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THE PENNSYLVANIA STATE UNIVERSITY

COLLEGE OF AGRICULTURE

DEPARTMENT OF AGRONOMY

June 1, 1969 to May 31, 1970

# ANNUAL REPORT FOR THE PERIOD ENDING MAY 31, 1970

## 211(d) INTERNATIONAL PROGRAM IN CROP MANAGEMENT
## AGRONOMY DEPARTMENT, THE PENNSYLVANIA STATE UNIVERSITY

## UNIVERSITY PARK, PENNSYLVANIA 16802

## SUMMARY

The personnel involved in the 211(d) Program at the Pennsylvania State University were very active during the past fiscal year. Mr. Michael L. Colegrove, Graduate Assistant, spent six months in India establishing a phosphorus fertility study. Dr. Richard H. Cole, Associate Professor of International Agronomy, was assigned to the project on January 1, 1970 and traveled to Maharashtra State in February to familiarize himself with the production problems and research being conducted in the area. Mr. Wayne L. Haag, a second doctoral candidate, joined the program during the year. Two other graduate student candidates are presently being considered.

The 211(d) Program has stimulated a consideration of the importance of international development in both graduate and undergraduate programs in Agronomy at the University. The 211(d) students and professor have been meeting on a weekly basis with Indian students supported by USAID India funds at the University. This association has proved beneficial to both groups. The possibility of obtaining an internship following completion of advanced degrees is being considered. The feasibility of offering an undergraduate option in International Development within the Agronomy major is being discussed by the Courses and Curriculum Committee in the Department.

The effects of the Program on departmental research will have to be evaluated in the future. Many of the faculty are presently considering how they can expand their project objectives to provide answers to problems of international scope. New projects involving crops of minor importance in Pennsylvania and major importance in India have been proposed. The shortage of growth chambers at the University to conduct research under environmental conditions similar to those found in India should be rectified in the future.

The need to improve the research facilities in India is well recognized. Adequate field plot equipment is not available at the locations where 211(d) participants could be expected to work in the future. Laboratory facilities are presently not used or inadequately supplied. Greenhouses are not used efficiently because of indequate temperature controls. It is hoped that outside funds can be found to encourage improving these facilities in the future.

The Pennsylvania State University has been improving its capability to render assistance in developing countries at a rapid pace. The assistance of Dr. Clarence S. Bryner, Professor of Agronomy Extension and former member of Penn State's USAID Production Team, has proved extremely helpful. He has provided several seminars at the University and spoken to many farm groups. Dr. Bryner recently prepared a half-hour television special for educational television. Dr. Roger Pennock, a member of the Agronomy faculty and the Agricultural Production Team in India, has been a strong motivating force contacting both faculty and students during his home leave in the spring of 1970. Mr. Colegrove, of the 211(d) team, is directing his attention to stimulating fellow students to consider careers in international agriculture. The 211(d) professor has been responsible for encouraging this participation and has been involved with a group of professors at the Pennsylvania State University interested in modernization in developing countries.

It appears that the 211(d) Program will be successful in providing an opportunity for graduate students to obtain experience involving problems relevant in developing countries and increasing the pool of scientists interested in assisting with agricultural development outside the United States. It is also stimulating the interest of agronomists in international assignments and careers, as well as informing them of the production problems important in India. The effectiveness of the project in encouraging youth to seek training leading to careers in international agriculture and in increasing the participation of the Agronomy Department at the Pennsylvania State University in international programs, will be evaluated in future years.

1. Grant Objectives

The major objectives of the 211(d) Program at the Pennsylvania State University are as follows:

1. To increase interest in and knowledge about agricultural problems of India and improve the capability of the Pennsylvania State University to become associated with international programs in grain crop production and management;

2. To increase the pool of scientists interested in and capable of assisting in agricultural development outside the United States;

3. To provide an opportunity for graduate students to obtain research experience in grain crop production and management involving problems relevant to India;

4. To create an awareness and stimulate interest of crop scientists in international assignments and careers; and

5. To encourage youth to seek training leading to careers in international agriculture.

## 11. Major Accomplishments

Mr. Michael L. Colegrove 211(d) graduate assistant, expanded his Ph.D. research studies on phosphorus fixation in soils by establishing a sorghum fertility trial at Poona, Maharashtra State in India during the fall and winter term of 1969-70. Since Mr. Colegrove was the first student to go to India in Penn State's 211(d) Program, difficulty was experienced in obtaining a site for the experiment as well as supplies, plot equipment, farm equipment, irrigation, and labor. The absence of a formal cooperative agreement between the Pennsylvania State University and an Indian University was apparently one of the major problems. No 211(d) professor was assigned to the project at this time. Labor was available only from a local village. A serious problem was encountered with insects at this location. Although an effort was made to remove all the insects from the sorghum plants by hand, rather severe crop losses were obtained.

The experiences of this involvement not only increased the research competence of Mr. Colegrove and his advisors, but were utilized to enrich the faculty and graduate students at the Pennsylvania State University during seminars and private discussions. Mr. Colegrove traveled a limited amount in India improving his ability to consult on agronomic problems in the country. He has used this information in one presentation at an elementary school in an agricultural community near State College, Pennsylvania in an effort to encourage youth to consider international careers. This type of activity will be expanded in the future.

Mr. Wayne L. Haag, a former Peace Corps employee and M.S. Candidate at Michigan State University, accepted a graduate assistantship during the 1969-70 project year. He has been enrolled as a full time student since September, 1969 taking the maximum course load for a graduate student. A thesis topic will be selected within the next month and preliminary Ph.D. thesis work started at University Park this summer. Mr. Haag will be prepared to go to India during the spring of 1971.

An additional M.S. candidate and a Ph.D. candidate will be recruited during the summer of 1970 if possible. While candidates are available it is difficult to find students both academically qualified and sufficiently motivated to go into international work.

Two Pennsylvania State University Agronomists were involved with the USAID Production Team in India during the past year. Dr. Roger Pennock visited the University while on home leave and arrangements were made for him to present seminars, participate in classes and talk to the undergraduate Agronomy Club about the problems involved in agricultural development and his experiences in India. Dr. Clarence S. Bryner returned to full time work as Extension Agronomist during the year and has presented several talks to farm groups

throughout the state. This has been helpful in explaining to our people the reasons for the University's involvement in international problems and in justifying the need for continuation of USAID programs.

The competence of two faculty members has been increased by their participation in the National Grassland Council Meetings in New Zealand and Australia this past spring. Dr. John B. Washko, a major contributer to the meetings, traveled on Council funds. Dr. John E. Baylor attended the Meetings while on a 6-month leave studying forage crop production and management in the two countries. The expertise of both professors will be utilized to further the objectives of 211(d) in the future.

In February of 1970, Dr. Richard H. Cole traveled for a month in Maharashtra State in India. The purposes of this trip were as follows: (1) To acquaint the 211(d) professor with the major grain crop production and management problems in Maharashtra; (2) to review the grain crop research being conducted in the state; (3) to determine locations where cooperative grain crop production research could be conducted in Maharashtra State; and (4) to study the present higher educational system in the state. The work being conducted by Mr. Colegrove was also reviewed at that time. It appears that the best location to send students at present would be to Poona College, a constituent college in the Mahatma Phule Agricultural University. Several excellent problems were suggested by the Indian Scientists and a cooperative agreement could be established in the future.

During the spring term of 1970 a weekly international agricultural development seminar was held for those students involved in the 211(d) international Agronomy Program and the Indian students enrolled in agronomy at the University. While this is a small group, the topics have proved interesting and mutually beneficial to all those involved. The students have suggested that we expand this group during the fall term.

Seminars discussing Indian agricultural research and education have also been presented in the regular agronomy seminar series attended by the departmental staff and graduate students. The seminar presented by Dr. Roger Pennock, USAID/APP Team in Poona, was attended by many visitors and created an awareness of the problems and benefits of international assignments.

Dr. Cole was called on for many other internationally oriented assignments during the year. Counseling with students, other than those involved in 211(d) and the Indian USAID participants, was common. The 211(d) students were also involved in advising other graduate students about courses of international interest. Both the 211(d) students and the 211(d) professor were involved in consulting on problems of an international nature because of their previous experiences before entering this program.

The 211(d) professor has also participated in a multi-discipline University Professors' Committee interested in the "Process of Modernization in Less Developed Countires". This Committee, chaired by Dr. Howard B. Leavitt, the University Coordinator of International

Development, is presently considering new ways the University should be involved in development and methods of cooperating across departmental and college lines. Seminars have been planned and outside resource scientists invited to participate.

The courses within the Department have been reviewed by the 211(d) staff to determine their relevance to international aspects of agronomy. The lack of a tropical crop production course at the undergraduate level will be alleviated by the initiation of an introductory course in Plant Science during the 1970-71 school year. Advanced Field Crop Production taught by Dr. Robert P. Pfeifer, a professor with considerable international experience, has been revised and includes problems relevant in developing nations. Dr. John B. Washko, professor in grassland management, will be in a position to add an international dimension to his course after his trip to New Zealand and Australia this past spring and because of his involvement as faculty advisor to one of our Indian students in the Department. Since no tropical soils course is offered in the department, this void will be filled by individual studies involving 211(d) participants and interested faculty. It should be pointed out that the internationally oriented students have requested additional information about research station management and the design and operation of laboratory, greenhouse, and growth chamber equipment and facilities.

Plans are being made for an orientation course for future Indian Participants by the Coordinator of International Agricultural programs. This course will draw upon Dr. Richard H. Cole as a resource person and interested Agronomy Graduate Students as well as past Indian Participants.

A Rural Transformation Program is being established within the College of Agriculture under the coordination of Dr. Robert H. McAlexander. This Program is designed to facilitate and encourage interdisciplinary research and teaching in International Agricultural Development. Undergraduate and graduate courses in development are planned as well as research in the processes of agricultural development. The 211(d) professor will participate in this Program and the 211(d) graduate students will be encouraged to elect courses initiated under the program.

Graduate students in the 211(d) Program are encouraged to participate in courses outside the Department of Agronomy and related technical fields. For example, one 211(d) student has taken for credit in economics courses involving "Economic Growth in Underdeveloped Areas" and "Land and Water Resource Policy", as well as "South Asian Governments" in political science.

It is difficult to enumerate all the accomplishments of a new program such as 211(d). As more students and faculty become involved, the impact of the 211(d) Program can be more adequately evaluated.

## 111. Expenditures

The five-year budget and expenditures through November 30, 1969 were as follows:

| Categories | Five Year Budget | Cumulative Expenditures |
|---|---|---|
| Salaries and Wages | $146,000.00 | $ 9,640.00 |
| Travel and Transportation | 21,000.00 | 1,296.00 |
| Equipment and Supplies | 22,000.00 | 1,069.46 |
| Other Direct Costs | 11,000.00 | 105.90 |
| Totals | $200,000.00 | $12,111.36 |

This is significantly less spent than the amount expected based on the original budget, primarily because of the absence of a 211(d) professor for a major portion of the granting period and the need to finalize precise future plans before equipment and supplies are purchased. The travel expenditures do not include approximately $4,000 for travel to be charged to the project at a later date.

Two trips to India were made by the Penn State 211(d) staff during the past fiscal year. Dr. Richard H. Cole was in Maharashtra from February 25, 1970 to March 30, 1970. He reviewed the research and educational facilities in the state in order to determine where cooperative grain crop production research could be conducted and where 211(d) students could be placed in the future. The cost of trip excluding air fare was $834.46. Mr. Michael L. Colegrove arrived in India September 25, 1969 and departed February 28, 1970. He conducted a portion of his thesis work at Poona during this period at a total cost excluding GTR Travel of $3,203.06.

Equipment purchased costing in excess of $100.00 includes the following: a constant temperature water bath, cost $595.00, obtained from Fisher Scientific Company for phosphorus determination, a shaker, cost $338.00 obtained from Arthur H. Thomas Company for phosphorus determination; and a desk, cost $107.58, obtained from All-Steel Equipment Co. for the 211(d) professor.

Work Plan and Budget for Next Year:

The proposed budget for the next fiscal year is as follows:

| Categories | 1970-71 Budget |
|---|---|
| Salaries and Wages | $33,000 |
| Travel and Transportation | 4,000 |
| Equipment and Supplies | 10,000 |
| Other Costs | 3,000 |
| Total | $50,000 |

The phosphorus fertility studies on sorghum initiated in 1969 at Poona, Maharashtra State in India and University Park, Pennsylvania will be continued in 1970 and the data utilized by Mr. Michael L. Colegrove in his Ph.D. thesis research. This work will become part of a thesis to be completed by the Summer Term of 1971.

Two new research projects will be initiated at The Pennsylvania State University in 1970. These projects, involving crop production and management of sorghum and soybeans, will provide objectives that are designed to solve problems common to both crops in India and Pennsylvania. Thesis proposals of 211(d) students will contribute to the solution of problems identified in these projects. Two students should be in a position to travel overseas in the spring term of 1971 to conduct a portion of their thesis work in India. Two additional students should start their course work during the next year and be prepared to go to India in 1972.

Several equipment purchases will be required in the fiscal year. Field plot equipment is needed to facilitate the planting and threshing of crops both in the United States and India. Additional laboratory and growth chamber equipment will be purchased to facilitate the handling of seed germination and emergence tests as well as the proposed ecological studies.

The 211(d) staff will continue to work closely with the Indian students studying agronomy at The Pennsylvania State University. The need to elect agricultural development courses within the programs of both undergraduates and graduates will be emphasized. Seminars involving staff members that have worked in India will be encouraged as a part of the regular organized seminar series. When international assignments are available an effort will be made to find qualified staff desiring to participate.

Dr. Richard H. Cole will attempt to find scientists in an Indian university interested in cooperating on the proposed graduate student research projects. The success of the program during the next year will be partially dependent on the ability of the 211(d) staff to make a workable agreement for cooperative research and to pursue the work to a satisfactory completion. If this can be accomplished, the involvement of agronomists at The Pennsylvania State University in internationally oriented agricultural education will be significantly accelerated.

The projected expenditures for future years of the project are as follows:

| | |
|---|---|
| 1971 - 72 | $60,000.00 |
| 1972 - 73 | $53,000.00 |