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International Development

Oregon State
University

211(d)

**MOISTURE CONSERVATION
AND UTILIZATION IN
LOW WINTER RAINFALL
AREAS OF LDCs**

AID/ta-G-1221

September 1978

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Report prepared by: Office of International Agriculture
Oregon State University
Corvallis, Oregon 97331 / USA

September 1978

PROGRAM PROFILE

grant title ●

MOISTURE CONSERVATION AND UTILIZATION IN
LOW WINTER RAINFALL AREAS OF LDCs

grant number ●

AID/ta-G-1221

grantee ●

Oregon State University

grant program director ●

Dr. S.F. Miller

AID grant manager ●

Dr. Dillard Gates, AFR/W

period of grant ●

July 1, 1975 to July 1, 1980

period covered by this report ●

July 1, 1977 through June 30, 1978

amount of grant ●

\$1,000,000

expenditures for report period ●

\$160,011.53

CONDENSED SUMMARY

This report documents the third year of a five-year grant to broaden the existing dryland agriculture expertise of Oregon State University and create a center of excellence and information aimed at assisting less developed countries with dryland production and management problems.

During the year \$160,011.53, and nearly 90 man months were employed to develop and provide the major outputs of the grant. The outputs include: establishment and maintenance of a dryland information service; provision of an advisory and consultant service; creation of international linkages; maintenance of an education and training program; and expansion of the research capability and knowledge base in dryland agriculture.

The information effort now includes a 3,000-entry DRYLAND BIBLIOGRAPHY (which is being expanded, through a supplement to the 2nd edition, by approximately 1,000 additional entries) and a document delivery service. A total of 2,747 pages of material have been sent through the delivery service to 17 requestors representing eight different IDCs. The BIBLIOGRAPHY was sent to 23 countries, not including the U.S.

Project personnel participated in a number of conferences and seminars directly related to dryland agriculture. Techecom (technical committee) members traveled to Syria, Tunisia, and Turkey to establish and maintain relations with existing institutions. Special effort was directed toward developing and continuing the excellent relationship between OSU and ICARDA*. The Directors General of both ICARDA and CIMMYT** visited OSU during the report period.

During the year 10 graduate students worked with members of the Techecom on various research programs directly related to grant objectives. One student received his Masters of Agriculture in Dryland Agriculture. Much of the research being conducted with grant support is located on, or near, the Sherman Branch Station at Moro, Oregon. This station was previously established as the training and research center for the project. Subclover research, however, is conducted in Douglas County, in western Oregon.

OSU staff continued preparation of the state of the technical arts document for dryland agriculture (SOTA). The rough draft version is presently being reviewed. Completion of the SOTA paper is anticipated in January, 1979.

Approximately 50 foreign visitors came to OSU to discuss semi-arid agriculture as well as to view Oregon production procedures for cereals, forages, and livestock. Techcom members spent approximately 120 man-days of time in this effort.

*ICARDA - International Center for Agricultural
Research in Dry Areas (Syria)

**CIMMYT - International Center for Maize and
Wheat Improvement

NARRATIVE REPORT

GENERAL BACKGROUND AND DESCRIPTION OF THE PROBLEM

Contrary to the popular belief that Oregon receives continuous heavy precipitation, the state's immense eastern region receives low amounts of rainfall concentrated during a few months of the winter season.

Agriculture in this area, aside from that under irrigation, depends on winter season rainfall and is, in the full sense of the term, dryland agriculture devoted to small grains and animal forage.

Oregon State University and the state's agricultural experiment station have devoted major effort over many years to developing technology and practices to improve agricultural production in the dryland areas. One of the primary thrusts involved has been conservation and beneficial utilization of available moisture. Numerous disciplines have participated in the ongoing effort resulting in the establishment of a significant body of information and experience with dryland agricultural production dependent on winter rainfall.

OSU staff members had previous experience with international programs in Turkey and Jordan oriented toward increasing cereal production and expanding cereal production research and extension. The existence of these programs, plus the interest and experience of OSU in dryland agricultural development, led to discussions with the U.S. Agency for International Development and ultimately resulted in AID awarding a 5-year grant to OSU to marshal and expand its expertise and to develop a center of excellence in dryland agriculture that could be harnessed for application to less developed countries. The grant, entitled Moisture Conservation and Utilization in Low Winter Rainfall Areas of LDCs, was subsequently launched in mid-1975.

PURPOSE OF THE GRANT

The specific purpose of the grant, as stated in the accepted proposal, is to mobilize and expand institutional response capability at Oregon State University to focus on moisture conservation and utilization in relation to food production with emphasis on small farms in low winter rainfall (Mediterranean climate) areas of the LDCs.

The grant allows OSU to develop broader response capability in: 1) situations involving grain-livestock interaction as a major dryland activity; 2) improved moisture conservation and utilization related to the grain-animal-forage production complex; 3) more efficient use of farm power and equipment within LDC social and economic constraints.

OBJECTIVES OF THE GRANT

In the broad perspective, the grant's objectives encompass the establishment and development of a center of competence with the ability and willingness to respond to needs of LDCs in low winter rainfall areas throughout the world to improve dryland farming systems and, by extension, the quality of life.

Five major objectives/outputs were defined for the grant:

- ▶ Output #1 - Establish and operate a centralized information system.
- ▶ Output #2 - Develop and provide an education training program specifically addressed to problems of IDCs.
- ▶ Output #3 - Expand, improve, and marshal an institutional research capability and knowledge base.
- ▶ Output #4 - Develop and provide increased advisory capacity.
- ▶ Output #5 - Promote and strengthen domestic and international linkages.

The objectives/outputs are detailed in the grant work plan (as revised), a copy of which is attached (Appendix I).

ACCOMPLISHMENTS

Each of the five objectives/outputs established for the grant are discussed in this section relative to the activity that has occurred within that particular sector. The objectives/outputs are condensed to just the words underlined in the foregoing section, Objectives of the Grant.

At the outset of the grant, an organizational structure was created within Oregon State University with the key body being the AID/OSU dryland grant technical committee (Techcom). Membership of the Techcom for 1977-78 was:

- Dr. F.E. Bolton, Department of Crop Science
- Mr. D.E. Booster, Department of Agricultural Engineering
- Dr. J.B. Fitch, Department of Agricultural and Resource Economics (left during year)
- Dr. T.L. Jackson, Department of Soils
- Dr. R.F. Miller, Department of Rangeland Resources
- Mr. T.L. Nordblom, Department of Agricultural and Resource Economics
- Dr. A.H. Winward, Department of Rangeland Resources

Dr. S.F. Miller heads the Techcom as grant director. Information/library support was represented by A.E. Wolff of the Sci-Tech and agricultural section of the William Jasper Kerr Library at OSU. Ms. Wolff participated in Techcom meetings as an ex-officio member.

Responsibility for coordinating the grant lies with the Office of International Agriculture, with Office staff members A.E. Deutsch and G.S. Knapp providing backup support to grant activities.

1. Centralized
Information
System
-

The entire printing of the second edition of the BIBLIOGRAPHY OF DRYLAND AGRICULTURE was distributed after publication in late October 1977.

Six copies remain on file and two are unaccounted for. Distribution according to country was:

Algeria - 5	India - 10	Mexico - 6
Australia - 3	Iran - 22	Morocco - 5
Colombia - 1	Iraq - 1	Pakistan - 8
Costa Rica - 1	Israel - 2	Philippines - 1
Egypt - 6	Italy - 1	Syria - 5
England - 1	Jordan - 3	Tunisia - 14
Ethiopia - 1	Lebanon - 1	Turkey - 31
France - 1	Libya - 3	USA - 60 (12 to AID/W)

The first supplement to the second edition of the BIBLIOGRAPHY was compiled during the year. Over 1,000 additional references were included in generally the same format as the second edition. Publication is anticipated for early fall 1978 followed by distribution. One change in listing individual references was to drop assigned item numbers, a system originally intended to expedite recipient use of the BIBLIOGRAPHY, but which apparently created some confusion, according to at least one letter received.

The computer system employed for the bibliographies and supplement now has the capability to produce a subject/title index whereas it previously generated a pure subject index with rows of numbers which then had to be looked up individually.

The material in the dryland bibliographic system covers all disciplines related to dryland agriculture, but devotes special attention to agricultural engineering (including equipment), agricultural economics, soils, agronomy, and range management. Journals, books, serials, papers, bulletins, and previously uncataloged reports from the United States and the North African-Mediterranean region are included.

Collected literature is housed in the Kerr Library in either the main library collection or in a special collection room assigned to the dryland agriculture program. The materials are indexed, coded, filed, and readily available to research personnel both inside and outside the University through library check-out procedures.

The dryland document delivery system developed earlier by grant personnel continued to mature during the year. Distribution of the second edition of the BIBLIOGRAPHY constituted a major effort, backed by receipt of requests for photocopied material. An information sheet describing the photocopying arrangement (up to 200 pages of non-copyrighted material available without cost) was enclosed with copies of the BIBLIOGRAPHY. The procedure generated a number of requests, some for a few pages and one for over 15,000 pages.

A.E. Wolff and A.E. Deutsch attended a meeting of CIDNET (Consortium for International Development Information Network), held at and called by the AID/University of California (Riverside) project in November, to stimulate discussion leading towards a basic decision on how CIDNET, and its information collection and dissemination functions, can be kept secure. A second aspect concerned modes of operation and "packaging" of information products. (Details, plus a list of institutions and personnel attending, appear in a trip report included in Appendix VII.)

As part of the continuing development of the dryland agriculture collection, a number of works were acquired during the year. A partial listing appears in Appendix VI.

The accomplishments of 1977-78 are consistent with, and inclusive of, the scheduled events and targets specified in the work plan. A total of 12.2 man months of professional time plus 418 hours of student help was spent in the pursuit of the objectives at a cost of \$24,000 from the grant. An additional 2 man months (at a cost of \$2,000) were contributed to the grant and pursuit of its objectives primarily in the form of support provided by the library plus administrative and logistic back-up by the University.

2. Education Training Program

The Techcom thoroughly reviewed existing class offerings at OSU with the intent of determining what existing courses were available to students studying dryland agriculture and which courses could be assembled to form a Master of Agriculture in Dryland Agriculture.

A leaflet describing the Master of Agriculture in Dryland Agriculture offered at Oregon State University was printed in October 1977. A broad initial distribution was carried out. In addition to various general information, the leaflet sets forth detailed suggested courses and combinations within various majors. The intent: provide sufficient information to assist potential students in assessing the varied opportunities in dryland studies at OSU. A number of responses requesting follow up information were received.

A proposed workshop in dryland agriculture, scheduled for June 1978 under the aegis of the USDA international agricultural education program was cancelled due to lack of response. Listing of the course was too late for incorporation in the USDA printed notice of courses scheduled for the year.

The workshop has been tentatively rescheduled for June 1979 again to include a mix of traditional class offerings, on-site field work, and field trips. The dryland research and training center at Moro, Oregon, will be utilized for the field segment of the workshop.

Several graduate students were assigned to Techcom members during the year. The students, in addition to pursuing an advanced degree, were engaged in research related to the dryland program. Students during the report year were:

<u>name</u>	<u>country</u>	<u>degree</u>	<u>subject</u>	<u>advisor(s)</u>
Abdellatif Belmehdi	Morocco	Ag.M.	Crop Science	Bolton
James Estes	U.S.	M.S.	Crop Science	Bolton
D. Michael Glenn	U.S.	Ph.D.	Crop Science	Bolton
Robert Henderson	U.S.	M.S.	Crop Science	Bolton
Gary Kiemnec	U.S.	Ph.D.	Soil Science	Jackson

<u>name</u>	<u>country</u>	<u>degree</u>	<u>subject</u>	<u>advisor(s)</u>
Catherine Mee	U.S.	M.S.	Range Resources	R. Miller
Thomas Nordblom	U.S.	Ph.D.	Ag. Economics	S. Miller
Steve Petrie	U.S.	M.S.	Soil Science	Jackson
Michael Russelle	U.S.	M.S.	Crop Science	Bolton
Ronald Taylor	U.S.	M.S.	Soil Science	Jackson

Mr. Belmehdi completed his degree in June 1978 and returned to Morocco. He prepared a paper entitled The Role of Summer Fallow in the Cropping Systems of the Drylands as part of his master of agriculture program.

Thesis research being conducted by Mr. Estes concerns the effect of water injection into the seed zone as an aid to emergence of dryland cereals.

The doctoral program of Mr. Glenn centers on rainfall and its interaction with various characteristics of dryland fallow-wheat rotations. Mr. Henderson's research program also focuses on moisture, but seeks to identify aspects of soil moisture under a variety of precipitation patterns.

The problem of ascertaining the nutritive value of wheat and barley aftermath for grazing by domestic animals was assigned to Ms. Mee. She began research--taking and analyzing samples--in an attempt to determine the effects of crop variety, environmental conditions, season of use, and parts of the crop plant on the nutritive quality of aftermath. The study has a dual objective of evaluating livestock operations on marginal range-crop lands.

Part of Mr. Russelle's research (completed in June 1978) was funded through the 21160 program. He worked under Dr. Bolton to determine soil moisture-temperature relationships prior to seeding (and) under four fallow tillage treatments. Water losses occurring under different depths and types of mulch were measured with the goal of developing information for suggested production techniques that help stabilize grain production in low rainfall zones. Two manuscripts developed from the research were submitted to scientific journals.

Gary Kiernee is studying the effects of P and S fertilizer treatments on the distribution of protein and non-protein nitrogen and sulfur in subclover forage. Total nitrogen contents of 5.5 percent in leaf blades and petioles has been measured suggesting a 34 percent protein content using conventional conversion factors.

"Take All Root Rot" (Gaeumannomyces graminis) of wheat is a world-wide problem in irrigated and higher production dryland areas. Lower soil pH levels (5.5 to 6.0) and maintenance of N in the ammonium form reduce the intensity of this disease. Research by graduate student Ron Taylor, under direction of T.L. Jackson, has shown that banding ammonium fertilizer with wheat seed, using nitrification inhibitors, and applying potassium and chloride chemicals also reduced the disease, as did addition of lime and phosphorus to a more acid (pH 5.2), P deficient soil.

Management of grazing livestock in conjunction with dryland cereal is presently being studied by Thomas L. Nordblom. Grain stubble and other cereal harvest residues provide a large and crucial seasonal feed source in many semi-arid regions. Areas of complementarity and competitiveness between the two enterprises will be defined. Uncertainty in the forms of weather and prices will be analyzed.

The University continues to provide substantial support in the realization of this objective by providing the Sherman Branch Station as the dryland training center. In total, approximately 16 man-months and \$32,000 of time and project funds were expended in the pursuit of this objective.

3. Institutional Research Capability and Knowledge Base

Several research programs or "mini-projects" were continued during the year. These included planting wheat on ridges to avoid winter moisture problems; assessing the digestibility of wheat aftermath; investigating the relationship of subclover to wheat. Several thesis problems conducted at the Moro station pointed toward additional useful dryland information.

Flooding of winter wheat on poorly drained soils can exert a deleterious effect on wheat production in many areas with dominantly winter rainfall. Stand losses can occur whenever wheat plant crowns are submerged for certain periods. Experimental work carried out under the guidance of Techcom member T.L. Jackson demonstrated that planting wheat on ridges (3 to 4 inches from top of ridge to bottom of trough) on 10 inch centers increased winter wheat yields by one ton per acre in 1977 over conventionally planted wheat.

Continuation of the project with refinements in equipment and planting techniques, plus heavier than normal rainfall, is expected to produce even greater yield increases in the coming year.

Work proceeded on evaluating variations in crude protein and digestibility of various wheat varieties as affected by site factors and climatic variation. Leaves, culms, and chaff of white wheat, club wheat, and barley is undergoing laboratory analysis following completion of field collections and measurements of stubble for the first year.

Initial raw findings indicated that not only does the percent crude protein level decrease as the year matures, but the availability of leaves decreases drastically. Most dried leaves fall to the ground after the first rains creating a layer of litter. Forage quality was higher on sites of higher stress (drier), and culm-to-leaf ratios were lower. Thus, availability of higher quality forage was greater in relation to the total production on the more stressed sites.

Other research has involved studying the relationship of subclover to wheat with indications that nitrogen fixation by rhizobium living in association with legumes can provide an important element of dryland wheat-forage-animal production systems. A further step involves field experiments to evaluate the effects of phosphorus, potassium, and lime on the yield of subclover and the amount of nitrogen fixed by subclover.

Techcom members prepared drafts of chapters for the State of the Arts document (SOTA) during the year. While behind the schedule originally established, the SOTA has made significant progress.

The Techcom met 41 times in 1977-78 and participated (as a group) in tours to the Moro station and the subclover research sites in Douglas County, Oregon. Several international visitors met with the Techcom, while others enjoyed a one-to-one relationship with various Techcom members.

Over 46 man months of effort and approximately \$80,000 were expended to achieve the cited results.

4. Increased Advisory Capacity

A manuscript entitled Tillage, Moisture Conservation, and Water Use Efficiency for Dryland Cereal Production in Winter Rainfall Regions, co-authored by F.E. Bolton and D.E. Booster, was accepted by the Oregon Agricultural Experiment Station as technical paper #4623. It was based, in part, on a joint presentation made at the International Symposium on Rainfed Agriculture in Semi-Arid Regions (Riverside, CA, April 1977).

Prof. Booster continued to investigate agricultural equipment for items that might be suitable, either as is or modified, for use on small dryland farming enterprises. He also conferred with other Techcom members and graduate students regarding design of experimental equipment for strip tillage, seeding, and fertilizer application in dryland cereal research.

Based on information disseminated through the Title XII effort, the Techcom initiated discussions with the intent of drawing up a proposal to submit to BIFAD (Board for International Food and Agriculture Development). This was done in June, 1978. The proposal would outline areas of unexplored problems revolving around the cereal-forage-animal complex in dryland areas. Complimentarities of research and the importance of a multi-disciplinary approach were cited as key factors to effectively tackle the problem. It was anticipated that a proposal for a strengthening grant under Title XII would be prepared and submitted in due course along the same lines.

Earlier, Drs. S. Miller and Jackson met with AID personnel from several bureaus and offices in Washington to consider current and future activities of the dryland effort.

Grant manager for AID, Dr. Dillard Gates, visited OSU in early May to informally review the program and accompany the Techcom on an observation trip to subclover research sites in Douglas County.

Dr. Bolton attended two conferences and presented papers as follows: at the Agronomics of Conservation Tillage Conference, Great Falls, MP, December 13-14, 1977, "Investigations on Rotary Strip-Tillage in Chemical Fallow for Seedbed Preparation and Stand Establishment in Dryland Cereals;" and at the Pendleton-Walla Walla Fertilizer Dealers Conference, Walla Walla, WA, January 5, 1978, "Precipitation During the Fallow Period and its Effect on Soil Nitrogen Levels in a Fallow-Grain Rotation."

Project personnel, Drs. Jackson and Bolton, were contacted on three different occasions by AID/Washington to travel to Pakistan and review the cereal production program of that country. Postponements and changes in AID planning resulted in their inability to participate even though considerable time was spent in preparation to leave. This was unfortunate in that both could have made an important contribution.

Eight man months and approximately \$16,000 were used to improve the dryland advisory capability of the University.

5. Domestic and International Linkages

Four OSU faculty members associated with the AID/OSU dryland program visited the International Center for Agricultural Research in Dry Areas (ICARDA) at Aleppo, Syria, in June 1978. The objective centered on establishing linkages covering activities of mutual concern and interest. Drs. Bolton, Jackson, and P. Miller and Mr. Deutsch discussed a variety of programs with ICARDA personnel including Dr. Harry Darling, director general, Dr. Owen Brough, assistant director general, and leaders and members of several departments. The OSU team also visited the new ICARDA research center site (under development outside Aleppo) and traveled to dryland village farming areas to observe crops and farming systems in action.

Drs. Bolton and Miller, and Mr. Deutsch traveled overland to southern Turkey, across the Anatolian Plateau, and eventually to Ankara. The OSU group met with the director and numerous staff members of the Wheat Research and Training Institute as well as members of the Faculty of Agriculture at the University of Ankara. Trip reports relating details of the programs and operations of the centers visited are contained in Appendix VII.

Prior to arriving in Syria Dr. Bolton spent two weeks in Tunisia as a member of a four-man consulting team carrying out a survey of agricultural potential for Central Tunisia's dryland area. Dr. Bolton, requested to participate in the effort by Mr. Thomas Wilson of AID/Near East Bureau, was asked to determine the potential for dryland cereal production and to recommend interventions for implementation of a program to increase the yield levels in the region. Major emphasis was placed on increasing barley production. Barley constitutes a major crop in the region, but is also a cereal in short supply in Tunisia.

Dr. Jackson, as a member of the editorial committee for the Agronomy Society of America (ASA) dryland monograph, attended a two-day meeting in Denver to review progress and develop chapter outlines. The monograph will include authors from all of the western states and is anticipated to become a major reference for scientists concerned with dryland agricultural production improvement.

Dr. Jackson also attended the ASA national meetings in Los Angeles, CA, during November 1977, and established contact with several international scientists.

A number of international researchers visited OSU during the year (complete list appears in Appendix III) including the directors general of ICARDA, Dr. Harry Darling, and CIMMYT (Centro Internacional de Mejoramiento de Maize y Trigo), Dr. Robert Havener (named to succeed Haldore Hansen). Mr. John Doolette, agronomist with ICARDA and world authority on no-till, reviewed the OSU dryland activity and presented a seminar during his visit to Corvallis in December 1977. Mr. Frank Crofts, lecturer on Agricultural Systems at Sydney University spent the month of June in Oregon reviewing cropping systems work underway in Oregon and discussing his work in Australia.

Techcom members responded to numerous requests for assistance from the Consortium for International Development (See Appendix II). OSU review teams during the year were in the Sudan, Senegal, and Egypt.

Four man months of professional time and \$8000 were used to create and strengthen international linkages.

OTHER RESOURCES
FOR GRANT-RELATED
ACTIVITIES

Oregon State University continued to contribute to the objectives of the grant through the free use of University facilities and administrative staffs. While this contribution was understood at the time of awarding the grant, its importance to the smooth functioning of the dryland program should not be overlooked. The library provided support through the efforts of the William Jasper Kerr agricultural librarian.

UTILIZATION OF
INSTITUTIONAL RESPONSE
CAPABILITIES IN
DEVELOPMENT PROGRAMS

Appendix II and III provide information concerning requests for assistance received by the grant, as well as a log of visitors. The Techcom responded to many AID requests to submit project proposals primarily working as a member of the Consortium for International Development (CID).

NEXT YEAR'S PLAN
OF WORK

Activities for the coming year are described by major objective/output.

A. Centralized
Information
System

Collection and evaluation of literature and information related to dryland agriculture will be carried on, as will the effort to expand document delivery.

The first supplement to the second edition of the BIBLIOGRAPHY is expected to be printed and available by mid-September. Efforts will be devoted to placing copies in the hands of potential users as well as making known the availability of the supplement.

The library group will continue to keep in touch with other members of the CIDNET team, especially the effort at the University of California, Riverside, and the machine-searchable data base at UCR.

Other possible areas that will receive attention during the year involve interlibrary loan activity, services to graduate students, and searches of the LIRS on-line data bases.

B. Education
Training
Program

The dryland workshop originally scheduled for June 1978 has been rescheduled for June 1979. The format has been altered from a month to two weeks of intensive activity involving all of the Techcom plus other OSU faculty members.

The revised workshop outline includes:

First week - at Corvallis: Theory of Dryland Agriculture
Soil-moisture relationships
Soil fertility concepts
Range resources and management
Dryland production techniques
Farm management and decision making

Second week - in the field: Applied Techniques
Dryland production in the Field
Weed control practices
Applied fundamentals of range management
Use and care of marginal lands
Winter annual legume program
Machinery and equipment familiarization
Summary and conclusion

The workshop will be geared to English speaking/comprehending individuals with a minimum of a bachelor's degree. Presumably, some of the participants would be able to return to their home nation and, in some manner, contribute to improved agricultural production in rain-fed regions. A minimum of 12, but not more than 20, participants would be involved. Participants would be expected to develop their own source of financial support.

A continuing effort will be made to involve graduate students in various disciplines and phases of the dryland work. In particular, the Master of Agriculture degree with emphasis in Dryland Agriculture will be accorded special attention.

The dryland program has developed closer linkages with the International Education Office at OSU. More international students are being made aware of educational opportunities in dryland agriculture. Also, students with an interest in dryland work, but who are deficient in English, are being referred to OSU's English Language Institute (operated through International Education) for short term courses to broaden lingual capability.

A course in the OSU Crop Science Department was revised and updated to fill a gap in the curriculum for training in dryland Agriculture. The course, Conservation Cropping, was taught for the first time during winter quarter (January-March) 1978. Twelve graduate students enrolled including representatives of Brazil, Morocco, and Turkey, along with domestic students, several from other than the Crop Science department. A brief description and outline of the class appears in Appendix VIII.

C. Institutional Research
Capability and
Knowledge Base

The Techcom will continue to review and evaluate opportunities for involvement that originate with CID as well as AID and, possibly, other organizations. A great number of opportunities are offered. Project personnel have spent, and will continue to spend time to evaluate opportunities as they arise.

High priority has been placed on developing the State of the Arts document from raw draft to completed publication. The document is presently being reviewed by Dr. John Martin, dryland consultant, for content and style. Revisions in the document will be made by the end of the year with publication to immediately follow.

The Techcom remains convinced that one of the key issues to improving dryland agriculture production in IDCs hinges on the livestock-cereal interface and the universe of implications surrounding this issue (natural, political, cultural, economic). Major emphasis will be placed on developing a proposal for research directed toward the livestock-cereal interface and the submission of this proposal to BIFAD within the parameters of the formula funding strengthening grant. A subcommittee has been formed to prepare the proposal. It will be reviewed, subsequently, by the entire Techcom and the University Dean of Research prior to submittal.

Mini-grant supported research under the parent 211(d) grant will be continued in the forthcoming year. The projects presently being conducted will continue. Dr. Bolton's project on the effects of precipitation on soil-nitrogen levels in fallow-grain rotations will be expanded to consider the effects of precipitation on stubble feed qualities. Crop residues constitute a major source of feed for livestock in dryland areas of the world.

D. Increased
Advisory
Capacity

OSU, through the Techcom and the Office of International Agriculture, will continue to readily accept requests for proposal submission and also provide careful scrutiny of such requests as well as a response. Additionally, requests for direct technical support will be taken under advisement and responded to affirmatively as feasible.

Similarly project personnel are available for consulting assignments as needed. The team can advise in dryland cereal production, soils, livestock and range management, farm and ranch management, and farm machinery. Several requests for project personnel have been received; each request will be given serious consideration.

E. Domestic and
International
Linkages

ICARDA is the logical focus of the attention of the OSU 211(d) grant. Close ties have now been made. ICARDA has asked that a project be submitted to them covering possible training in Oregon of dryland students from IDC's. A committee has been appointed to prepare the documentation.

The wheat breeding program at OSU led by Dr. Kronstad will continue to cooperate with the Techcom in areas of mutual interest. A joint spirit of collaboration exists within the two projects and will continue to be encouraged.

Washington State University and the University of Idaho are now members of CID (Consortium for International Development). WSU, U of I and OSU have a similar concern for dryland areas. It is proposed that the three Universities, working through CID, support each other in providing manpower for projects of mutual concern. The Deans of the respective schools have already spoken in support of the effort. Close communication will be maintained.

INVOLVEMENT OF
MINORITY PERSONNEL
AND WOMEN

All techcom members are regular employees of Oregon State University and its various departments. No new technical positions were created because of the grant. Women filled the positions of project secretary and librarian; the latter was a member of a minority ethnic group. During the year four students, all women, worked as library assistants. All classified and non-classified positions at Oregon State University are recruited through established procedure, utilizing and following the statement of the Office of Affirmative Action and Equal Employment.

Opportunities are created for graduate training through the grant. Prospective students are evaluated without regard to race, creed, religion, age, national origin, handicap, marital status, or sex. All academic departments and the OSU registrar abide by this standard.

TABLE F-1
FINANCIAL SUMMARY

Categories	Total 5-year budget	Year #1 expended July 1, 75- June 30, 76	Year #2 expended July 1, 76- June 30, 77	Year #3 expended July 1, 77- June 30, 78	Total expended as of June 30, 78	Budget balance as of June 30, 78
<i>Academic Staff</i>	<i>\$470,817</i>	<i>\$27,340.00</i>	<i>\$27,825.00</i>	<i>\$102,301.00</i>	<i>\$174,550.00</i>	<i>\$196,261.00</i>
<i>Clinical Staff and Students</i>	<i>28,183</i>	<i>3,234.00</i>	<i>16,048.05</i>	<i>8,006.68</i>	<i>27,288.73</i>	<i>50,894.27</i>
Total Salaries and Wages	549,000	70,574.00	113,873.05	117,367.68	301,814.73	247,185.27
Other Payroll Expenditures	82,822	10,147.84	16,504.45	18,373.59	45,025.88	37,796.12
Materials and Services	83,678	1,569.91	5,102.99	3,361.96	10,034.86	73,643.14
Computer Costs	17,000	676.62	2,355.14	2,052.10	5,083.86	11,916.14
Publication Costs	20,000	0	334.57	982.79	1,317.36	18,682.64
Travel	127,500	13,869.24	34,145.99	12,220.88	60,236.11	67,263.89
Contribution to CID	50,000	10,000.00	10,000.00	1,000.00	21,000.00	29,000.00
Equipment	70,000	5,143.50	32,104.33	4,652.53	41,900.36	28,099.64
TOTALS	\$1,000,000	\$111,981.11	\$214,420.52	\$160,011.53	\$486,413.16	\$513,586.84

TABLE F-2
 EXPENDITURE REPORT
 JULY 1, 1977 THROUGH JUNE 30, 1978

I.	A.	Salaries			
		Academic		\$103,067.00	
	B.	Other			
		Library	\$6,294.00		
		Clerical	5,333.46		
		Other non-professional	2,673.22		
				14,300.68	
		<u>TOTAL SALARIES AND WAGES</u>			\$117,367.68
	C.	Fringe benefits			18,373.59
II.		Student Support			-
III.	A.	Consultants			-
	B.	Guest lecturers, visitors, etc.			-
IV.	Travel		TOTAL NO. OF TRIPS	TOTAL AMOUNT	
	A.	Domestic	65	5,701.09	
	B.	Foreign	5	6,519.79	
		<u>TOTAL TRAVEL</u>			\$12,220.88
V.	Equipment				
		One Mettler balance		1,184.00	
		One Pentax ME camera		299.40	
		Other		3,169.13	
		<u>TOTAL EQUIPMENT</u>			\$4,652.53
VI.		Library acquisitions			441.77
VII.		Publications			982.79
VIII.		Other			5,972.29
				<u>TOTAL FOR YEAR</u>	\$100,011.53

TABLE F-3
EXPENDITURES AND PROJECTIONS

Categories	Expenditures		Projections for		
	Report period	Total to date	Year #4	Year #5	Totals
<i>Academic Staff</i>	<i>2109,201.00</i>	<i>2274,220.00</i>	<i>2110,302</i>	<i>2125,000</i>	<i>2219,388.00</i>
<i>Classified Staff and Students</i>	<i>8,000.00</i>	<i>27,288.73</i>	<i>16,300</i>	<i>18,000</i>	<i>61,654.73</i>
.....					
Total Salaries and Wages	117,367.68	301,814.73	133,228	146,000	581,042.73
Other Payroll Expenditures	18,373.59	45,025.88	22,649	24,905	92,579.88
Materials and Services	3,361.96	10,034.86	23,000	37,752	70,786.86
Computer Costs	2,052.10	5,083.86	4,500	10,000	19,583.86
Publication Costs	982.79	1,317.36	4,000	5,500	10,817.36
Travel	12,220.88	60,236.11	29,000	35,200	124,436.11
Contribution to CID	1,000.00	21,000.00	10,000	1,000	32,000.00
Equipment	4,652.53	41,900.36	18,853	8,000	68,753.36
.....					
TOTALS	\$160,011.53	\$486,413.16	\$245,230	\$268,357	\$1,000,000.16

TABLE F-4
 DISTRIBUTION OF 211(d) GRANT FUNDS AND
 CONTRIBUTIONS FROM OTHER SOURCES OF FUNDING
 JULY 1, 1977 THROUGH JUNE 30, 1978

Grant Objectives by Output	EXPENDITURES				
	Period Under Review	Cumulative Total	Projected Next Year	Projected to 5th Year of Grant	Non 211(d) Funding
Centralized Information System	\$24,001.73	\$73,187.68	\$36,785	\$40,254	\$2,000 library
Education and Training	32,002.31	97,922.19	49,049	53,671	---
Research Capability & Knowledge Base	80,005.76	240,267.73	122,615	134,179	4,500
Advisory Capability	16,001.15	39,816.04	24,523	26,836	---
Domestic & International Linkage	8,000.58	36,215.52	12,261	13,418	---

APPENDIXES

Appendix I - Work Plan (Revised)

Appendix II - Requests for Assistance and
Action Taken

Appendix III - Short Term Visitors

Appendix IV - Foreign Graduate Students in the
School of Agriculture at Oregon
State University 1977-78

Appendix V - Grant Personnel

Appendix VI - Library Acquisitions

Appendix VII - Trip Reports

Appendix VIII - Conservation Cropping, course
description and outline



MOISTURE CONSERVATION AND UTILIZATION
 IN LOW WINTER RAINFALL AREAS OF LDCs
 211(d) Program
 AID/ta-G-1221

WORK PLAN (Revised 3/77)

OUTPUT: #1 Centralized Information System

ACTIVITY	STAFF	START/FINISH DATES	SCHEDULED EVENTS/TARGETS	EXPECTED RESULTS
A) Collect, evaluate, inventory and disseminate information covering current LDC, U.S. and other developed countries' dryland agricultural production systems.	All	Sept. 1975-Sept. 1977	CID Information Workshop Sept. 22-26, 1975.	Published information summary and computer listing of available reference materials at OSU and other CID institutions.
1) Assessment of availability of current information already assembled at UCR, other CID Universities, and other institutions and/or agencies (GSDA, FAO, etc.).	All		Visit UC/R Oct. 1975.	
2) OSU library linked to UCR and CID library information systems.	Lib.			
3) Assist in developing integrated information system in cooperation with CID Universities.	Lib., Dir.			
4) Develop an information dissemination system consistent with available resources.	Lib.	Jan. 1977	Active functioning program.	Dryland information more readily available to LDC scientists.
B) Integrate information from the State-of-the-Art survey of LDC's in low rainfall areas into the information system.	Lib.	Cont. through Jan. 1978		
C) Inventory sources of individual and institutional talent within LDC's and developed countries.	All	Cont. through July 1978	Questionnaire sent to all OSU Faculty - Jan. 1976; incorporation of talent into general CID pool.	Improved response capability.
D) Disseminate new knowledge from the State-of-the-Art survey through textbooks, newsletter, technical bulletins and extension-type publications.	All	Cont. through July 1978	Determination of appropriate method of dissemination July 1978.	Improved scientific awareness of the State-of-the-Art.
E) Design and develop an information retrieval system for acquisitions and dissemination of materials from the information bank, in cooperation with CID.	Lib., Dir.	Sept. 1975 - Jan. 1976	CID Information Workshop Sept. 22-26, 1975; initiate information retrieval systems Nov. 1975.	A computerized, searchable retrieval system available to scientists conducting research in dryland areas.

WORK PLAN (Revised 3/77)

OUTPUT: #2 Education and training program specifically addressed to problems of IDC's

ACTIVITY	STAFF	START/FINISH DATES	SCHEDULED EVENTS/TARGETS	EXPECTED RESULTS
A) Identify IDC's' educational needs in dryland agriculture as part of the State-of-the-Art survey.	All	March 1976 - Oct. 1976	On-site visits to Med. region March-May 1976; Sept.-Oct. 1976.	Identified education needs and priorities for both formal and informal training.
B) Establish an interdisciplinary curriculum committee to evaluate existing course offerings and to identify areas of need.	All	Jan. 1976 - March 1976	First draft of suggested curriculum changes, Feb. 1976.	Improved curriculum for formal training in dryland production and utilization.
C) Develop capacity to handle an increased number of IDC and U.S. graduate students in disciplines associated with dryland agriculture.	All		First student arrivals, Sept. 1976.	6 Ph.D. and 15 M.S. in progress by Fall, 1978.
D) Develop resources to conduct pilot basis short courses on specific topics involving dryland agriculture for: a) senior policy decision makers; b) junior technical personnel, either at OSU or at selected sites.	All		Course in integrated livestock-cereal production systems to be offered in late Spring, 1978.	
E) Develop special courses, workshops and conferences as needed for AID and CID personnel.	All	April 1977	Symposium on dryland agriculture in cooperation with the UC/R.	Topics: Tillage and moisture conservation; Farm implements and machinery; Crop & livestock interrelationships; Cereals & Forage production; Grazing systems; Dryland agricultural systems.
F) Establish an education, training, and research base in dryland crop production at the Sherman Branch Station near Moro, Oregon.	All	Nov. 1975 - Termination of project	Equipment needs to be specified Fall, 1975; equipment to be purchased Fall, 1975 - Spring, 1976; first applied field trials to be started Fall, 1976.	Completed training and research center for applied research and extension training.

WORK PLAN (Revised 3/77)

OUTPUT: #3 Research Capability and Knowledge Base will be Improved.

ACTIVITY	STAFF	START/FINISH DATES	SCHEDULED EVENTS/TARGETS	EXPECTED RESULTS
Carry out preliminary steps for on-site visit to Mediterranean.	All	Oct. 1975-Mar. 1976	Selection of team members; initial review of literature; determination of meaningful data to be collected; identification of countries and persons to be visited; schedule meeting with AID, CID and UC/R to coordinate mutual activities and share accumulated knowledge.	Written on-site visitation plan and schedule; awareness of the program of UC/R.
Prepare State-of-the-Art paper on dryland technology; sections to be included are:				
Cereal-production technology;	F.B.	Oct. 1975-Sept. 1977	Completed bibliographic review and identification of relevant literature; circulate rough drafts of various sections.	Completed State-of-the-Art paper.
Cereal-forage technology;	F.B., A.W.			
Cereal-equipment;	F.B., D.B.			
Forage-livestock;	A.W.			
forage-livestock equipment;	A.W., D.B.			
Production economics;	J.F.			
livestock				
cereal				
Market and institutions;	J.F.			
livestock				
cereal				
Soil-moisture relations;	L.B.			
livestock				
cereal				

WORK PLAN (Revised 3/77)

OUTPUT: #3 Research Capability and Knowledge Base will be Improved. (continued)

ACTIVITY	STAFF	START/FINISH DATES	SCHEDULED EVENTS/TARGETS	EXPECTED RESULTS
Carry out an on-site visit to the Mediterranean, Near East region to compare existing conditions with State-of-the-Art.	All	March - May 1976	Evaluation of existing technology in the North African/Mediterranean area, countries to be visited include Morocco, Tunisia, Turkey, Iran and Pakistan.	Comparison report of existing conditions vs. State-of-the-Art.
Carry out an on-site visit to dryland areas of Australia	A.W., T.J., J.F., F.B.	Sept.-Oct. 1976	Familiarization and evaluation of Australian forage-cereal production system.	Useful contribution to knowledge of State-of-the-Art.
Develop research proposals on knowledge gap as identified by SOTA.	All	Jan.-July 1977	Develop a long term research proposal oriented toward further understanding the interrelationship between livestock and cereal production; submit proposal to AID/W by June 1977.	Completed research in one of the most important problems in dryland agriculture. The research will be multi-disciplinary and fully integrated.
Serve as repository and principal institution for dissemination of knowledge with regard to dryland farming in low winter rainfall zones.	Lib.	Aug. 1975-July 1978	Determine system of collection and cataloging; obtain necessary materials through appropriate means including purchase when necessary; establish a literature search service.	Complete collection of published works; ability to send relevant materials to requesting agencies.



WORK PLAN (Revised 3/77)

OUTPUT: #4 Increased Advisory Capacity

ACTIVITY	STAFF	START/FINISH DATES	SCHEDULED EVENTS/TARGETS	EXPECTED RESULTS
Develop efficient advisory service to provide short-term and long-term consultants in dryland-related topics.	All	Jan. 1975 - June 1980	Initial capabilities to provide consultants to start by Jan. 1976 in dryland agronomy, soil management, agricultural economics, and weed control.	Increase competency in problem identification, analysis and design.
		July 1977	It should be noted that the agricultural economics component of the grant phases out July 1977 unless additional funding is provided.	Increase capability to assist in project operations dealing with education, research or extension.
		July 1977 - June 1980	Provide advisory and consultant service (in addition to the above) in livestock-grazing management systems and agricultural power and machinery specialties.	Increase capability to evaluate proposed and on-going programs and projects. Complete consultant and advisory service in: <ul style="list-style-type: none"> cereal production soil management/moisture conservation range management pest management including weed control farm management farm power and machinery management
Accept opportunities for staff to participate in special training programs, consistent with grant objectives, that are available through AID, CID and other groups.	All	July 1975 - June 1980		Improved staff response capability.
Provide for faculty exchange with other institutions or agencies.	Selecta			Enlarge talent selection in pool.
Bring outside faculty to OSU to conduct seminars, workshops and conferences for staff improvement.	All	July 1975 - June 1980	Bill Wright (Rockefeller Foundation, Turkey) to discuss existing cereal forage production problems (Sept. 1975). Dr. R. J. French (Australian Dept of Agriculture) to discuss dryland research in Australia.	Staff education.

WORK PLAN (Revised 3/77)

OUTPUT: #5 Domestic and International Linkages

ACTIVITY	STAFF	START/FINISH DATES	SCHEDULED EVENTS/TARGETS	EXPECTED RESULTS
Prior to on-site visits, a close association between CID and OSU will be established to ascertain areas where interinstitutional approaches are desirable or where existing information can be exchanged. Special emphasis will be placed on the programs at U. of A. and UC/R where complementary activities and interties can be developed.	All	Continued	Preliminary meeting with UC/R to exchange information and solicit cooperation (Oct. 1975).	Close working relationship with CID universities, especially UC/R.
Professional partnerships will be established with USAID, CID, ICARDA, CIMMYT and FAO for the purpose of: initiating personnel exchange; developing contacts in LDC's and facilitating travel; fostering faculty-student exchanges; exchanging information; planning and conducting cooperative research programs or joint advisory services; and developing common training programs both in the US and LDC's. These latter inputs will be a continuing activity conducted throughout the program.	All: (Director to have special responsibility).	Continued	Contact with many of the institutions will be made in conjunction with on-site visits.	Close working relationship with international agencies and centers.
A strong linkage with Rockefeller Foundation, Ford Foundation, USAID and ICARDA will be developed to aid in identifying and financing individuals to participate in training programs at M.S. and Ph.D. levels. FAO can provide resources and identify people to participate in short courses and training programs of longer duration.	All	Continued	Contact will be made with the institutions during on-site visits. In addition, present personal and project linkages will be strengthened.	Facilitated flow of students to OSU to participate in training programs.
Linkages also will be formed with scientists in semi-arid lands where cooperative research and training can be conducted. M.S. and Ph.D. students, on returning to their respective LDC's, will remain closely associated with the total program thus establishing permanent linkages.	All	Continued	A list of LDC scientists working in dryland areas will be developed. The possibility of providing information and scientific results through a periodic newsletter or other device will be explored. Cooperative research to be initiated with local scientists through new AID/OSU contracts (July 1978).	Closely knit group, if scientists aware of the state of the art and aware of work being conducted in similar ecological zones. Active research effort in adapting existing technology and developing needed new technology.

<u>Description of Request</u>	<u>Request from Organization</u>	<u>Contact</u>	<u>Action Taken</u>
Dr. Miller to help w/ development & dist. of prospectus on OSU/English Lang. Inst. facilities and services (ELI) (10-20-77).	OSU/Int'l Ed.	Erik Christy Coord. Spec. Programs	Prospectus sent to Bruce Anderson/CID for info for other CID schools (11-30-77).
Request for proposal document (12-9-77).	CID	D.D. Johnson	Document prepared and sent to CID trustees.
Continued interest for OSU team to go to Indonesia for feasibility study of growing wheat grain.	P.T. Bogasari Flour Mills Jakarta	S.G. Yap	Info sent to Bruce Anderson/CID; CID did not follow up.
Request for ground rules in CID recruiting procedures for short-term assignments (5-11-78).	Aq Econ/OSU	L. Eisgruber	Letter sent to James Wood CID/Logan with suggested procedures (5-16-78).
Request to provide color picture for CID staff page in brochure (6-12-78).	CID	Bruce Anderson	Phoned Wilson Foote; Dick Floyd will handle (6-19-78).
Request for staff to attend CID sponsored Conference on Women and Food, in Tucson, AZ held Jan. 1978 (11-26-78).	CID	John Fischer Kathleen Cloud	Margaret Lewis, Extension & Sookjo Ro, Home Ec. attended; Ms. Lewis wrote report.
Request for proposal to develop materials and methods to improve irrigation water mgmt. programs in LDCs (6-30-78).	CID	James Wood	Referred to Agric. Eng.
Interest in production of development-oriented handbooks on key commodities or problems (6-22-78).	U. of Hawaii thru CID	Donald Plucknett thru Bruce Anderson	Sent memo to Hort & Crop Sci; awaiting reply (6-30-78).
Request for interest in evaluation and re-design of total livestock program in Mali (5-11-78).	CID	Bruce Anderson	Sent memo to approp. depts. requesting expression of interest in participating in project; forwarded bio-data of Stanley Shively.
Request for info on short courses in soil and water conservation and reclamation at undergrad & diploma levels (5-18-78).	Dept. of Ag., Kuala Lumpur Malaysia	Ong Teng Sion Section Head	Suggested they contact Engin. Research Center at Colorado State (6-12-78).

<u>Description of Request</u>	<u>Request from Organization</u>	<u>Contact</u>	<u>Action Taken</u>
Request for Dr. Miller to stop in Thailand to visit and discuss work	Rockefeller Foundation	Jerachone Sriswasdilek	Dr. Miller visited (2-8-78).
Request for short term training programs on topic of on-farm storage relevant to Nepalese conditions.	Hill Ag. Dev. Proj. (Kathmundu)	A.G. Rijik	Sent memo to Dr. Miner w/request to respond. (12-13-77).
Request for "land clearing expert," short term.	CID/Bolivia	James H. Thomas	Notified Range Resources & Forestry Depts. (5-25-78).
Request for personnel for long term positions under CID/Bolivian contract, 10 positions (6-1-78).	CID Trustees	-	Sent memo to dept. heads of School of Agric. w/request (6-8-78).
Request for training of selected Egyptian personnel in non-degree programs sponsored by AID (5-18-78 and 5-26-78).	CID	Bruce Anderson	Sent memo to depts. requesting expression of interest in developing program.
Request for Farming Systems & Research Handbook and pilot training project proposal (4-5-78) -	CID	James Wood	Sent names (5-3-78).
and CV of personnel for possible employment (5-5-78).	CID	Bruce Anderson	Sent CV (5-3-78).
Request for replacement of agronomist on CID contract in Iran (12-9-77).	CID	James Wood	Sent letter to Vance Pumphrey for poss. interest.
Received info on proposed contract for Agricultural Development Bank of Iran.	CID	Bruce Anderson	Sent orig. to Grant Blanch Ag. Econ. (9-23-77).
Dr. Miller attended CID Iran Conference Jan. 17-20, 1978, Denver, CO.	CID	Bruce Anderson	Sent 4 syllabi for proposed curriculum in Farm Mgmt. Train. in Iran (1-27-78).
Request for expression of interest in handling training program for Agric. Develop. Bank of Iran.	CID	Bruce Anderson	Memo to L. Eisgruber & F. Hagelstein for expression of interest; no action.

<u>Description of Request</u>	<u>Request from Organization</u>	<u>Contact</u>	<u>Action Taken</u>
Letter through Dean Cooney's office regarding tech. assistance for Integrated Agric. Develop. Project, contract AID and Haiti (2-2-78).	-	Paul H. Allen	Memo to depts. with request to send bio-data to F.M. Rason, Haiti, TAMS engineering.
Request for interest in cooperating with Practical Concept Inc. on two projects in Haiti (5-1-78).	CID	James Wood	Memo to Miner and Hagelstein for expression of interest; no response as yet.
Request for personnel for Water Management Technology Project for Jordan (5-5-78).	CID	James Wood	Memo to Miner and Hagelstein, then sent letter to Bruce Anderson that Ag Engineer can only handle short-term programs without additional support.
Request for Technical Proposal # 6787929 OMVS Agronomic Research II project 628-0605 - Senegal River Basin (2-22-78).	AID	James Wood	Sent letter - unable to submit tech prop. at the time (3-6-78). Contract awarded to CID; Boersma went to Senegal on this project.
Request for technical assistance (8 weeks) in Sudan (2-15-78).	CID	James Wood	Proposed names and bio-data of 6 people; three were employed on the project: Lear, Goetze & Edwards.
Telephone request from Tom Wilson (AID/W) to assist in finding dryland agronomist for Tunisia position (8-17-77).	AID/W	Tom Wilson	File search and phone calls - gave Wilson two names of interested people: William Murphy and Chris Kirby.
Requests to send "Agricultural Decision-Making in the Drylands," presentation by J. Fitch at Riverside Symposium.	U.C. Davis U.C. Berkeley N.M. State U. U. of Wyoming	Nancy Hemstrom Ag. Econ OSU	Sent between 12-1-77 and 3-7-78.

<u>Description of Request</u>	<u>Request from Organization</u>	<u>Contact</u>	<u>Action Taken</u>
Request for info. and publications on research results that provide info on nutrient and/or soil structure building value of crop residues and animal wastes (1-6-78).	FAO Rome, Italy	H.M. Gregersen	Sent 2 annual reports on 211(d) grant on moisture conservation and utilization in dryland areas.
Request for info (publications) on plant physiology related to salinity problems and information about doing graduate work at OSU for Ph.D. (request went to library first) (1-12-79).	Kage-Sanyu Tehran, Iran	Kazuo Nakabayashi	Sent grad. school catalog, dryland ag. brochure, prospective foreign student brochure, and letter indicating UC-Riverside and U. of Arizona as good places (3-8-78).
Request for information on tech. and/or scientific research in arid-region activities--also interested in cooperation in field (4-22-78).	University of Kerman, Iran	A. Vaziri	Sent dryland brochure and bibliography of Dry. Ag. Letter sent indicating no money for cooperation but money requested possibly for future (5-10-78).
Interest in possibility of short educ. visit or train. on practical and applic. life on arid lands problems (5-21-78).	University of Kerman, Iran	A. Vaziri	Review #2 sent and info on informal training session for Spring 1979 mentioned (6-9-78).
Correspondence concerning six students from Univ. of Gezira to attend OSU and applications plus request for staff to visit (7-25-77).	Sudan	Hassan E. Tayeb El Hag	Letter sent when students arrived; funds not then given for trip which did not develop.
Invitation to nominate two women to participate in workshop seminar on The Role of Women in Title XII.	AID	Office of Title XII	Dean Hawthorne decided not to participate so no nominations sent.
Request for application for registration at OSU for Moussa Irsheid.	Damascus, Syria	Abdul-Kader Irsheid of Ministry of Agr. and Agrarian Reform	Sent admission form and when returned, forwarded to Office of Admissions (3-31-78).

<u>Description of Request</u>	<u>Request from Organization</u>	<u>Contact</u>	<u>Action Taken</u>
Letter to Dean Cooney for exchange program between OSU and Tunisia.	Tunisia	Ezzedine Chelbi, Min. of Agric.	Dean Cooney sent letter stating if funds could be arranged OSU would be interested; French language cited as problem.
Request for Proposal from Research Triangle Institute for Collaborative Research Support on Small Ruminants (12-30-77).	Research Triangle Institute	Paul Mulligan	Sent copies to J. Oldfield and J. Schmitz to prepare proposal (1-6-78).
Request to provide agronomist to review Pakistan wheat project (12-77).	AID/Washington	K. Byergo	Floyd Bolton and T. Jackson prepared to leave at three different times; neither went.

Appendix III. Short-Term Visitors

<u>name</u>	<u>country</u>	<u>position-affiliation</u>
R.G. Anderson	Mexico	Asst. Director, CIMMYT wheat program
David Ariel	Israel	Head, extension service, cereal division
Faik Bahhady	Syria	Farming systems group, ICARDA
Menouar Batata	Algeria	Trainee, CIMMYT
Adda Besseghieur	Algeria	Trainee, CIMMYT
R.B.L. Bhardwaj	India	Agronomist, All-India Wheat Improvement Program
N.E. Borlaug	Mexico	Director, CIMMYT wheat program
Houari Bouhafis	Algeria	Trainee, CIMMYT
A. Daaloul	Tunisia	Research scientist, INAT
Harry Darling	Lebanon	Director General, ICARDA
John Doolette	Syria	Research specialist, farming systems group, ICARDA
Jamal Fuad	Libya	Agronomist, FAO
Jerry Grant	Ecuador	IADS/CIDA representative
Robert Havener	Mexico	Director General elect, CIMMYT
Borje Hedman	Sweden	Research scientist
N.C. Joshi	India	Director, Central Plant Protection Training Institute, Hyderabad
Art Klatt	Ecuador	CIMMYT representative
Iarbi Meziani	Algeria	Trainee, CIMMYT
Ahmed Moussa el Ali	Syria	Ministry of Agriculture
Abdullah M'Sahi	Morocco	Ministry of Planning
Jorge Elias Neto	Brazil	EMBRAPA
M.L. Parkipuny	Tanzania	Extension specialist
Mike Prescott	Turkey	CIMMYT/Rockefeller representative

<u>name</u>	<u>country</u>	<u>position-affiliation</u>
Wade Reeves	Nigeria	Training Officer, IITA
Zohor Rosen	Israel	Research scientist
Adnan Shihabe	Syria	Trainee, CIMMYT
Krishnan Singh	India	Researcher/educator
Bill Wright	US	Program director, IADS

Appendix IV. Non-U.S. Students in the School of Agriculture at
Oregon State University, 1977-78

Argentina

Andres Abramovich	Jr	Crop Sci
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Australia

Dennis O'Brien	Grad	Ag Econ
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Brazil

Marcos V. Assuncao	Grad	Crop Sci
Carlos E. Camargo	Grad	Crop Sci
Vanderlei P. Canhos	Grad	Food Sci

Francisco Dubbern de Souza	Grad	Crop Sci
Edison Geromel	Grad	Food Sci
Jose Hennigen	Grad	Crop Sci

Julio C. Lhamby	Grad	Crop Sci
Claudio Lovato	Grad	Crop Sci
Maria Lucia Paez	Grad	Ag Econ

Paulo Brasil Paez	Grad	Ag Econ
Rubens Sader	Grad	Crop Sci

Cameroon

Joe Eric Ngam	Grad	An Sci
Pierre R. Ngaba	Grad	Food Sci

Canada

Robert G. Bromley	Grad	Fish & Wildlife
Thomas G. Johnson	Grad	Ag Econ
Kenneth D. Russell	Grad	Ag Econ

Colin N. Sorhus	Grad	Ag Econ
John H. Wiens	Grad	Soil Sci
Dale Zobell	Grad	An Sci

Taiwan/R.O.C.

Yih H. Chang	Grad	Food Sci
Rong-Yue Chao	Grad	Food Sci
Yuh-Mei Jong/Chung	Grad	Food Sci

Ching-Hua David Feng	Grad	Food Sci
Chieh-Yin Lu	Grad	Genetics
Mei-Hwa Wang Ma	Grad	Hort

Mei-Chen Miaw	Grad	Food Sci
Yueh-Mei Wong	Grad	Hort
Bih-Lian Yang	Grad	Ag Econ
<u>Colombia</u>		
German Escobar	Grad	Ag Econ
<u>Dominican Republic</u>		
Federico Cuevas Perez	Grad	Crop Sci
<u>Ethiopia</u>		
Gideon Abraham	Grad	Ag Econ
Solomon Bellete	Grad	Ag Econ
Ahmed M. Hussein	Grad	Ag Econ
Mengistu Yemane-Berhane	Sr	Crop Sci
<u>France</u>		
Michel L. Kulbicki	Grad	Fish
<u>Germany</u>		
Andrea Hummel	Grad	Gen Ag
<u>Ghana</u>		
Emmanuel Apraku	Grad	Ag Econ
Mawuena F. Dzogbefia	Grad	Crop Sci
<u>Greece</u>		
Demetrios Kazantzis	Grad	An Sci
<u>Hong Kong</u>		
Timothy Yuet-Chee Leung	Sr	Food Sci
<u>Iceland</u>		
Tumi Tomasson	Grad	Fish
<u>India</u>		
Lekkala V. Reddy	Grad	Crop Sci
Promode Kumar Shah	Grad	Crop Sci
<u>Indonesia</u>		
Metty S.K. Poei	Grad	Food Sci

Iran

Mozaffar Michel Bahrami	Grad	Soil Sci
Asghar Eskandanian	Grad	Range Res
Firoozeh Naaseh-Shahri	Grad	Food Sci
Sohaila Sepahpour	Fr	Hort
Maryam Shadbeh	PB	Food Sci

Iraq

Abdulilah M. Al-Ani	Grad	Hort
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Ireland

David Yodkovic	Grad	Fish
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Japan

Shuji Takeda	Soph	Fish
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Jordan

Adnan Allan Shqeir	Grad	An Sci
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Kuwait

Hasan Mohammad Al-Najjar	Sr	Ag Engr
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Liberia

Philippe L. Desquesnes	Jr	Gen Ag
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Libya

Yousef Mohamed El-Shrek	Grad	Food Sci
Yosef Geddeda	Grad	Hort
Sitir M. Hassanein	Grad	Food Sci
Ali Ahmed Rahuma	Grad	Ag Econ

Republic of Malagasy

Aimee Rabakoarihanta	Grad	Hort
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Malaysia

Kee Chan Chong	Grad	Ag Econ
Li Foong Yoong Chong	Grad	Ag Econ
Hock Swee Goh	Grad	Soil Sci
Chin Aik Soh	Grad	Crop Sci

Mexico

Abraham Benitez	Grad	Fish
Pedro Brajcich	Grad	Crop Sci
Lorenzo Jose De Rosenzweig	Grad	Food Sci
Enrique Raul Fuentes	Jr	Fish
Carlos Francisco Madero	Grad	Food Sci
Eligio Ortega-Rivas	Grad	An Sci
Guillermo Ferrara Ortiz	Grad	Crop Sci
Javier H. Patino	Soph	Gen Ag
Maria Teresa San Roman	Grad	Food Sci
Ariel Santos	Grad	An Sci
Glaforo Torres-Hernandez	Grad	An Sci
Jose Valencia-Villarreal	Grad	Crop Sci

Micronesia

Edwin Benjamin	Fr	Fish
Abel Kikuharu	Fr	Gen Ag
Benigno M. Sablan	Jr	Fish

Morocco

Abdellatif Belmehti	Grad	Crop Sci
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Nepal

Binayak Prasad Bhadra	Grad	Ag Econ
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Netherlands

Hendrik G. Doelman	Jr	An Sci
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New Zealand

Jane McKergow	Jr	An Sci
Peter James McNab	Jr	—
Philip M. Rolston	Grad	Crop Sci
Jennifer M. Somervell	Jr	Hort

Nigeria

Adeshina Aderibigbe	Grad	An Sci
Olusegun Timothy Ayeni	Grad	Food Sci
Patrick O. Ebisi	Grad	Food Sci
Charles O. Okereke	Soph	Ag Econ
Paul O. Onafeko	Grad	An Sci
Nnadozie Kenji Osuji	Grad	Wildlife
Olu Shasanya	Fr	Food Sci

Peru

Enrique Calmet	Grad	Poultry
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Philippines

Rogelio N. Tagarino	Grad	Ag Econ
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Sierra Leone

Dennis Anthony Morgan	Sr	Fish
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Sudan

Awadelkarim H. Ahmed	Grad	Ag Econ
Elgasim Ali El-Gasim	Grad	An Sci
El Amin A. El Khalifa	Grad	Food Sci

Ali Salih Gangi	Grad	Crop Sci
Abu El Hassan S. Ibrahim	Grad	Crop Sci

Sweden

Niels Treschow	Soph	Ag Econ
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Thailand

Methi Ekasingh	Grad	Soil Sci
Suthat Julsrigival	Grad	Crop Sci
Marut Muangkoe	Grad	Ag Econ

Kovit Nouchpramool	Grad	Food Sci
Santibhab Panchaban	Grad	Soil Sci
Vichien Petpisit	Grad	Crop Sci

Weerasak Prokati	Grad	Crop Sci
Suntaree Yingjajaval	Grad	Soil Sci

Trinidad

Joseph Raphael King	Jr	Ag Econ
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Tunisia

Mohamed N. Ben Ali	Grad	Crop Sci
Moncef Mohamed Harrabi	Grad	Crop Sci
Amor H. Yahyaoui	Soph	Crop Sci

Turkey

Ahmet Ertug Firat	Grad	Crop Sci
Engin Ozdilek	Grad	Crop Sci

Uyanda

Benny Wanjala

Grad

Fish

Venezuela

Omaira Lozano

Soph

Gen Ag

Appendix V. Grant Personnel

Individuals associated with the grant program at Oregon State University for the period covered by this report, or the period indicated, are listed below.

LARRY L. BOLERSMA - soil scientist, .25 FTE* July 1, 1977 to November 30, 1977

FLOYD E. BOLTON - agronomist, 1.00 FTE

DEAN E. BOOSTER - agricultural engineer, .25 FTE

PATTY BROWN - secretary, 1.00 FTE, July 1, 1977 to August 31, 1977;
.50 FTE, September 1, 1977 to June 30, 1978

ROBERT E. COSTA, JR. - soils research assistant, July 1, 1977 to August 31, 1977

JAMES B. FITCH - agricultural economist, 1.00 FTE, July 1, 1977 to August 31, 1977

THOMAS L. JACKSON - soil scientist, .50 FTE

CATHERINE MEE - rangeland research assistant, .50 FTE

RICHARD S. MILLER - rangeland specialist, .25 FTE

STANLEY F. MILLER - director and agricultural economist, .50 FTE

A.H. WINWARD - rangeland specialist, .50 FTE

AGNES E. WOLFF - librarian, .50 FTE, July 15, 1977 to June 30, 1978

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Assisted by A.E. DEUTSCH and G.S. KNAPP, staff members of the Oregon State University Office of International Agriculture.

*FTE = full time equivalent

Appendix VI. Library Acquisitions

A partial listing of titles acquired in the OSU dryland collection during the report year and paid for by 21111 funds:

1. Acid Land Irrigation in Developing Countries--Worthington, E.B.
2. Arid Lands Research Institutions: A World Directory--
Paylore, P.
3. Arid Zone Development: Potentialities and Problems--
Mundlak, Y.
4. Conservation in Arid and Semi-Arid Zones--FAO
5. Desertification: Its Causes and Consequences--Secretariat
of the United Nations
6. Guidelines for Watershed & Management--FAO
7. Hydrological Techniques for Upstream Conservation--FAO
8. Intercropping in Semi-Arid Areas--Monyo, J.H.
9. More Water for Arid Lands--National Academy of Sciences (3
copies)
10. North American Droughts--Rosenberg, N.J.
11. Plant Adaptation to Mineral Stress in Problem Soils--Wright, M.J.
12. Social and Technological Management in Drylands--Gonzalez, N.L.
13. The Millets. Importance, Utilization and Outlook--Rachie, K.C.
14. Water Deficits and Plant Growth--Kozlowski, T.T.
15. World Food and Nutrition Study: The Potential Contributions
of Research--National Academy of Sciences
16. World Water for Agriculture--Hargreaves, G.H.

Office of
International
Agriculture



Corvallis, OR 97331/USA (503) 754-3541

TRIP REPORT

To: University of California Riverside

By: A. Wolff and A. Deutsch

Date(s): November 28 & 29, 1977 (half-day on each date)

Purpose: To attend a meeting of the Consortium for International Development information network (CIDNET) called and hosted by the Moisture Utilization for Semi-Arid Tropics (MUSAT) program at UCR.

Discussion: Representatives of seven CID-member universities attended plus the CID associate director and members of two information groups. Those attending were:

U.C. Riverside - Glen Cannell, Doris Illes, Everett
Wallace, Pat Copeland

Colorado State - Marjorie Rhoades

University of Arizona - Linda White

Utah State - Bonnie Thompson, Caroline Leadingham

U.C. Davis - Elizabeth Boardman

New Mexico State - Lowell Duhrsen

Oregon State - Agnes Wolff, Allan Deutsch

CID Executive Office - Willis Shaner

Information Handling Systems - Judith Russell, Renee
Martin

Information Sciences/Genetic Resources - Kanti Rawal

The gathering was organized by Dr. Glen Cannell (UCR) to stimulate discussion leading towards a basic decision on how CIDNET, and its information collection and dissemination functions, can be kept secure as well as its manner of operation and packaging.

A dual-level funding condition prevails. Colorado State, Utah State and Arizona no longer have 211(d) programs and have had to cut back their information programs and also seek alternative funding. (New Mexico and U.C. Davis do not have active CIDNET programs). UCR and OSU are in a stronger position by being able to rely on currently budgeted 211(d) grant monies to support CIDNET related activities. The latter two institutions, however, face the same uncertainty of funding at the time of completing their present grants, 1979 and 80 respectively.

Dr. Cannell expressed concern that the mass of bibliographic data compiled to date might be lost unless the data bases are completed to an operating plateau where they can be maintained. He also foresaw the need for obtaining funding to continue the various programs and their maintenance.

The two meeting sessions were devoted to:

- a) a review of current CIDNET activities at each (of the 7) institutions by representatives from the various schools;
- b) presentations by Information Sciences/Genetic Resources (IS/GR), an autonomous group at the University of Colorado at Boulder, and by Information Handling Services (IHS), a privately owned, profit-oriented firm;
- c) a discussion of the options and a call for action.

IS/GR stated that their computerized program was unsuitable for bibliographic work. It was unclear why they were included in the program other than they had been recommended to Dr. Cannell by Donald Johnson of CSU.

IHS demonstrated equipment and recommended micro-format (most likely microfiche) for CIDNET materials. The firm felt that there was enough potential in the material gathered so far to warrant them becoming involved. They frankly stated that they would expect to more than break even on marketing the materials. They felt that some arrangement could be worked out to disseminate requested materials to recipients in LDCs without cost to the recipient.

Under the urging of Dr. Cannell, the University of Arizona representative proposed that:

the UCR/MUSAT group pursue detailed proposals from IHS that would explore microfiching and marketing of CIDNET data bases.

The proposal was seconded and approved by the group with the clear understanding that by so doing no participating institution committed to expend funds in any way or to engage in a relationship with IHS.

The goal is for UCR to obtain proposals from IHS and to share this information with CID members so that an item concerning the future operations of CIDNET can be placed on the agenda of the January 1978 CID directors meeting.

AW/AD:pb

Trip Report
T.L. Jackson
June 22-July 1, 1978
Syria

TO: Travel to Syria to visit ICARDA Research Center at Aleppo and AID Office at Damascus.

DATES: Left Corvallis June 22 enroute to Syria and returned July 1, 1978

The purpose of this trip was to establish contact with ICARDA, to become better acquainted with their programs, and to explore possibilities of establishing cooperative working relationships between 211(d) AID team members and ICARDA staff members. We also wanted to establish contact with the Damascus US-AID office.

Individuals contacted while in Syria:

Harry S. Darling - Director General, Beirut
Owen L. Brough - Assistant Director General, Aleppo
Shawki Barghouti - Communications Specialist

Farming Systems Research Group:

John Doolette
David Gibbon
Fritz Basler
James Harvey
Faik Bahhady

Food Legume Improvement:

M.C. Saxena - Agronomist/Physiologist
Rafiqul Islam - Microbiologist

Donald Minehart - Station Operations

Cereal Improvement:

Thomas L. Rauch

We had an opportunity to visit with the Director and Administrator of ICARDA, project leaders in cropping systems, legume, wheat and forage crop programs.

The facilities being developed and the staff being assembled at ICARDA (Aleppo) should make this one of the outstanding International Research Centers.

I was particularly impressed with the Cropping Systems Research Group. It is easy to establish a large program in Variety Testing and Plant Breeding, but it is much more difficult to establish and organize meaningful research on cropping systems and to integrate the effects of management systems and new practices on the overall benefits to a society.

A group of dedicated and vigorous research workers are being assembled in all areas. The physical facilities are being developed and training programs are being considered.

The possibilities of Syrian Trainees coming to Oregon State University was discussed. This seems to be one area for possible cooperation. Funds are available within Syrian US-AID programs to pay for trainees coming to the U.S. A major problem will be identification of Syrian trainees that have the English language capabilities to participate in graduate studies.

The lack of an organized soil fertility-plant nutrition program may be a major weakness in ICARDA's present program. Laboratory facilities will not be available for chemical analyses of soil and plant samples for a few (3 to 5) years. Chemical analyses of soil and plant samples will be essential in identifying fertilizer use efficiency and plant nutrition problems. Micro-nutrient deficiencies will undoubtedly affect introduction of some new crops. The possibilities of establishing cooperative research work in this area was discussed with ICARDA administration.

TRIP REPORT

SYRIA,

TURKEY,

and the U.K.

June 22-July 9, 1978

Allan Deutsch, Information/Administration

AD

SUMMARY

Four members of the AID/Oregon State University dryland program--211(d)--visited the International Center for Agricultural Research in Dry Areas (ICARDA) at Aleppo, Syria, to establish linkages covering activities of mutual concern and interest. Collaboration on training programs, both degree and technical, hold significant potential for the immediate future. While ICARDA is active in the cereal breeding and pathology areas, it presently does not have any formalized range or range-cereal interaction functions.

In Turkey, the AID/OSU group participated in a joint meeting with an AID representative, a Rockefeller Foundation representative, and members of the University of Ankara Faculty of Agriculture relative to the possibility of establishing a multi-faceted agreement between the U. of A. and OSU. There was also the opportunity to participate in a wheat program field day.

During a short stay in the U.K. the writer attended the Royal Agricultural Show to obtain information on the latest developments in small application equipment, and visited the Weed Research Organization, Oxford, to learn of current programs and maintain a linkage between WRO and OSU programs.

SYRIA

The AID/OSU contingent--Dr. Floyd Bolton, dryland cereal agronomist; Dr. T.L. Jackson, soil fertility specialist; Dr. Richard Miller, range management specialist; and the writer--learned of ICARDA's (International Center for Agricultural Research in Dry Areas) mission, conception, and operation from Dr. Owen Brough, the Center's Assistant Director General for Administration.

Efforts begun in 1972 to establish a dryland research center culminated with the official establishment of ICARDA in January 1977. Headquarters were envisioned for Beirut, but political unrest precluded this, although the director general, Dr. Harry Karling maintains an office in Beirut. The primary location is at Aleppo, with other sites anticipated for Tabriz, Iran; Amman, Jordan; and the Beqaa Valley of Lebanon.

At present ICARDA has five research sections: farming systems; cereal improvement (read: breeding); food legume improvement; forage improvement; and communications & training. A staff listing is attached. It became apparent that the study of range and the aspect of range-cereal crop interface has not been given much consideration as yet.

The OSU group met with representatives of several sections, including M.C. Saxena (food legume improvement), John Doolette, Fritz Basler, David Gibbon, and James Harvey (farming systems), A. Hadjichristodoulou and Tom Rauch (cereal improvement), and Shawki Barghouti (communications and training). Three members of the farming systems group are engaged in an extensive survey of local farming methods to provide base data for potential improvements or changes. Dr. Basler, staff weed scientist, noted that he had found over 100 important weed species in Syria in reviewing some 20 sites, and as many as 30 species in a single site. Grass weeds predominate. One specie particular to Syria, Cephalaria syriaca, is a major problem weed in grain. Orobanche sp. constitutes another problem, especially in legume crops.

Dr. Brough indicated a strong interest in establishing linkage with OSU at several levels. One would involve formal training programs, both degree and non-degree. A second area of collaboration would entail sending selected OSU graduates to ICARDA as research associates for short term periods (up to a year). It was suggested that OSU prepare a draft proposal covering training and submit it to ICARDA for review. The magnitude of training has potential to run over \$100,000 annually.

The communication and training effort also involves News from ICARDA, a periodic newsletter, seminars and workshops, a series of training manuals, and one monograph per year.

ICARDA is actively engaged in developing a headquarters and research site approximately 30 km south of Aleppo. The Syrian government, on October 4, 1977, deeded 948 ha. of land to ICARDA, including a hilly spine with vestiges of Roman ruins. Four villages were involved; the politics of substituting compensating land to the villagers had not been solved as of late June 1978, leading to periodic problems. The first trials were set out in October 1977 and site development has progressed at a rapid rate. Completion of buildings and occupancy appear to be 24-36 months in the future.

One day was devoted to a field trip to Syria's major hydroelectric dam, an earthfill structure on the Euphrates River, designed, constructed, and financed by the U.S.S.R. Over 90% of the country's electric power is generated at this one site. Irrigation water is being pumped to several distant agricultural development blocks and a major canal system

is planned, though not constructed yet. The second phase of the field trip involved a tour to the steppe area, a very low rainfall region primarily populated by Bedouin tribes and devoted to sheep raising and some marginal cropping. Earlier the same day the OSU group inspected fertile areas north of Aleppo where a variety of field crops and orchards flourished. Intercropping was readily evident.

TURKEY

Dr. Sefik Yesilsoy, soil scientist at the Cucarova University Faculty of Agriculture, Adana, met Bolton, Miller, and Deutsch at the Turk-Syrian border and traveled with the group for two and a half days. He took the group to the Cucarova campus for a tour of research plots and laboratories, the latter with extensive equipment. The entire institution is relatively new with potential for making a major contribution to Southern Turkish agriculture.

From Adana the group traveled to the Alta Nova state farm on the Anatolian Plateau; there was an opportunity to observe the change in agriculture from traditional Mediterranean (citrus, vegetables, etc.) to dryland cereal culture. Alta Nova embraces some 29,000 ha of land. The base facilities were impressive. A tour of animal production facilities was conducted (for the OSU visitors) including a new multi-stall cow milking facility under construction.

The group arrived at the Wheat Research & Training Institute, Ankara, and was welcomed by Drs. Basri Devecioglu, director, Charles K. Mann, Rockefeller Foundation representative, and J. Michael Prescott, CIMMYT regional pathologist. Mann accompanied the OSU team to a meeting with the Dean of Agriculture at the University of Ankara, Dr. Turhan Gunes, to discuss the possibilities of establishing an exchange program between the Faculty of Agriculture and OSU. Dr. Mehmet Bulbul, a participant at the U.C. Riverside-OSU dryland symposium in 1977, was also present as was AID affairs officer W. Ernest Popp. Dr. Gunes and his faculty seek to establish faculty exchange, plus a training program, and generation of funds for laboratory equipment improvement. Dr. Mann suggested preparation of a generalized bilateral 'agreement to enter into an agreement' and only then to seek out various potential sources of funding at a later date. This appeared to fall on deaf ears. The document to be drafted will probably contain numbers and specifics.

One day was devoted to attending a wheat field day at the Ministry of Agriculture's new Haymana Research Station, 50 km. out of Ankara. Professional researchers in a variety of disciplines, but related to wheat primarily (several with degrees from OSU), attended the event. Once fully developed, Haymana will be a major research site for wheat breeding and agronomic improvement. Nedret Durutan, an MS in weed science from OSU, pointed out that the use of the sweep on state farms is increasing the incidence of Bromus tectorum, whereas the moldboard plow seems to control it. Durutan will conduct her Ph.D. research on Bromus. She also pointed out other weed species on the increase in wheat and asked for information on control methods.

A brief stop was also made at the Cayir Mera Zoological Institute (Ankara) to gather information regarding range research. Very little applicable data was forthcoming.

U.K.

The writer attended the 1978 Royal Agricultural Show (Warwickshire) at which several British pesticide application equipment manufacturers had displays. Cooper Pegler have developed a wheeled carrier for their CP-3 knapsack sprayer incorporating a ground-drive cam that actuates the sprayer.

Dorman Sprayers continues to offer a knapsack sprayer that will, at 30 strokes per minute, effectively deliver liquid to an 8-nozzle tail boom. Horstine Farmery is building both a manually operated and powered version of a knapsack style granule applicator.

A brief visit to the Weed Research Organization, Oxford, began with Director John Fryer and P.J. Terry. Fryer indicated some of the shifts and increased breadth of WRO such as the addition of a developmental botany group to the WRO staff. The group will add a basic weed plant research dimension aimed at leading to insights on more effective weed control.

James Elliott, leader of the weed control department, explained that new herbicide application techniques needed to be developed for application on wet, muddy fields. He cited literature requested from, and supplied by, the AID/OSD program (weed control) as being helpful in planning experimental work.

A review of the major WRO experimental plot application equipment was conducted by M.E. Thornton. In addition to the one-man units, WRO workers have perfected an easily adjusted 2-man boom that will cover swaths up to 4 meters wide.

The weed science group, under the leadership of Dr. Keith Holly, has several projects under way, including work that should help refute or corroborate the present day belief that herbicide spraying should not be performed during early mornings that are dewy. The group has tentative plans for constructing a "rain" chamber to both simulate precipitation conditions and introduce weed control techniques analagous to actual field conditions.

WRO has expanded its facilities to include new office and lab space and has modernized some existing space. The information section, led by John Hardcastle, has not only moved into renovated quarters, but has been given broader responsibilities. A new series of technical leaflets has been launched. The WRO bibliography series now stands at 119. A much larger darkroom is under construction to meet increased need for visuals.

TRIP REPORT

Syria (ICARDA)
JUNE 24-30, 1978

Floyd E. Bolton

INDIVIDUALS CONTACTED

Dr. Harry Darling	Director General
Dr. Owen L. Brough	Asst. Director General
FARMING SYSTEMS RESEARCH GROUP	
Mr. John Doolette	Forage Agronomist
Dr. Fritz Basler	Weed Control Specialist
Mr. David Gibbon	Agronomist
Mr. James Harvey	Agricultural Economist
Mr. Faik Bahhady	Research Associate
CEREAL IMPROVEMENT GROUP	
Dr. Andreas Hadjichistodoulou	Plant Breeder
Dr. Sakti Jana	Plant breeder/Computer Specialist
Dr. Ahmed Kamel	Plant Pathologist
Mr. Thomas L. Rauch	Research Associate
FOOD LEGUME IMPROVEMENT	
Dr. M. C. Saxena	Agronomist/Physiologist
Dr. Rafiqul Islam	Microbiologist
COMMUNICATIONS AND TRAINING	
Mr. Shawki Barghouti	Agric. Communications Specialist
EXPERIMENT STATION DEVELOPMENT	
Dr. Donald Minehart	Station Operations Engineer

ITINERARY

June 24, 1978	Rome to Damascus (Overnight)
June 25, 1978	Damascus - Aleppo (by car) (morning) Afternoon: meet with Dr. Owen Brough and ICARDA Staff for brief orientation.
June 26, 1978	A.M.: Continue briefing and orientation with ICARDA Staff. P.M.: Visit to Experiment Station site to review current development. (Brough, Minehart)
June 27, 1978	Field trip: A.M. Region N.W. of Aleppo in 400-600 mm rainfall zone. Noon: At Euphrates Dam Site, tour of dam and irrigation facilities. P.M. Return to Aleppo via Steppe or Semi desert region. Cereal (barley) and grazing (sheep & goats) main enterprises.
June 28, 1978	Conferences with research groups in ICARDA.
June 29, 1978	Continue conferences with research groups and individuals at ICARDA.
June 30, 1978	Final meeting with Dr. Darling and Brough for debriefing and individual meetings with ICARDA Staff.

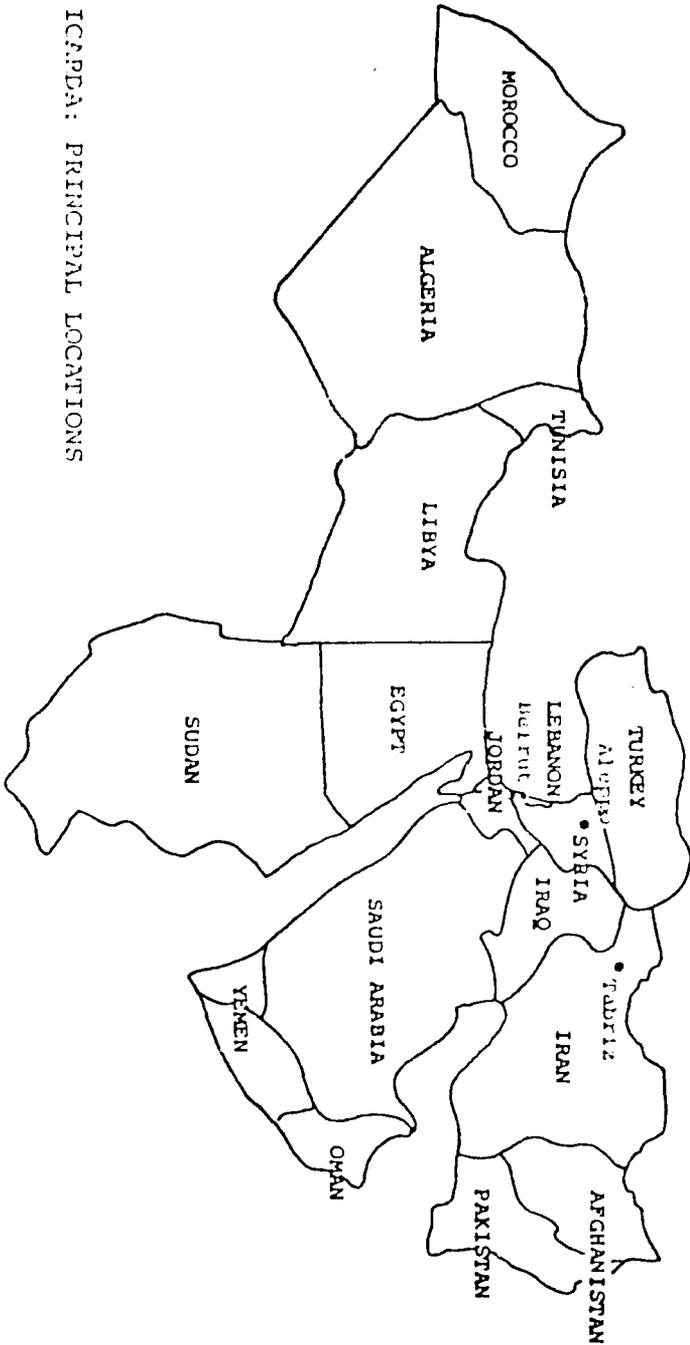
July 1, 1978. Leave Aleppo (by Car) for Syria-Turkey broder crossing for rendezvous with Dr. Sefik Yesilsoy, Adana University, Adana, Turkey and Varal Tosun, administrative assistant for Rockefeller Foundation project. Proceed to Adana, Turkey (overnight).

The main purpose of our visit to ICARDA was to strengthen the linkage between this international research center and the International Dryland Program at Oregon State University. As we had anticipated, there were many common areas of research and development between the two institutions. A better understanding of the mutual interests of the research scientists from both groups was achieved. Drs. Darling and Brough and others of the research staff are very interested in our dryland training program at Oregon State at both the degree and non-degree levels.

There was interest in developing linkages in common research areas between ICARDA and O.S.U. One aspect of this interest was shown in the desire of ICARDA to offer post-doctoral and pre-doctoral positions to some of our U.S. graduate students. The mechanics of this program was discussed in some detail with Drs. Darling and Brough. Interst in obtaining the services of senior research staff of O.S.U. both on a short (1-3 months) or longer term (1 year sabbitical type) basis was also indicated.

The objectives and long term goals of ICARDA were presented as follows:

ICARDA: PRINCIPAL LOCATIONS



INTERNATIONAL CENTRE FOR
AGRICULTURAL RESEARCH
IN THE DRY AREAS
(ICARDA)

AN INTRODUCTORY OUTLINE

HISTORICAL BACKGROUND

In April 1972 the Technical Advisory Committee (TAC) of the Consultative Group on International Agricultural Research (CGIAR), concerned about the state of agricultural research in the Near East and North Africa, commissioned a team under the leadership of Mr. Dunstan Skilbeck to review the research needs of this region.

This mission spent six weeks in the region in the spring of 1973 and identified a widening gap between demand and domestic production of grains and livestock, together with a declining productivity of natural resources in some areas. To deal adequately with these and other regional problems, the Skilbeck Mission recommended the establishment of a new international agricultural research centre for the Near East and North Africa.

This recommendation was endorsed by the TAC and the CGIAR at International Centres Week 1974, and a sub-committee was formed to carry out the necessary planning for the establishment and development of ICARDA.

The International Development Research Centre (IDRC) was appointed as Executing Agency for the initial phase in the development of ICARDA, and a Board of Trustees was subsequently elected to manage the organisation.

Suitable sites were identified in Syria and Iran, and agreements were signed with the respective governments to enable ICARDA's operations to be developed and maintained.

The ALAD Program

The Arid Lands Agricultural Development program (ALAD) of the Ford Foundation, which began in 1968 and had been operating throughout the Near East from its base in the Lebanon, was used as a base for the development of two of the major research programs of ICARDA, and many ALAD scientists and workers were transferred to ICARDA in January 1977 when it officially came into being. This has served to maintain the momentum of ongoing agricultural research relevant to ICARDA in the region during the transition and development phases.

THE ICARDA RESEARCH PROGRAM

The objectives of ICARDA are to conduct research and training to increase and stabilise food production in the region and specifically:

- (a) to serve as an international centre for research into and the improvement of barley, lentils and broad beans (*Vicia faba*) and such other crops as may be designated by the Board of Trustees in consultation with the CGIAR;
- (b) to serve as a regional centre, in cooperation with other appropriate international agricultural research centres for research in other crops of major importance in the region such as wheat and chickpeas;
- (c) to conduct research into and develop, promote and demonstrate improved systems of cropping, farming and livestock husbandry;
- (d) to collaborate with and foster cooperation and communication among other national, regional and international institutions in the adaptation, testing and demonstration of improved crops, farming and livestock systems; and
- (e) to foster and support training in research and other activities carried out in the furtherance of its objectives.

Within these objectives the research program of ICARDA can be divided into four major program thrusts which will supply the basic inputs for an integrated farm resource development approach to the problems of food production in the region.

I. Integrated Farm Systems Program

This program is designed to establish the underlying principles on which to base the development of appropriate farming strategies to make more efficient use of the soil, water and other resources available in the region.

The work will be divided into three inter-related sub-programs:

(a) Environmental Systems

This sub-program involves the following:

- (i) Collection and storage of long-term climatic data from a large network of stations in the region
- (ii) Development of soil/water balance models to characterize sub-regions in terms of climatological features, patterns of water availability and length of growing season
- (iii) Development of comprehensive growth models to characterize key environmental parameters controlling the adaptation of the principal crops and pastures in the region, and to evaluate alternative cropping patterns and farming strategies for the region.

(b) Resource Management

This will involve the integration of the important crop, pasture and livestock components of the current operational farming systems into more efficient farming strategies by improved management and more effective use of physical and biological resources.

A sheep flock will be maintained for use in this program as sheep are the most important animal component of the farming systems of the region.

(c) Socio-Economic Studies

This sub-program will help to identify the various environmental, biological, economic and social constraints that limit the actual and potential production of the existing farming systems in the region, and monitor the consequences of adoption of the new and modified technology generated by the overall research program.

II. Cereal Crops Improvement Program

The main objectives of this program are to improve the stability and productivity of wheat (Breadwheat, *Triticum aestivum*, and Durum Wheat, *T. durum*) and Barley (*Hordeum* sp.), as these are the main crop components of the farming systems in the region.

In addition the program will explore the potential for the introduction of Triticale into the cropping of the area.

Much of the work, especially that concerned with wheat, will be carried out in close cooperation with CIMMYT (the International Maize and Wheat Improvement Centre) in Mexico.

III. Food Legume Crops Improvement Program

The program will focus on the improvement of lentils, broad beans and chickpeas which are the major food legume crops in the region and which are an important staple food for many of the poorer people, providing as they do a large proportion of the dietary protein intake.

A small program on dry peas and dry beans may be initiated in the future in cooperation with the International Centre for Tropical Agriculture (CIAT) in Colombia.

The chickpea improvement program will be run in close cooperation with the International Crops Research Institute for the Semi-arid Tropics (ICRISAT) based in Hyderabad, India.

IV. Forage Crops Improvement Program

In the short term this program will concentrate on the development of successful forage legumes (*i.e.* Medics, Vetches, Lucerne and Sainfoin) to be used as ley pastures for sheep feeding in rotation with the cereal crops.

Both annual and perennial legumes will be used to build up soil fertility and to provide valuable quality forage for the sheep flock as part of an integrated farm system.

The sheep flock maintained by ICARDA will also be used to evaluate forage quality, digestibility and palatability in this program.

Within the above programs, there will also be components for research into Weed Control, Machinery Development and others, which although applying mainly to the farm systems program will, of necessity, also service the other breeding programs.

Support Operations

These include activities aimed at providing support to the research programs (*i.e.* laboratory services, farm and labour management, site development, and library & documentation services).

In addition main support operations will be developed alongside the research programs to assist in the dissemination of knowledge generated by ICARDA and other institutions throughout the region.

This will be accomplished through:

- (i) Active cooperation with national and regional programs
- (ii) Training programs catering for varying levels of expertise
- (iii) Technical publications for wide-ranging distribution
- (iv) Organising and sponsoring conferences, seminars and symposia.

Further information on specific areas within the program may be obtained by contacting:

SYRIA

ICARDA,
P.O. Box 5466,
Aleppo,
Syria

ICARDA,
P.O. Box 5908,
Damascus,
Syria

IRAN

ICARDA,
P.O. Box 1653,
Tehran,
Iran

LEBANON

ICARDA,
P.O. Box 114/5055,
Beirut,
Lebanon

There are many similarities between objectives and goals of ICARDA and the previous project in Turkey (1967-1975) which involved Oregon State University, USAID, The Rockefeller Foundation, CIMMYT and the Government of Turkey. It was generally felt that this same model of cooperation and effort would be desirable in the development of ICARDA's program. The ICARDA program is considerably broader in scope and area than the Turkey project was, but is still considered an appropriate model to emulate.

Dr. Brough was particularly interested in a cooperative arrangement between ICARDA and OSU in advanced degree training programs in Dryland Agronomy, Weed Control, Range and Pasture Management, Plant Breeding (cereals and forage) and Farm Management Economics. ICARDA anticipates that 3 to 5 participants per year at OSU for about the next 5 to 8 years. It was suggested by Dr. Brough that a 5 year program be developed by OSU in the form of a proposal along with an adequate budget and be sent to him. He would then have something to present to prospective donors, e.g. AID, if and when offers of assistance were made.

The visit to ICARDA was personally and professionally a very worthwhile venture and certainly increased my knowledge of dryland conditions in the Middle East. Several areas of mutual interest and cooperation were identified. The hospitable and cooperative attitude of all the staff at ICARDA made the visit a valuable and enjoyable venture.

Trip Report

Syria - Turkey - United Kingdom
June 22, 1978 - July 12, 1978

Richard F. Miller

TRIP OBJECTIVES

The primary objectives of this trip were to: (1) make contact with ICARDA in Aleppo, Syria; (2) observe the state of the arts of range management in Syria; (3) observe interspersed rangelands in Turkey; and (4) make contact with the Wheat Research Center in Ankara.

SYRIA

In Syria Dr. Bolton, Dr. Jackson, Mr. Deutsch, and myself met with some of the ICARDA staff. We discussed the research centers facilities and objectives with Owen L. Brough, Assistant Director General and Harry S. Darling, Director General. We also met with the following research staff: John Doolette, Dave Gibbon and James Harvey in farming systems; M. C. Saxena and Rafiqul Islam in food legume improvement; Shawki Barghouti, training and communications; and D. Minehart, station development.

A present gap in the training of young men from North Africa and the Near and Middle East is the absence of range and livestock management. Dr. Shawki Barghouti was very interested in the possibility of O.S.U. giving a range management short course in the spring. Source of funds was not discussed; however, it was made clear that funding from O.S.U. probably would not be available.

The most fruitful days I spent were with Fiak Bahhady, research associate in the farming systems program. Fiak has spent a number of years working for the Ministry of Agriculture before coming to ICARDA. He attained some training in range management while attending Utah State University for two quarters. During a three day period in the field, I was able to observe and discuss range and livestock problems in Syria. The following discussion is a brief state of the art of range management in Syria.

Currently there are three major groups of people in Syria that own livestock. These are the villagers, semi-Bedouins and Bedouins. The villagers are generally located in the cultivated regions. These people rely on both the individual family plots for growing food and their livestock. In these wetter areas both sheep and goats are common. Villagers depend heavily on crop aftermath and intermingled rangelands to provide feed. They usually supplement their animals from four to five months out of the year.

The Semi-Bedouin people are generally located in villages where the cultivated lands join the Steppe. These people have intermarried with various Bedouin tribes. Some graze their animals near the villages all year round while others graze their bands far into the Steppe.

The Bedouins, although at one time strictly nomadic, are beginning to set up home bases. Much of the land around their homes is being cultivated and planted to barley, even though the government has made it unlawful to farm in the Steppe. Barley crops generally cannot be harvested due to low rainfall (200 mm annual average) so the animals are allowed to graze on it.

Nomadic herds, consisting of only sheep, graze deep into the Steppe from February through May, frequently traveling 300-400 kilometers. Initial growth of Steppe vegetation usually begins in February with rapid vegetative growth and flowering occurring in March and April. The growing season usually terminates in May. Once forage dries up and becomes unavailable the herds are moved into the agricultural areas - feeding on crop residues¹. Animals are frequently placed on cultivated lands immediately after harvest. The Bedouins are generally required to supplemental feed their livestock five months out of the year.

High inputs presently going into this system are: (1) expensive supplemental feed (i.e. barley, beet pulp, cottonseed cake, etc.), (2) leased cultivated lands where animals feed on crop residues or crops not productive enough to harvest, and (3) water-hauling eight months out of the year, twice a day during the dry season. Distances to water sources are highly variable, but one nomadic group observed was hauling water from the Euphrates--18 km. away. Water during the wetter months comes from cisterns.

Lamb crops are low (70-80%) varying highly with climate. A good operator can expect to receive about 300 lire/lamb and 75 lire for cheese from the ewe. The cost inputs per ewe are around 300 lire per ewe. With poor lamb crops and variable climatic conditions, it is difficult for these people to break even.

Many of the large owners break their herds up into flocks of 350 animals. They either pay a herder or a family member to take charge of the animals. Some attempt is presently being made to organize Bedouin tribes into cooperatives. It appeared little management or decision-making processes were being based on a cooperative organization. However, emergency feed for drought years is supplied to the defined cooperatives by the government at low interest rates.

Fiak Buhhady has made some progress with the Bedouins. He has been able to protect some areas from grazing which were coming back into such perennial grasses as Stip .sp. He has also planted some Atriplex species (one being Atriplex canescens) with some success. His major success has been getting the nomads to cooperate on some of these trials by not grazing their herds on these areas.

Poisonous plants tend to be a problem, in some years varying with weather. Livestock diseases often are transmitted from country to country in this region, frequently starting as far south as Sudan or as far east as Pakistan. Common problems are sheep pox, foot and mouth disease, inertoximia, foot rot and internal parasites.

While in the Steppe, I traveled with Dr. Robert F. Sullons, a veterinarian from the Animal Virus Research Institute, Pirbright, England. He felt disease and parasite problems of animals in these areas was largely due to poor nutrition - increasing animal susceptibility.

The state of range management in these countries is presently very low. Major emphasis on cereals and little emphasis on forage has created an imbalance in prices of high quality versus low quality food stuffs. Currently a kilo of grain costs the same as a kilo of straw. Although the standard of living is much lower in these countries, the price of lamb is about 170% higher than U.S. prices. There is a lack of trained personnel in the field of range management in Syria. Even trained scientists in the agriculture area have little concept of rangelands or range management. Most immediately think of intensively managed hay or legume pastures. One center has been set up in Syria to look at plants that may possibly revegetate Steppe areas, however little progress has been made. Although land of the Steppe is not as productive as arable land, it is an extremely important resource since it makes up such a large portion of the Near East countries. Range management as a science and as an applied tool is almost non-existent in Syria.

TURKEY

In contrast to Syria, Turkey was a much more highly developed country. State farms are currently carrying on breeding programs to upgrade farmers flocks. They are crossing marinos with fattails. The farms are presently attaining 132% lambing crop. Lambs go to market at 9 months of age, weighing approximately 45 kilograms. This was superior to results attained by local farmers.

There is little nomadic activity in Turkey. Many of the flocks are grazed around the villages. Most of the rangelands in Turkey lie in the eastern part of the country.

Although I had very limited exposure to the range program in Turkey, it appeared to have progressed little. I visited with Oserkurt, the deputy director of the Forage and Pasture Institute in Ankara. The current thrust in range has been to build some exclosures, and seed mixtures on overgrazed areas without any seedbed preparation - with little results. Not only is the lack of seedbed preparation a problem, but it appeared that species being seeded (i.e., alfalfa and sanffoin) were not suited for the area. For these two reasons, I felt the present range program was poorly organized and progressed little.

The Shotgun approach has been used in seeding such mixtures as crested wheatgrass, intermediate wheat grass, Fescue sp., alfalfa and sanffoin. The lack of range-trained personnel was apparent in Turkey.

ENGLAND

While in England I visited the Grassland Research Institute, however few of the personnel were available. I did observe some of their pastures near the station. I also visited Kew Gardens. This botanical garden is famous for its collections of plant species from all over the world.

TURKEY

July 1 - 5, 1978

Individuals contacted:

Dr. M. Sefik Yesilsoy - Professor of Soils, Faculty of Agriculture, Adana University
Mr. Vural Tosun - Administrative Assistant, Rockefeller Foundation Project
Dr. Charles Mann - Agricultural Economist, Rockefeller Foundation Representative
to the Wheat Research and Training Project, Ankara, Turkey
Dr. J. M. Prescott - Cereal Pathologist, Middle East Region for CIMMYT
Dr. Turan Gunes - Dean, Faculty of Agriculture, Ankara University, Ankara, Turkey
Dr. Mehmet Bulbul - Professor, Faculty of Agriculture, Ankara University
Mr. W. Ernest Popp - AID Affairs Officer, USAID, Ankara, Turkey
Dr. Omer Bakir, Professor - Faculty of Agriculture, Ankara University
Dr. Basri Devecioglu - Director, Wheat Research and Training Project, Ankara, Turkey
Mr. Mengu Guler - Chief Agronomist " " "
Miss Nedret Duratan - Weed Control Specialist " " "
Mr. Mustafa Pala - Asst. Agronomist " " "
Mr. Kamil Yakar - Cereal Breeder " " "
Mr. Necati Celik - Cereal Pathologist " " "
Mr. Ergin Unver - Cereal Chemist " " "
Mr. Yusuf Ergun - Assistant Director " " "
Mr. Mufit Kalayci - Agronomist - Agricultural Research Institute, Eskisehir, Turkey
Mr. Nadir Izgin - Assistant Director of Research, General Directorate of Agriculture,
Ministry of Agriculture, Ankara, Turkey
Mr. Selman Aktan, Chief Agronomist, Agricultural Research Institute, Samsun, Turkey
Mr. Alpaslan Pehli Vanturk - Agronomist - Forage and Pasture Research Institute,
Ankara, Turkey
Mr. Erol Karina - Cereal Breeder = Agricultural Research Institute, Eski, Sehir, Turkey
Mr. Adan Akoglu - Wheat Research and Training Project - Ankara
Mr. Ahmet Bulbul - " " " " "

ITINERARY

July 1, 1978 - Arrive at Syria-Turkey border (by car). Met by Dr. Sefik Yesilsoy and Mr. Vural Tosun. Proceeded by car to Adana, Turkey. Afternoon: Toured facilities and research station of Adana University, Faculty of Agriculture. Reviewed research trials of Dr. Yesilsoy on tillage, fertilizers and crop rotations. Overnight in Adana.

July 2, 1978 - A.M.: Left Adana (by car) proceeded to Altinovia State Farm via Selfike - Konya route. Reviewed livestock and cropping operations on State Farm. Overnight at State Farm guesthouse.

July 3, 1978 - Leave Altinona State Farm, arrive Ankara at Noon. Afternoon: visit wheat research and training project and personnel. Met with Dr. Turan Gunes, Dean of Faculty of Agriculture, Ankara University and Staff. Meeting attended by Dr. Gunes, Dr. Bakir, Dr. Bulbul (Faculty of Agriculture), Dr. Charles Mann (Rockefeller Foundation), Mr. Ernest Popp (USAID-Turkey) and OSU team (Bolton,

Trip report
Turkey - page 2
Floyd Bolton

Deutsch and R. Miller). Meeting concerned cooperative agreement between Oregon State University, School of Agriculture and University of Ankara, Faculty of Agriculture to exchange faculty, conduct joint research projects and provide advanced training for staff of Faculty of Agriculture.

July 4, 1978 - A.M.: Visit to newly established cereal research station of the Wheat Project at HAYMANA. Reviewed the Agronomic research program currently under way at this station. P.M.: Returned to wheat project headquarters in Ankara for review of Agronomic research program at Eskisehir and Diyarbakir (Central and Southeast Turkey)

July 5, 1978 - A.M.: Leave Ankara (by air) via Istanbul to U.S.

July 6, 1978 - Return to Corvallis, Oregon

GENERAL OBSERVATIONS

This trip to Turkey presented the opportunity to observe the cereal production program two years after the phase-out of the OSU-USAID-Rockefeller Foundation involvement. The project, after being entirely under the direction of Turkish scientists is moving along very smoothly. The overall production of cereals, especially wheat, has exceeded the previous record yield for the past three years. The 1978 crop was expected to set yet another record in total production. It is difficult to believe that from 1960 to 1973 Turkey was importing an average of about 700,000 metric tons of cereals per year to make up the deficiency in production. Since 1975 Turkey has produced cereals (mostly wheat) in excess of domestic needs of about 1 million metric tons/year.

The Government of Turkey and the Ministry of Agriculture are convinced that the Wheat Research and Training Project is largely responsible for the dramatic increase in cereal production. Government policy in cereal prices, import of goods and services, etc. certainly helped the program, but the technical production information was mostly supplied by the wheat project. Consequently, the director of the project, Dr. Basri Devecioglu, told me that as long as he submitted a reasonable budget for the coming year it was approved without question. Even though cereals are currently being produced in quantities greatly in excess of domestic needs, the GOT policy is to continue a strong, production-oriented, research program. If production continues to greatly exceed domestic demand, then the policy will be to reduce the area under production by restricting use of marginal lands generally unsuitable for cereal production. These lands could then be profitably returned to improved pasture or grazing areas. It was gratifying to observe such a sensible, sound approach to overproduction. There are undoubtedly many thousands of hectares that should be in permanent pasture rather than in cereals. However, as long as Turkey was in a deficit position in cereals production, it would have been impossible to mount a program to restrict production on marginal areas.

The Wheat Research and Training Project

All phases of the wheat project, cereal breeding, cereal pathology, cereal quality and production agronomy appeared to be functioning well with most positions filled by well-trained, motivated, hard working Turks. The morale and "team spirit" was evident among the staff from the director to the field laborer. The idea of close cooperation and the "team-work" approach between and among the various disciplines was emphasized both at the project level and in the academic training program all during the period of Oregon State University's involvement in the project. It was encouraging to see that this attitude was still apparent. This was not the case in the early days of the project. There are still minor problems and conflicts to be sure, as there are in all programs, but these minor difficulties are not allowed to grow until they wreck a program.

At the request of the project director, Dr. Basri Devecioglu, and the Rockefeller Foundation representative, Dr. Charles Mann, I was asked to review the overall agronomy program of the project and make suggestions for future directions. Since my time was extremely limited for this task (1 day) obviously my observations are quite broad and general. Anyway, I spent one full day with the agronomy team and reviewed their current research in the field and listened to their plans for future research. The observations and comments made concerning the agronomy research program must be recognized for what they are; a quick cursory view. However, since I started the project in 1970 and functioned through 1973 as project leader, I was thoroughly familiar with most of the experiments currently being conducted. In fact, some of the trials were continuations of those begun in 1972 and 1973.

The overall agronomy program seemed well organized and covered most aspects of cereal production techniques. Many of the previous trials on rate and date of seeding, time of fertilizer application, rate of fertilizer application, row spacings and fertilizer placement which had been carried out for the past 5-6 years were terminated and the data summarized in bulletin form for the use of extension agents to present to farmers. In addition, previous trials on time of tillage, depth of tillage, types of tillage implements and weed control in the crop were also terminated after several years of data collection (5-7 years) and the results summarized in bulletins. These research results, with the cooperation of extension agents in 5 provinces, were currently being demonstrated in a series of small simple experiments on farmer's fields. The experiment-demonstrations included trials on:

- 1.) Time of tillage - optimum March-April and late May-June
- 2.) Depth of Initial Spring tillage - Shallow-12 cm, Deep 20 cm.
- 3.) Type of Implement - Moldboard plow vs. sweep plow
- 4.) Seeding Rates - 4 rates Low - Optimum - High
- 5.) Seeding Dates - 2 dates Optimum vs Late
- 6.) Chemical Weed Control - 2 treatments None vs Recommended Control

Although I observed none of the above experiment - demonstrations in the field, the yield results presented indicated that the recommended optimum practices did indeed demonstrate their superiority over the old traditional cultural practices.

The agronomy research team had already identified additional problem areas and were conducting field trials on the Haymana Research Station in an effort to find solutions. The series of new trials recently initiated included:

- 1) Tillage trials involving time, depth, and implements. These trials though similar to previous experiments are designed to measure different parameters such as soil temperature and infiltration rate to determine why variable results are obtained from season to season under some system.
- 2) A series of experiments to observe Variety-Management-Moisture-Fertilizer Interactions to determine the best practices under a given set of climatic conditions.
- 3) Foliar application of liquid nitrogen and herbicides in the Spring to reduce expense and time required for separate applications.
- 4) Weed Control trials both cultural and chemical for better control of weedy grasses, particularly Bromus spp.

Other research areas not presently covered but planned for the immediate future were:

- 1) Cereal-Food Legume rotations - Wheat - Lentils or Chickpeas
- 2) Cereal-Forage Legume rotations - Wheat - Vetch or Sainfoin

There was little I could add to the well-rounded program presented other than encouragement to keep up the good work at the Haymana Research Station.

At the Eskisihir Research Station which is in a higher rainfall area representing the transition zone between annual and fallow cropping a similar research program is being conducted by Mufit Kalayci (also an OSU graduate). In addition to the standard rate and date seeding, fertilizer, weed control trials, Mufit's future program includes trials on:

- 1) Water Storage Efficiency in 450-600 mm rainfall zone to compare annual vs. fallow rotations for cereal production.
- 2) Row spacing - water consumption characteristics.
- 3) Variety - water consumption interactions - to help characterize drought tolerant plant types
- 4) Seed Quality for planting - effects of size and protein content.

Mufit's program is coming along quite good, but he could use more support in terms of personnel, particularly in the area of weed control.

The cereal production program in Turkey was very impressive, in spite of my own personal bias in its favor. The Ministry of Agriculture uses the wheat project as a model for initiating other production programs involving a given commodity. The G.O.T. is hoping that similar projects in food and forage legumes, and livestock production will be equally successful as the wheat project. If the G.O.T. is willing to give the same support and training as received in the wheat project, I have no doubt they will be successful.

TRIP REPORT

June 9, 1978 - July 5, 1978

Floyd E. Bolton

TUNISIA

June 10 - 23, 1978

Individuals Contacted

USAIS - TUNIS

Dr. Hermon S. Davis, Jr.	Director
Dr. Carl Ferguson,	Chief, Food and Agriculture Division
Dr. Douglas W. Butchart,	Head, Livestock Project
Mr. W. F. Litwiller, Economist	PASA Team, Range & Forage Improvement Project
Mr. G. R. James, Irrigation Agronomist	" "
Mr. D. N. Palmer, Plant Materials Specialist	" "
Mr. J. R. Dickey, Livestock Specialist	" "
Mr. H. P. Galt, Soil Conservationist	" "
Dr. P. Demongeot, Chief, Rural Development Affairs	
Mr. John Blackton, USAID/Washington D. C.	Rural Development Office
Government of Tunisia - Ministry of Agriculture	
Mr. Abdelinajid Slama - CNEA	
Mr. Lasram, Director - INRAT	
Mr. Moncef Harabi, Barley Breeder - INRAT	
Mr. Habib Halila, Soil Fertility Specialist - OC	
Dr. A. Daaloul, Director, College of Agronomy - Le KEF INAT	
Dr. Mohamed Mekni - Plant Geneticist - INAT	
Mr. Ben Dhiarf, Director, Agric. Tech School - Le KEF	
Mr. Hedi El Hamari, Commissioner of Agric. - Le KEF Governorate - GOT - MOA	
Mr. Fekih Ridha, Commissioner of Agric. Kasserine Governorate - GOT - MOA	
Mr. Mohsen Falaj, Deputy " " Agric. Production " " "	

University of Missouri Consulting Team

Dr. Albert R. Hagan, Agricultural Economist and Team Leader - UMC
Mr. Charles F. Cromwell, Jr, Agricultural Engineer - UMC
Mr. Itil Asmon, Agricultural Engineer - Private Consultant for ATAC,
McLean, VA, USA.
Dr. Floye E. Bolton - Dryland Agronomist - Oregon State University
MUSA (Mid-America Consortium) Consulting Team in Tunisia
on the Agricultural Technology Transfer Project (No.664-0304)
Dr. Douglas Ensminger - Rural sociologist - UMC and Ford Foundation
Dr. Don Hanway - Agronomist - University of Nebraska

*Dr. Glenn Anderson - CIMMYT - Mexico

*Dr. Piero Bronzi - Ford Foundation - Cairo, Egypt

*Drs. Anderson and Bronzi were in Tunisia on a brief survey visit to determine the status of the accelerated cereals production project which had been assisted by CIMMYT personnel from 1968 - 1975. I had the opportunity to spend the afternoon of June 13 with them and to review the progress of the CIMMYT - Ford Foundation sponsored program since the departure of all international staff in 1975.

Trip Report
Tunisia

ITINERARY

- June 9, 1978 Leave Corvallis
- June 10, 1978 Arrive - Tunis, Tunisia
- June 11-13, 1978 Tunis - orientation and conferences with AID, GOT personnel and University of Missouri consulting team.
- June 14, 1978 To LeKef for review of Agronomy teaching and research institute. Accompanied by Moncef Harrabi, INRAT and Habib Habila, Office of Cereals. Met with Dr. Daouloul and Staff at Agronomy Institute for briefing. Visited recently acquired research station (1500 Ha) about 6 km. outside of LeKef.
- June 15, 1978 To Kasserine Governorate for field survey of project area. Met with agricultural extension personnel in Thala delegation. Field tour of Foussana, Sbeitla and Djilma delegations in afternoon with Commissioner and Deputy Commissioner of Agriculture for the Kasserine Governorate.
- June 16, 1978 Return to Tunis via Sbiba, Maktar and Siliana delegations with numerous stops to observe crops and cropping systems.
- June 17 - 21, 1978 - Tunis. Write outline, begin report and brief AID and GOT personnel on findings.
- June 22, 1978 Complete consultant report and conduct briefing session with AID and consulting team members.
- June 23 - Depart Tunis - arrive Rome for rendezvous with OSU Dryland Agricultural TECHCOM members (Jackson, Miller, Deutsch) for trip to ICARDA in Aleppo, Syria.

The purpose of the visit to Tunisia was to participate in a survey of the agricultural potential of the dryland area of Central Tunisia. My participation in this project was at the request of Mr. Tom Wilson, Near East Bureau, AID, Washington, D. C. The project was under auspices of the University of Missouri - Columbia. It was the second phase of an agricultural assessment of the potential for development of dryland in that region. My role as a member of a four-man consulting team was to determine the potential for dryland cereal production and recommend interventions for implementation of a program to increase the yield levels in the region. The major emphasis was to increase barley production which is a major crop in the area and is currently in short supply in Tunisia.

A detailed report with recommendations was prepared and submitted to Dr. Al Hagan, Team Leader, University of Missouri-Columbia.

Appendix VIII. Conservation Cropping, course description and outline

CONSERVATION CROPPING - CrS 520

A sound soil and crop management system makes maximum efficient use of resources available in any environment. Two major resources that must be considered are the soils and the moisture supply. The objective of this course is to examine the factors in cropping systems that make efficient use of moisture, protect against soil losses due to wind and water erosion, make efficient use of the natural and applied fertilizer materials and maintain soil structure and organic matter under rainfed climatic conditions. Emphasis is placed on cropping systems that are economically feasible under a given set of economic, political and social conditions.

A. Grades

Term grades will be based on:

1. Participation in class discussions
2. 2 mid-terms and a final exam
3. Term paper

B. References

Selected materials from various sources will be made available for each main topic. Some copies will be provided, while other materials will be placed on reserve either in the Kerr Library or in the Crop Science library room.

C. Lecture and Discussion Topics

1. Introduction and course objectives
2. Climatic factors and their effects on cropping systems
3. Soil and crop management variables

- a. Uncontrollable - water (rainfed agric.) temperature, wind, etc.
 - b. Controllable - Tillage, weeds, planting date and rate,
fertility, etc.
4. Determining yield potential in a given environment
 5. Identifying yield constraints in cropping systems
 6. Field research to determine best cropping packages
 7. Soil management factors - tillage
 8. Soil management factors - weed control