. development of expertise in tropical soils a cadre of soil scientists would be formed (the Consortium) whose experience and knowledge could be used to help alleviate the growing problems of adequate food and nutrition. This wise and perceptive action by the Agency is now maturing at a time when men so trained are beginning to be called upon to serve.

##### 2. Objectives of the Grant:

The objectives of the grant have been expounded in previous reports and embodied in the grant itself. Briefly they include: increasing

senior staff and supporting personnel to faculty, provide for consultant services and work-study tours, develop an undergraduate and graduate program (teaching and research) in Soils, and strengthen library and teaching resources at the institution.

Results of four years of efforts to develop institutional competency have justified the original objectives. At this point experience and expertise developed should be synthesized for utilization in efforts to better human conditions in LDCs and the United States. The objectives should embody this concept, if not explicitly stated in the original grant, it should be recognized at this time.

In assessing its position, Prairie View A&M University feels that its main contribution should be to deliver agricultural improvement packages (modern technology modified for use under diverse conditions) to the small farmers who operate subsistence or market-subsistence farms in the LDCs.

### 3. Accomplishments:

The accomplishments will be discussed in terms of attaining the objectives stated in Section 2.

#### 3.1 Staff Additions:

No senior staff or additional supporting staff were employed during this report period.

#### 3.2 Visiting Consultants:

Mr. D. W. Levandowsky, tropical horticulturist was a visiting consultant during June and August of 1973 and February 1974. He reviewed the potentialities of the Sahel zone of Africa

for grain and nut production and methods of water con-  
serva-tion applicable to the small farmer. In addition  
Mr. Levandowsky, accompanied staff on a work-study tour  
of West Africa.

The following people presented seminars to our student and  
staff campus-wide, under the grant sponsorship:

<u>Name</u>	<u>Institution</u>	<u>Subject</u>
Dr. A. I. Thomas President	Prairie View A&M Uni. Prairie View, Texas	"The Role of the 1890 Colleges and Universities in maintaining continuous relevancy in its programs to meet the needs of society: an administration overview".
Mr. R. L. Hart Professional Recruiter	Ford Motor Company Dearborn, Michigan	"Professionalism in your Career".
Mr. Wash Allen Radio Station KCOH	Houston, Texas	"Youth's aspirations in a changing World".
Dr. George Woolfolk Chairman	Dept. of History Prairie View A&M Uni.	"The Intellectual Climate for Progressive Research".
Dr. Gwendolyn Newkirk Chairman	Dept. of Education and Family Resources Uni. of Nebraska	"Human Nutrition: Problems of a growing Population".
Dr. E. E. Burns Dept. of Food Technology	Texas A&M University College Station, Texas	"An Overview of the World Food Crises: Present and Future".

### 3.3 Information Storage:

The information storage program (ADD NAMES) and the retrieval  
program (SEARCH) was enlarged to include another program (FIND)  
where the name of a particular scientist can be recalled; whereas  
in SEARCH, the recall is by discipline etc., only. Present  
storage consist of the bio-professional data of 138 - scientists  
working in agriculture-world-wide. Questionnaires for the

acquisition of the raw data have been sent to several institutions in South and Central America.

### 3.4 Institutional Linkage:

A relevant linkage; meaning exchange of information, personnel and/or coordinated research was established with the following institutions:

<u>Institution</u>	<u>Location</u>	<u>Involvement</u>
CIAT	Colombia, S. Amer.	Tour, Info. Exch.
Escuela Nacional de Agric.	Chapingo, Mexico	Info. Exch.
CIMMYT	El Batan, Mexico	Tour Info. Exch.
Turrialba (IICA)	C. America	Tour Info. Exch.
U. of Florida College of Agric. African Study Center	U.S, Florida	Student Recruitment and Info. Exch.
Texas A&M U.	U.S., Texas	Class Lectures Tropical World Panel
Dept. of Development Suriname	Suriname, S. America	Tour Savanna and Info. Exch. Consultant
Ministry of Agric. and F.A.O. Cameroon	W. Africa	Tour Savanna Info. Exch.
Ministry of Agric. IRAT Ivory Coast	W. Africa	Tour Savanna Info. Exch.
Senegal-Irat & ORSTOM	W. Africa	Tour Savanna Info. Exch.
ORSTOM	Paris	Conf. Info. Exch. Tour
IRAT	Paris	Conf. Info. Exch. Your
FAO - UN	Rome	Conf. Info. Exch. Tour
Ghana (U. of Ghana)	W. Africa	Tours, Info. Exch.
Kamasi, Soils Inst.	W. Africa	Tours, Info. Exch.
Nigeria (U. of Ibaden)	W. Africa	Tour, Info. Exch.

IITA	Ibaden, Nigeria	Tour, Info. Exch.
U. of Houston	U.S., Texas	Systems Analysis Info. Exch. Educ. Modules
U. of Hawaii	U.S., Hawaii	Experiment design for the transfer of technology
Texas A&M U.	U.S., Texas	Soil Survey-Work Plan Conf.
ICA	Carimagua Colombia, So. America	Tour, Info. Exch.
Int. Potato Inst.	Lima, Peru, S.A.	Tour, Info. Exch.
Ag. Res. Center	Chiclayo, Peru, S.A.	Tour, Info. Exch.
Yurimaguas Exp. Sta.	Yurimagua, Peru, S.A.	Tour, Info. Exch.
Campinas	San Paulo, Brazil, S.A.	Tour, Info. Exch.
Brazilia	Brazil, S.A.	Tour, Info. Exch.
Washington, D.C.	U.S.A.	Tour, Info. Exch.
U. of Hawaii	U.S., Hawaii	Cooperative Research Project in Phosphorus Studies

### 3.5 Workshops and Seminars:

Drs. J. Kirkwood, J. Collins, and E. Brams presented a paper and participated in a workshop held at the University of Hawaii "Experimental Design Workshop".

In addition to the above, the records, papers, and tapes of the workshop held last year in Santo Domingo were edited, translated and compiled (in Spanish) into a 222 page report which has been distributed.

### 3.6 Graduate Research:

The graduate research program has been enlarged as shown in the following Table. It lists those students who have entered

the M.S. program this year and their research activities and those who have graduated and their theses.

<u>Name</u>	<u>Country</u>	<u>Source of Funds and Amount</u>	<u>Research Activity</u>
*W. G. Abbott	USA	\$300/mo- AID	Manganese Status in Acid Texas Prairie Soils
*T. Burke	USA	\$300/mo- CSRS	Models of Western Farm Technology Adapted for LDCs
*J. Dews	USA	\$300/mo- CSRS	Vegetable Cultivation under Multiple Cropping Systems
**R. Harvey	USA	\$300/mo -AID	Characteristics of Several Soils of P.V. Experiment Station
*B. Rengaswamy	India	\$300/mo -CSRS	Innovative Small Farm Operations for LDCs
**L. Tejeda	Dominican Republic	\$300/mo- AID	Response of Tomatoes to Rock Phosphate and Superphosphate in So. Texas Soils
**Lugard Etuk	Nigeria	\$300/mo-AID/CSRS	Reforestation of Abandoned Farmland in Nigeria
*Cesar Tejeda	Dominican Republic	\$2.00/hr - AID	A Model of Competency Based Instruction for Use in the Dominican Republic
**Robert Dixon	USA	\$300/mo-AID	Zinc Movement in Prairie Soils
Hilary Maduakor	Nigeria	\$300/mo -CSRS and AID	Cadmium and Mercury Pollution of Soils and Produce: Extent, Effect, and Control
Charles Kargbo	Sierra Leone	\$300/mo- CSRS	Production of Onion Under Tropical and Sub-Tropical Environments
Normil Henry	Haiti	\$300/mo-AID	Grass-Tropical Legume Pastures

Louis Andre	Haiti	\$300/mo-AID	Soil Sodium and Maize Growth
+Donald Moten	USA	\$2.00/hr-AID	The Movement of Two Pesticides in Soils of Houston County
Robert Banks	USA	\$300/mo-AID	Protein Content of Tropical and Subtropical Forages as Influenced by Fertilize Practices

The research efforts include mission-oriented projects aimed at intensified agricultural systems. The staff always involves the graduate student in domestic projects or projects designed to solve problems of international agriculture. These are listed in Section 3.6 of this report and Section 5 of the 1972-73 Annual Report.

Publications and presentations of our research efforts during this report period are as follows:

1. Lopez, C. E., James Kirkwood. 1974. "Isolation of Microorganisms from a Texas Soil Capable of Degradating Urea Derivative Herbicides". Soil Sci. Jour. Proc. Vol. 38, No. 2.
2. Brams, E., P. Brams, 1974. "Professionalism in Agronomy: A Wider View". Journal of Agron. Ed. (Accepted for Public. 1974).
3. Brams, P., T. Shores, and E. Brams. 1974. "The Development of a Generative - Competency Based Instructional System in Agronomic Education", J. or Agron. Ed. (Accepted for Public. 1974).
4. Collins, J., J. C. Polanco, and J. Kirkwood, 1973. "Soils of the Savanna Guabatico-Dominican Republic". ASA Meeting Div. S-5 and Tech. Bull. TAES No. 3.
5. Harvey, R., J. Collins, 1973. "Characteristics of Several Soils Developed on the Sand Interiors of the Texas Coast Prairie". ASA Meeting Div. S-5.

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\*New Student

\*\*Graduate, M.S. Soils

+B.S. Graduate in Soils

6. Kirkwood, J., Y. P. Chang, 1973. "Tropical Savanna - A Potential Frontier for Increasing Food -Fiber". ASA Meeting Div. A-6
7. Dixon, R. H. A. Mangaroo, 1973. "The Adsorption and Strength of Bonding of Zinc in Texas Soils". ASA Meetings, Div. S-2.
8. Brams, E., J. Collins, and J. Kirkwood. "Experimental Design For Predicting Crop Productivity With Environmental and Economic Inputs", Prairie View A&M University, Prairie View, Texas.
4. Impact of Grant Supported Activities in Developing Institutional Capabilities.

As stated in preceding reports, the personnel brought to the institution under sponsorship of the grant are contributing to the development of the entire institution by enriching the curricula through the number and quality of courses offered and by assisting staff of other disciplines to develop proposals for basic and applied research. ("Remote Sensing of Grains Under Stress NASA sponsored, and The Extent of Soil Pollution Under Systems of Intensive Grazing on Texas Coastal Plain Soils, EPA sponsored). Non-agricultural students are becoming more aware of the soils program goals and are participating in our courses. Undergraduate and graduate students are becoming increasingly involved in our international work. Two students presented papers at the Agronomy Society of America National Meetings in Las Vegas, Nevada and one undergraduate holds a national office in the Student Activities Section of The ASA.

A graduate student is serving with AID in a training program as an intern with the Agricultural Section of the Technical Assistance Bureau. His development under the program has served as a stimulus to the other graduate students in agriculture.

The soils team are also involved in developing instructional innovations for the education of change agents employed in LDCs to transfer technology to the indigenous farmer.

The staff and resource center facilities are being called upon to contribute to seminars and other University sponsored programs.

5. Utilization of Institutional Resources in Development:

The library collection has been available to students and staff in other disciplines. Recently (from our library) material dealing with livestock production and pasture improvement was compiled upon request of the Ministry of Development in Suriname, S. America. In addition, the quality and extent of the materials were enriched through the cooperation of the University Consortium so that the package sent to them was quite extensive, updated, and relevant to their problem. It is believed that more exchange between the Consortium members would greatly expand the influence of the Consortium in the LDCs. Each has unique qualities which can be utilized for the benefit of people requesting technical assistance.

The School of Agriculture of the University of Sierra Leone at Njala has requested a joint project to refine a multiple cropping system for the small farmer based on work started there by members of our staff in 1968 and expanded during the visit of Mr. Chernon Karmara, agronomist at Njala College, to Prairie View A&M University soils staff. Plans for the experimental designs are now underway.

The University, upon request, distributed copies of the Proceedings of the First International Symposium of Soils of the Tropical Savanna and other publications dealing with tropical soils and international development.

A former graduate student is now engaged in research sponsored by North Carolina State University in Peru as a part of his PhD program at North Carolina State University. Two graduates are working in the

Dominican Republic, one as a private consultant in fertilizer usage to expand rice and vegetable production and the other with the Ministry of Agriculture.

6. Other Resources for Grant-Related Activities

See Table I.

7. Next Year's Plan of Work and Anticipated Expenditures

Our major efforts for the succeeding years to utilize the expertise and facilities Prairie View A&M University has developed to aid the small farmers of the LDCs when assistance is requested by a recipient country.

Efforts will consist of developing a delivery system which will bring modern adaptive research/technology to the small farmer in a way that he will accept and utilize for his benefit. The key to this system will be the para-professional who will function as an intermediate between the scientist and the farmer.

We also plan to hold workshops on Delivery Systems during the winter of 1975, meanwhile university scientists who have worked in this field will present seminars at Prairie View A&M University.

We plan to continue our work in the compilation of material from diverse sources for the inclusion into a permanent monograph on the Soils of the Savannas.

We intend to expand our resource center through the acquisition of new periodicals and sundry materials. We also plan extensive tours of the Sahel zone and the S. American savannas, work-study tours such as these are essential to the development of a delivery system within the savanna ecology in which we propose to work.

We do not intend to expand our graduate enrollment, but to

maintain our present enrollment at 10 students with the foreign students to USA ration of 1 to 1, if possible.