

MOROCCO

Agronomic Institute Project

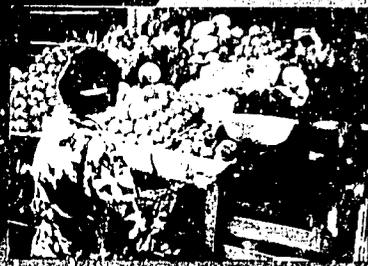
INTERNATIONAL
AGRICULTURAL
INSTITUTE
RUE DE LA LIBERTÉ, 23
1049 BRUXELLES
BELGIQUE

PN.AAW.620



GOALS

- Train IAV Faculty to the Doctoral Degree
- Provide one year Master of Science training for IAV Students
- Develop Library, Information and Computer Resources at IAV
- Assist in establishing Research Libraries and Facilities



AGRONOMIC INSTITUTE PROJECT

MOROCCO

SIXTH ANNUAL REPORT, 1985 - 1986

AID 608-0160

January 1987

TABLE OF CONTENTS

	<u>Page</u>
I. SUMMARY of GOALS and ACCOMPLISHMENTS	1
II. INTRODUCTION	5
<u>Project Purpose and Goals</u>	5
<u>Background to the Project</u>	5
III. WORK ACCOMPLISHMENTS	8
IV. PROJECT ACTIVITIES IN FY 1986	15
<u>Technical Assistance</u>	15
Resident Staff	15
Short Term Assignments	17
<u>Participant Training</u>	20
<u>Commodities</u>	25
<u>Other</u>	27
Contract Management	27
AID - Contractor Relationships	28
V. FINANCIAL REPORT	29

IV.	APPENDICES	<u>Page</u>
	I. List of American Universities	31
	II. Visits of Short Term Staff	32
	III. Breakdown of Short Term visits	35
	IV. Distribution of Doctoral Participants	36
	V. Doctoral Programs Completed	37
	VI. Memorandum of Agreement	39
	VII. Books and Journals Donated to IAV, ENA, ENFI	42
	VIII. Minutes of the Sixth Annual Project Review	43
	IX. Program on Water Management	48
	X. Annual Reports of Resident Staff	52
	XI. Roster of Participants	109

AGRONOMIC INSTITUTE PROJECT
Sixth Annual Report, 1985 - 1986

I. SUMMARY of GOALS and ACCOMPLISHMENTS for FY 86

SUMMARY of GOALS

1. Formalize the procedure for conduct of doctoral dissertation research and writing in Morocco.
2. Assist Institut Agronomique et Veterinaire Hassan II in the oral defense of doctoral participants for the degree of Doctorat es Sciences Agronomique.
3. Continue participant training at United States universities for Third Cycle, Master's degree and Doctoral programs;
4. Provide faculty for short term assignments.
5. Assist Institut Agronomique et Veterinaire Hassan II in developing its documentation center.
6. Help Institut Agronomique et Veterinaire Hassan II increase its data analysis and storage facility.

1

SUMMARY of ACCOMPLISHMENTS for FY 86

1. Participant Training	<u>Projected</u>	<u>Accomplished</u>
Faculty in United States		
Doctoral Arrivals	30	19*
MS Degree Arrivals	5	5
Faculty return to Morocco		
Doctoral	19	20
MS Degree	9	9
Third Cycle arrivals in United States	5	5
Third Cycle returns to Morocco	23	20
Travelers		
Short Term Travelers	7	8
Post Doctoral Travelers	11	12
Degrees completed		
Doctorat es Science Agronomique	11	12
PhD	0	1
2. Short Term Visitors	<u>Projected</u>	<u>Accomplished</u>
Advisors	50	39
Consultants	5	12
Administrative	5	6
Other	0	2

*IAV could not provide the numbers that were scheduled to enter the program.

3. Data Analysis and Storage Capability

Objective: To acquire, ship and place computers at Institut Agronomique et Veterinaire Hassan II, Ecole Nationale d'Agriculture and Ecole Nationale de Forestry Engineers and to provide a consultant to review the program.

Accomplishment:

- A. A consultant, Dr. David Nelson, visited Institut Agronomique et Veterinaire and assisted with a proposal to continue the computer program.
- B. The following commodities were supplied to Institut Agronomique et Veterinaire Hassan II, Ecole Nationale d'Agriculture, and Ecole Nationale de Forestry Engineers.

Commodity	Numbers in		Total
	1985	1986	
IBM PC, XT and AT	23	22	45
Printers	14	10	24
Transformers	24	12	36
Supplies of various kinds such as paper, hardware, and software	43	30	73

4. Documentation Center

Objective: To acquire scientific books and journals for Institut Agronomique et Veterinaire Hassan II Documentation Center and to provide a consultant to review the program.

Accomplishment:

- A. A consultant, Dr. Ralph Blasingame, visited Institut Agronomique et Veterinaire Hassan II to review facilities and assisted with a proposal to continue the program.
- B. Orders were placed for scientific books and journals at a value of \$150,000.00.
- C. University of Minnesota faculty members contributed a large number of books and scientific journals on topics of Agricultural Science to Institut Agronomique et Veterinaire Hassan II, Ecole Nationale d'Agriculture and Ecole Nationale de Forestry Engineers.

5. Development of a Central Supply

A Central Supply Center has been activated by assignment of space and IAV faculty persons to operate it. An order for \$10,000 worth of commodities has been received at Institut Agronomique et Veterinaire Hassan II.

6. A Plant Pest Management specialist, Dr. David Noetzel of the University of Minnesota, was at Institut Agronomique et Veterinaire Hassan II from March to June 1986.

Projections not achieved in FY 86

1. We were unable in FY 86 to place short term resident team members in Horticulture Science and Food Science. These persons will serve in FY 87.
2. We were unable to place an extension person on The Resident Team in FY 86. This person should be assigned in FY 87.

II. INTRODUCTION

The Institut Agronomique et Veterinaire Hassan II, and the University of Minnesota, with financial support from the U.S. Agency for International Development, have been collaborating in education and research since 1970. Current activities are supported by a host country contract, signed in 1980 and extended in 1985 to April 1990. This report covers FY 1986 which is the period from October 1, 1985 to September 30, 1986 and is the Sixth Annual Report of the Project.

Project Purpose and Goals

The purpose and goals of the Project are described in detail in the Project Paper and other Project documents. Briefly, the purpose and goals are to assist with faculty training and related institution building activities of the Institut Agronomique et Veterinaire Hassan II (IAV), Ecole Nationale d'Agriculture de Meknes (ENA) and Ecole National de Forestry Engineers de Sale (ENFI). These activities will provide scientists, managers and technicians needed for Morocco's agricultural development and develop the linkages between education, research and extension to improve the lot of low income farmers and herders. •

The major output of the Project will be: trained Moroccan faculty members of IAV, ENA, and ENFI; graduate level programs offered in the agricultural and social sciences at IAV; and theses and publications developed in Morocco. The Project will also assist the doctoral candidates to contribute to the broader institutional development of research and extension linkages of IAV, ENA and ENFI.

The major inputs provided in FY 1986 were participant training, technical assistance and commodity support. The details of Project inputs are contained in the Sixth Annual Work Plan of FY 1985-86 which should be read along with this report.

Background to the Project

This Project is a follow-up Project from two previous projects and contracts. The cooperation between the University of Minnesota, IAV and USAID has been ongoing since 1970. The first Project started in 1970 and primarily provided technical assistance in undergraduate (second

cycle) teaching in soil science and later in agronomy and horticulture. The second Project (1976-1980) saw an evolution of emphasis by providing assistance to Masters of Science level programs (Third Cycle) of IAV and a broadening to fields of plant pathology, rangeland management and watershed management. Increasing numbers of Third Cycle students were sent as participants to the U.S., for one year of beginning graduate level work and returned to Morocco to complete their memoires (thesis), with the support of a resident team. By 1980 IAV was offering Third Cycle programs entirely at the Institute in Soil Science and Watershed Management and was beginning to offer the Third Cycle in other fields.

The present Project was designed in 1979 through the collaborative assistance mode to deal with one of the major pieces of unfinished business in IAV's drive to institutional maturity - the development of Moroccan faculty. During the 1970's, IAV experienced phenomenal growth of students (from 16 to 2,300), of programs (23 in 1980), of budget and of institutional philosophy. The creation of a well trained Moroccan faculty became the critical element for IAV's institutional growth to continue and to permit it to become self supporting and capable of generating the human capital so urgently needed to manage and support Morocco's agricultural development.

The present Project also provided for broadening of support from a few well chosen disciplines to the whole of the Institute and a formalization of the institution building goals of AID's assistance which, although part of preceding projects, was subsumed under more limited objectives. These and other details are documented in the Evaluation of Phase II conducted in fall 1978, in the Project Paper (1980), in the Evaluations conducted in summer of 1983 and in 1986, and in the Project Paper (1984).

The Project is unique in that, subordinate to its institution building goals, the faculty development activities are planned within the framework of the institutional growth of IAV, ENA and ENFI. For example, the faculty is not being developed by simply sending participants to the U.S. for Ph.D. training. Rather, all faculty participants upon completion of their preliminary examinations in the U.S. return to

Morocco and conduct dissertation research on Moroccan topics, in Morocco at the Institute. They are awarded the degree Doctorat es Sciences Agronomiques on successful defense of the dissertation. Not all participants attend the University of Minnesota. Active support and placement of the faculty at twenty-three U.S. universities has been achieved (Appendix I page 32). The faculty therefore, creates the Doctorat es Sciences Agronomiques degree which is awarded by IAV.

It is important to appreciate some of this background to the Project. Over the years, AID has been successful in Morocco in making a long term commitment to institutional development. The rapid development of IAV, ENA and ENFI is now beginning to be appreciated as not only a necessary and vital part of AID development assistance strategy but also as a necessary condition for the development of Moroccan agriculture.

Thus the initiation of the present Project in June 1980, and its continuation in 1985 marked more than just a major new commitment by AID to Moroccan agricultural development. It was a milestone in the institutional history of IAV, ENA and ENFI and the beginning of their emergence as independent, national institutions, taking their place in the international community of agricultural science and capable of their own sustained contribution to Moroccan agricultural development. The job is not yet completed - but the goal is a realizable one.

III. WORK ACCOMPLISHMENTS

1. Doctoral program for faculty.

Seventy-one participants have finished their course work and preliminary examinations in the U.S. and have returned to Morocco. (Appendix XI, page 109). Twenty-nine have completed their doctoral programs (Appendix V, page 37).

Forty-four persons were involved in doctoral studies at U.S. universities during the year, 19 arrived in U.S.A. during 1986. Twenty-four U.S. universities, including the University of Minnesota, are involved in the doctoral program (Appendix I, page 31). Twelve doctoral defense programs were held in FY 86. Each of these events was attended by 75-150 persons who were: a) relatives and/or friends of the participants, b) faculty members of the Institute, c) administrators of the Institute, US AID, and embassies of European nations, d) members of Morocco's scientific community and e) the examination committee. After the presentation of the dissertation and its defense, and on recommendation of the committee, the Doctorat Es Sciences Agronomique was conferred upon the participants by the Director of IAV, Dr. M. Sedrati.

The program on the oral defense of the doctoral dissertation has been a major event in the institutional growth of IAV, in IAV gaining recognition as an educational institution in Morocco as well as in the international community.

The names of participants who have completed doctoral degrees at IAV and at U.S. universities are shown in Appendix V, page 37. Participants who received only the Ph.D. did so at their own expense.

2. M.S. program for faculty.

Ten programs were in progress at end of in FY 86 (Appendix XI page 112). Twenty faculty participants have completed degrees under this program and have returned to Morocco. Eleven universities are involved as shown in Appendix I, page 31.

3. Third Cycle Program.

The Third Cycle Program is IAV's equivalent of the U.S. Master of Science Program. Students are sent to U.S. universities (Appendix XI page 113) for course work and professional experiences. At the end of 12 - 15 months they return to Morocco to do degree research and to receive the degree Engineer d'Etat. Two hundred one persons have completed this program and have returned to Morocco.

4. Time Schedule.

Resident Staff, participant training and commodities have been provided as planned. Project outputs are also ahead of schedule. Twenty-nine persons have completed the doctoral program and another eighty-five are enrolled in it. Twenty persons have completed the M.S. program. Two hundred ten persons have been enrolled in the Third Cycle program since the program started in 1972. (Appendix XI, page 113).

5. Annual Review and Work Plan Meeting.

The collaborative assistance mode and host country contract set the tone by which AID, IAV and the University of Minnesota operate as partners to evaluate and fine tune the project. This process works very well and relationships between the three partners were good. The minutes of the Sixth Annual Project Review are located in Appendix VIII, page 43).

6. Short-term Technical Assistance.

Faculty on short-term assignments advised doctoral participants, gave seminars at the Institute and at other institutions and provided expert advice to the Institute and other institutions in the areas of their specialization. These visits provide the basis for creating linkages between IAV faculty and their departments and sister departments in US universities. See Appendix II, page 32 for a listing of short-term visitors during FY 86.

These visits have increased each year. In FY 82, 83, 84 and 85 there were, respectively, 15, 18, 12 and 48 short term visitors. In FY 86 there were 59 short term visitors.

7. Project Amendment and Evaluation.

In FY 85 the Project was amended to extend and expand its activities until April 1990. In FY 86 the Project was again evaluated and found to be successful in meeting its goals and objectives. The recommendations of the Evaluation Team concerned positioning IAV for continued development during the decade of 1990 after the Project has been terminated.

8. Micro computers.

Computer availability and useage at IAV continued to improve during FY 86. A total of 45 IBM PC units, along with needed printers, transformers and software were acquired and shipped to Morocco. These commodities have been placed at IAV, ENA and ENFI. This program was reviewed in FY 86 and a proposal for continuation has been submitted to US-AID by IAV.

9. Documentation Center.

Assistance to the IAV Documentation Center was started in 1986. Orders totaling \$150,000 have been placed for scientific books and journals. These items are now beginning to arrive at IAV.

The faculty of the University of Minnesota continues to contribute many books and scientific journals to libraries at IAV, ENA and ENFI. (See Appendix VII page 42 for details on the contributions).

10. Linkages with other Institutions.

The development of cooperative research and teaching activities between IAV and other research and educational institutions is vital for growth of IAV as a force in Moroccan agriculture. Major current linkages are as follows.

- a. MIAC Project with Institut Nationale de la Recherche Agronomique (INRA).

Cooperation between this project and IAV continues as indicated in the report of FY 85.

b. Oral Defense of Doctoral Theses

The oral defense held for each participant on completion of the doctoral thesis continues to provide an excellent opportunity to form and strengthen linkages. Each committee is made up of outstanding experts from several sources. Serving on the committees in 1986 were people from the following:

MIAC Project of Morocco
ICARDA (International Center for Arid Agriculture)
CIMMYT (International Center for Maize and Wheat)
Mohamed V University, Morocco
Ministere de la Sante, Morocco
INRA Dyon, France
University of California-Riverside
University of Minnesota
Michigan State University
FAO (Food and Agriculture Organization of the United Nations)
Texas A&M University
Agricultural University of Vienna
University of Florida
Station de Sciences du Sol, Montfavet, France
University of Reading, England
Institut Agronomique Paris
Swedish University of Agronomy Science
US Department of Agriculture
University of Paris VI

In addition, offers for cooperation continue to be extended by representatives of various European countries such as The Netherlands, Belgium, West Germany, Austria, Great Britain, France, Italy etc.

At the conclusion of some of the oral defense programs, workshops/seminars are held at IAV on the topic of the doctoral dissertation. Participants in these workshops/seminars include members of the oral defense committee as well as Moroccan scientists. In FY 86, six such workshops/seminars were held.

c. The International Plant Biotechnology Network

During FY 86, this organization, headquartered in Ft. Collins, Colorado, negotiated with IAV to place one of its regional centers of activity at IAV. This regional center will help extend modern biotechnical techniques and materials throughout French speaking Africa. The decision to place the center in Morocco was due in large part to the excellent work on plant tissue culture being done in IAV facilities at Rabat and Agadir by doctoral participants in horticultural science.

IAV and the Tissue Culture for Crops Project of Colorado State University recently completed a Memorandum of Agreement to help coordinate their activities in biotechnology. See Appendix VI page 39 for a copy of the Memorandum.

Faculty at IAV, who have skills in producing disease free stocks of banana, strawberry, potato, rose and carnation, have begun contacts and work with several organizations interested in acquiring these stocks. Some of these organizations are: SODEA (Society of Developing Agriculture), DPVCTRL (Organization of Plant Protection and Certification of Plants, SOGETA (Society of Managing Agricultural Areas). These organizations receive the stocks that have been produced under agreement with IAV faculty members and further increase them for sale to Moroccan growers. Strongest activity to date has been with banana.

d. Small Ruminant Collaborative Research Support Program (CRSP)

This program, funded by US-AID, is cooperative with five countries and ten U.S. universities. The University California at Davis manages the program. Morocco recently joined the CRSP. The project is concerned with sheep and goats and has work underway on genetics, nutrition and feeding, range management and sociology. Five IAV faculty and one researcher from ENA are co-investigators. In addition, eight other faculty members from IAV and ENA cooperate with the CRSP. All the Moroccan investigators and cooperators have received training in the degree programs of the Project and IAV.

Most have also received on the job training by visitors from the CRSP institutions. This CRSP is truly a cooperative effort involving IAV, ENA and associated U.S. Universities.

e. Cooperation with Utah State University

IAV and Utah State University cooperated in presenting a course on Management of Water at IAV in September/October 1986. Twenty-seven persons from four African countries participated. This workshop was significant because: (1) it was the first such workshop in this part of Africa, (2) it was conducted largely in the french language; and (3) it was carried out largely by IAV faculty. Present plans are to repeat the course several times annually. See Appendix IX page 48 for a copy of the program/announcement for the International Course on On-farm Water Management.

f. Cooperation with NIFTAL

In FY 86, IAV and The Project for Nitrogen Fixation in Tropical Agricultural Legumes (NIFTAL) began discussions on placing a regional NIFTAL Center at IAV. This Center, if established, would serve other African countries as well as Morocco. The Center would promote the use of biologically fixed nitrogen (BNF) in agriculture and develop an outreach program, and assist in training students.

g. International Foundation for Science

This foundation, with headquarters in Sweden, supports research in many countries. Moroccan scientists received 19 funded grants from the Foundation between 1974-85. Of these, 15 were to IAV scientists: five of the grants are in their second stage, nine have just been initiated and one has been completed.

Summary of Accomplishments

The sixth year of the Project was highly successful. No significant problems were encountered. The experience of faculty performance in doctoral programs continued to be good. The Project is on schedule in the number of faculty participants in the United States and back in Morocco. Dissertation research is proceeding well. Twenty-nine participants have completed doctoral degrees. Relations between IAV, the University of Minnesota and AID were excellent. The Project enjoyed strong support and commitment from the leadership of AID, IAV, and the University of Minnesota. The Project remained within budget. In short, the Project has every appearance of being a high success.

IV. PROJECT ACTIVITIES IN FY 1986

Technical Assistance

A. Resident Team

During FY 86 six senior scientists and two junior scientists were assigned to the Project. They were:

Senior Scientists: Dr. Donald Johnson - Veterinary Medicine (Team Leader)
Dr. Aly Lasheen - Horticulture Science
Dr. Ben Lockhart - Integrated Pest Management
Dr. James Burleigh - Cereals Pathology
Dr. Kent Crookston - Agronomy

Junior Scientists: Ms. Laura McCann - Animal Science
Dr. Jack Garrett - Animal Science

Individual reports of activities by the resident staff are in Appendix X, page 51.

Dr. Aly Lasheen completed eight years of service to IAV and IAV's Department of Horticulture in July, 1986. During his tenure, Dr. Lasheen saw the Horticulture Department expand into the Horticulture Complex at Agadir and was a principal advisor in the development of the Complex. He assisted many students to begin their careers and was instrumental in placing nine persons in the horticulture doctoral training program. Four of these participants have completed the doctorate and two others are almost finished. He has prepared a report on the development of horticulture in Morocco. Dr. Lasheen plans to return to his home in Lexington, Kentucky.

Dr. R. Kent Crookston completed two years of service to IAV and IAV's Agronomy Department in July, 1986. Dr. Crookston's major achievement was to assist many doctoral participants in the writing of their doctoral dissertations. Dr. Crookston has returned to his post at the University of Minnesota.

Dr. Ben Lockhart completed ten years of service to IAV and the Project in January 1986. He served in the Plant Pathology Department at Rabat and at Agadir. He investigated plant diseases of Morocco caused by viruses and established two virology laboratories and a plant disease clinic. He advised many students in plant pathology and left behind a well trained group of plant virologists to build upon the foundation that he laid. One of Dr. Lockhart's major contributions was to demonstrate that first class scientific work can be done in Morocco. He published with his colleagues and students many scientific papers in the journals of Europe and the United States.

Ms. Laura McCann completed her work in IAV's Animal Science Department in December 1985 and returned to the University of Minnesota. Ms. McCann's contributions were significant in that (1) she completed a study on the feed value of different kinds of straw in Morocco, (2) she demonstrated that IAV's library system can adequately serve a serious scholar, (3) she earned the degree Engineer 'd Etat at IAV, (4) she earned the Master of Science degree at the University of Minnesota with the thesis produced in Morocco, 5) she assisted in organizing and operating a feeds analysis laboratory at IAV.

Dr. Jack Garrett, a Research Associate in the Animal Science Department of the University of Minnesota, joined the resident staff in September 1986. He is a specialist in Animal Nutrition and Management with skills on the use of computers in animal science research.

The principal role of the Resident Staff in Morocco is to provide support and assistance to institution building activities, particularly to the completion of faculty dissertation research and writing at IAV. With 45 participants presently in Morocco doing dissertation research and another 15 scheduled to return in FY 86, the service to these people is a major activity of the Resident Staff.

The activities of the Resident Staff were largely related to the continued improvement of initiatives already underway. These activities are listed below.

1. Coordinate and cooperate in the activities of local hire personnel in office management, commodity clearance, shipping, and pre-departure preparation of participants.

2. Role as "Resident Coordinator." Each Resident Team Member serves as a resource person to assist in advising and guiding the Moroccan participants in the day-to-day aspects of their thesis research and writing. This role has developed since the U.S. academic advisors are available in Morocco about once/year and communicate at other times by mail or telephone. The role of the Resident Team Member as a Resident Coordinator has greatly increased, and will continue to be important as the number of participants doing research and writing in Morocco increases.

3. Meet with participants several times each year to monitor participant progress and to ensure communication with U.S. Advisors, with the Project and with IAV administration.

4. Working with the Moroccan doctoral participant to arrange for the visit of his/her U.S. advisor. Thus arrangements are made to meet the advisor, to take care of his housing needs, and seminars are scheduled and contacts are made with appropriate persons at IAV and other Moroccan Institutions.

5. Assist doctoral participants with preparations for the oral defense of thesis before an international committee.

B. Short Term Assignments

Faculty advisors. During FY 86 short term visits were made by 39 faculty advisors of returned IAV faculty (Appendix II, page 32). The number of advisor visits will continue at about 60 visits/year for the duration of the Project. The visits by advisors are essential to assure the timely conduct of quality dissertation research. They are equally important for developing the permanent institutional linkages between IAV and U.S. universities. The faculty advisors supplied by different U.S. universities during FY 86 are shown in Appendix III, page 35.

Faculty advisors spend 1-3 weeks in Morocco. They are encouraged to travel to field sites of research being done by the Moroccan participant and to make extensive contacts with other Moroccan agricultural scientists and leaders. The advisors present seminars at IAV and at other institutions such

as INRA, Mohamed V University, the Ministry of Agriculture and Agrarian Reform, etc.

Consultants

Twelve consultants were provided during FY 86. Their names and fields of expertise are shown in Appendix II, page 33. These consultants provided assistance in new professional areas (disciplines) in which the Project has had either limited previous experience or a need to reinforce the Resident Team. All consultants gave public lectures and were widely available to faculty at IAV and to other Moroccan scientists for discussing teaching research and outreach activities in their disciplines. Four visitors were of special significance to IAV. Two of the visitors reviewed the data analysis program and the Documentation Center program. Two of the visitors studied IAV programs and participation of women in the Project.

In FY 86 Professor Ralph Blasingame of Rutgers University visited Mr. A. El Bakkali, IAV librarian and participant in the doctoral program, to provide expert advice and guidance on the development of IAV's Documentation Center. His report was the basis for a proposal submitted by IAV to AID, to continue support for the acquisition of library resources.

In FY 86, Dr. David Nelson, Head of the University of Minnesota Computer Center, again visited IAV to evaluate the data analysis facility program and to assist in the preparation of a proposal to AID to continue support. The Project has acquired and shipped to Morocco 45 IBM-PC units which have been installed at IAV, ENA and ENFI.

In FY 86 two special visitors were sent to IAV by the University of Minnesota to do special studies. These studies were financed by Title XII funds that had been earmarked to support the Project. Dr. George Wardlow came in June 1986 to study the student admission and student evaluation policies of IAV and to study how these policies might be related to Moroccan student success at U.S. universities. Dr. Victoria Coifman came in July 1986 to study the participation of women in the Project. Dr. Coifman interviewed each woman participant to gain insight into the significance of their US experience in the development of their careers in Morocco. She also attempted to identify problems that may have been experienced by women participants.

Inspection Visits. Four visits were made. Two by the Project Director, one in October 1985 and the other in June 1986. On these visits the Director participated in the Annual Review and Work Plan meeting, met with the Resident Team and made trips to the School of Agriculture at Meknes and to the Forestry School at Sale. At these campuses the Director was informed of the problems encountered by the participants as well as of their successes. The inspection visit also provided a welcome opportunity for discussion and evaluation of Project operations with IAV and USAID.

Dr. Delane Welsch, Assistant Dean for International Programs in the College of Agriculture at the University of Minnesota, visited the resident team, the Director and Secretary General of AID and USAID officials.

Dr. C.E. Allen, Dean, College of Agriculture, University of Minnesota, also visited Morocco in February 1986. He spent time advising a participant, Mr. Kabbali, a faculty member in Animal Science at ENA, and conducting the doctoral oral defense of Mr. Kabbali. During his visit Dean Allen also visited with administrators, faculty members and students at ENA and IAV as well as with officials of US-AID.

C. Participant Training

Graduate education and training of IAV faculty and IAV third cycle students is a primary activity of this Project to provide the human resources critical for the institutional development of IAV and other Moroccan Agricultural Institutions which it serves. Participant training in the U.S. continued, as a major activity during FY 86 in support of this Project objective.

Participants are faculty members of IAV, ENA and ENFI in doctoral and M.S. programs, and third cycle students of IAV who come to the U.S. generally for 12-15 months beginning graduate training and then return to do their "memoire" in Morocco under direction of the IAV faculty. The combined Minnesota-IAV Projects, since the beginning in 1972, have hosted 354 participant academic programs; 210 Third Cycle students, and 114 Doctoral and 30 Master of Science participants from the faculty. Rosters of participants in these combined programs are given in Appendix XI, page 109.

During FY 86, 172 participants were served by the project; 116 in U.S. residence (84 faculty and 32 students) and 56 in Morocco. At the maximum there were 87 participants in U.S. residence (October) and the minimum number was 52 (May). Total participant training months was 800 (66.7 participant year equivalents), a decrease of 22% from FY 85, which was the peak participant training year of the Project. (FY 85 = 1028, FY 84 = 982, FY 83 = 773, FY 82 = 759, and FY 81 = 804 participant months).

During FY 86, 19 faculty arrived for doctoral study for a total of 114 doctoral programs in progress or completed. Twenty faculty completed their doctoral course work and preliminary examinations during the year and returned to Morocco to pursue their dissertation research. Fourteen faculty completed doctoral programs during the year; 13 IAV Doctorats and one U.S. PhD (Appendix V, page 37). At the close of FY 86 there were 43 faculty pursuing doctoral studies in the U.S., 42 pursuing dissertation research in Morocco, and 29 program completions for either the IAV or U.S. doctorate.

A second "modified" doctoral program was initiated in Plant Breeding in FY 86 in which the participants complete an agreed amount of course work and experience in the U.S. and then complete their examinations, research and dissertation in Morocco with a co-advisor at IAV. The first such modified program was initiated in Dairy Science in FY 85 and the participant returned

to IAV this year to pursue research prior to returning next year for additional course work. This second participant will follow a similar plan. This program arrangement will provide an important step in IAV's post-graduate studies program development.

Eighteen faculty were engaged in M.S. programs in the U.S. during FY 86. There were six new programs initiated and eight program completions during the year, and ten programs in progress at the end of the year. The total faculty M.S. degree programs to date is 30 in 13 major fields of study and including 12 other universities.

The distribution of doctoral participants according to major field and university is given in Appendix IV page 36. Approximately 53% of all doctoral participants (60 of 114) have been placed in programs at other universities. This is a slight overall increase (1%) during the year as a result of continuing efforts to maintain a broad U.S. educational base. During FY 86, 11 (58%) of the 19 faculty initiating programs were placed at seven universities other than Minnesota. Currently 23 U.S. Universities are cooperating with the University of Minnesota in the doctoral training program and among these Universities nine have three or more participants.

The doctoral participants returning to Morocco during the year completed their U.S. studies in an average 29.6 months (compared with 29.1 in FY 85, 29.3 in FY 83, and 29.6 in FY 84) including supplemental language training as necessary. The time range was 25 to 33 months with 29 months as the modal class. Many factors continue to contribute to the length of time for U.S. program completions including additional course work and research methodology required for their disciplines and examination schedules. The achievement of most faculty participants to complete their U.S. programs within this limited time continues to be a truly remarkable record for the project.

There were 27 third cycle students in residence at the beginning of FY 86, including 3 completing two-year programs. At the close of the year there were 16 students in residence, including 1 scheduled to complete the sixth year program and 9 who will complete fifth year studies during Fall 86, and 2 scheduled to do the sixth year program in the U.S. Five new students arrived during late summer for English language and academic programs. One of these will be placed at another U.S. university to provide the program emphasis

requested by IAV. This reduction in new students continues the phase out of third cycle programs in the U.S. with the last five students scheduled to arrive in summer 1987.

Due to long term efforts at IAV to enhance English Language training for participants who will study in the U.S., most faculty and third cycle student participants arrived in FY 86 with a strong English background sufficient to achieve near proficiency during an intensive supplemental English program. The value and the advantage of this continued emphasis upon English language at IAV is essential for achieving participant program objectives within the limited time available to them.

During the year all participants attended professional society meetings (some presented research papers), and disciplinary and commodity work-shops and conferences as approved on an individual basis. They also participated actively in field and laboratory research and development projects under supervision of their academic advisors. These activities are considered an integral part of graduate professional training for both faculty and student participants, and will be continued.

The University of Minnesota Project Office continues to coordinate and monitor academic programs including submission of regular reports and progress on programs to IAV and AID. The Project continues to provide administrative and management support to participants including all areas of their well being; coordination of admission applications, provision of special services and logistical support related to program development such as supplies and equipment purchases and shipment to Morocco, assistance with medical and dental referrals and claims processing, and many other special needs which arise on an individual basis. FY 86 completes the sixth year of successful Project assistance with major medical insurance through International Underwriters/Brokers, Inc. These services are considered to significantly enhance the participant training experience in the U.S.

Short Term Participant visits to the United States by IAV officials, senior faculty and support staff continue to be very useful in the development of close collaborative relationships and in helping the officials to gain a better understanding of higher agricultural education in the United States. Continuation of these visits is proposed for the future. Short term visitors and the purposes of their visits follow.

Mr. Larbi Firdawcy, Secretary General of IAV, traveled to the University of Minnesota during May 1986. On campus he visited with University of Minnesota officials on long range planning by IAV. He also visited with participants who are studying at the University of Minnesota.

Dr. M.M. Fassi-Fehri, Professor in IAV's Department of Microbiology and Contagious Diseases, visited the U.S. 29 July to 30 August 1986. He visited scientists and laboratories at the University of Minnesota, Iowa State University, the USDA National Center of Animal Diseases at Ames Iowa, the USDA Center for Control of Transmissible Diseases at Atlanta, Georgia, the Mobay Corporation at Kansas City, Kansas. In addition to visits Dr. Fassi-Fehri presented seminars on diseases of sheep.

Dr. B.E.L. Hamouri, Professor in IAV's Department Chemistry and Biochemistry, visited the U.S. 10 August to 29 August 1986. He attended meetings of the VII International Congress of Photosynthesis at Brown University, Providence, Rhode Island. He presented a paper on sugar production in wastewater. He visited laboratories at the University of California-Berkeley and Cornell University.

Dr. Said Benlamlih, Professor in IAV's Department of Physiology and Therapeutics visited the U.S. 22 July to 31 August 1986. He visited laboratories and scientists at University of Minnesota, Colorado State University, University of California Davis, University of California-Riverside, and USDA and USAID Washington, D.C. He presented seminars on physiology of pregnant small ruminants.

Dr. M. Rejdali, Professor in IAV's Department of Ecology, visited the United States from 15 July to 16 August 1986. He attended the International Symposium on The Systematics and Evolution of Grasses at the Smithsonian Institute, Washington D.C. After the symposium he visited laboratories and scientists at the University of Minnesota, University of California-Davis, Colorado State University, University of Ohio, and New York Botanical Gardens. He also attended the meeting of American Institute of Biological Sciences (AIBS) at Amherst, Massachusetts.

Dr. Mustapha Agbani, head of IAV's Department of Agronomy visited the United States 1 August to 30 August 1986. He visited the University of Minnesota, University of California-Davis, Colorado State University, and attended the Tenth International Plant Nutrition Colloquium in Rockville, Maryland.

Mr. Said Jait, Technician in IAV's Department of Soil Science, visited the University of Minnesota and Colorado State University 1 March to 14 November 1986. Mr. Jait received training in basic techniques of soil, water and plant analysis including the use of computers to assist with these analyses.

In addition to the short term participants reported above twelve, doctoral program participants traveled to the United States after completing requirements for IAV's Doctorat es Sciences Agronomique under what is entitled the mini-post doctoral program. In this program participants carry out a variety of professional activities including: preparation of journal publications from their theses, attend scientific meetings, and conferences, review curriculum problems, become better acquainted with the organization of the US land grant system of agricultural education, visit laboratories of special interest, etc.

Each post doctoral program is not more than three months in duration and is considered essential in the transition of the participant from graduate student to professional status.

D. Commodities

Commodities supplied included a vehicle, library development items, research support and computers.

Continuing support for research was provided by logistic support, support for resident team research and through participant training support.

The final accounting and almost all purchases are made through the Project office at the University of Minnesota. An accurate inventory is maintained on all major equipment items at the University of Minnesota Project Office in Rabat.

The logistic support fund is to provide, on a priority basis, various supplies, chemicals and equipment not readily available in Morocco and to assist with the maintenance and improvement of major items of equipment e.g. electron microscope, amino acid analyzer etc., on an annual basis.

The research of each member of the Resident Team is supported by an annual allocation of about \$10,000.00 per person. These funds are used to support on-going research by the team member and his students.

Although not included under the commodity line in the budget, there is significant procurement of commodities associated with participant training and especially the doctoral dissertation research of faculty returning to Morocco. Experience in FY 86 was that most of the dissertation research support funds (\$10,000 per faculty member) were spent in the U.S. on scientific equipment and supplies. These supplies along with other research support commodities were delivered to Morocco in eight separate air freight shipments. The Project also has returning participants and short term travelers hand-carry urgently needed supplies to Morocco.

Procurement, shipping, custom clearance and delivery in Morocco is done by Project staff. The rapid and efficient delivery of these needed commodities has been a major contribution to Project success but is a heavy load on support staff time.

The installation and maintenance of Project supplied commodities will continue to be a major work load for the resident team and for Project support staff. The ordering of spare parts for scientific equipment is an important but time consuming activity, and the need for spare parts will increase as the Project continues and the equipment is used more.

E. Other

1. Contract Management.

The Project is managed by a half-time Project Director at the University of Minnesota, assisted on campus by two half-time training officers, by a half-time assistant, by 1.5 accountants and 1.0 secretary and by a half-time student assistant. The persons involved (none on full-time basis) were:

Dr. Roy D. Wilcoxson, Project Director
Dr. James C. Sentz, Training Officer
Dr. George Wardlow, Training Officer
Mrs. Helen Cullen, Senior Secretary
Mrs. Muta Paulson, Accountant
Mrs. Julie Borris, Accountant
Mrs. Linda Lamke, Accountant
Mr. Ron Young, Logistic Support Officer and Accountant
Mrs. Gerda Wilson, Travel Coordinator
Mr. Phay Vang, Accountant
Mr. Scott Smith, Student Assistant
Mrs. Pat Van Cleave, Assistant to Project Director

The Project has a heavy administrative load because of the large numbers of students and participants placed at many U.S. universities, the unique nature of the training program (almost none of the participants are in the United States on U.S. degree programs), the complexity of the host country contract, and the intensive nature of logistic support needed on the Project. ^{1/}

^{1/}For more details see the Seventh Annual Work Plan and Budget, Agronomic Institute Project, October 1986.

In Morocco the Team Leader, Dr. Don Johnson, was assisted by competent local hire staff of accountants, Mr. Said Le Korchi; Mrs. Lynn Santacatarina and Mr. Charaf Gharbaoui; a secretary, Mrs. Kelly Fareh and an office coordinator, Mr. Habib Quonin. A part-time bilingual secretary, Mrs. Christine Heaton, also assisted at Agadir and at Rabat during the year.

The administrative burden of the Project in Morocco continues to be heavy and will continue to be heavy during the next few years as doctoral participants return to develop their research programs. Logistic support (including customs clearance and local distribution), advising and consulting by the Resident Team, visits by advisors and other short term persons, preparations of departing participants have all increased the administrative burden.

2. AID - Contractor Relationships

The relationships of AID-Washington and US-AID-Rabat with the University of Minnesota have continued to be excellent.

US-AID-Rabat was unfailing in its courteous and efficient support of the Project, the Resident Staff and TDY short term staff. Their help in processing, on short notice, large numbers of third cycle participants and faculty doctoral participants, is especially appreciated. Particular appreciation is expressed to Mr. M. Hanafi for his ongoing assistance, to Dr. Malcolm Purvis and Mr. Ronald Stryker for their enthusiastic support, and to Mr. Robert Chase for his leadership and encouragement.

Mr. John Lowenthal, AID-Washington, provided ongoing support for the Project. His assistance in keeping AID Washington knowledgeable of project activity has been a valuable contribution.

V. FINANCIAL REPORT

The amounts budgeted for FY 86 and actual expenditures are shown on page 30. Most expenditures were less than amounts budgeted. The Short Term Staff budget was underexpended despite a significant increase in this activity. The Participant training budget was underexpended largely because of over estimations for faculty participants and short term participants. The amounts expended for fringe benefits and indirect costs were less than anticipated.

APPENDIX I

List of American Universities

that Cooperate

List of American Universities that Cooperate with the
Project in Doctoral, Masters Degree and Third Cycle Programs.

Universities	Doctoral	Masters	Third Cycle
<u>Western U.S.A.</u>			
Utah State University	*	*	*
University of California			
Davis	*	*	*
Riverside	*		*
California State University			
Chico			*
Fresno			*
Humboldt			*
Oregon State University	*	*	*
Colorado State University	*		*
New Mexico State University	*		
University of Idaho	*		
Montana State University			*
University of Nevada			*
Washington State University	*		*
University of Arizona		*	*
<u>Mid-Western U.S.A.</u>			
Kansas State University	*		*
Purdue University	*		
University of Nebraska	*	*	*
University of Wisconsin	*		*
Michigan State University	*	*	*
University of Michigan	*		
University of Minnesota	*	*	*
University of Southern Illinois		*	
University of Illinois	*		*
University of Kentucky	*		
Iowa State University	*	*	*
Ohio State University	*	*	.
<u>Southern U.S.A.</u>			
Texas A & M University	*	*	*
Texas Tech University		*	
North Carolina State University	*		*
Auburn University			*
University of Georgia	*		*
University of Louisiana			*
University of Florida			*
<u>Eastern U.S.A.</u>			
Rutgers University	*		
Cornell University	*		
Syracuse University		*	
Rhode Island			*

APPENDIX II

Visits of Short Term Staff

Visits to Morocco by Short Term Staff in FY 86.

Visitors	Dates (m/d/yr)	Field	Advisee
<u>Faculty Advisors</u>			
Molina, J.	10/1-15/85	Soil Science	Hilali, A.
Schmidt, E.	10/1-15/85	Soil Science	Hilali, A.
Brooks, K.N.	11/17-24/85	Forestry	Tayaa, M.
Berglund, E.	11/17-24/85	Soil Science	Tayaa, M.
Young, C.W.	11/27-12/5/85 3/4-18/86	Animal Science	Eddebarh, H.
Hatfield, F.J.	12/10-26/85 6/25-7/25/86	Civil Engineering	Bartali, E.
Simmons, S.	12/7-21/85 6/20-29/86	Agronomy	Chafai, A
Busta, F.	1/7-21/86	Food Science	Ababouch, L.
Goodrich, P.	2/11-27/86	Agric Engineering	Achkari-Begdouri, A
Stadelmann, E.	2/1-15/86 7/10-25/86	Horticulture	ElAttir, H.
Csallany, S.	2/1-25/86	Food Science	Rahmani, M.
Allen, C.E.	3/4-18/86	Animal Science	Kabbali, A.
Goodrich, R.	3/4-18/86	Animal Science	Ilham, A.
Adams, D.C.	2/29-4/16/86	Forestry	Messat, S.
Johnson, D.F.	3/29-4/22/86	Forestry	Messat, S.
Cornelius, S.	3/4-18/86	Animal Science	Eddebarh, A.
Olson, W.G.	3/9-21/86	Veterinary Medicine	Hamliri, A.
Roelfs, A.P.	4/29-5/10/86	Plant Pathology	Ezzahiri, B.
Pomeroy, B.S.	4/26-5/10/86	Veterinary Medicine	Bouzoubaa, K.
Moslemi, A.	5/22-6/18/86	Forestry	Hachmi, M.
Rittenhouse, L.	6/1-7/10/86	Animal Science	El Aich, A.
Tatini, S.R.	6/15-7/13/86	Food Science	Hamama, A.
Cutts, C.E.	6/28-7/19/86	Civil Engineering	Bartali, E.
Jeppson, R.W.	6/24-7/6/86	Irrigation	Oulhaj, A.
Robertshaw, D.	6/1-7/1/86	Veterinary Medicine	Zine-Filali

Short-term visits to Morocco in FY 86 (continued)

Visitors	Dates (m/d/yr)	Field	Advisee
<u>Faculty Advisors</u>			
Lockhart, G.	6/10-7/1/86	Food Science	Bakhella, M.
Stromberg, B.E.	6/10-24/86	Veterinary Medicine	Khallaayoune, K
Senauer, B.	7/1-13/86	Agric. Economics	Amane, M.
Markhart, A.H.	7/5-15/86	Horticulture	Choukr-Allah, R
Read, P.E.	9/5-10/6/85 7/7-17/85	Horticulture	Choukr-Allah, R
Briske, D.D.	7/1-11/86	Range Science	Berkat, O.
Smeins, F.E.	7/1-11/86	Range Science	Berkat, O.
Richter, H.*	7/10-25/86	Horticulture	El Attir, H.
Stadelmann, Lee	7/10-25/86	Horticulture	El Attir, H.
Vardolakis, I.G.*	7/25-8/1/86	Irrigation	Debbarn, A.
<u>Consultants</u>			
Fenster*	11/6-15/85	Extension	
Dunkel, F.*	11/20-26/86	Grain Storage	
Rasmusson, W.*	11/20-25/86	Irrigation	
Boggen, W.R.*	11/20-25/86	Irrigation	
Noetzel, D.M.	3/1-6/15/86	Entomology	
Rust, R.H.	4/1-30/86	Soil Science	
Lockhart, B.	4/1-30/86	Plant Pathology	
Hammond, J.	4/12-22/86	Agric. Economics	
Nelson, D.	9/1-15/86	Computer Science	
Blasingame, R.	9/6-26/86	Library Science	
Lipowitz, A.	7/4-15/86	Veterinary Medicine	
Caywood, D.D.*	7/4-15/86	Veterinary Medicine	

Administrative Visitors

Larsen, P.	3/1-15/86	Plant Pathology
Burnside, O.	3/1-15/86	Agronomy
Boehlje, M.	4/12/22/86	Agric. Economics
Welsch, D.	10/19/30/86	Assist. Dean
Wilcoxson, R.D.	10/19-11/26/86 6/10-7/1/86	Project Director

Other Visitors**

Wardlow, G.	6/10-25/86	Agric. Education
Coifman, V.	6/25-7/20/86	African Studies

* At Partial cost to The Project because these people were in Europe or Morocco on other business.

**At no cost to The Project because they were funded by the University of Minnesota

APPENDIX III

Breakdown of Short Term Visits

Breakdown of Short Term Visits FY-86

<u>No. Short Term Visits</u>	<u>University of Minnesota</u>	<u>Cooperating Universities</u>
59	41	18

Cooperating Universities

<u>Name</u>	<u>Number</u>
Kansas State	1
Rutgers	1
Colorado State	2
University of Idaho	3
University of Florida	1
University of Arizona	2
Michigan State	3
Utah State	1
Texas A&M	2
Agric. Univ of Vienna	1
USDA	1
	<hr/>
TOTAL	18

APPENDIX IV

Distribution of Doctoral Participants

Doctoral Participants Distribution, September 1986.
(Numbers in brackets have returned to Morocco)

Major	University of Minnesota		Other U.S. ^{1/} Universities		Total	
Agronomy & Plant Breeding	7	(4)	5	(3)	12	(7)
Horticulture	5	(5)	5	(2)	10	(7)
Plant Pathology	4	(3)	5	(3)	9	(6)
Entomology	1	-	1	-	2	-
Forestry	2	(1)	4	(2)	6	(3)
Soil & Watershed Science	4	(4)	4	(3)	8	(7)
Animal Science	4	(4)	7	(3)	11	(7)
Range Science	-	-	6	(5)	6	(5)
Irrigation & Engineering	3	(2)	6	(5)	9	(7)
Veterinary	13	(9)	7	(4)	20	(13)
Food Science	5	(2)	1	(1)	6	(3)
Nutrition	1	(1)	4	-	5	(1)
Economics	4	(2)	-	-	4	(2)
Statistics	1	-	-	-	1	-
Geodetic Science	-	-	1	-	1	-
Other	-	-	4	(3)	4	(3)
Totals	54	(37)	60	(34)	114	(71)

^{1/} Cooperating Universities and Number of Participants.

California-Davis	7	Michigan	1
California-Riverside	4	Michigan State	3
Colorado State	4	Nebraska	1
Cornell	1	New Mexico State	1
Georgia	1	North Carolina State	2
Idaho	5	Ohio State	1
Illinois	1	Oregon State	5
Iowa State	3	Purdue	2
Kansas State	4	Rutgers	1
Kentucky	1	Texas A&M	3
		Utah State	7
		Washington State	1
		Wisconsin	1

APPENDIX V

Doctoral Programs Completed

Doctoral Programs Completed

Doctoral Programs Completed (U.S. Ph.D. and/or IAV Doctorates Sciences Agronomiques)

<u>Name</u>	<u>Specialization</u>	<u>Date</u>	<u>University/ Degree</u>
1. ABABOUC, L.	Food Science	9/86	IAV/DSc
2. ABDELLAOUI, R.	Irrigation Engr.	9/85 3/86	IAV/DSc Utah State/PhD
3. ABOULABBES, O.	Watershed Mgt.	8/84	Utah State/PhD
4. AIT KADI, M.	Irrigation Engr.	6/85 8/85	IAV/DSc Utah State/PhD
5. AMMATI, M.	Plant Nematology	9/85 12/85	IAV/DSc UC Riverside/PhD
6. BARTALI, E.	Civil Engineering	7/86	IAV/DSc
7. BAZZA, M.	Soil/Water Science	8/85	Univ. CA-Davis/PhD
8. BENESSALAH, D.	Forest Inventory	7/85	IAV/DSc/Minn/PhD
9. BERKAT, O.	Range Science	7/86	IAV/DSc
10. BOULIF, M.	Plant Pathology	10/85 3/86	IAV/DSc Minn/PhD
11. CHAFAI, A.	Agronomy	6/86 9/86	IAV/DSc Minn/PhD
12. CHOUKR-ALLAH	Horticulture	7/86 9/86	IAV/DSc Minn/PhD
13. EDDEBBARH, A.	Animal Science	3/86 5/86	IAV/DSc Minn/PhD
14. EL ATTIR, B.	Horticulture	7/86 9/86	IAV/DSc Minn/PhD
15. EL OTMANI, M.	Horticulture	9/85	Riverside/PhD
16. ESSATARA, M.	Nutrition	9/85 10/85	IAV/DSc Minn/PhD
17. EZZAHIRI, B	Plant Pathology	5/86 10/85	IAV/DSc Minn/PhD
18. HILALI, A.	Soil Science	11/85 5/86	IAV/DSc Minn/PhD
19. HILALI, A.	Horticulture	5/85 5/86	IAV/DSc Minn/PhD
20. IBNATTYA, A.	Range Management	10/84	Oregon State/PhD
21. KABBALI, A.	Animal Science	3/86 5/86	IAV/DSc Minn/PhD
22. MERZOUK, A.	Soil Science	9/85	Minnesota/PhD
23. NARJISSE, H.	Range Management	8/81	Utah State/PhD

Doctoral Programs Completed, page 2

<u>Name</u>	<u>Specialization</u>	<u>University</u>	
		<u>Date</u>	<u>Degree</u>
24. OUATTAR, S.	Plant Physiology	7/85 8/85	IAV/DSc Minn/PhD
25. OUSSIBLE, M.	Agronomy	7/85 10/85	IAV/DSc Minn/PhD
26. RAISSOUNI, B.	Agric. Chemistry	9/84	New Mexico/PhD
27. TAYAA, M.	Water Shed Mgt	10/85 12/85	IAV/DSc Minn/PhD
28. ZAHOUR, S.	Plant Breeding	9/84 12/84	IAV/DSc Minnesota/PhD
29. ZEMRANI, A.B.	Animal Science	9/86	Kentucky/PhD

APPENDIX VI

Memorandum of Agreement

MEMORANDUM OF AGREEMENT

Between

The Tissue Culture for Crops Project
of Colorado State University, USA
And
The Institut Agronomique Et Veterinaire
Hassan II
of
Agadir and Rabat, Morocco

The Tissue Culture for Crops Projects (TCCP) and the Institut Agronomique et Veterinaire Hassan II (IAV Hassan II) agree to collaborate in the International Plant Biotechnology Network (IPBNet). The purpose of IPBNet is to establish working partnerships among researchers worldwide with interest in using plant tissue culture and other emerging plant biotechnologies to accelerate the development of stress-tolerant food crops. Collaboration will involve: (A) cooperative research, (B) graduate education and training and (C) information and personal exchange. These three areas of collaboration are detailed below.

- A. Research collaboration. Research collaboration between the TCCP and IAV Hassan II will include, but not be limited to: 1) the development of tissue culture techniques with application to crops of interest to IAV Hassan II and 2) The production and field testing of plants derived from cell cultures selected for resistance to various diseases and environmental stresses.

- B. Graduate Education and Training. The IPBNet Training Program in tissue culture techniques welcomes candidates from IAV Hassan II and cooperating countries to participate in the formalized six month training program, or to design an appropriate research proposal for a shorter or longer period of training. Graduate students selected by IAV Hassan II would also be welcome at the TCCP to facilitate technique development and the exchange of research information between the two research laboratories depending upon space availability.

IAV Hassan II has also acquired a vast experience in teaching short courses in specific tropical crops and in tissue culture techniques. Training candidates from the TCCP or other IPBNet member countries would be able to come to IAV Hassan II to obtain expertise with one or more tropical crops. IAV Hassan II also has the facilities for inservice training or a regional workshop on tropical crops. Details would be arranged on a student by student basis.

- C. Information and Personal Exchange. IAV Hassan II is invited to participate in the International Plant Biotechnology Network (IPBNet) formed by TCCP. This membership involves a regular exchange of research news. IPBNet publishes a newsletter every six months and would like to receive all pertinent IAV Hassan II publications including scientific studies, annual reports and newsletters. IAV Hassan II in turn, will receive all pertinent TCCP/IPBNet publications. Visiting scientists with defined research goals are welcome at either institution provided space is available. For personal exchanges the TCCP personnel traveling to IAV Hassan II. IAV Hassan II will pay the costs of transportation and will seek external aid for room and board, tuition, etc. for IAV Hassan II personal traveling to Colorado State. The purpose of this would be to increase communication of ideas and techniques between the two institutions, and hence the rate of progress in research. The level of exchange is suggested to be that of a technician or graduate student who intends to remain at their home institution for some years.

- D. Concluding Comments: The TCCP and IAV Hassan II will be free to use the data and photographs relating to this cooperative research agreement in annual reports and similar institutional publications with proper acknowledgement to each other's contribution. In the case of scientific papers, the manuscript will be jointly developed and published, after mutual consultation and agreement on authorship and content, in suitable scientific journals. Research collaboration between the TCCP and IAV Hassan II may be expanded in the future depending on the availability of funds and the degree to which expanded collaboration would prove mutually beneficial.

This agreement will be in force until it is terminated by mutual agreement between the two parties.

For Tissue Culture for Crops Project
Colorado State University, USA

Murray Nabors, Project Director

Date

Susan J. Ferguson, Network Coordinator

Date

For Institut Agronomique et Veterinaire
Hassan II, Rabat and Agadir, Morocco

Dr. M'Hamed Sedrati, Director

Date

APPENDIX VII

Books and Journals Donated

to

IAV, ENA, ENFI

Books and Journals sent to Institute during FY 86

1. Books - About 200 books on different topics of Agricultural Science

2. Journals

<u>Name</u>	<u>No. Annual Volumes</u>
Journal of Bacteriology	6
Bacteriological Reviews	1
Food Technology	14
Plant Physiology	11
Journal American Soc. Horticultural Science	10
Horticultural Science	14
Journal Plant Growth Regulators	1
Minnesota Soil Surveys	24
Soil Science Soc. America	10
Proceeding Soil Science Society America	7
Crop Science	7
Agronomy Journal	5
Journal Soil and Water Conservation	6
Agronomy Abstracts	7
Photochemistry and Photobiology	8
Journal Animal Science	10
Journal Dairy Science	10
Journal Poultry Science	10
World Poultry Science Journal	10
American Journal Botany	3
Total Volumes	188
Total Journals	21

APPENDIX VIII

Minutes of the Sixth Annual Project Review

MINUTES OF SIXTH ANNUAL REVIEW OF
WORK PLAN AND BUDGET
HELD AT IAV HASSAN II, 22 OCTOBER, 1985

The meeting began at 9:16 a.m., with Dr. Sedrati welcoming. Dr. Welsch, Dr. Wilcoxson, Dr. Johnson, Dr. Lasheen, Dr. Lockhart, Dr. Burleigh, Miss McCann, and Dr. Crookston represented the University of Minnesota. Mr. Hanafi and Dr. Stryker represented USAID.

In a preliminary exchange, it was noted that a correction of the Work Plan was needed on page 31. The green house at Agadir cost \$35,000 rather than \$35,000,000. Hanafi asked for a status report of the interactions with INRA and MIAC regarding their doctoral students receiving an IAV degree (see page 33). Firdawcy responded that cooperation is now going well. Before turning the time over to Wilcoxson, Firdawcy asked that everyone feel free to express their individual points of view, and not consider the meeting a meaningless formality.

Wilcoxson reported that he had received no corrections or suggestions from St. Paul Campus people who had been given a copy of the Work Plan. He conducted a quick review of the Work Plan, and made particular mention of key points (referred to by page in the Work Plan).

Page 5: There will be several changes in project personnel during the year. Laura McCann will be leaving the Project in December. Lockhart will be returning to the St. Paul Campus in December. Lasheen will be terminating during 1986. Crookston pointed out that plans for his replacement should be considered immediately, as his current contract expires July 1986.

Page 7: In addition to those participants who have or will complete doctorates in FY 85/86, there are six participants who have completed PhD's without obtaining IAV doctorates, making a total of 17 Project participants with doctorates or PhD's.

Page 8: TDY staff last year consisted of 50 advisors who came to supervise research or participate in exams, and six special consultants. The plan is to continue with about the same level of activity in 1986.

Page 10: There are no plans to change the support staff in St. Paul or Morocco.

Page 11: There were no problems in connection with participant training.

Page 13: No changes anticipated from the Work Plan in terms of commodities.

Page 15: Project evaluation is scheduled for January 1986.

Following Wilcoxson's brief discussion of the Work Plan, Johnson commented that feedback from exam committees had been positive. He congratulated the Project on progress regarding doctorates received over the past year.

Johnson noted that we were still waiting for AID approval of library purchases. Hanafi and Stryker said there was no anticipated problem. Firdawcy reported that the Minister of Agriculture had made a personal statement of support of the Institute library, saying that it should become the most complete and largest agricultural library in the country. The Minister pledged financial support of the library from the Ministry, and asked that the Institute assemble a list of needs, and to communicate this to the Ministry. He said the Ministry would include IAV library support as part of its 1986 budget.

Lasheen requested that an effort be made to include and incorporate those participants who had "jumped ship" and obtained the PhD without the IAV doctorate. Wilcoxson said that the Project was going to claim them.

Johnson pointed out that since the Project will terminate in 1990, this year (1986) should be the last year that participants (33 more) can leave for the U.S. This would allow for two years in the U.S., plus two years in Morocco to complete the research. Firdawcy said the Institute cannot send 33 participants this year. Some will have to go later. There will have to be some adjustment in their programs. He said we must at least assure that all participants will be back in Morocco before April 1990, since the current project cannot be budgeted beyond then. He said it would be up to the Institute to see that unfinished participants were not stranded beyond that date. He anticipated a need to negotiate with AID for a means to extend some aspect of wrap-up support.

Wilcoxson asked the team members to give a brief oral report of their activities over the past year, plus anticipated activities during the next year.

Johnson reported that his efforts were going well, and that he expected success with participants in 1986. His only regret was that his team leader duties prevented involvement in research with participants, and in clinic development, as much as he would prefer.

Lockhart said all of his duties have been handed over completely to Moroccan colleagues. Field research facilities at Agadir are good. He requested a return in the summer of 1986 to help two students complete their memoirs. Firdawcy expressed gratitude for Lockhart's good work (establishment of two virology labs which are functioning well).

Burleigh reported success with participants and research (plus special workshop on crop loss management). He has several promising research projects and more unfolding, and has assumed project responsibility for coordinating computer acquisitions.

McCann expressed appreciation for the opportunity to participate in the Project. She is satisfied with her experience and education here. She recommended TDY visitors giving seminars at the Institute prepare a write-up of their presentation, and speak very slowly, so that students can follow. Firdawcy suggested that each department in the U.S. should send a junior scientist here. Wilcoxson pointed out that funding is always the major problem.

Lasheen observed that the obtainment of doctorates by four Agadir participants by the end of 1986 would really help. Their future in Morocco (cooperation with local farmers, the ministry, the prime minister's farm, etc...) looks promising. Lasheen will write a "plan for horticulture development in Morocco" this year. He made a plea for not only continued, but increased support for Agadir. He pointed out the need for a "trained" industry if Morocco is to compete with European horticulturists.

Crookston reported that a very favorable image of the Institute existed among the diplomatic community in Rabat as a result of impressive doctoral exams. All his work objectives have been met, except initiation of an IAV graduate policy, which he recommended be considered soon. Firdawcy invited Crookston to begin immediately to assemble a first draft of a graduate policy with a focus on project participants at this point. Institute-wide policy should then be approached with a committee including non-Project faculty.

Stryker distributed the AID review of the work plan and budget (attached). Noteworthy discussions arose regarding three points as follows:

Point 2: (staffing). Firdawcy encouraged enlargement of the spectrum of people who serve as resident coordinators. The Institute soon will not need any more permanent presence, but will need friendship, connections, and relationships with a multitude of departments so that it can branch out and become better-known. Wilcoxson said that when Lasheen and Lockhart leave, several short-term people will come in and give intensive inputs. Lockhart pointed out the need for specific research projects and said that short-term, in-and-out contacts do not put in place lasting projects. Welsch said we need specific department heads to establish a long-term commitment with a sister department in Morocco. Some departments at Minnesota appear interested: others do not. His office is exploring funding possibilities. There are several promising opportunities. Firdawcy said we need to start now to join U.S. departments in a permanent linkage.

Point 4: (attendance at annual meetings by team members). Hanafi repeated the request that the Project demonstrate in their travel requests how international travel will help Institute building. Firdawcy requested that IAV faculty accompany team members on international travel whenever possible. Crookston's two trips during the next year was questioned. Crookston pointed out that he did not travel last year, that one of his trips this year was paid for by non-Project funds, and that participants were accompanying him on both trips which were planned specifically to provide them experience and professional contacts.

Point 5: (Evaluation issues). Firdawcy brought up the question of how to deal with participants who have defended their U.S. PhD in advance of, or perhaps in lieu of, the IAV doctorate...some after having conducted very little, if any, research in Morocco. He asked the Minnesota team for a recommendation. Lasheen recommended that once these participants had completed an appropriate amount of in-Morocco research, they be allowed to defend that research for an IAV doctorate. Lockhart urged the Project to focus on the original objective of obtaining the IAV doctorate, and to

ignore the U.S. PhD (regardless of whether obtained before or after the doctorate). Crookston suggested that participants not be promoted until the IAV doctorate is granted. Firdawcy pointed out that the primary problem with these suggestions was that participants have a legal claim to promotion as soon as they receive the U.S. PhD. Therefore, the obtaining of the IAV doctorate, and the beneficial Institute-building experience associated with that exercise, might become secondary or overlooked in the future, unless it was prioritized.

Considerable discussion followed, and several suggestions were offered. The group did not reach a satisfactory resolution, however, so Welsh proposed that the issue be tabled, and that a discussion of it be resumed during the team meeting scheduled two days later (Oct. 24, 1985). This was agreed to, with the understanding that a recommendation would be provided to the Institute. Firdawcy insisted that we resolve the issue before the January evaluation, and assigned Crookston to incorporate the resulting Project decision into the guidelines that he is to prepare.

Wilcoxson suggested a focus on two key questions during the January review:

1. What are the lessons that have been learned thus far for the Institute and its development?
2. What are the lessons that have been learned thus far for USAID and other funding agencies?

Wilcoxson then proposed that we accept the work plan and budget as presented, with modifications as discussed and resolved today. His proposal was agreed to, and the USAID representatives agreed to supply written approval to implement the plan and the budget.

The meeting adjourned at 1:27 p.m.

APPENDIX IX

Program on Water Management

LIEU

Le cours aura lieu à l'Institut Agronomique et Vétérinaire Hassan II à Rabat durant les quatre premières semaines. Les participants recevront par courrier le détail des essais de cours en même temps que les imprimés et formulaires d'inscription. Les travaux de terrain auront lieu la cinquième semaine, dans un périmètre irrigué et des exploitations privées dans la région du Chert non loin de Rabat.

CERTIFICATS

A l'expiration du cours, des certificats seront délivrés aux participants conformément au degré de participation au cours.

RÈGLEMENT DES FRAIS DE PARTICIPATION

Les participants à ce cours doivent fournir les documents nécessaires pour le règlement des frais de participation par l'intermédiaire du représentant de l'organisme donateur à Washington, D.C. Dans le cas où l'organisme donateur n'aurait pas de représentation à Washington, D.C., le participant devra se présenter à Rabat avec un chèque libellé en \$US pour le montant des frais du cours. Le traitement des documents administratifs sera pris en charge par le CIUSU qui est familiarisé avec les procédures de l'Agence Américaine pour le Développement International.

INFORMATIONS ET INSCRIPTIONS

Comité d'admission
Centre International de l'Irrigation
Département de l'Équipement et de l'Hydraulique
Institut Agronomique et Vétérinaire Hassan II
BP 6202 - Agdal - RABAT MAROC

CLIMAT

Le cours aura lieu à la fin de l'été. Le jour il fait assez chaud (chambres à manches courtes) mais les nuits sont fraîches. À Rabat, les températures moyennes mensuelles de septembre et d'octobre sont respectivement de 22 °C et 20 °C. La moyenne des précipitations de ces mêmes mois est respectivement de 9 et 54 mm.

LOGEMENT ET DÉPLACEMENT

Le Centre mettra à la disposition des participants le moyen de transport nécessaires aussi bien pour le déroulement des cours que pour certains besoins courants. La nourriture et le logement **NO SONT PAS** pris en charge par le Centre.

Le coût par chambre est de l'ordre de

100 DH par personne occupant une chambre ;
150 DH pour deux personnes occupant une chambre.

L'indemnité officielle pour la nourriture et le logement varie entre 50 et 70 \$US. Le montant exact des dépenses personnelles dépendra des préférences et des goûts de chacun.

DATES D'ARRIVÉE ET DE DÉPART

Il est recommandé que les participants arrivent à l'Aéroport International Mohamed V de Casablanca le samedi 5 septembre 1986. Un bus est disponible pour la liaison entre l'aéroport et Rabat. Une séance d'information concernant la région, l'Institut Agronomique et les aspects généraux du cours sera organisée au cours du weekend. Le cours prendra fin dans la nuit du vendredi 10 octobre par une cérémonie de clôture et un dîner. Aucun départ ne devra être prévu avant le samedi 11 octobre. Les détails seront transmis avec la lettre d'admission délivrée par le Centre aux personnes admises au cours.

INSCRIPTION

L'inscription aura lieu le lundi 8 septembre 1986 de 8h 30 à 10h au Centre International de l'Irrigation à l'Institut Agronomique et Vétérinaire Hassan II, Rabat, Maroc.

COUT

Le coût du cours, y compris les enseignements, les matériels des travaux pratiques, les manuels, le transport, une calculatrice programmable, et le dîner de clôture est de 2 400 \$US. Les demandes d'inscription par courrier postale seront acceptées jusqu'à la date limite du lundi 25 août, 1986. Les réservations par téléphone ou par telex peuvent être reçues jusqu'à la date limite du 2 septembre 1986, mais leur satisfaction est sujette à la disponibilité des places.

MP: 1\$US est approximativement égal à 9 Dirhams (DH) Marocains.

INTERNATIONAL IRRIGATION CENTER

Département de l'Équipement et de l'Hydraulique
Institut Agronomique et Vétérinaire Hassan II
BP 6202 - AGDAL - Rabat Maroc
Télex: 93331673

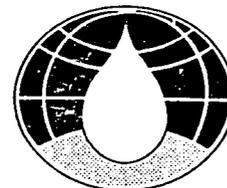
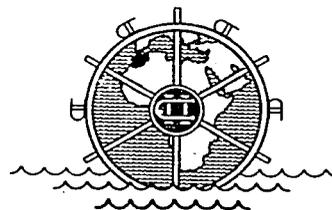
COURS FUTURS EN ANGLAIS ET EN FRANÇAIS

Cours	Date	Lieu	Coût
GESTION DE L'EAU AU NIVEAU DE L'EXPLOITATION AGRICOLE	18 Août - 27 Sept 1987	Rabat	2,900 \$US
ATELIER SUR LES STRATEGIES ET POLITIQUE DE PLANIFICATION POUR L'AGRICULTURE IRRIGUEE	13 Sept - 4 Octobre 1987	Rabat	1,000 \$US

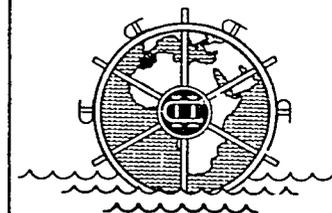
Un Accord de Coopération élargi a été signé en août 1985 par le Directeur de l'Institut Agronomique et Vétérinaire (IAV) Hassan II et le Président de l'Université d'État de l'Utah (USU) jetant les bases pour une collaboration à long terme entre le Centre International d'Irrigation à USU (CIUSU). Un effort commun pour dispenser des cours de courte durée dans chacun des deux Centres sera entrepris. Il est également prévu de mener des activités communes de recherche appliquée en Afrique et ailleurs.

Le présent cours, "Gestion de l'Eau au Niveau de l'Exploitation Agricole," est notre première entreprise commune. Bien que ce cours soit dispensé en français, le même cours sera donné en anglais et en français, au Maroc en 1987, par le personnel des deux Centres.

Le CIUSU se charge prioritairement des cours en français et en anglais alors que le CIUSU concentrera son intérêt sur les cours en anglais et en espagnol. Ce premier cours n'est que le début d'une collaboration visant à satisfaire un besoin sans cesse croissant pour l'amélioration de la productivité de l'agriculture irriguée dans de nombreuses régions du monde.



CENTRE INTERNATIONAL DE L'IRRIGATION



COURS INTERNATIONAL SUR LA GESTION DE L'EAU AU NIVEAU DE L'EXPLOITATION AGRICOLE

EN FRANÇAIS

7 SEPTEMBRE AU 11 OCTOBRE, 1986

DÉPARTEMENT DE L'ÉQUIPEMENT ET DE L'HYDRAULIQUE
INSTITUTE AGRONOMIQUE ET VÉTÉRINAIRE HASSAN II
BP 6202-AGDAL-RABAT, MAROC

Best Available Document

GESTION DE L'EAU AU NIVEAU DE L'EXPLOITATION AGRICOLE

7 SEPTEMBRE AU 11 OCTOBRE, 1986
Rabat, Maroc

L'amélioration de la gestion de l'eau d'irrigation au niveau de l'exploitation agricole, nécessite une équipe pluridisciplinaire composée de personnes ayant une formation dans le domaine des sciences physiques (agronomie, pédologie et ingénierie) et de personnes formées dans les sciences humaines (économie, sociologie, anthropologie et droit) capable de bien comprendre le système d'irrigation au niveau de l'exploitation. A côté de ces personnes expérimentées et de haute qualification technique dans les disciplines requises, le développement, l'efficacité de gestion et de communication, et la collaboration étroite entre les membres de l'équipe d'un côté et ceux-ci et les agriculteurs d'un autre côté, sont des ingrédients indispensables pour la réussite du projet. Quelques uns des éléments essentiels pour un travail d'équipe pluridisciplinaire sont le respect pour la contribution que chacune des disciplines peut apporter, le désir d'établir une communication efficace avec les agriculteurs et les autres disciplines et le désir d'apprendre de chacun et des agriculteurs en particulier.

Une attention particulière doit être donnée au profil de l'agriculteur (le client), pour comprendre ses besoins et ses perceptions quant aux contraintes majeures de l'exploitation. Cette méthode permet de consolider la crédibilité de l'équipe face aux agriculteurs en assurant l'intérêt de ceux-ci pour la solution des problèmes auxquels l'exploitation agricole fait face. La participation du client est une méthode efficace pour acquiescer les informations concernant le dynamique du système d'exploitation agricole et pour identifier les obstacles et les atouts contre ou pour le changement. Les agriculteurs ont généralement beaucoup d'informations considérables, aussi bien qu'une compréhension intuitive de la façon dont leur système fonctionne, pourtant ils sont souvent ignorés par les experts.

OBJECTIFS DU COURS

Le présent cours est une approche multi-disciplinaire pour agronomes, pédologues, ingénieurs, économistes, sociologues et anthropologues avec les objectifs suivants:

- Insister sur la nature multi-disciplinaire du transfert des technologies de gestion de l'eau d'irrigation aux agriculteurs
- Développer la maîtrise et la capacité d'apprendre à partir des agriculteurs
- Décrire des processus méthodologiques qui peuvent être adaptés et importés du monde pour améliorer la productivité agricole et la gestion de l'eau sur l'exploitation
- Procurer une formation de terrain pour permettre de diagnostiquer les problèmes de la production agricole, évaluer l'efficacité de l'irrigation y compris les pertes dans les réseaux, déterminer la viabilité économique de l'entreprise agricole et intervenir les agriculteurs
- Enfin, développer les capacités de travail en équipe multi-disciplinaire

ORGANISATION DU COURS

RACHID ADELLOU
Co-directeur du Cours

MOHAMED AIT-KADI
Co-directeur du Cours

GAYLORD V. SKOGENBOE
Co-directeur du Cours

PROGRAMME

- I. INTRODUCTION
Philosophie, objectifs et grandes lignes du cours
- II. UTILISATION DE CALCULATRICE PROGRAMMABLE
Utilisation de calculatrice programmable pour l'analyse des données de terrain et la planification des irrigations
- III. LES SYSTEMES D'EXPLOITATION AGRICOLE APPROCHES DE RECHERCHE ET DE VULGARISATION
Développement et transfert de technologie aux agriculteurs basés sur une compréhension globale de l'environnement agro-climatique, socio-économique et politique
- IV. PROCESSUS METHODOLOGIQUE POUR L'AMELIORATION DE LA GESTION DE L'EAU AU NIVEAU DE L'EXPLOITATION AGRICOLE
Développement d'un processus orienté vers l'augmentation de la productivité des terres irriguées, la distribution plus équilibrée des revenus et l'économie des ressources. Des chercheurs formés dans les domaines des sciences physiques et sociales, travaillent en collaboration avec les agriculteurs les contraintes majeures à l'amélioration de la productivité agricole et recherchent des solutions acceptables à ces contraintes
- V. RELATIONS EAU-SOL-PLANTE
Propriétés physiques des sols, courbes de rétention, et mesures de l'humidité du sol. Extraction et mouvement de l'eau, réponse des cultures à l'eau, aux fertilisants et aux sels
- VI. PLANIFICATION DES IRRIGATIONS
Méthodes d'estimation de l'évapotranspiration potentielle et celle des cultures, fréquence des irrigations, planification de la distribution de l'eau et méthodes de planification des irrigations
- VII. DIAGNOSTIC DE L'ENVIRONNEMENT AGRONOMIQUE
Tests et analyses de terrain pour l'identification des contraintes agronomiques: types de cultures, sols, climat, irrigations, protection des cultures et pratiques culturales

- VIII. MESURE DES DEBITS D'EAU ET EVALUATION DES PERTES EN EAU DANS LES CANAUX AU NIVEAU DE L'EXPLOITATION
Méthodes de terrain et instruments de mesure et d'enregistrement des débits d'eau. Techniques pour l'évaluation des pertes en eau à partir des réseaux de l'exploitation
- IX. EVALUATION DES SYSTEMES D'IRRIGATION AU NIVEAU DE L'EXPLOITATION
Techniques d'évaluation de l'avancement, de l'infiltration, de la percolation profonde et du ruissellement sur des champs irrigués en gravitaire. Technique pour l'évaluation de l'efficacité de l'irrigation, et de la percolation profonde sur des champs irrigués par des réseaux sous pression
- X. ECONOMIE DES EXPLOITATIONS AGRICOLES
Méthodes de collecte et d'analyse des données de gestion nécessaires à l'évaluation de la disponibilité et de l'utilisation des ressources au niveau de l'exploitation agricole. Identification de contraintes à l'amélioration de l'usage, ainsi que des ressources
- XI. EVALUATION DES RESEAUX SOCIO-CULTURELS
Approches classiques pour cerner les conditions institutionnelles qui affectent le comportement de l'agriculteur face à l'irrigation. Evaluation des ensembles de règles, organisations, croyances et des modes d'interaction des facteurs qui déterminent le comportement de l'irrigant
- XII. ORGANISATION DES AGRICULTEURS POUR LA GESTION DE L'EAU
Méthodes pour la formation d'associations d'irrigants chargées de la construction, de l'exploitation, de l'entretien et de la réhabilitation de leur réseau d'irrigation en vue de l'augmentation de la productivité agricole
- XIII. ANALYSE ET INTERPRETATION DES DONNEES DE TERRAIN
L'analyse des données de terrain se fera par des équipes pluridisciplinaires. Un rapport final qui comprendra une analyse pluridisciplinaire sera préparé par chaque équipe de participants

Larbi Fildawy

Othmane Lahou

Wynn A. Walker
Co-Auteur

Derrick J. Thom

Kurt Lonsway

PLANNING DES COURS

Le cours sera donné en une session intensive de cinq semaines, cinq jours par semaine. Les cours théoriques auront lieu le matin alors que les travaux pratiques et les travaux de terrain se dérouleront pendant les après-midis. Les week-ends seront mis à profit, autant que possible, pour des activités connexes.

PROFESSEURS

Les cours seront donnés par des professeurs qualifiés ayant une grande expérience internationale dans le domaine de la gestion de l'eau dans les pays en voie de développement. La plupart des professeurs ont déjà travaillé pour plusieurs années en Afrique. Des professeurs renommés pour leur contribution dans le développement de technologies de gestion de l'eau et leur expérience dans le transfert de technologies agricoles seront invités à donner des conférences.

- Rachid Abdelou (Relations Eau-Sol-Plante, Planification des Irrigations)
- Mohamed Ait Kadi (Processus Méthodologique pour l'Amélioration de la Gestion de l'Eau au Niveau de l'Exploitation Agricole, Evaluation des Systèmes d'Irrigation au Niveau de l'Exploitation)
- Moïse Akenshi (Economie des Exploitations Agricoles)
- Moïse Bouderbala (Les Systèmes d'Exploitation Agricole Approches de Recherche et de Vulgarisation)
- Abdelhak Mezzi (Organisation des Agriculteurs pour la Gestion de l'Eau)
- Kurt Lonsway (Mesure des Débits d'eau et Evaluation des Pertes en Eau dans les Canaux au Niveau de l'Exploitation)
- Othman Ouhq (Mesure des Débits d'eau et Evaluation des Pertes en Eau dans les Canaux au Niveau de l'Exploitation)
- Mohamed Ouabou (Diagnostic de l'Environnement Agronomique)
- Christian Puech (Utilisation de Calculatrice Programmable)
- Gaylord V. Skogenboe (Processus Méthodologique pour l'Amélioration de la Gestion de l'Eau au Niveau de l'Exploitation Agricole)
- Derrick J. Thom (Organisation des Agriculteurs pour la Gestion de l'Eau)

PARTICIPANTS

Ce cours est conçu comme un séminaire pluridisciplinaire pour agronomes, pédologues, ingénieurs dans les domaines agronomiques, et le génie civil et rural, spécialistes de la sociologie et de l'économie rurales et anthropologiques. De façon générale, les participants à ces cours se recrutent parmi un large éventail hiérarchique avec comme dénominateur commun un intérêt dans l'amélioration de la productivité des terres irriguées. En conséquence toute personne concernée par les ressources en eau et les projets de développement agricole, la vulgarisation, la recherche agricole, le développement rural etc., peut tirer profit de ce cours. Les travaux de terrain permettront un contact direct avec les différentes phases de l'irrigation. Les personnes incapables ou indisposées de participer activement aux travaux de terrain ne sont pas encouragées à participer à ce cours.

**COURS INTERNATIONAL SUR
LA GESTION DE L'EAU AU NIVEAU DE L'EXPLOITATION AGRICOLE
Du 7 Septembre au 11 Octobre 1986**

Recherches
RACHID ADELLOU

Nom: _____

Date de naissance _____

Adresse personnelle _____

Ville _____

Téléphone personnel _____

Titre ou fonction _____

Organisation _____

Préférez envoyer des informations sur l'expérience professionnelle en irrigation _____

Adresse de l'employeur _____

Ville _____

Téléphone de l'employeur _____

Normal Institution d'origine _____

Nationalité _____

Lieu de naissance _____

Code Postal _____

Pays _____

No du Passeport ou de l'Id _____

Université d'appartenance _____

Code postal _____

No. Tél. _____

Code postal _____

No. Tél. _____

Pays _____

Best Available Document

APPENDIX X

Annual Reports of Resident Team

ANNUAL REPORTS OF RESIDENT TEAM

<u>Name</u>	<u>Page</u>
Dr. D. Johnson	52
Dr. J. Burleigh	71
Dr. R. Crookston	75
Dr. A. Lasheen	87
Dr. B. Lockhart	104

ANNUAL REPORT 1985-1986

by

Dr. D.W. Johnson

Professor of VETERINARY MEDICINE

And ANIMAL PRODUCTION

TEAM LEADER

INTRODUCTION

IAV has continued to progress toward becoming a first class international institution of higher education in agriculture and veterinary medicine. In FY 86 progress continued in building the doctoral program. Conducting the doctoral examination is developing into a routine procedure. Eleven participants completed doctoral examinations this year under project support. This brought to 20 the total number of doctorates awarded under program. A total of 25 doctorates have been granted by the IAV; three faculty members completed doctoral examinations with support from other countries. The doctoral examination is an important event in building an environment in which the faculty of IAV can participate in the exchange of scientific ideas. Furthermore the examination is an event of which the faculty should truly be proud. The international seminars following many of the examinations provide information on the latest advances in all scientific fields of agriculture and veterinary medicine.

The development of the Third Cycle curriculum has continued to progress with implementation of additional offerings and improvement in the quality of studies. Since the Third Cycle program is now offered entirely in Morocco, and is therefore a new program, additional financial support is required to provide the necessary research supplies and equipment. Students must develop the appropriate scientific expertise for their field of study in addition to the field training they receive. They also must improve their use of data analysis. Thus it has become apparent during the past year that there is further need to improve the statistical and data analysis training facility of IAV. This need is in addition to the current project input into the data collection and analysis facilities for faculty research.

Good progress was made in FY 86 in the development of the documentation center and the data collection and analysis facilities. Both of these activities are extremely essential for continued growth of IAV's academic, research and extension activities.

One concern of the evaluation team, also expressed by others, is the future of IAV after the Project ends. How will IAV maintain its program beyond 1990 and how can it keep the well-qualified faculty with the current budgetary constraints? This problem must be dealt with. One solution that appeared in FY 86, was the development of a regional workshop that was offered by the International Irrigation Center at IAV in cooperation with Utah State University. This program provides for a long-term collaborative relationship between the International Irrigation Center at IAV and the International Irrigation Center at USU. An MOU was signed in 1985 to allow joint efforts at both locations in conducting short-term training courses. Also, joint applied research activities will be staffed by both centers at locations in Africa and other parts of the world.

Several evaluation teams visited IAV during FY 86. The most important of these was the CIED evaluation team and mid-term AID evaluation. These evaluations were time consuming for the team and team leader. Their report was positive but did express some concerns which must be addressed in the coming fiscal year. Areas of concern were: (1) the need for continued growth in the management capabilities of IAV. (2) the need for the faculty to apply their knowledge to solve Moroccan agricultural problems and thus gain greater recognition within their society; (3) the need to improve funding from GOM to create an environment where faculty can be properly rewarded for their productivity; (4) the need for departments to continue accepting responsibility to administer their total program; and (5) the need for continued awareness that the future of IAV will partially lie in its ability to become a regional African and Middle East Center for agriculture and veterinary medicine programs in research, teaching and extension.

My activities for FY 86 are presented in the following report in the same format as developed in the work plan:

- I. Administrative Duties
- II. Faculty Development Activities
- III. Specific Research and Professional Activities in Veterinary Medicine and Animal Production
- IV. International Travel
- V. Publications and Presentation

I. Administrative Duties

The administrative responsibilities for the Project in-country staff have continued to increase. Therefore additional administrative support was obtained so that the team leader and the resident team members will be more free to actively advise IAV departments on the development of curriculum, research and extension.

- A. Daily management and supervision of the in-country staff
 - 1. Administrative assistant - Habib Quonin
 - 2. Administrative Assistant - Kelly Fareh
 - 3. Accountant - Said LeKorchi (he left the Project at end of August, 1986). Sharaf Gharbaoui (he was hired in late September).
 - 4. Senior Administrative Assistant - Lynn Santacatarina (started work 15 September 1986 and initially had to do only accounting duties.)
 - 5. Secretary - Kelley Fareh.

All in-country employees make important contributions to Project management. This includes working with future participants, returned participants and TDY visitors; receiving and distributing mail and commodities; preparing travel schedules for participants, resident team members, and TDY visitors; general office operation and administration of Project activities e.g. scheduling of doctoral examinations and accounting and management of the Dirham account.

B. Meetings (2-3 per week) were held with IAV administrators on various Project management decisions that needed to be made jointly by the University of Minnesota and IAV.

As we continue to work with IAV administrators they continue to improve in their management of IAV. This is evident in their improved management of the faculty in the development of curriculum, library facilities, computer facilities, research programs, extension activities and the formation of stronger and more formal linkages with government and private industries involved with agriculture. There continues to be a need for each IAV department to improve its commitment to decision making on curriculum, research activities, training of young faculty, and to exchange scientific information within the department.

The administrative structure of IAV remains quite informal but it is rapidly growing and becoming more de-centralized. This year for the first time there was IAV department input in the preparation of the work plan for fiscal year 1986-87.

C. Weekly meetings were held with AID agricultural officers to conduct Project business and to report on progress of Project activities.

Frequent contact was maintained with USAID Agricultural officers through personnel meetings and periodic reports on Project Activities. In FY 86 USAID required that TDY visitors have a de-briefing visit with the USAID Project officer.

The team leader was frequently contacted by USAID to meet official visitors, to provide them with a better understanding of IAV and the University of Minnesota Project. Project communication with US-AID included Dirham expense vouchers, obtaining Visas for long and short term participants, and notifying USAID of advisor and consultant visits.

D. Twenty three team meetings were held. Four involved all team members and 19 were with part of the team. All meetings were to discuss Project policy and to obtain input from team members on a variety of issues on which decisions were needed.

E. Four administrative and faculty development trips were taken to Agadir. On these trips, 1-3 days in length, meetings were held with participants, team members and potential participants. One trip in November was to attend the International Climate, Drought and Food Supply Conference.

F. Eight administrative and faculty development trips were made to ENA-Meknes. On these trips discussions were held with the Director of ENA and with faculty participants. Two trips were made to participate in the thesis defense of 4th year ENA students as an examining committee member.

G. The development of the Documentation Center continued this year: Orders for books and journals, were placed and these began to arrive by the end of the fiscal year. Dr. Ralph Blasingame returned to Morocco during September 1986 to evaluate progress and to prepare a report and recommendations to guide the Project and IAV in further development of the Documentation Center. Continued effort is needed to improve publicity on the resources available in the Center and to insure Moroccan commitment to support the Center. Dr. Jack Garrett has replaced Dr. Crookston as the team member responsible for the Documentation Center development.

H. Data collection and analysis facilities: The purchase of computer hardware and software continued in FY 86. Dr. David Nelson returned to Morocco in September 1986 to prepare an evaluation of progress in the program and to determine which goals in the original report should be modified to bring the plan to completion and to insure a modern state of technology for the computer center at IAV.

Dr. Rasmusson from the University of Arizona reviewed the computer facilities at IAV in November 1985 and reported that he agreed with the microcomputer plan for IAV based on current usage needs recommended by Dr. Nelson.

Throughout the year, as more micro-computers were placed into use at IAV, minor technical difficulties became more frequent. This has led to discussions on training an individual from IAV faculty or staff to handle these problems. This proposal was discussed in the annual work plan review meeting and it was recommended that it become a part of the amended work plan to be submitted in March or April 1987.

I. The International Conference on Water Management organized by His Majesty Hassan II was held 20-24 November 1985. It was well attended (568 persons attended) and it demonstrated that Morocco has considerable capability in water resource management. The conference was held in Agadir. Participants include GOM governmental agencies and representatives from 25 foreign countries and seven International organizations dealing with water. Attending were 137 Moroccans from five Ministries and nine schools and faculties. At the end of the conference recommendations were drafted for governmental action and a scientific proceeding is being prepared. Dr. Wilcoxson and the team leader attended this conference.

J. The IAV hosted the 2nd International Workshop on System Analysis February 10-28, 1986. A two week computer workshop was held as part of this program. The ability of IAV to host this workshop was in part due to the assistance the Project has given in computer procurement. The team leader participated in this conference.

K. International Irrigation Center

The first International course on on-farm water management was held at IAV 7 September 11 October 1986. This program was offered in collaboration with the Utah State International Irrigation Center and was conducted entirely in French. The course had participants from eight African countries and from five ORMVA offices in Morocco plus seventeen 5th year students from IAV. This activity appears to be a possible model for the future of IAV as a regional center in all areas of agriculture and veterinary medicine. This model could provide Morocco with a top quality program for the continued development of agricultural productivity and also provide the necessary basic training, research and extension to benefit other countries in the region.

L. Evaluation teams and other programs which required administrative in-put by the team leader.

1. CDIE and mid-term AID evaluation, 3 January - 12 February 1986. This required preparation prior to the arrival of the team as well as frequent meetings with the team.
2. CRSP-SR annual meeting 25-27 February 1986. A one day trip to the TADLA research farm was made to review the genetic and reproduction experiments and nutritional experiments. Another day was spent in formal presentation of research data.
3. MIAC evaluation panel April 29, 1986 - a half day was spent with this group to explain the University of Minnesota's role with IAV and possible increased interaction or linkages with INRA.

II. Faculty Development Activities

A. Faculty participants preparing to go to the United States for studies.

1. Meetings were held with those faculty doctoral and master degree participants who were preparing their dossiers for submission to U.S. Universities and those who had been accepted. All team members including the team leader were assigned faculty members to advise in preparation of their dossiers. An effort was made to brief each participant prior to departure. Students departed at various times from June to September depending on their need for intensive English or not and the time when studies began in the fall.

B. Third Cycle Participants.

English training was provided twenty 4th year agronomy students. From this group six were selected to go to the U.S. for advanced English training.

C. The Team leader serves as resident coordinator for forty-four faculty participants in various stages of their doctoral studies. He held 113 meetings with these students during this year.

1. Faculty participants (17) in the U.S. for whom the team leader serves as resident coordinator:

<u>NAME</u>	<u>Field of Study</u>	<u>University</u>
ABDENNEBI, M.	Vet Toxicology	Minnesota
He plans to take his preliminary exam in December, 1986 and return to Morocco to begin his research studies. He has made good progress in training in all techniques for toxicology and drug residue determination.		
AIT BOULAHSEN, A.	Poultry Science	North Carolina State
He is making good progress in his studies.		
AKASBI, M.	Food Science	Minnesota

BENABDELJELIL, J.	Avian Nutrition	Georgia
He has made good progress in graduate studies but will be making request to stay until January 1987 before completing his preliminary exam and returning to Morocco to do research.		
BEN KERROUM, N.	Microbiology	Oregon State
He has just initiated his graduate studies.		
BERRADA, J.	Vet Microbiology	Iowa State
He has just initiated graduate studies and his advisor Dr. Fassi-Fehri and the team leader have discussed his proposed research study on bovine tuberculosis.		
BOULJIHAD, M.	Vet Pathology	Kansas State
He has just initiated graduate studies.		
ETTARID, M.	Geodetic Science	Ohio State
He has just initiated graduate studies.		
LEMTOUNI, A.	Nutrition	Cornell
She has nearly completed graduate studies. Will take prelim exam in early 1987 and return to Morocco to continue research studies.		
MESSAHOU, D.	Food Technology	Minnesota
He will take the prelim exam and return to Morocco in early 1987 to begin research.		
OUASSAT, M.	Veterinary Anatomy	Iowa State
He has completed one year of study in the U.S. and has been making satisfactory progress. It is planned that his advisor Dr. Dellman come to Morocco in early 1987 to teach histology and become familiar with laboratory facilities in Vet. anatomy.		
RIHANI, N.	Animal Science	UC-Davis
He is making good progress in graduate studies and will return to Morocco in September 1987.		
SABEUR, K.	Reproductive Physiology	UC-Davis
She is making good progress in graduate studies and will return to Morocco in September 1987.		

<u>NAME</u>	<u>FIELD OF STUDY</u>	<u>UNIVERSITY</u>
SAIDI, B.	Food Technology	Minnesota
He will complete preliminary exam and return to Morocco in December 1986.		
SIKA, M.	Nutrition	Illinois
He has nearly completed his academic studies and is scheduled to return to Morocco in December 1986. However, he has requested an extension for additional course work in radio isotope technologies.		
TERRAB, A.	Nutrition	U. Wisconsin
He is making good progress in his studies and should complete his preliminary exam in the Spring.		
TLIGUI, Nour-Said	Vet Pathology	Minnesota
He has completed 9 months of graduate study and is progressing well in his studies.		

CHAARANI, B.

Animal Health

She has completed all data collection on her research on the productivity of sheep flocks and causes of neonatal mortality and abortion in sheep. She is in the process of analyzing data and preparing her thesis. She has experienced difficulties in data analysis which have been challenging. Her study is one of a few using on-farm field data, thus she should be commended for this effort. Her advisor is planning to visit Morocco in December 1986 to provide guidance in thesis writing.

DERQUAQUI, L.

Reproductive Physiology

He has begun research data on his study at the TADLA farm. His work is on the breeding flock developed by the CRSP-SR, it should be a collaborative effort which has worked well for others over the past three years.

EL AICH, A.

Range Management

His advisor worked with him during the month of July 1986 to finish the initial draft of his thesis. He went to the U.S. in August 1986 under CRSP-SR support to do special data analysis on his thesis data. He plans to defend his thesis in November 1986.

EL BAKKALI, A.

Library Science

He went to Rutgers University this year to take his qualifying examination and to have his research proposal approved by his examining committee. He returned with his advisor, Dr. Blasingame, in September 1986. At this time Dr. Blasingame completed a progress evaluation of the development of the Agriculture Documentation Center and advised Mr. Bakkali on data collection for his thesis. He will return to Rutgers in early 1987 to defend his thesis.

EL HAMIDI, M.

Vet Pathology

He has been actively involved in administration of his department since returning in March 1986. He has developed a good thesis research proposal on Vitamin A deficiencies in the neonatal lamb. He is also collaborating on Hamliri's study on selenium deficiency and both are working on the causes of neonatal lamb mortality at TADLA farm using the CRSP-SR flock.

GUEROUALI, A.

Ruminant Physiology

He has the oxygen consumption equipment in place to conduct research on the energy needs of the prolific D'man sheep during pregnancy. His study also will be on some of the ewes from the TADLA CRSP-SR flock. Dr. Robertshaw and he have agreed that Dr. Donald Johnson of CSU will serve as a co-advisor on research studies because of Dr. Robertshaw's increased administrative duties and move from CSU.

HAMAMA, A.

Vet Public Health

He is collecting data on staphylococcus and salmonella food poisoning from dairy products. His advisor, Dr. Tatini, visited Morocco in March 1986. Dr. Tatini will become a short term resident team member from March 1987-June 1987 and will be able to work with Dr. Hamama in much of the data collection phase of his research.

HAMLIRI, A.

Clinical Nutrition and Biochemistry

He has made good progress in research studies. He has completed data collection on a study on methods to control selenium deficiency. He is in the process of doing an epidemiological survey on five areas in Morocco to determine the extent of selenium deficiency. He is doing this study in collaboration with Dr. Hamidi, who is working on Vitamin A deficiency. His advisor was here in March 1986. He is using the breeding flock of the CRSP-SR project to collect his research data.

ILHAM, A.

Animal Nutrition

He has collected one year of data on research studies on calcium and phosphorus requirements in sheep. He will collect data again in the Winter of 1987. His advisor, Dr. Goodrich, has been here to work with him twice - in March 1986 and again in November 1986. He had problems in obtaining a proper calcium deficient diet and thus must repeat the portion of his study from last year.

KABBAJ, H.

Dairy Cattle Health Management

He has collected one year of data on 20 dairy farms of SODEA and will collect a second year of data on these farms. There will be three groups, one in which mastitis will be controlled, one in which reproduction problems will be controlled, and in the third group no changes or new procedures will be made. His advisor visited Morocco in September 1985 to evaluate the herds he had chosen for his study.

KHALLAAYOUNE, K.

Vet Parasitology

He has research studies underway. His advisor visited in June 1986 to make final adjustments in protocol. His study is on Fasciola infection in sheep, its epidemiology, diagnosis and possible methods of control.

LAKHDASSI, H.

Vet Reproduction

He is planning to do his studies in a modified plan. He has spent six months in the U.S. then returned to Morocco for one year of research studies and will return to the U.S. for one year of additional academic study before returning to Morocco to complete research studies and receive his doctorate. He is working on a hormonal assay for early pregnancy detection in cattle. His teaching and extension activities are in dairy cattle reproduction.

LAMNAOUER, D.

Vet Toxicology

He has been conducting studies on fennel poisoning in cattle and sheep. He is determining the toxic principle and will try to determine whether or not fennel is safe for livestock at some stages of growth.

MEJJATI-ALAMI, M.

Range Science

He returned to Morocco in September 1986. His advisor, Dr. Bedell, was in Morocco in November 1986 to initiate thesis research studies. A new study site was chosen to determine if different levels of grazing pressure and/or different patterns of seasonal grazing will allow for an improved range.

TIBARY, A.

Theriogenology

His study will be on factors which will allow for increased fertility and improved understanding of the male factors involved in artificial insemination in sheep. Mr. Tibary has been extensively involved in teaching and service activities and will need to reduce these activities to make progress on his doctoral studies.

ZINE FILALI, R.

Vet Physiology

He finished data collection this year on how the camel conserves water even under high environmental temperatures. His advisor worked with him on data analysis in July 1986. Zine Filali's study brought together environmental physiologists at IAV from USA, England, Sweden and Morocco and during the month of July they conducted research as a team.

ZGUIGAL, H.

Vet Anatomy

She has made excellent progress on her studies on the vascular system of the head of the camel. Her advisor, Dr. Ghoshal, was in Morocco in September 1986 and reviewed her progress and helped her develop a chronological plan to finish her data collection by the Fall of 1987. She has made a good contribution to teaching and research in her department.

3. Faculty participants (4) who have completed their doctoral degrees in Morocco and for whom the team leader has served as resident coordinator.

NAME

FIELD OF STUDY

EDDEBBARH, A.

Dairy Cattle Breeding

He successfully defended his doctoral studies on 17 March, 1986. He has become very much involved in developing his field of dairy cattle breeding and management. He is making important contributions in this area to various private producers, parasitical farms, and the dairy cattle activities of ORMVA and MARA. He worked on publications in the U.S. this past summer and made a presentation on his research studies at the American Dairy Science meetings.

ESSATARA, M.

Nutrition

He successfully defended his doctoral studies on 24-9-86. He has continued to work on papers for publication and was invited by the United Nations University to visit regional centers in Chile and India, with the possibility of developing a regional center in Morocco. He plans to go to the U.S. in December 1986 to participate in a clinical nutrition conference and develop further collaborative research programs.

HILALI, A.

Soil Science

He successfully defended his doctoral studies on 15-10-85. He completed post-doctoral studies at the University of Minnesota and at the NIFTAL Center in Hawaii during November 85 - January 1986. He has been developing a proposal to develop a regional center of NIFTAL at IAV. This center would provide training and research on nitrogen fixing legumes utilized in the region.

KABBALI, A.

Animal Nutrition

He successfully defended his doctoral studies on 5-2-86. After his doctoral examination a round table was held with Moroccan leaders in the field of red meat production. Discussions were held on ways in which meat production could be improved in Morocco. A trip to the Addrouch Santa Gertrudis breeding farm was also part of this day's activities.

He has been named head of the Animal Science faculty at Meknes. He completed a post doctoral study in the U.S. and attended the Animal Science meetings in August and September of 1986.

D. The team leader served on the examining committee of Dr. M. El Howadfi who did his thesis research on Infectious Bronchitis of Chickens. His study was funded by the British government.

III. Specific Research and Professional Activities in Veterinary Medicine and Animal Production. The Team leader served as advisor or examining committee member on the following:

A. Thesis research by 6th year students at IAV:

1. The Team Leader served as advisor for a student who did his research studies on "False positive tuberculin reactions in local breed and friesian cattle." Cattle on the IAV research farm and those on large parasitical farm were used in this study to try and identify the sensitizing agent causing responses to single intradermal skin tests. The study will attempt to identify the cause by a comparative cervical skin test, necropsy examination of reactors, and by cultural methods as well as by animal inoculation.

2. The Team leader served on the examining committee of a student who did his studies on copper deficiency in local breed cattle. The study presented some clinical evidence that this condition exists in the Ghart area of Morocco.

3. The Team leader served on the examining committee of a student who studied the use of oak browse for sheep and goats in the El Hajib area. The results of this study indicated that goats can utilize a larger amount of oak browse than sheep without a loss in body weight.

B. Thesis research by 6th year students at ENA:

1. Team leader served as an examining committee member for a thesis project on Ca and P need of sheep. This was a controlled study done in the animal science department at Meknes. Animals provided with Ca + P supplementation had a 10-20% increase in rate of daily gain in body weight.

2. A second study was done on dairy herds in the Meknes area. Milk production increased 10-20% when Ca + P supplementation was provided.

C. Field investigations for animal health management and to control disease problems.

1. The Team leader endeavored to maintain a program for brucellosis and tuberculosis control on the dairy herd at the FAG. This required four visits to the FAG.
2. The Team leader made two management visits to the IAV farm at Tadla to evaluate sheep flock management.
3. The Team leader made one visit to two SODEA dairy farms to review general dairy herd management but especially to work with Haj Kabbaj on his herd health research study and on this visit to collect samples for mastitis testing.

IV. International Travel

A. Two trips were made to the U.S. this past year. One in November and December 1985 and the other in August 1986. Reports of these trips were prepared and are on file. On the return portion of the trip to the University of Minnesota in August 1986 I attended the 14th World Congress of Cattle Diseases and made a presentation on Research studies in Morocco.

B. I attended the annual meeting of the office of International Epizootics attended at no expense to the Project. This meeting was held in Paris May 26-29, 1986. This meeting was also attended by Dr. A. Morsil, Chief of the Direction of L'elevage in MARA, Dr. El Hafi, Chief of Animal Health in the D.E. in MARA; Dr. M. Fassi-Fehri, head of Dept. of Microbiology and Infectious Diseases at IAV, and Dr. M. Bakkali, head of the Biopharm Biological laboratory in Morocco. The opportunity to interact with these people allowed the team leader to assist in strengthening linkages between the IAV and the offices mentioned in Ministry of Agriculture. The report of this meeting was prepared and is on file.

V. Publications and Presentations

Taoudi, A., Kirckhoff, H., Johnson, D.W. and Kheyyali, D.: Pathogenicity of M. Capricolum in Sheep. Accepted for publication in Veterinary Microbiology.

Johnson, D.W., Aidi, M., Taoudi, A., Berrada, J., and Fassi-Fehri, M.: False Positive Tuberculin Reactions in Friesian and Local Breed Cattle in Morocco. Proceeding 14th World Congress of Cattle Diseases Vol. 2 1328-1329, 1986.

Fassi-Fehri, M., Johnson, D.W. Taoudi, A., Berrada, J.: Epidemiologie des diarrhees Escherichia coli et Rotavirus chez le veau et Agneau au Maroc. Accepted for publication Annales de Recherche Veterinaire.

ANNUAL REPORT 1984-1985

by

Dr. James Burleigh

Professor of PLANT PATHOLOGY

I. Advising

Of the faculty participants for whom I have responsibility as resident coordinator I worked closely with four - M. Boulif, B. Ezzahiri, S. Messat and M. Hachmi. During 1985-86 Mr. Boulif, Mr. Ezzahiri and Mr. Messat took their final exams for the Doctorat es Science Agronomique and I served on their committees. I met once with Mr. Hachmi and his advisor to discuss thesis work plans. From that meeting it was evident that Mr. Hachmi has a well-conceived and sound approach to his subject. He has prepared a detailed study plan for Morocco to complement research done in Idaho.

In the Department of Plant Pathology I served as major advisor for the thesis research of two fourth-year students, as co-advisor for two fourth-year students and as a committee member on the examining committee of four six-year students.

II. Research

a) Varietal behavior/disease loss nurseries were planted at 12 locations throughout the major cereal-growing regions of Morocco. Those nurseries are designed to: 1) note the reaction of promising wheat and barley lines to diseases and insects; 2) accumulate crop loss information due to diseases and insects; and 3) determine the regional risk of infection by diseases and insects. The project is a joint effort between IAV and INRA.

During 1985-86 disease notes were taken at least four times at each nursery to note disease progress. All nurseries except Tanger were harvested for grain yield. Data from 1984-85 and from 1985-86 are being stored on cassette tape for easy retrieval and examination. Reliable disease loss data were obtained for Pyrenophora tases on barley. The regional distribution of specific pathogens is emerging from our data. With additional data we will be able to establish disease risk by geographical regions of the country and thereby help the cereal breeders focus their efforts on regional disease problems and regional varietal performance.

- b) The study planned on yield loss in durum wheats due to Pyrenophora tritici-repentis was conducted but results were inconsequential due to: 1) our inability to distinguish between early infections by Septoria tritici and those by P. tritici-repentis, and 2) the lack of severe infections by P. tritici-repentis.
- c) One joint meeting of cereal workers from IAV, INRA and ICARDA was held to present results and coordinate cereal improvement efforts. The immediate, principal outcome of the meeting was to have plant pathologists from IAV assist breeders from INRA in varietal selection during 1987. A long-term objective is to build a formal working relationship in cereal improvement between IAV and INRA. To that end a second organizational meeting is planned for February 1987.

III. Teaching

- a) As in past years I taught a class (12 hours) in disease epidemiology to fourth-year students in plant protection at Agadir.
- b) I presented six hours of lecture on disease control and twenty hours on disease epidemiology to fifth-year students in plant protection.
- c) The seminar on curriculum planning for plant pathology was not held.

IV. Construction

- a) The greenhouse was constructed but electricity, water and air conditioning are not yet installed. We are waiting for IAV to bring water and electricity from existing buildings to the greenhouse. As soon as that task is complete the contractor will finish the wiring of the greenhouse and it will be functional. The installation of an air-conditioning system will be needed before the greenhouse can be used during the summer.
- b) The seed storage facility was completed and is functioning. Now, seed can be stored free from losses by insects, rodents, and high temperature.

V. Resident team assignments

a) A large order of glassware and chemicals was made during FY 86 but a storage location has not yet been identified. Two written requests were made (April and May 1986) to the administration of IAV for space to store and dispense supplies but I have not yet received a formal response.

Until IAV designates a suitable location for supply storage, progress on this task remains nil.

b) I met with Dr. D. Johnson on six occasions during FY 86 to coordinate purchase of computer hardware and software. I met with Dr. D. Nelson in September 1986 to help coordinate his task of assessing computer needs. Also, I helped coordinate a short course on computer literacy by Dr. S. Cornelius.

c) I coordinated English language courses for second-cycle students, professors, secretaries, and technicians. Two instructors were hired.

d) I assisted four students prepare their dossiers for study in the United States (Mr. Said Aboufaraj, Mlle Wafa, Mr. El Baggari and Mr. M. Bouhida).

VI. Manuscript preparation

I wrote and submitted for publication an article on "Effects of *Pyrenophora teres* and weeds on barley yield and yield components."

VII. Conference attendance

I attended the annual meeting of the American Phytopathological Society and presented a paper, "An explanation for the perpetuation of yield loss from *Pyrenophora teres* in Moroccan barleys."

ANNUAL REPORT 1985-1986

and

END-OF-TOUR REPORT

by

Dr. Kent Crookston

Professor in AGRONOMY

Due to the fact that I left the project in July of 1986, my report will be a combination annual report: end-of- tour report. In the annual section I will account for my principal activities during the academic year 1985-1986. In the end-of-tour section I will give a faculty-level perspective of the project, and will offer a few suggestions for project consideration.

Annual Report

Assisting Individual Participants

Interacting with individual doctoral participants became the focus of my efforts during my final year. I was advisor or resident coordinator for eleven doctoral participants (see table 1). When I left, six had completed the doctorate of Ph.D., and all eleven had made excellent progress, either toward degree completion or in postdoctoral activities. I met at least monthly with each participant in Morocco, and corresponded with their advisors semi-annually. I also maintained a regular correspondence with Mr. A. Bamouh, the only participant not yet returned to Morocco when I departed.

In addition to assisting with the degree completion of my own advisee, M. Oussible, I aided in the completion of the doctoral theses, and served on the final exam committees of M. Agbani, A. Chafai, R. Choukr-Allah, H. Elatir and O. Berkat. I was also able to assist in the preparation of ten IAV authored manuscripts eight of which have been submitted to refereed journals or are in press. The remaining two are currently in departmental review (see list of publications).

I was assigned to oversee the advisement of 15 third cycle participants. With a couple of exceptions, my involvement with these students was minimal. Each had a local advisor (Moroccan doctoral participant) who did a fine job of seeing these participants either to degree completion, or toward good progress. Only one participant failed to make satisfactory progress. This student was taken under special advisement, and arrangements were made for a repeat of one year of studies in Morocco before completion on the third cycle degree.

Assisting the Institute

a. Development of a graduate program.

My primary charge in this area was to initiate, and develop as far as possible, a graduate program for the institute. Our project objective was to have in place a fully operational IAV graduate program by the year 1990, when our current contract expires. In January 1986, I submitted a first proposal of a graduate school constitution, and a set of graduate program guidelines to Mr. Firdawcy. In preparing this document, it became obvious to me however, that IAV was not yet ready to assume Ph.D. graduate status, and that to attempt to do so by 1990 would be unwise. Mr. Firdawcy was of the same opinion, and indicated that doctoral-level efforts would probably need to be continued in cooperation with outside universities until at least beyond the year 2000. We agreed to leave my proposal "on the shelf."

b. Development of the library

My assignment to assist in development of the IAV library was facilitated by the excellent cooperation of the IAV faculty. Both Mr. El Bakkali (who took leave in early 1986 to complete his Ph.D.) and his replacement Mr. Bel Kacim, did a superior job of administrating the project funds assigned for library development. Although the IAV library is in great need of attention and funding, I can report that US-AID contributions to the library are being effectively utilized.

c. Teaching

During fall term of the past year, I cooperated in the development of two new agronomy courses. Dr. Ouattar taught the first (crop physiology), and I organized and participated in the second (a seminar series on efficient crop water utilization). I also presented three seminars on crop physiology, plus conducted a workshop on 'how to write a thesis or manuscript.'

d. Obtaining physical facilities, research equipment, etc.

Dr. Burleigh and I oversaw the near completion of the agronomy: plant pathology greenhouse, plus the completion of a seed storage facility for agronomy and plant pathology. The bulk of my own research budget was assigned to the purchase of scientific instruments and research supplies selected after consultation with members of the agronomy faculty regarding their most urgent needs.

Assisting the Project

a. Assembling a guidebook for participants and advisors

In October of 1985 I submitted the first draft of the guidebook for project input. It was given final approval by Mr. Firdawcy in March 1986, and was printed and mailed to all participants and advisors in April.

b. Miscellaneous

I assisted in a wide variety of day-to-day project activities including acting as team leader during Dr. Johnson's absences. My wife and I hosted a number of visitors to the Institute. Acting as hosts, and making local arrangements for visitors consumed a large amount of time, but all of us on the team found these activities to be an essential aspect of project operations.

Participation in International Conferences

I attended a workshop: symposium co-sponsored by ICARDA (Syria) and the Italian National Research Center, held in Italy, October 27-31, 1985. Dr. Ouattar accompanied me. The paper I presented included results from his thesis, and will be published by John Wiley & Sons (see publications list). The workshop was excellent, and Dr. Ouattar and I were introduced to a number of potential research cooperators. As a result of contacts made at the workshop, Dr. Roger Austin of the Cambridge Plant Breeding Institute came to Morocco to serve on the doctoral exam committee of Mr. A. Chafai, and Dr. Theodore Hsaio of U.C. Davis came from his sabbatical leave in Germany and presented an outstanding seminar on water relations to IAV students and faculty.

I also made arrangements to visit the ICARDA headquarters in Syria, and for Dr. Oussible, Dr. Guessous, and Mr. Sadiki to accompany me and discuss cooperative efforts between IAV and ICARDA. Unfortunately, this visit was cancelled and could not be rescheduled before my departure. ICARDA is still willing to receive an IAV group, however, and I have encouraged my Moroccan colleagues to make the necessary arrangements.

Table 1. Doctoral Participants Assigned to Crookston

In Morocco July 31, 1986

	<u>Major</u>	<u>School</u>	<u>Advisor</u>	<u>Current Status</u>
ABDELLAOUI, R.	Irrig. Eng.	Utah	Walker	Doctorate completed, post doc progressing well
BAKHELLA, M.	Grain Sci	Kansas	Hosney	Making excellent progress
BAZZA, M.	Soils	Calif.	Nielson	Ph.D. completed, doctoral program aborted
BEN BELLA, M.	Agronomy	Kansas	Paulson	Making excellent progress
BERKAT, O.	Rge. Mgt.	Texas	Briske	Doctorate completed, post doc underway
DRIOUCHI, A.	AgEcon.	Minn.	Roe	Making excellent progress
FILALI, A.	Irrig. Eng.	Utah	Willardson	Making excellent progress
OUATTAR, S.	Agronomy	Minn.	Crookston	Doctorate and post doc completed
OUSSIBLE, M.	Agronomy	Minn.	Crookston	Doctorate completed, post doc underway

In U.S. July 31, 1986

Bamouh, A.	Pl.Phys.	Calif.	Hsaio	Returning in October, excellent progress
------------	----------	--------	-------	--

Publications (co-authored, or prepared cooperatively during 1986).

1. Bouaziz, A. and L. Bruckler. 1986. Soft wheat germination in dry conditions. Submitted to Crop Sci.
2. Chafai, A., S. Simmons and R.K. Crookson. 1986. Effect of tiller removal on barley yield as influenced by soil water status. Submitted to Crop Sci.
3. Chafai, A. and S. Simmons. 1986. Translocation of photassimilates from nonsurviving tillers in barley. In departmental review.
4. Chafai, A. S. Simmons and R.K. Crookston. 1986. Effects of water stress on reciprocal transfer of photoassimilate between the main shoot and nonsurviving tillers in barley. In departmental review.
5. Crookston, R.K. and S. Ouattar. 1986. Modifying maize to combat drought. In: Improving winter cereals for moisture-limiting environments. S. Varma Editor. John Wiley & Sons, Ltd. (in press).
6. Ouattar, S., R.J. Jones, and R.K. Crookston. 1986. Effect of water stress during grain filling on the pattern of maize kernel growth and development. Crop Sci. (in press).
7. Ouattar, S., R.J. Jones, R.K. Crookston and M. Kajeiou 1986. Effect of drought on the water relations of the developing maize kernel. Crop Sci. (in press).
8. Ouattar, S. 1986. Effect of direct osmotic stress on the developing maize kernel. Crop Sci. (in press).
9. Ouattar, S. and R.K. Crookston. 1986. The effect of leaf area manipulation on soil moisture usage and grain yield of maize grown under drought condition. Submitted to Austral. J.Pl. Phys.
10. Oussible, M., and R.K. Crookston. 1986. The effect of subsoiling a compacted clay loam soil on the growth, yield, and yield components of wheat. Crop Sci. (in press).

End-of-Tour Report

My two years with the Institut Agronomique et Veterinaire Hassan II were an outstanding experience. My sincere thanks are extended to the many people who made my stay in Morocco possible and pleasant. This includes the faculty and staff in agronomy at the University of Minnesota who covered for me during my absence, the faculty and staff at IAV (especially in agronomy) who welcomed me as one of their own, and the members of the project team with whom I enjoyed working.

I count it my good fortune to have been associated with a project rated to be one of US-AID's most successful. Many reasons have been given for the success of the project. A large part of the success has been determined to be a timely combination of key personalities, organizations, and circumstances. After these factors, I believe the majority of the credit, however, must go to the Moroccan faculty participants. These are men and women of very high calibre. The future and continued success of the Institute will certainly depend on their performance. The Institute, as has been pointed out by many evaluators and observers, is (all things considered) in good shape, but fragile. By comparison, the participants, as well as the education they are receiving, are not fragile. If the Institute is to become strong, it will only do so by retaining a strong faculty. I therefore suggest that there be a continual monitoring of all that we do in terms of how it affects the training and welfare of the participants.

Recommendation Number 1

My first recommendation for the project is that there be an evaluation of the advantages and disadvantages of granting IAV doctorates in Morocco. To say that this unique feature of the project has resulted in controversy might be an understatement. The process appears to have several advantages, and these have been documented elsewhere. My experience with the project has shown me that there are also several disadvantages associated with granting doctorates in Morocco, some more readily apparent, and some almost hidden (impact to be realized in the future).

I am sensitive to our project's concern that we not over-emphasize the negative--that we stand by the project design and give it a chance to prove itself. I am also sensitive, however, to the danger of ignoring or glossing over problems that should be faced and dealt with. It is my perception that, in our desire to see the current approach succeed, we may be taking an overly defensive posture, and that an appropriate level of objectivity might be lacking.

We are currently at a very opportune position in our implementation of the in-Morocco doctorate idea. We have the advantage of experience (20 doctorates already granted), and yet we also have enough time ahead of us to benefit from that experience (120 doctorates still to be earned). However, if we are to take full advantage of our position, I believe we will have to be willing to turn, for a while, from quite so much sales pitch to a little more self examination.

As I see it, perhaps the most serious disadvantage of the current design, is that it has not fostered a close and confident relationship between the Moroccan participants and our project personnel. Those most closely associated with the project know of the ill feelings on the part of many faculty participants and their advisors because of our inflexible insistence on adhering to the current design; and on taking punitive action against participants and advisors who, under conditions of strain and pressure, made a decision to modify their approach to it.

I have considered that a certain amount of ill feelings between the faculty and our project are a natural by-product of the Institute's development. I have considered that the current design might allow Morocco to make a great developmental leap forward--to put in place a Ph.D. degree granting institute right away, rather than to wait for it to evolve slowly and painlessly. I have also considered that the current design would help Moroccans experience the solving of problems in Morocco, rather than enabling them to escape to a developed country every time the going got rough. But, the questions I find myself asking include: what is the basis for the conclusion that the granting of in-country degrees will move Morocco forward? Is artificially placing one component at the Institute conspicuously beyond the developmental level of the rest of the Institute

(and especially beyond the level of the entire country) a wise move? Ought not the capability to grant degrees, and the reputation which accompanies such a capability, be earned, rather than assumed? I am concerned that the premature granting of the IAV doctorate ignores the valuable constraints of the natural evolutionary process.

When our US-AID funding and professional assistance stops, might not the IAV graduate program be discovered to be only a superstructure without adequate substance and in-country backup? When our project terminates, and the Moroccan faculty are left to face the realization that they are not yet a self-sustainable Ph.D.-level institute, and that the government of Morocco cannot provide them adequate support to become such, might not the subsequent let-down bring about a serious erosion of morale? Might not the premature assumption of world-class status prove to have been detrimental? I suggest we carefully consider the potential negative as well as positive ramifications of our current approach. In other words, perhaps we should be considering ways to prepare our cooperators for what is most likely to happen, rather than promoting something unrealistic.

I realize that such considerations may be considered pessimistic, and not merely circumspect. But couldn't we determine the average cost (at other institutions) of maintaining a program capable of supporting Ph.D.-level research across as diverse an area as is now represented by the Institute? Then shouldn't we start considering the likelihood that the government of Morocco will be able to provide that type of support to IAV, especially given that INRA is the recognized agricultural research organization in Morocco?

For me, a very important question is: considering the circumstances, does IAV really want to be a Ph.D.-granting institute? Does Morocco want to train and then hire all of its own agricultural professionals? If having its own in-country doctoral-level university means preventing the future researchers of Morocco from going to other diverse centers of learning for their training, won't there develop a serious problem of inbreeding? Will there be a market for Moroccan agricultural Ph.D.s? After the Institute itself is fully staffed, how many doctorates in agriculture will be called for in the country--i.e., will a necessary critical mass of graduates be sustainable? How will IAV maintain quality

control if it operates wholly within Morocco? Those of us who have lived there have already seen how certain powerful and influential people have attempted to push through the acceptance of unqualified candidates for the attainment of IAV doctoral degrees. The admission of graduate students into the IAV doctoral program currently requires that the student be accepted by a foreign institution which is not influenced in its decisions by any ministry or personality within Morocco. What would happen if that valuable check on the system were removed?

Perhaps the most important question is: what kind of training is our current design providing the participants? It is my concern that participants are not being as well-trained to be researchers, and especially writers, as they could be. Why? Because, when they most need guidance and the presence of an experienced advisor, plus access to a library and a general Ph.D.-level support base, they are usually left wanting. My own experience as an advisor of two doctoral participants, co-advisor of a third, and assistant to a number of others, convinced me that our current practice warrants a careful reconstruction, if for no other reason than to examine the type of training it provides.

I should also point out that several advisors, as well as entire examining committees, have shared with me the concern that the current examination procedure is not a quality professional exercise. Committees flown in at someone else's expense have felt under pressure to pass and/or not to examine the participants thoroughly--especially since family, friends, and colleagues are usually in attendance, not only for the oral presentation, but for the entire questioning and defense process as well. Having served on nine exams, I can report that this is a real (although not a major) problem.

Also, I wish we could do something about the confusion and attendant waste of time associated with the assembling of exam committees. The problem seems to be primarily one of logistics associated with matching travel plans of people from different countries with the timely completion of the thesis, mailing reader's copies, keeping in touch with committee members when the phones are down, receiving evaluations, etc. The number of exams scheduled over the next three years will require that, on the

average, one be held during almost each working week. I suggest that a file for each participant be maintained on a project computer in Morocco, and that these files be regularly scanned (perhaps bi-weekly) to determine which steps (including follow-ups) need to be taken for each one so that the customary last-minute rush and scramble to prepare for an exam can be alleviated. Arbitrary decisions as to which examiners will have their expenses paid by the project has contributed to the confusion, and to participant's feelings of resentment toward the process as well.

As was pointed out earlier, twenty exams are now behind us; one hundred and twenty more lie ahead. I encourage us to take timely advantage of our present unique position, and to conduct a sort of mid-stream evaluation to see if a change is warranted--if not in design, at least in approach.

Recommendation Number 2

I believe our project could do with some improvement of inter-relationships. To this end I offer two specific suggestions. First, the project should increase the involvement of the overall team. As I see it, there are three under-represented groups: (1) the Moroccan faculty participants, (2) the in-country team of resident coordinators, and (3) the U.S. advisors. I therefore recommend that a committee of four Moroccan participants be selected (perhaps two who already have the doctorate, and two who do not), and that this committee meet with the entire resident (in-Morocco) team at least semi-annually (perhaps quarterly), to discuss items of concern to both groups. I also recommend that a committee of four American advisors be selected (perhaps two from Minnesota, and two from other universities), and that this committee meet at least annually with the project leader at St. Paul to discuss items of interest or concern. Finally, I recommend that the resident (in-Morocco) team assemble for a one-day gathering at least quarterly, and that feedback, inputs and ideas be exchanged. I found it difficult to effectively represent the project while in Morocco (i.e., to field questions about, and defend, our operations) because of a lack of information, and a lack of involvement in project decisions.

Second, I believe it would help a great deal if the project would follow the written guidelines for participants and advisors that were distributed in April. I would recommend that there be no modification of those guidelines, nor change in interpretation or implementation of them, without the input of the participants, the resident team, and the U.S. advisors.

Conclusion

I do not believe our College of Agriculture could be involved in a more promising project. I hope my in-country efforts, as well as my comments in this end-of-tour report will contribute not only to the success of the project, but to good relationships between Morocco and the U.S., and to a lasting bond of professional exchange and friendship between the University of Minnesota and the Institute Agronomique et Veterinaire Hassan II, as well.

ANNUAL REPORT 1985-1986

by

Dr. Aly M. Lasheen

Professor of HORTICULTURAL SCIENCE

I. INTRODUCTION

In May 1985, the first Moroccan Doctorat es Sciences Agronomiques in Horticulture was granted to a member of the horticultural faculty at the I.A.V. Mr. Hilali presented his dissertation at the Institute in Rabat and later was granted his PhD from the University of Minnesota. He was the first to complete his program out of a total of eight faculty participants. Two more participants, Mr. Elattir and Mr. Choukr-Allah were granted the Doctoral July 10 and 14, respectively, and later their PhD's also from the University of Minnesota. Of the remaining five, Mr. Aaouine has completed all the requirements for both degrees and expects to present his dissertation almost any time, and Mr. Walali hopes to finish in 1987. Within the next three years the remaining three hope to complete their program.

In January 1986 third-cycle training in horticulture was started in both Rabat and Agadir involving 16 students. Course work and research for these students has been taking place both in Rabat and Agadir.

In general, the Horticultural Advisor has been actively involved in the institution building process at the Agadir complexe. The principal activities and accomplishments during the period covered by this report are discussed below.

II. PRINCIPAL ACTIVITIES AND ACCOMPLISHMENTS

A. Faculty Development

a) Faculty Departures for Training

Several faculty members from the two departments of horticulture in Agadir and Rabat left Morocco for further training as follows.

1. Abdelhadi ABOUSSALIM left to England to start his program for a PhD in the tissue culture of olives.
2. Ouafae BENLHABIB is presently at Colorado State University working on a PhD degree program involving salinity tolerance in tomato using tissue culture techniques.
3. Abdelaziz EZZAHOUANI is now in France starting a PhD program dealing with grapes, the same subject as his MS program at Fresno State University.

4. Sliman AFARAJ is also in France starting a PhD program in mineral nutrition of grapes.
5. Ahmed SKIREDJ is also in France for a PhD program in the area of mineral nutrition of legumes.
6. Driss ALAMI is in France working on a PhD program in the area of floriculture.
7. Ahmed AID-OUBAHOU is in his second year of a PhD program at Michigan State University involving post-harvest physiology of tomatoes and other horticultural species.
8. Cherif M. BEN-ISMAIL is in Belgium for his second year on a PhD program working on chilling requirement of apples.
9. Abdellatif EL-FADL is also in Belgium working on a PhD program on water and salt tolerance of tomatoes.
10. Lahcen KENNY was admitted to the University of Arizona to pursue an M.S. degree program on some aspects of jojoba culture and propagation.
11. Cherif M. HARROUNI is at the University of North Wales, United Kingdom, pursuing a PhD program involving the ecology of drought resistant species in relation to the struggle against desertification.

Our faculty training program recommendations called for training in four important areas of horticulture: fruit breeding, post-harvest physiology, vegetable breeding/seed technology and arid land crops. As indicated above, Ait-Oubahou is now being trained in post-harvest physiology and Kenny is in arid land crops. It is hoped that Ali Lansari, now in Meknes, will go to the States for a PhD program in fruit breeding at Michigan State University to work with Dr. Iezzoni, Assistant Professor of fruit breeding. It is also hoped that another faculty member will be sent for a PhD in Vegetable breeding/seed technology. The services of two faculty members in those two areas are urgently needed for horticultural development in Morocco.

b) Faculty Participants now in Morocco

A total of ten faculty participants are now in Morocco both in Agadir and Rabat. Four of them have already been granted the Doctorate from the IAV as well as the PhD from the University of Minnesota. The rest are in various stages of completing their programs.

1. Abderrahmane HILALI

Hilali was granted the Doctorat at IAV on May 29, 1985 and later his PhD from the University of Minnesota. Since then he has been continuing his research on potato breeding by simply maintaining his breeding lines and applying for grants to various donors. Also, from the beginning, Hilali has been in charge of administration of the Complexe as Secetaire General Adjoint, a responsibility that consumes a great deal of his time. His future research will involve the production of potatoes from true potato seed or TPS, in cooperation with Drs. Lauer of Minnesota and Veilleux of Virginia.

2. Hassan ELATTIR

On July 10, 1986 Elattir presented his dissertation on "Improvement of Drought Resistance in Tomato" and was granted his Doctorat from IAV. His defense was judged above average by his committee. He later traveled to Minnesota for his PhD final presentation. Presently, he is teaching at the Complexe.

3. Redouane CHOUKR-ALLAH

On July 14, 1986 Choukr-Allah presented his dissertation "Effect of Ca on Lycopersicon esculentum sensitivity to sodium chloride" and was granted his Doctorat from IAV. His presentation was excellent particularly his response to questions posed by members of his committee. He later traveled to Minnesota for his PhD presentation. He has also been teaching at the Complexe and seeking grant support to continue his research in the area of salinity.

4. Mohamed EL OTMANI

El Otmami returned to Morocco in August 1985 after completing all the requirements for the PhD at the University of California, Riverside. Some of the results of his dissertation research have been

published in the Journal of the Am. Soc. Hort. Sci. under the title: "Fruit Age and Growth Regulator Effects on the Quality and Structure of the Epicuticular Wax of 'Washington' Navel Orange Fruit," Amer. Soc. Hort. Sci. 110(3): 371-378, 1985.

Since his return he has been working in cooperation with the horticulture advisor to evaluate the efficiency and usefulness of two growth regulators on citrus senescence and preharvest crop control. Gibberellic acid (dGA3 at 10-20 ppm) to delay fruit senescence and 2,4-dichlorophenoxyacetic acid (2, 4-D at 16 ppm) to reduce fruit drop. Results of the work will be prepared for publication in 1987 and would be useful regarding: resistance of the peel to sustain shocks and resist puncture, color and its delay or earliness, internal quality, post harvest storage and physiology among other aspects of yield and quality.

It is hoped that after El Otmani completes his research in Morocco he would be permitted to present the results of his research for a Doctorate from IAV to a committee chaired by his advisor, Dr. Charles Coggins of the University of California at Riverside, an authority in the field of citriculture.

5. Dou WALALI

Progress in completing his thesis research has been slow for the reasons discussed in earlier reports. For this reason, it became necessary to request an extension of his PhD residency at the University of Minnesota. A one-year extension was granted provided that he repeats his preliminary examination, a condition he must accept. But for Walali to be able to finish analyzing his data and preparing his dissertation, I believe he needs help from his advisor, Dr. Hackett, who is too busy to stay in Morocco for a period of two or three months. Thus, it is hoped that Walali would be permitted to spend some time in St. Paul to complete his dissertation before its presentation for a Doctorat in Morocco.

6. Mohamed AAQUINE

Aaouine has not been able to present his dissertation in Morocco due to administrative complications and the inability of his advisor, Dr. Murashige, to find a suitable date to come to Morocco. It is hoped that all this will be sorted out in early 1987.

7. Noureddine CHEIKH

Cheikh returned to Morocco in June 1986 to start his PhD research on the effect of growth regulators in the study of whole plants which may help solve or explain some physiological disorders caused by environmental changes and stresses. His training as plant physiologist in the area of growth regulation would have a wide and useful application to many crops in Morocco.

Since his return he has been waiting to receive chemicals he ordered before his departure from Minnesota. In the meantime, he has been teaching and recently has been cooperating with colleagues at the O.R.M.V.A. in planting several soybean varieties for evaluation in the region of Souss.

8. Mohamed TAMI

Since his return to Morocco two years ago, Tami has been heavily engaged in teaching. But he hopes to continue his education towards a PhD either in the U.S. or Europe.

9. Mimoun MOKHTARI

Since his return to Morocco in June 1985, Mokhtari has been teaching in the division of Landscape Architecture at the Complexe. He is also interested in the propagation of certain species of south Morocco such as carob and argan.

10. Abderrahmane OSSOR

After completing requirements for an MS degree on grasses with Dr. Don White at the University of Minnesota, Ossor returned to Morocco in the fall of 1986. Since his return he has been assigned to the department of horticulture in Rabat.

c) Faculty Participants now in the States

Only three faculty participants remain in the States, Ahmed MAHOU and Ahmed AIT-OUBAHOU, both at Michigan State University and Lahcen KENNY at the University of Arizona.

1. Ahmed MAHOU

Mahhou's performance at Michigan State has been outstanding. He is expected to return to Morocco in 1987 to start his dissertation

research. Since he has been assigned to Rabat, it is expected that he would conduct his research in Meknes working on growth regulation of deciduous fruits.

2. Ahmed AIT-OUBAHOU

Ait-Oubahou is in his second year at Michigan State working with Dr. David Dilley, professor of post-harvest physiology. He is the first participant to major in post-harvest physiology and with this speciality would be a welcome addition to the horticultural faculty.

By necessity he has been working on the post-harvest of an annual crop, tomatoes, but it is hoped his training would be complemented with additional training in citrus post-harvest physiology, an important area of research for Morocco. Thus it is recommended that he be allowed to spend one or preferably two quarters at the Citrus Experiment Station and Training Center in Lake Alfred, Florida, where the best program in citrus post-harvest physiology is available. It is also recommended that he be allowed to enroll in an annual workshop on post-harvest handling of vegetables sponsored by U.S. AID at one of the U.S. universities each year. The workshop is an intensive course tailored to the needs of developing countries and thus would be quite pertinent for Ait-Oubahou's program. Arrangements for his participation may be worked out by his advisor through Dr. Sentz.

3. Lahcen KENNY

Mr. Kenny, with assistance from Dr. Bartz in Minnesota, was accepted at the University of Arizona to do an MS degree on drought resistant species such as jojoba which have attracted a lot of attention in Morocco. His training and experience in that area will be most useful and timely for Morocco.

d) Faculty Participants departing to the U.S.

From the three faculty members proposed and accepted last year for graduate programs in the U.S. only two, Ait-Oubahou and Kenny, actually left. The third, Lansari, hopes to go this year; his case is briefly discussed below.

Ali LANSARI

Lansari's application for a PhD program at Michigan State University has been provisionally accepted. He is qualified and interested and has background in fruit breeding, a badly needed speciality for horticultural development in Morocco. If Lansari begins his graduate work he will become the first fruit breeder in the country. In addition to studies at MSU it is recommended that he also spend some time at Davis, California, to become acquainted with breeding methods of specific fruit crops in California such as almonds and apricots, among others, which are in need of improvement in Morocco. This program would be arranged by his advisor and Dr. Sentz.

e) Third-cycle Participants completing their Research in Morocco

During the period of this report three third-cycle participants, Mohamed MUNIR, Zarhoune MESSAOUDI and Lahcen GRASS, completed their research in Agadir advised by the horticulture advisor and one of his Moroccan colleagues for each participant.

1. Mohamed MUNIR

After completing his fifth year at Michigan State where he was advised by Dr. David Dilley, professor of post-harvest physiology, Munir returned to Morocco in early 1985. He did his memoire research on "Effect of exogenous ethylene on the fruit of some tomato varieties after harvest and loss during packing prior to shipping." Munir received some help from local tomato growers and the OCE office in Agadir.

2. Zerhoune MESSAOUDI

Messaoudi completed his fifth year at the University of Minnesota advised by Dr. Carl Rosen, Assistant Professor in mineral nutrition in both the Department of Horticulture and the Department of Soils. His memoire research was on "The effect of calcium on growth and nutritional status of apples." He presented his memoire in February 1986 and was judged satisfactory.

3. Lahcen GRASS

In Minnesota, Grass was advised by Dr. David Davis, professor of Vegetable breeding. His memoir research was on "Survey of vegetable seed production and use in Morocco and prospects of their improvement." He presented his memoir in Spring 1986 and was judged excellent.

f) Participants other than Faculty

The following participants all completed their fifth year in the U.S. After getting their degrees from IAV they have been working for the Ministry of Agriculture and Agrarian Reform (I.N.R.A.):

Lahcen ABDANE	Driss EZZOUBIR
Mohamed ACHAHBOUN	Mohamed MEDOUAR
Abdel-Allah AMBRI	Zerhoun MESSAOUDI
Hassan BELLOUCH	Mohamed MUNIR
Allah CHIBANE	Hassan OUABBOU
Rachid DAHAN	Abdelhak RIZQUI
Mohamed EL MOATAMID	

B. Teaching and Curriculum Development

The horticultural advisor has not been participating actively in classroom teaching since there are five members of the faculty who already completed their PhD program who can do a better job of teaching. There are also three others carrying a full load of teaching. Thus the advisor's activity in teaching has been limited to participation in updating course content and assisting in laboratory courses.

Despite some reservations regarding third-cycle training, the department of horticulture in Agadir and Rabat has been offering such training. We started in January 1986 with sixteen students who have been receiving instruction in both Agadir and Rabat. The advisor participated in curriculum design and course content. He also offered a course in scientific English to all students because students rely heavily on publications in English.

After completing their fifth year of course work, third cycle students are expected to devote their sixth year to complete a research problem of their choice. The sixteen students will be divided between the senior members of the faculty as advisors. By the time this is initiated, the advisor will have departed from Morocco.

C. Laboratory, library and farm development

Support for maintenance and service of laboratory equipment and spare parts continued to come from this advisor's budget and the logistic support budget. Also for limited support for the faculty and students.

We received some more computer equipment which has been needed and heavily used by faculty and some students with help from our secretary, Christine Heaton. But it is again recommended that the computer room be air conditioned to protect and lengthen the working life of that equipment.

Several books have been purchased mostly through the library fund for the Agadir library. During the year all the books acquired for the horticulture department have been turned over to the Complexe library which still needs more books and especially journals.

Before his departure, this advisor plans to turn all his personal journals and books over to the Complexe library as a gift.

D. Research Development

The status of current research projects is discussed below:

1. Collection and Chemical Identification of Euphorbia Latex in Southern Morocco for Export

Two major species of Euphorbia, E. resinifera and E. beaumierana, are to be found in vast areas in southern and eastern Morocco. Among other species they protect against soil erosion, but otherwise have no economic value and cannot be eaten by animals. In recent years some people have been sun-drying the latex of E. resinifera and illegally exporting the dried product to some European firms where it is sold in pellet form as a medicinal tea at exorbitant prices. But when the latex is sundried, however, it is oxidized and most of its chemical properties are changed with loss of several of its volatile compounds.

An American pharmaceutical company, LC Services Corporation, is interested in importing large quantities of the liquid latex. But some preliminary work must be done regarding extraction, oxidation and solubility in various organic solvents. Later some latex samples stored in alcohol will be sent by air to that company in Maryland for extensive analysis. Results of the preliminary work and the chemical analysis must be submitted to the Forestry Department before a request for export would be granted to interested individuals and/or companies.

A Belgian colleague (a photopharmacist) and one or two students will cooperate with me in this project. We expect many obstacles that must be overcome before the latex can be exported, but the information gained may open the door for a new source for Morocco to earn badly needed foreign currency.

2. Avocado Rootstock and Variety Trial

Again this year, a severe heat wave with temperatures as high as 50°C destroyed some young avocado trees and severely damaged some old trees. Nevertheless, trials on avocado must continue but the trees should be protected by wind breaks and well maintained.

3. Plant Collection

The same heat wave discussed above took its toll on some trees in the plant collection; a few were completely destroyed. It was apparent that the damage resulted from desiccating winds, not high temperature per se. Some plastic labels indicating scientific and common names were affixed to rectangular wooden boards screwed to aluminum pegs. Unfortunately, however, they were stolen, but before his departure, the advisor plans to have the pegs embedded in small concrete bases to make it difficult and possibly useless for someone to pull it out of the ground.

4. Arid Land Crops

The jojoba plant stands are growing satisfactorily in two locations. In about one more year some of these plants may yield some seed for the first time.

Guar was planted again this year and yielded more than last year, about 5,800 kg/ha. Results of those two years indicated that this species of legume (relative of soybean) appears to be a promising species for the semi-arid zone, particularly when its nutritive value is considered.

A few mesquite trees have been planted at the Complexe after being established in pots for one year in the greenhouse.

E. Publications

The following paper has been accepted for publication: The argan tree (Argania sideroxylon) a desert source of edible oil. Morton, F.J., G.L. Voss and A.M. Lasheen. Econ. Bot. 1986 (in print).

F. Professional Meetings

The advisor participated in the following professional meetings during the year of this annual report.

1. International Society for Horticultural Science and the Portuguese Horticultural Association conference at Albufeira, Portugal from 3 to 10 December, 1985.

Unfortunately, none of our Moroccan colleagues were able to participate in such an important conference with so much relevance to Morocco; only a Belgian colleague, Mr. M. Sirjacobs, and the advisor participated. Contributions from Morocco to the conference were limited to the following.

- a) Protected Cultivation of Sweet Pepper in an arid zone. Evaluation of water consumption and rationing - a paper by Sirjacobs and Lasheen.
- b) Lasheen gave a 15 minute presentation on "The University of Minnesota involvement in institution building at the Institut Agronomique et Veterinaire Hassan II in Rabat and Agadir, Morocco."
- c) Lasheen co-chaired one of the sessions.

Other than formal sessions, post-conference excursions through Portugal were organized from 7 - 10 December.

2. The advisor participated in two horticultural workshops which were organized at the Complexe in 1985-86.

G. Faculty Participant Research Coordination

This activity involves the coordination of the research program of all horticultural faculty participants: Dou Walali, Mohamed Aaouine, Hassan El Attir, Redouane Choukr-Allah, Mohamed El Otmani, Nouredine Cheikh, Ahmed Mahhou, Ahmed Ait-Oubahou and Lahcen Kenny. Others, not in horticulture, include: El Houssine Bartali, Mohamed Rahmani, Ahmed El Baggari, Abdelhafid Debbagh, El Hassane Semlali, Aissa El Meskine and Abdelhaq Hanafi.

H. Professional Contacts

Several professional contacts were made during the year; important ones are discussed below.

1. Due to the contacts made last year with Professor R.G. Wyn-Jones of University College of North Wales, it was possible for one of our colleagues in Agadir to go to Wales and start his PhD program. Mr. M. Cherif Harrouni left in July 1986 to Bangor, Wales to pursue a program involving the ecology of drought resistant species. We are also hoping for further professional assistance, particularly in the area of salinity the speciality of Dr. Jones who was a member of the examining committee of Dr. Choukr-Allah.

2. Another contact which was established last year was with Dr. Adrian Evans of Imperial College, Silwood, London. He sent application forms for scholarships offered by the Arab-British Scholarship Fund. Four colleagues sent applications.

3. The contact made last year with the International Plant Biotechnology Network (IPBNET) at Colorado State has started to pay dividends. The program has agreed to have the IAV as its partner in Africa and Agadir has been picked as the venue for their international tissue culture conference next year. Information regarding hotels and other facilities has been forwarded to Colorado to plan for that conference. Also, Mr. Abdelwahed Zaid, Director of the INRA Tissue Culture Laboratory in Marrakech has been offered a fellowship to continue his graduate training for a PhD. He expects to go to Colorado State University in August 1986.

I. Administration

1. With the help of the project secretary, Christine Heaton, routine administration of project affairs in Agadir continued throughout the period covered by this report until the advisor's departure from Morocco.

2. Several groups and individuals including the American Ambassador in Rabat, Visitors from the University of Minnesota and other universities in the U.S. and other countries, from AID Mission, Rabat, and from U.S. AID Washington visited Agadir and the Complexe during the year.

J. Period from July 31 to December 23, 1986

The horticulture advisor's status as a team member was terminated on July 31, 1986. Since then the advisor prepared a major report on "Horticultural Development in Morocco" which includes the following:

1. Definition of horticultural crops
2. Historical account of horticulture in Morocco
3. Statistical profile
4. Resources and potentials
5. Research, education and extension
6. Other resources and conditions
7. Development strategy
8. Export potential
9. Recommendations
10. Bibliography

It also includes appendixes on: Moroccan climate, vegetable processing in Morocco, scientific and common names, and a partial list of agricultural organizations and institutions. The report also includes references and quotations from speeches by His Majesty King Hassan II with relevance to horticultural development. The report has been dedicated to His Majesty and the Director of IAV is planning to forward a copy to the King before the author's departure in December.

The report was completed and the first copies were received from the binders on November 14.

Copies of the report have been distributed to the following individuals and organizations.

1. IAV

Sedrati (2)

Firdawcy

Horticulture Department Members: Rabat, Agadir

Department Heads: Entomology, Soil Science, Plant Pathology, Agronomy,
Animal Science

2. USAID

U.S. Ambassador, Nassif

Stryker

Erlich

Hanafi

Johnson

Purvis

3. University of Minnesota

Gene Allen

Dick Sauer

Delane Welsch

Don Johnson

Bill Manseur

Jane McKinnon

Pat Borich

Jim Sentz

Aly Lasheen

Jim Burleigh

Faculty Advisors

Mark Brenner

Wes Hackett

Paul Read

Bud Markhart

Ed Stadelmann

Florian Lauer

Dave Davis

Luke Waters

Jim Luby

Department Heads

Wm. Larson

O. Burnside

R. Jones

J. Bartz

M. Boehlje

Other

Industry (10)

4. Managing Directors of following agricultural organizations and institutions.

Association de Producteurs des Primeurs et des Agrumes du Souss	A.P.P.A.S.
Association des Producteurs d'Agrumes du Maroc . .	A.S.P.A.M.
Association des Producteurs Maraichers du Maroc . .	A.S.P.R.I.M.
Compagnie Marocaine d'Agriculture	C.O.M.A.G.R.I.
Direction de la Production Vegetale	D.P.V.
Direction de la Protection des Vegetaux, des Controles Techniques et de la Repression des Fraudes	D.P.V.C.T.R.F.
Direction de la Vulgarisation Agricole et de la Reforme Agraire	D.V.A.R.A.
Ecole Nationale d'Agriculture	E.N.A.
Ecole Nationale d'Eaux et Forets	E.N.F.I.
Institut Agonomique et Veterinaire Hassan II . . .	I.A.V.
Institut National de Recherche Agronomique	I.N.R.A.
Office de Commercialization et d'Exportation . . .	O.C.E.
Societe Agricole des Services au Maroc	S.A.S.M.A.
Societe de Development Agricole	S.O.D.E.A.
Societe d'Horticulture et d'Acclimatation au Maroc.	S.H.A.
Societe de Gestion des Terres Agricoles	S.O.G.E.T.A.
Institut Agronomique et Veterinaire Hassan II . . .	I.A.V.
Institut National de Recherche Agronomique	I.N.R.A.
Office de Commercialisation et d'Exportation. . . .	O.C.E.

At present the report is being translated into French by a Belgian Colleague of the author and his wife. It is hoped that the translation would be completed and copies of the French version of the report distributed to the following organizations before the author's departure in December.

Ministry of Agriculture	25 copies
IAV	20 copies
Industry (Europe)	20 copies
Same as D above	16 copies

Visit of Dr. James Bartz

Dr. James Bartz, Head Department of Horticulture and Landscape Architecture, University of Minnesota, arrived in Agadir October 29 and departed November 25. The general objective of his visit was to meet with members of the horticultural faculty and plan for the future. Several meetings were organized at the Complexe and a three-day retreat was held in Agadir. Director Sedrati, Mr. Firdawcy and Dr. Johnson were also invited to participate for one day during the retreat. Dr. Bartz also traveled to Rabat where he met with Director Sedrati, Mr. Firdawcy and Dr. Johnson. He also had meetings at the Ministry of Agriculture and U.S. AID Mission. Details of his visit will be available in his trip report, but generally his visit was very valuable and timely especially before the departure of the horticulture advisor and arrival of his replacement.

Activities Following Dr. Bartz's Departure

Following Dr. Bartz's departure November 25, the following was or will be accomplished prior to the advisor's departure December 23.

1. The needed parts necessary for the reverse osmosis water system have been received in Agadir; the advisor intends to complete the installation of the various components before his departure. If time does not permit, he plans to leave the necessary instructions for his colleagues to do the job. However, it may be necessary to have an engineer from the company do it.
2. Concrete bases for labels of scientific and common names of species included in the plant collection at the Complexe (see project 3 above) were made. But again the job may be completed after his departure by one of his Moroccan colleagues.

END of TOUR REPORT

1985-1986

by

Dr. B.E. Lockhart

Professor in INTEGRATED PEST MANAGEMENT

This report represents a summary of experiences, observations, ideas and impressions gathered over the period 1971-1986 when I was associated with the Institut Agronomique et Veterinaire Hassan II. The views expressed are personal ones and should be taken as subjective assessments rather than as a reportage of facts and activities.

One of the most striking and gratifying developments has been the evolution of the administrative structure of IAV. This developmental process has included decentralization of decision making, and more recently, the emergence of the individual departments as increasingly active and effective partners within the overall administrative structure. These changes in the administrative framework of IAV are especially apparent to anyone who witnessed the Institut's operation in the years immediately after its founding.

The second noteworthy development has been the progressive Moroccanization of the IAV teaching faculty and a progressive reduction in the role of visiting professors, and expatriate faculty. This development has had a profound effect on curriculum planning, scheduling of courses, and on the consideration of the relevance of course content.

The third development of note has been the evolution at IAV of an educational philosophy that represents a hybrid between what was at first a strictly European model and the more recently encountered U.S. model. This has led to two important changes, the first being that IAV has been able to adopt from each model those aspects judged to be most useful and relevant to the Moroccan context. The second important change has been the evolution of a far more open attitude towards new and different philosophies of educating students at both the undergraduate and graduate levels. This very important evolution in attitude is, again, perhaps most apparent to those with memories of the 1970-75 epoch.

In my opinion, the mix of Project administrators has contributed to the successful implementation of the University of Minnesota's contractual obligations. Approximately four sets of personnel in St. Paul and in Morocco have been involved, possibly through an equal mixture of chance and design. The Minnesota Project has been fortunate to have administrative personnel who were able to function effectively in the particular development phase of the Project, and within the particular framework of UM-IAV-GOM relationships, with which their tenure coincided. The project

personnel who functioned effectively within the context of the 1970-1975 period would perhaps have not been as apt in their particular abilities, attitudes and styles as those who succeeded them in the later phases of the project, and vice versa. There has also been an evolution in the working relationships between the University of Minnesota, USAID, IAV, and the Government of Morocco, and this has also required an evolution in the administrative style of UM project personnel.

At the level of the individual University of Minnesota faculty member in a teaching/research function at IAV, some of the factors which have unquestionably contributed to their ability to perform creditably have been the following:

1. Provision of an annual operating research budget. This allows the individual the opportunity to maintain a level of productive research, and also to assist colleagues both within and outside IAV in their own programs. This provision has greatly assisted in the development of nuclei of research and professional interactions cutting across departments, institutions and ministerial affiliations.
2. A constant professional and academic association with the home Department at Minnesota. This linkage provides an important and necessary stimulus that goes beyond the mere provision of physical logistic support.
3. The excellent services rendered by the logistic support staff. Although it is not considered apt to mention names, and although those names may never find their way into final reports, it is inconceivable that one could have accomplished anything without the efficiency and dependability of Ron Young, Habib Quonin, Julie Borris, Christine Heaton, and others.
4. In my case at least, excellent relations with colleagues in similar projects funded by the Belgian, French, West German, or other governments, as well as with Moroccan colleagues in institutions outside IAV. A system evolved with open access to each other's laboratories and facilities, shared research projects, joint field work, and joint authorship of publications. It is, in my view, sheer folly to either anticipate or engender any sense of rivalry between projects, whether funded by the same or different governments,

supposedly working towards a common end.

There is hardly any historical perspective not clouded by some element of disappointment. There are several aspects of academic and professional development which have not occurred at IAV at the rate that one would have preferred. However, most of these developments need to be assessed against the broader background of the social, economic and historical context within which IAV and its faculty function and interact. However, one element that has been most disappointing, is the relatively poor development of library resources at IAV. For an institution which has demonstrated so much dynamism and energy in other areas, IAV's attitude towards its library resources may with justification be described as one of benign neglect, at best.

The energy that IAV has managed to inject into its development in the past 16 years, will be required in the future decades. One can easily detect a current malaise arising from restrictions on the job market for IAV - and indeed all university graduates, in Morocco. If the 'raison d'e'tre' of IAV lay in the provision of graduates to fill a finite number of government vacancies, one could seriously question the economic justification for its establishment, and also question the justification for its continued operation. The important, vital challenge confronting IAV and its faculty has less to do with the mechanics of curriculum development and research administration than with a re-definition of mission and status within the agricultural, educational and professional sectors. To continue to function with any sense of useful purpose, the composite body of academic and administrative staff at IAV must view itself as being more than a mere vehicle for turning out X number of graduates to fill X number of projected vacancies in the public and private sectors each year. There must be a greater degree of responsiveness to needs and accountability to an external clientele than is currently perceived or accepted. This demonstration of extra academic commitment tied to a solid academic base will determine whether IAV evolves into a valued organization capable of promoting and supporting agricultural development or remains simply another third-world university producing more graduates than can be usefully employed.

If there is today a critical challenge facing the faculty and administration at IAV, it is in gaining the confidence and respect of the local agricultural and agro-industrial community. It is disconcerting to witness the arrival of expatriate consultants summoned by local farm managers and entrepreneurs wary of the competence and expertise of their compatriot scientists at IAV. The burden of proof of competence clearly lies with the scientists. The degree and the quickness with which the collective body of IAV can provide this proof of competence will in great measure determine the future status of this institution.

APPENDIX XI

ROSTER OF PARTICIPANTS

Roster of Participants
 FACULTY DOCTORAL PARTICIPANTS
 Minnesota - AID - Morocco Project

<u>Name</u>	<u>Specialization</u>	<u>Arrival in U.S.</u>	<u>Return Morocco</u>	<u>University</u>
1. ABABOUC, Lahsen	Food Science	12-80	12-82	Minnesota
2. ABDELLAOUI, Rachid	Irrigation Engr	9-82	1-85	Utah State
3. ABOULABBES, Omar	Watershed Mgt	11-79	10-81	Utah State
4. ACHKARI-BEGDOURI, Abdelatif	Agric/Food Engr	7-82	1-85	Minnesota
5. ACHOURI, Mohammed	Plant Pathology	1-82	3-84	Minnesota
6. AIT-KADI, Mohamed	Irrigation Engr	2-80	7-82	Utah State
7. AMANE, M'Barek	Ag Economics	7-82	10-84	Minnesota
8. AMMATI, Mohammed	Plant Nematology	7-81	3-84	U CA-Riverside
9. BADDYR, Mohamed	Fisheries	6-82	7-83	U Michigan
10. BADRAOUI, Mohamed	Soil Science	7-83	1-86	Minnesota
11. BAKHELLA, Mohamed	Food Science/Grain	6-83	1-86	Kansas State
12. BAKKOURY, Mohamed	Vet Anatomy	7-83	3-86	Minnesota
13. BARTALI, El Houssine	Civil Engr (Bldgs)	1-82	7-84	Michigan State
14. BAZZA, Mohamed	Soil & Water Sci	9-82	7-85	U CA-Davis
15. BEN BELLA, Mohamed	Agronomy	7-83	1-86	Kansas State
16. BENCHEQROUN, Najib*	Plant Virology	9-78	9-80	U CA-Riverside
17. BENESSALAH, Driss	Forest Inventory	9-79	1-82	Minnesota
18. BENSALAH, Abdelouhab Z.	Animal Science		10-81	Kentucky
19. BERKAT, Omar	Range Science	8-79	10-81	Texas A & M
20. BOUJENANE, Ismail	Animal Breeding	7-83	12-85	U CA-Davis
21. BOULIF, Mohamed	Plant Pathology	1-79	9-80	Minnesota
22. BOURFIA, Mohamed	Animal Breeding	7-80	9-82	Minnesota
23. BOUZOUBAA, Khalid	Vet Microbiology	7-83	2-86	Minnesota
24. CHAARANI, Bahija	Vet Pathobiology	7-81	10-83	Minnesota
25. CHAFAI, Alaoui	Agronomy	7-81	10-83	Minnesota
26. CHEIKH, Nouredine	Horticulture	9-83	6-86	Minnesota
27. CHOUKR-ALLAH, Redouane	Horticulture	1-81	5-83	Minnesota
28. DEBBARH, Abdelhafid	Civil Engineering	7-80	12-82	Minnesota
29. DERQUAOUI, Lahsen	Vet Endocrinology	7-83	3-86	U CA-Davis
30. DRIOUCHI, Ahmed	Agric Economics	7-82	10-84	Minnesota
31. EDDEBBARH, Abdesselam	Dairy Nutrition	7-81	9-83	Minnesota
32. EL AICH, Ahmed	Range Science	7-82	1-85	Colorado State
33. EL ATTIR, Hassan	Horticulture	9-79	1-81	Minnesota
34. EL BAKKALI, Abdelghani	Lib & Infor Sci	1-80	6-82	Rutgers
35. EL HAMIDI, Mohamed	Vet Pathology	6-83	4-86	Kansas State
36. EL OTMANI, Mohamed	Plant Science	9-82	8-85	U CA-Riverside
37. ESSATARA, M'Barek	Nutrition	7-79	12-81	Minnesota
38. EZZAHIRI, Brahim	Plant Pathology	1-81	4-83	Minnesota
39. FILALI, Abdelwahab	Ag Engineering	7-83	12-85	Utah State
40. GUEROUALI, Abdelhai	Vet Physiology	7-83	4-86	Colorado State

* Deceased

FACULTY DOCTORAL PARTICIPANTS (cont.)

	<u>Name</u>	<u>Specialization</u>	<u>Arrival in U.S.</u>	<u>Return Morocco</u>	<u>University</u>
41.	HACHMI, Mohamed	Forest Products	10-82	7-85	Idaho
42.	HALLATOU, Mohamed	Horticulture	8-79	10-82	U CA-Riverside
43.	HAMAMA, Abed	Vet Microbiology	7-83	3-86	Minnesota
44.	HAMLIRI, Ahmed	Vet Medicine	7-83	12-85	Minnesota
45.	HILALI, Abdelali	Soil Microbiology	9-78	9-80	Minnesota
46.	HILALI, Abderrahmane	Vegetable Breeding	7-78	12-80	Minnesota
47.	IBNATTYA, Abdelhaj	Range Science	12-79	9-81	Oregon State
48.	ILHAM, Abdelillah	Animal Science	7-83	11-85	Minnesota
49.	KABBALI, Ahmed	Animal Science	7-80	9-82	Minnesota
50.	KABBAJ, Haj	Vet Medicine	7-82	12-84	Minnesota
51.	KHALLAAYOUNE, Khalid	Vet Pathobiology	7-83	12-85	Minnesota
52.	MERZOUK, Abdelaziz	Soil Conservation	8-79	10-81	Minnesota
53.	MESSAT, Said	Forest Resources	9-82	6-85	Idaho
54.	NARJISSE, Hamid	Range Science	3-79	8-81	Utah State
55.	OUATTAR, Said	Agronomy	7-79	12-81	Minnesota
56.	OULHAJ, Ahmed	Agric Engineering	7-83	6-85	Utah State
57.	OUSSIBLE, Mohamed	Agronomy	12-79	10-81	Minnesota
58.	RAHMANI, Mohammed	Food Science	7-81	12-83	Minnesota
59.	RAISSOUNI, Bachir	Agric Chemistry	7-80	8-83	N Mexico State
60.	RAMMAH, Abdallah	Plant Nematology	1-83	7-85	N Carolina St
61.	TAYAA, M'Hammed	Watershed Mgmt	8-79	10-81	Minnesota
62.	TIBARY, Ahmed	Vet Theriogenology	7-82	1-85	Minnesota
63.	WALALI-LOUDIYI, Dou	Horticulture	6-78	9-80	Minnesota
64.	ZAHOUR, Ahmed	Plant Breeding	1-79	1-81	Minnesota
65.	ZGUIGAL, Hadhoum	Vet Anatomy	7-82	8-85	Iowa State
66.	ZINE-FILALI, Rachid	Vet Physiology	7-81	9-84	Minnesota & Colorado St
<u>Arrived FY 84</u>					
67.	ABDENNEBI, El Hassane	Vet Toxicology	7-84		Minnesota
68.	BAMOUEH, Ahmed	Plant Physiology	3-84	9-86	U CA-Davis
69.	BOUAYAD, Hassane	Vet Surgery	7-84		Minnesota
70.	BOUHACHE, Mohamed	Weed Science	6-84	11-86	U CA-Davis
71.	EL IDRISSE, Ahmed	Vet Medicine	7-84		Minnesota
72.	FATMI, M'Barek	Plant Pathology	2-84	11-86	Idaho
73.	IBRAHIMI, Abdelouafi	Statistics	7-84		Minnesota
74.	KHATOURI, Mohamed	Forestry	8-84		Idaho
75.	MAHOU, Ahmed	Horticulture	7-84		Michigan State
76.	MEJJATI-ALAMI, Mohamed	Range Science	8-84	9-86	Oregon State
77.	MOSSEDDAQ, Fatima	Agronomy	6-84	9-86	Colorado State
78.	MOUGHLI, Lhoussaine	Agronomy	6-84	9-86	Colorado State
79.	SIKA, Mohammed	Nutrition	8-84		Illinois

Faculty Participants, (cont.)

	<u>Name</u>	<u>Specialization</u>	<u>Arrival in U.S.</u>	<u>Return Morocco</u>	<u>University</u>
	<u>Arrived FY 85</u>				
80.	AIT-OUBAHOU, Ahmed	Horticulture	9-85		Michigan State
81.	BENABDELJELIL, Khalid	Poultry Science	3-85		Georgia
82.	BRAHIM, Nouredine	Entomology	12-84		Purdue
83.	DOUKKALI Rachid	Agric. Economics	10-84		Minnesota
84.	EL YOUSOUFI, Mustafa	Range Science	8-85		Texas A&M
85.	ESSAFI, Boubker	Irrigation Engr.	9-85		Utah State
86.	EL AL, El Aid	Forest Resources	7-85		Minnesota
87.	LAKHDISSI, Hassan	Animal Science	6-85	1-86	Washington St
88.	LEMTOUNI, Aicha	Nutrition	1-85		Cornell
89.	MASSAHOU, Driss	Agric Engr. (Food)	12-84		Minnesota
90.	OBANNI, Mohamed	Plant Breeding	12-84		Purdue
91.	RIHANI, Nacif	Animal Science	9-85		U CA-Davis
92.	SABEUR, Khalida	Endocrinology	9-85		U CA-Davis
93.	SAIDI, Bouchta	Food Science	12-84		Minnesota
94.	SBAI, Abdelaziz	Agric. Economics	7-85		Minnesota
95.	TERRAB, Abdelhaq	Nutrition	12-84		Wisconsin
	<u>Arrived FY 86</u>				
96.	ABOULFARAJ, Said	Entomology	7-86		Minnesota
97.	AIT BOULAHSEN, Abdellah	Poultry Science	10-86		N Carolina State
98.	AKASBI, Mohammed	Food Science	7-86		Minnesota
99.	ALAOUI, Larbi	Nutrition	9-86		Oregon State
100.	BANI-AAMEUR, Fouzia	Plant Breeding	3-86	12-86	Minnesota
101.	BENJELLOUN, Hassane	Forest Soils	1-86		Oregon State
102.	BEN KERROUN, Nouredine	Microbiology	7-86		Oregon State
103.	BENTASSIL, Abderrazzak	Agronomy	6-86		Texas A&M
104.	BERRADA, Jaouad	Vet Microbiology	6-86		Iowa State
105.	BOUHIDA, Mohamed	Plant Virology	9-86		Minnesota
106.	BOULJIHAD, Mostafa	Vet Pathology	6-86		Kansas State
107.	ETTARID, Mohamed	Geodetic Science	6-86		Ohio State
108.	KAANANE, Amar	Food Science	9-86		Minnesota
109.	KHATTABI, Abdellatif	Forest Resources	6-86		Idaho
110.	OUASSAT, Mohamed	Vet Anatomy	6-86		Iowa State
111.	REMAH, Abdallah	Plant Pathology	8-86		Nebraska
112.	RZOZI, Si Bennesseeur	Agronomy	7-86		Minnesota
113.	SADIKI, Mohammed	Plant Breeding	7-86		Minnesota
114.	TLIGUI, Nour-Said	Vet Pathology	1-86		Minnesota

FACULTY M.S. PARTICIPANTS
Minnesota - AID - Morocco Project

	<u>Name</u>	<u>Specialization</u>	<u>Arrival in U.S.</u>	<u>Return Morocco</u>	<u>University</u>
1.	AIT-OUMESSAHO, (MESSAHOU) Driss	Food Engineering	7-79	12-81	Minnesota
2.	BENJELLOUN, Sabah	Nutrition (Human)	7-83	1-86	Iowa State
3.	EL BAGGARI, Ahmed	Food Science	7-81	1-84	U CA-Davis
4.	EL HALOUAT, Abdelhaq	Food Science	7-83	2-86	Minnesota
5.	ESSAFI, Boubker	Irrigation Engr	7-80	9-82	Utah State
6.	ESSEDDIQI, Mohamed	Forest Economics	9-76	9-78	SUNY - Syracuse
7.	GAROUAZ, Khadija	Engl Sec Lang	1-82	3-84	Michigan State
8.	GOURAMA, Hassan	Food Science	7-83	2-86	Nebraska
9.	KHANANE, Amar	Food Science	8-81	3-84	Minnesota
10.	LAMNAOUER, Driss	Vet Pathobiology	7-79	8-81	Minnesota
11.	MOKHTARI, Mimoun	Horticulture	7-82	6-85	Minnesota
12.	OSSOR, Abderrahmane	Horticulture	7-83	4-86	Minnesota
13.	RAMDANI, Abdellah	Ag Engineering	7-83	1-86	Minnesota
14.	SABEUR, Khalida	Animal Physiology	7-80	9-82	Minnesota
15.	SAIDI, Bouchta	Food Science	7-79	12-81	Minnesota
16.	TAMI, Mohamed	Food Science	7-81	5-84	Oregon State
17.	ZAHAR, Mohamed	Food Science	7-83	1-86	Minnesota
18.	ZAKI, Abdellatif	English Second Language	8-79	12-81	So. Illinois & Minnesota

Arrived FY 84

19.	EL MESKINE, Aissa	Food Science	7-84		Minnesota
20.	HANAFI, Abdelhaq	Entomology	7-84		Minnesota
21.	JENANE, Chakib	Agric Engr.	7-84		Minnesota
22.	ROUCHDI, Mohamed	Civil Engr.	6-84	9-86	Ohio State
23.	SEMLALI, El Hassane	Civil Engr.	6-84	9-86	Ohio State

Arrived FY 85

24.	MOUNSIF, Mohamed	Range Science	5-85	12-86	Texas Tech
-----	------------------	---------------	------	-------	------------

Arrived FY 86

25.	ABOUFADL, Larbi	Geodetic Science	6-86		Ohio State
26.	AZOUGGAGH, Mohammed	Agric. Engineering	7-86		Minnesota
27.	BOUDLALI, Abdelhak	Plant Pathology	10-85		Minnesota
28.	EL BARE, Brahim	Range Science	6-86		Texas A&M
29.	FERJI, Zahra	Plant Pathology	7-86		Minnesota
30.	KENNY, Lahsen	Horticulture	6-86		Arizona

THIRD CYCLE PARTICIPANTS
Minnesota - AID - Morocco Project

I. PREVIOUS CONTRACT

<u>Name</u>	<u>Specialization</u>	<u>Returned</u>	<u>University</u>
<u>Arrived September 1972</u>			
1. LAHLOU, Mohamed	Soils-Photo Interpretation	8-73	Minnesota
<u>Arrived August 1973</u>			
2. BERKAT, Omar	Range Science	12-74	Utah State
3. BOULIF, Mohamed	Plant Pathology	8-74	Minnesota
4. ISMAILI, Mohamed	Plant Science	12-74	Utah State
5. SAADAQUI, El Mostapha	Plant Pathology	8-74	Minnesota
<u>Arrived August 1974</u>			
6. AANANE, Aissa	Soil Fertility	10-75	Minnesota
7. ABOU-FIRASSI, Mohamed	Water Sci & Engr.	8-76	U CA-Davis
8. BANI-AAMEUR, Fuzia	Plant Breeding	9-75	Minnesota
9. BENCHEQROUN, Najib	Plant Virology	4-76	U CA-Riverside
10. EL YOUSOUFI, Mohamed	Range Science	12-75	Oregon State
11. HILALI, Abdelali	Soil Microbiology	1-76	Minnesota
<u>Arrived August 1975</u>			
12. ATIQUI, Mohammed	Range Science	12-76	Colorado State
13. HALLATOU, Mohamed	Horticulture	6-77	Florida
14. IBNELMOUATA, Azzouz	Plant Breeding	9-76	Minnesota
15. MERZOUK, Abdelaziz	Soil Conservation	7-77	MN & Ariz (MS)
16. OMERANI, Abdeslan	Soil Conservation	7-77	Arizona
17. OUSSIBLE, Mohamed	Agronomy	1-77	Louisiana State
18. TAYAA, M'Hammed	Watershed Mgmt	7-77	Minnesota
19. ZAHOUR Ahmed	Plant Breeding	9-76	Minnesota
<u>Arrived August 1976</u>			
20. AHYOUND, Abdelaziz	Watershed Mgmt	9-77	Arizona
21. CHOUKR-ALLAH, Redouane	Horticulture	4-78	MN & U CA-Davis
22. EL GHARBAOUI, AbdeLaouahed	Range Science	9-77	Arizona
23. EZZAHIRI, Brahim	Plant Pathology	7-78	Minnesota
24. HAFIDI, Brahim	Plant Virology	10-77	Minnesota
25. KELILI, Driss	Plant Protection	10-78	U CA-Riverside
26. LAABDI, Mohamed	Soil Conservation	9-77	Minnesota
27. LARAISSSE, Esserhini	Range Science	9-77	MN & Colorado
28. SKIREDJ, Ahmed	Horticulture	4-78	MN & U CA-Davis

THIRD CYCLE PARTICIPANTS (cont.)

<u>Name</u>	<u>Specialization</u>	<u>Returned</u>	<u>University</u>
<u>Arrived July 1977</u>			
29. ACHAHBOUN, Mohamed	Horticulture	7-79	Minnesota (MS)
30. ACHOURI, Mohamed	Plant Pathology	9-78	Minnesota
31. BAZZA, Mohamed	Soil Physics	8-79	U CA-Davis
32. DAALI, Allal	Forest Management	7-79	Minnesota
33. EL HAIBA, Mostapha	Watershed Mgt .	12-78	Minnesota
34. EL MAGHRAOUI, Abdelaziz	Range Science	3-79	MN & Oregon St.
35. GOURIMATE, Mohamed	Agronomy	9-78	Kansas State
36. JLIBENE, Mohamed	Plant Breeding	9-78	Minnesota
37. KHATOURI, Mohamed	Forest Management	7-79	Minnesota
38. LAHLOU, Mohammed	Watershed Mgt.	12-78	Minnesota
39. TAYOUGA, El Haj	Soil Fertility	9-78	Minnesota
<u>Arrived July 1978</u>			
40. AMBRI, Abdel Ilah	Horticulture	12-79	U CA-Davis
41. AMRI, Ahmed	Plant Breeding	10-79	Minnesota
42. BARHMI, Kouider	Soil Conservation	12-79	Minnesota
43. EL-YAMANI, Mohamed	Plant Virology	12-79	Minnesota
44. JELLAL, Naima	Soil Fertility	9-79	Minnesota
45. MEDOUAR, Mohamed	Horticulture	12-79	Minnesota
46. MOUJANE, Raha1	Plant Pathology	12-79	Minnesota
47. OUMEKLOUL, Ahmed	Range Science	12-79	U Nevada

THIRD CYCLE PARTICIPANTS (cont.)

II. PRESENT CONTRACT

<u>Name</u>	<u>Specialization</u>	<u>Returned</u>	<u>University</u>
<u>Arrived July 1978</u>			
1. BERRE, Abdelattif	Food Processing	7-80	Minnesota (MS)
2. BOUKHNAFER, Mohamed	Range Science	8-80	Washington (MS)
3. CHERIQI, Ahmed	Forest Products	10-80	Minnesota
4. EL OTMANI, Mohamed	Citrus Culture	7-80	MN & FL (MS)
5. FARIH, Ali	Plant Pathology	8-80	U CA-Riverside
6. RAMMAH, Abdallah	Plant Nematology	9-80	U CA-Riverside
<u>Arrived July 1979</u>			
7. ABDELMOUTTALIB, Abder	Ag Economics	8-80	Minnesota
8. AKAABOUNE, Ahmed	Seed Technology	9-80	MN & Oregon
9. BAMOUH, Ahmed	Plant Physiology	10-80	Minnesota
10. BARA, Said	Animal Breeding	8-81	Minnesota (MS)
11. BENABDELJELIL, Khalid	Poultry Science	1-81	Minnesota (MS)
12. CHEIKH, Nouredine	Plant Physiology	11-81	Minnesota (MS)
13. CHERGAOUI, Abdelaziz	Range Science	1-81	Humboldt St. CA
14. EDDEBBARH, Abdelaziz	Ag Engr (Irri)	10-81	Minnesota (MS)
15. KHACHANI, Mohamed	Horticulture	12-80	Minnesota
16. LAAOUANE, Lahib	Plant Physiology	11-80	MN & U CA-Davis
17. LEMTOUNI, Aicha	Nutrition	9-81	Minnesota (MS)
18. MAACHOUK, Driss	Poultry Science	12-80	Minnesota
19. MARRAKCHI, Abdel	Vegetable Science	12-80	Minnesota
20. MEJJATI-ALAMI, Mohammed	Animal Nutrition	9-80	Minnesota
21. MESKINE, Mohammed	Nematology	10-80	MN & U CA-Riv.
22. OUBAHA, Lahcen	Plant Genetics	1-81	Minnesota
23. SIKI, Mohammed	Nutrition	9-81	Minnesota (MS)
24. TERRAB, Abdelhak	Nutrition	9-81	Minnesota (MS)
25. ZAID, Abdelouahhab	Plant Physiology	8-81	MN & U CA-Riv.
<u>Arrived July 1980</u>			
26. ABDANE, Lahcen	Hort/Breeding	12-81	Minnesota
27. ABIEDI, El Hassan	Dryland Agric	12-81	MN & Nebraska
28. ALAQUI, Jalal	Agric Economics	12-81	Minnesota
29. ALAQUI, Larbi	Nutrition (Human)	1-82	Minnesota
30. AIT OUBAHOU, Ahmed	Plant Physiology	12-81	MN & Nebraska
31. BENZAROUEL, Driss	Agric Economics	12-81	Minnesota
32. BOUCHAREB, Karim	Agric Economics	12-81	Minnesota
33. BRAHIM, Nouredine	Plant Protection	6-82	Minnesota (MS)
34. CHAIR, Mohammed	Marine Fisheries	6-82	MN & OR State
35. DARFAOUI, El Mostafa	Range Science	12-81	Montana State

THIRD CYCLE PARTICIPANTS (cont.)

	<u>Name</u>	<u>Specialization</u>	<u>Returned</u>	<u>University</u>
<u>Arrived July 1980 (cont.)</u>				
36.	EL BRAHLI, Azzedine	Weed Science	7-81	Minnesota
37.	EZZOUBIR, Driss	Citrus Culture	1-82	MN & Florida
38.	HARKOUSSE, Mohammed	Range Science	12-81	Utah State
39.	KAROUANI, Rachida	Nutrition (Human)	1-81	Minnesota
40.	LANSARI, Ali	Fruit Breeding	12-81	Minnesota
41.	LAZAAR, Mohammed	Animal Science	9-82	Minnesota
42.	MERGOU, Mohamed	Plant Breeding	10-81	Minnesota
43.	NSARELLAH, Nasser	Plant Genetics	12-81	Minnesota
44.	OBANNI, Mohamed	Plant Breeding	10-81	Minnesota
45.	RIHANI, Nacif	Animal Science	4-82	Minnesota
46.	SABIK, Mohammed	Plant Breeding	10-81	Minnesota
47.	SAHOUANI, Hassan	Plant Pathology	12-81	Minnesota
48.	SEIMANI, Abdellaziz	Plant Breeding	12-81	Minnesota
49.	SOULEIMANI, Abdallah	Animal Science	3-82	Minnesota
50.	TADLAOUI, Mohamed	Animal Science	6-82	Minnesota
<u>Arrived July 1981</u>				
51.	AIT M'HANND, Thami	Range Management	9-82	Utah St.
52.	AOUJI, Mostafa	Nutrition (Human)	10-82	Minnesota
53.	AZZIMANI, Ahmed	Agric Economics	9-82	Minnesota
54.	BADDYR, Mohammed	Inland Fisheries	6-82	Michigan
55.	BARI, Abdallah	Plant Breeding	10-82	Minnesota
56.	BATTAR, Mokhtar	Animal Breeding	9-82	Minnesota
57.	BENYASSINE, Abderrahim	Plant Breeding	9-82	Minnesota
58.	BOUALIL, Abdelilah	Dairy Nutrition	9-82	Minnesota
59.	BOULMENE, Saoud	Agric Economics (Deceased)	12-81)	Minnesota
60.	CHAFAI, Housni	Dryland Agriculture	2-83	Minn & Neb
61.	CHIBANE, Allal	Horticulture	9-82	Minnesota
62.	CHOULLI, Abdellatif	Animal Sci (Meats)	1-82	Minnesota
63.	DAHAN, Rachid	Horticulture	10-82	Minnesota
64.	EL HADDI, Abderrahman	Dryland Agric.	9-82	Minnesota
65.	EL HONSALI, Mohammed Ali	Range Management	9-82	U CA-Davis
66.	EL MOATAMID, Mohammed	Horticulture	10-82	Minnesota
67.	EZZAHOUANI, Abdelaziz	Hort (Viticulture)	12-82	CA State-Fresno
68.	JERRARI, Chaouki	Poultry Science	9-82	Minn & Georgia
69.	KHODARI, Mohammed	Aquaculture/Fish.	9-82	Auburn U, AL
70.	Mouafi, Hamid	Agric Economics	9-82	Minnesota
71.	NABIL, Hassan	Nutrition (Human)	9-82	Minnesota
72.	OUABBOU, Hassan	Horticulture	12-82	Minnesota
73.	RAHEL, Mohammed Amal	Plant Pathology	9-82	Minnesota
74.	SEMLALI, Mohammed	Aquaculture/Fish	9-82	Auburn U, AL

THIRD CYCLE PARTICIPANTS (cont.)

<u>Name</u>	<u>Specialization</u>	<u>Returned</u>	<u>University</u>
<u>Arrived July 1982</u>			
75. ABOUELANOUAR, Abdelhak	Nutrition	1-84	Minnesota
76. BELHADRI, Mohammed	Plant Breeding	9-83	Minnesota
77. BELLOUCH, Hassan	Horticulture	10-83	Minnesota
78. BENAHNIA, Khadija	Agronomy-Weed Sci	9-83	Minnesota
89. BOUHIDA, Mohamed	Plant Pathology	8-84	U CA-Riv. (MS)
80. BOUNFOUR, Malika	Entomology	1-85	U CA-Riv. (MS)
81. DARIF, Mohamed	Fisheries	9-83	MN & Oregon
82. EL HOUSNI, Abdellah	Animal Science	9-83	Minnesota
83. EL YOUSFI, Brahim	Plant Pathology	1-84	Minnesota
84. GAIZI, Asmae	Poultry Science	9-83	Georgia
85. HACHEN, Jamal	Agronomy/Weed Sci	9-83	Minnesota
86. HADDOUCH, Moha	Dryland Agric	1-84	Oregon St.
87. HAJJI, Nouama	Fisheries	1-84	Texas A&M-Galv.
88. HAMMIDA, Mustapha	Agric Economics	12-84	Minnesota (MS)
89. IBNOUGHAZALA, Toufiq	Nutrition	9-83	Minnesota
90. KARKACHE, Mohamed	Horticulture	11-83	Minnesota
91. KSSILI, Nouredine	Animal Science	9-83	Minnesota
92. MALLAH, Abdelmoula	Poultry Science	9-83	Georgia
93. MGHIZOU, Mohamed	Agric Economics	12-84	Minnesota (MS)
94. MOUSSAIF, Fawzi	Animal Science	9-83	Minnesota
95. MSIKINE, Driss	Agronomy-Forages	9-83	Minnesota
96. RIZQUI, Abdelhak	Horticulture	10-83	Minnesota
97. TOUALI, Abdelaziz	Appl Econ/Fish	10-84	Oregon St.(MS)
98. YESSEF, Mohamed	Range Science	1-84	Texas A&M
99. ZEBZAMI, Mustapha	Plant Pathology	1-84	Iowa State
<u>Arived July 1983</u>			
100. ALAQUI, Mohamed	Range Science	1-85	Texas A&M
101. BELLAMLI, M'Sika Taj-Eddine	Agric Economics	9-84	Minnesota
102. BOULANOUAR, Bouchaib	Range Science	1-85	Colorado St(MS)
103. BOUQUENTAR, Malika	Plant Pathology	1-85	Illinois
104. BOUSRAREF, Abdelaziz	Dryland Agric.	12-84	Kansas St.
105. EL BEHRI, Abdelfatah	Agronomy	1-85	Minnesota
106. EL HARCHALI, El Hassane	Nutrition	1-85	Minnesota
107. EL HARTI, Jaouad	Animal Science	10-84	Minnesota
108. EL HMAMSI, Mohamed Mounir	Animal Science	10-84	Minnesota
109. EL HIMDY, Badre	Agronomy	10-84	Minnesota
110. EL KABBAJ Mohamed Taieb	Animal Science	10-84	Minnesota
111. EL MZOURI, El Houssine	Range Science	12-84	U CA-Davis
112. EZ-ZARZARI, Abdelfdil	Plant Breeding	10-84	Minnesota
113. FALAKI, Mohammed	Animal Science	10-84	Minnesota
114. FORTASS, Mohammed	Plant Pathology	1-85	Wisconsin

THIRD CYCLE PARTICIPANTS (cont.)

<u>Name</u>	<u>Specialization</u>	<u>Returned</u>	<u>University</u>
<u>Arrived July 1983 (cont.)</u>			
115. FATEMI, Zain El Abidine	Plant Breeding	9-84	Minnesota
116. GRASS, Lahcen	Horticulture	1-85	Minnesota
117. LAHRAOUI, Abdelkader	Agric Engr	9-84	Minnesota
118. LARHRAFI, M'Hammed	Agric Engr	1-86	Minnesota (MS)
119. MESSAOUDI, Zerhoune	Horticulture	1-85	Minnesota
120. MOUNIR, Mohamed	Horticulture	1-85	Michigan St.
121. RACHIDI, Faouad	Dryland Agric	12-84	Kansas St.
122. SOUAF, Mohamed	Dryland Agric	10-84	Oregon St.
123. TAHIRI, Amar	Plant Breeding	10-84	Minnesota
124. TARIB, Jamal	Agric Engr	9-84	Minnesota
125. TOUIL, Moussa	Agric Engr	1-86	Utah State (MS)
126. ZOUBI, Abdelaziz	Fisheries	1-85	Rhode Island
<u>Arrived July 1984</u>			
127. ABIDI, Mohamed	Agronomy	12-85	Kansas State
128. ABOUSSALEH, Youssef	Nutrition	12-85	Minnesota
129. ADNASSE, Abdellatif	Agronomy	9-85	Minnesota
130. ALEM, Abdellah	Horticulture	12-85	Chico St. CA
131. AMAR, Boujamaa	Agronomy	9-85	Minnesota
132. ARABA, Abdelilah	Animal Science	9-85	Minnesota
133. BAKALI, Mohamed	Animal Science	9-85	Minnesota
134. BELMOKHTAR, Lamyia	Plant Breeding	12-85	Minnesota
135. CHAFIK, Abdelaziz	Animal Science	9-85	U CA-Davis
136. CHRICHI, El Mostafa	Horticulture	12-85	Chico St. CA
137. EL GHOLEBZOURI, Ahmed	Agric Economics	12-85	Minnesota
138. EL HILALI, Ahmed	Animal Science	9-85	Minnesota
139. EL OUADILI, Raja	Applied Econ/Fish	12-85	Oregon St.
140. EZEKARI, Mohamed	Agronomy	12-85	Nebraska
141. HARRAQUI, Fouad	Agric Economics	12-85	Minnesota
142. IBZER, Abed	Plant Pathology	12-85	Iowa State
143. JEBBANEMA, M'hamed	Range Science	1-86	Colorado St(MS)
144. LAGNAOUI, Abdelaziz	Entomology	-	Minnesota
145. LAIDOUNI, Mohamed	Animal Science	9-85	Minnesota
146. NASSIR, Abderrahim	Agronomy	12-85	Kansas State
147. RHALLOUSSI, Abderrahim	Horticulture	12-85	Chico St. CA
148. ZAHIR, Hamid	Agronomy	12-85	Oregon State

THIRD CYCLE PARTICIPANTS (cont.)

<u>Name</u>	<u>Specialization</u>	<u>Returned</u>	<u>University</u>
<u>Arrived July 1985</u>			
149. ABDELALI, Aziz	Animal Science	12-86	Minnesota
150. ARABA, Miloud	Poultry Science		Georgia
151. BAHRI, Hakima	Plant Breeding	12-86	Minnesota
152. BEN MOUMEN, Abdelhafid	Hydrology	10-86	Minnesota
153. BOUABID, Rachid	Soil Science	11-86	Minnesota
154. EL KASMI, Hajib	Plant Breeding	11-86	Minnesota
155. KHABOUZE, Abdelhaq	Int. Pest Mgt.	10-86	Minnesota
156. RAFRAFI, Mohamed	Agronomy-Weed Science	12-86	Minnesota
157. ZEHAUF, Mustafa	Agro-Climatology		Nebraska
158. ZIZI, Nourreddine	Irrigation-Engr.		Utah
<u>Arrived July-September 1986</u>			
159. AKHTOUCH, Bassou	Plant Breeding		Minnesota
160. ABOUSSERHANE, Mohamed	Dairy Science		Minnesota
161. CRAAY, Abdelkader	Agro-Climatology		Nebraska
162. M'RABET, Rachid	Soil Science		Minnesota
163. BOUKHAL, Ali	Soil Science		Minnesota