CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) — PART I

Report Control Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
PD-AAQ-664 Arid Lands Agriculture Research Program XD-AAQ-664-A	298-0170	NE/TECH/AD

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 85-1

☒ REGULAR EVALUATION ☐ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING		7. PERIOD COVERED BY EVALUATION	
A. First PRO-AG or Equivalent FY 82	B. Final Obligation Expected FY 86	C. Final Input Delivery FY 86	A. Total	$ 7 million	From (month/yr.)	9/84
			B. U.S.	$ 5 million	To (month/yr.)	10/84
					Date of Evaluation Review	11/3/84

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Ensure that more junior scientists (post-graduates) are involved in collaborative research efforts, travel and training.	SDSU	2/28/85
2. Ensure that all parties involved with the project receive clear guidelines on the transferring of funds.	NE/TECH/AD, SDSU	2/28/85
3. Encourage more active participation of consultants and missions in stimulating regional cooperation by assisting in a) setting up annual steering meetings and b) arranging visits by junior scientists from each country.	SDSU	2/28/85
4. The next external evaluation should be conducted in September 1987.	NE/TECH/AD	9/30/87

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

- ☐ Project Paper
- ☐ Financial Plan
- ☐ Logical Framework
- ☐ Project Agreement
- ☐ Implementation Plan e.g., CPI Network
- ☐ PIO/T
- ☐ PIO/C
- ☐ PIO/P
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

- A. ☒ Continue Project Without Change
- B. ☐ Change Project Design and/or ☐ Change Implementation Plan
- C. ☐ Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

NE/TECH/AD, Gary W. Bittner
NE/MEUR, Anne Gooch
NE/DP/E, Judy Wills
NE/TECH/AD, Jim Dunn
NE/TECH/AD, Wilbur Thomas

12. Mission/AID/W Office Director Approval

Signature: Kenneth H. Sherper

Typed Name: Kenneth H. Sherper, Near East Bur Director

Date: 2/7/85

AID 1330-15 (3-78)

NEAR EAST EVALUATION ABSTRACT

PROJECT TITLE(S) AND NUMBER(S)	MISSION/AID/W OFFICE
Arid Lands Agricultural Research Program 298-0170	NE/TECH/AD

PROJECT DESCRIPTION The project will support U.S. efforts to foster regional cooperation and development between Egypt and Israel through the involvement and interaction of their scientists conducting agricultural research on the use and management of saline water for crop production, fodder development and utilization and arid land plant species as a source of industrial raw materials.

AUTHORIZATION DATE AND U.S. LOP FUNDING AMOUNT	PES NUMBER	PES DATE	PES TYPE
5/82 . $5 million	85-1	2/5/85	[X] Regular [ ] Other (Specify) [ ] Special [ ] Terminal

ABSTRACT PREPARED BY, DATE	ABSTRACT CLEARED BY, DATE
Gary W. Bittner, NE/TECH/AD December 11, 1984	Jim Dunn, NE/TECH/AD

REASON FOR EVALUATION

This was a mid-term evaluation, conducted about two years after project approval.

PROJECT STATUS

This project aims at joint Israeli-Egyptian research on three major aspects of arid land agriculture. It has completed two years of operation, but essentially, only one full year of field trials.

Project infrastructure and the necessary staff and facilities are in place and working well. Coordination between Egypt and Israel has been established and is apparently effective.

KEY FINDINGS

Measured by either input or output indicators, progress is quite satisfactory.

Regional tensions have heightened in the area since project approval, but have not prevented effective cooperation.

The only serious delay in project operation was caused by a fund-flow problem, which was outside the control of project personnel.

A proposed "add-on" for Bedouin demonstration and technology transfer appears to be soundly conceived and a highly desirable supplement to the major activities. The review team recommends early approval and funding of this activity.

Extension of the present project by three years (to a total of eight) is also recommended.

LESSONS LEARNED

1. The project has demonstrated that effective cooperation is possible between Egyptian and Israeli scientists.
2. Findings of the project research are likely to have practical importance for agricultural development in both countries. The need to extend this information directly to cultivators and herdsmen is thoroughly understood.
3. The evaluation was timely; another evaluation should be conducted in about two years.
4. The interaction of San Diego State University with officials and participants in Egypt and Israel is excellent.

MEMORANDUM

TO: S/AE, N. Antoinette Ford

FROM: NE/TECH, Kenneth H. Sherper

SUBJECT: PRC Recommendations on the Evaluation of the Mid-Term Arid Lands Research Project and the Bedouin Proposal

Subject Evaluation report and the Bedouin proposal were reviewed concurrently by the PRC on November 8, 1984. They were reviewed together because the Bedouin proposal was recommended in the evaluation as an "add-on" to the Arid Lands Research Project. The PRC does not recommend approval of the Bedouin proposal for a number of reasons. These reasons are described below in reviewing the recommendations of the Arid Lands Research evaluation.

Evaluation Recommendations

1. The project is proceeding well and should continue to receive AID funding and support.

The PRC agrees with this recommendation.

2. It is strongly recommended that the proposed "add-on" for Bedouin demonstration and technology transfer be approved and funded as soon as possible.

The PRC does not recommend approval of the Bedouin Proposal for the following reasons:

-The research results must be applied and tested in the field before demonstration and technology transfer efforts are initiated.

-Demonstration and technology transfer efforts of the magnitude explained in the proposal should be handled as a separate but linking activity.

-Insufficient information was provided in the social and technical analysis.

-The project included pre-project activities that are not normally funded under regional cooperation projects.

3. Extension of the present project by three years (to a total of eight years authorization) should be made concurrent with the "Bedouin" add-on.

The PRC agrees with part of this recommendation.

-With proper justification, the PRC would support the idea of extending the existing project. Justification should include how much time, money and resources would be required to attain the current research objectives.

-The Bedouin Proposal is not supported because of points discussed above.

4. An evaluation should again be conducted in approximately two years, preferably drawing on some of the experience gained by the present evaluation team.

The PRC disagrees with this recommendation for the following reasons:

-The internal project reviews at 18 month intervals are sufficient for project monitoring requirements.

-The PRC recommends an external evaluation be done three years from this evaluation. (It would be a final evaluation or a mid-term evaluation, if the project is extended.)

Additional PRC Recommendations

1. Junior scientists (post-graduate) must be more involved in collaborative research efforts, travel and training.

2. Ensure that all parties involved with the project receive clear guidelines on the transferring of funds.

3. Strongly encourage more active participation of consultants, embassies, and USAID in stimulating regional cooperation through assisting in:
- setting up annual steering meetings
- visits by junior scientists from each country

IV

Action Recommendation

The PRC recommends your approval and signature of the attached letter notifying San Diego State University Foundation of the outcome of the review of the evaluation and the proposal.

Attachments:

(1) Evaluation
(2) Bedouin Proposal
(3) Letter

Clearances:
DAA/NE, B. Langmaid _____
NE/TECH/AD, J. Dunn _____
NE/TECH/SARD, J. Grayzel (draft)
NE/DP/E, J. Wiffis (draft)
NE/MEUR, A. Gooch (draft)
AA/PPC/PD, J. Williamson (draft)

Drafted:NE/TECH/AD:Gary Bittner:dm:TT/T4/84:
Re-draft:OT/30/85:T514I

Dr. Mohamed El-Assal
Program Coordinator
Arid Lands Agriculture Research Program
San Diego State University Foundation
San Diego, California 92182-1900

Ref: Arid Lands Research Evaluation and Bedouin Proposal

Dear Dr. El-Assal:

We have recently reviewed the evaluation of the Arid Lands Research Project and the Bedouin proposal. They were reviewed together because the evaluation recommended approval of the Bedouin proposal as an "add-on" to the Arid Lands Research Project.

We support the idea of extending the existing project to apply the research results in the field (on-farm trials). We recognize that more time and perhaps more money would be required to complete some of the research. The delays in transferring funds to the project in Egypt, coupled with the drought condition for the research trials, warrants consideration of a project extension. However, there must be justification for the time, money, and resources that would be required to attain research objectives and application.

The evaluation report recommended another external evaluation of the project in two years. However, we believe that the internal evaluation plan is sufficient for monitoring purposes and the next external evaluation should be conducted in approximately three years.

In reviewing the evaluation, we recommend the following additional items:

1. Encourage more active participation of junior scientists (post-graduate) in collaborative research, in training, and in the exchange of visits between countries.

2. Continue to encourage more active participation of consultants and missions in stimulating regional cooperation by assisting in (a) setting up annual steering meetings and (b) arranging visits by junior scientists from each country.

However, we do not concur with the evaluation recommendation to approve the Bedouin proposal as an add-on. This decision is based on the fact that funding is simply not available at this time. Additionally, several specific deficiencies were noted in the Bedouin proposal that are provided below for your information.

1. The social and technical analyses are incomplete.

2. The research results should be applied and tested in the field before large-scale demonstration and technology transfer efforts are undertaken.

3. Demonstration and technology transfer efforts of the magnitude described in the proposal should be handled as a separate but linking activity.

4. The project included pre-project activities that are not normally funded under regional cooperation projects.

Although we cannot approve the Bedouin proposal, we encourage further analysis of the problems and needs of the Beduoin communities. We suggest this might be in the form of initial discussion papers rather than program proposals.

Let me close by saying that the Arid Lands Research Project received a positive evaluation and that we are interested in the application of the project's research results. We continue to support regional cooperation and encourage programs that foster this cooperation.

Sincerely yours,

M. Antoinette Ford
Assistant Administrator
Bureau for Near East

Clearances:
DAA/NE, B. Langmaid _____
NE/TECH, K. Sherper _____
NE/TECH/AD, J. Dunn _____
NE/TECH/SARD, J. Grayzel (draft)
NE/DP/E, J. Wills (draft)
NE/MEUR, A. Gooch (draft)
AA/PPC/PB, J. Williamson (draft)

Drafted:NE/TECH/AD:Gary Bittner:dm:11/19/84
Re-drafted:01/31/85:1516I

VII

MID-TERM EVALUATION OF

COOPERATIVE ARID LANDS AGRICULTURE RESEARCH PROGRAM

(CALAR)

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Prepared By:

Dr. Earl Leng, Team Leader/
Cooperation Specialist
Dr. Paul Eberhardt, Saline Water
Irrigation Specialist
Dr. Glenn Davis, Production
Horticulturist/Agronomist

September 1984

Contract: PDC-1406-I-04-4087

viii

CALAR Evaluation Report Outline

		Page
I.	Summary	1
II.	Project Background	5
III.	Evaluation Methodology	8
IV.	External Factors	10
V.	Key Project Assumptions	11
VI.	Progress Since Project Inception	14
VII.	Inputs	17
VIII.	Outputs	19
IX.	Purpose	22
X.	Goal	27
XI.	Beneficiaries	29
XII.	Unplanned Effects	32
XIII.	Lessons Learned/Recommendations	33
XIV.	Comments/Remarks	35

APPENDICES

1.	Log Frames for Main Project and Sub-Projects	A-1
2.	Budget Plans, from Approved Project Paper	A-15
3.	Evaluation Team Scope of Work	A-26
4.	Evaluation Team Composition	A-35
5.	Israel - Egypt Memorandum of Understanding	A-37
6.	Technical Report of Dr. Paul Eberhardt	A-43
7.	Technical Report of Dr. Glenn Davis	A-58
8.	List of Key Individuals and Agencies	A-69
9.	Bibliography of Key Documents	A-72
10.	Itinarary of CALAR Review Team	A-75

I. Summary

A. Current Situation

This collaborative project, based on coordinated efforts by Egyptian and Israeli scientists to solve major problems of arid land agriculture, is completing its second full year of project authorization, but essentially only its first year of a full-scale field operations. Planned as a 5-year project, with $5 million life-of-project A.I.D. funding and about $1 million each from Egypt and Israel as in-kind contributions, it aims at joint Israeli-Egyptian studies and field trials on three major topics. Overall project coordination and linkages are provided by the San Diego State University (SDSU) Foundation as prime contractor.

Project activities are in the general areas of saline water utilization, improvement of arid-land forages and animals, and industrial crops which can be grown under arid conditions. Field and laboratory research sites for each of these three topics are provided by each of the two participating countries, and direct links to cultivators and graziers are to be established and maintained.

Project infrastructure and the necessary staff and facilities are in place, and apparently working well. Coordination between Egypt and Israel, particularly at the more senior level of scientists, has been established and is apparently effective.

B. Progress in Relation to Design

Measured by either input or output indicators, progress appears to have been quite satisfactory, though somewhat uneven. Delays in initial fund availability, particularly in Egypt where currency exchange procedures resulted in a one-year start-up shortfall for field trials, have been the only serious problem which can be identified.

Specifically, the general project structure and proposed activities were put in place and into operation promptly. Considering the grave level of Middle East political tension in the period since project approval (1982), the achieved level of contact and cooperation is highly satisfactory and commendable.

Salinity studies have progressed well in both countries, particularly in their laboratory aspects, which are not limited by seasonal conditions. Field trials in Egypt, as indicated, were delayed a year in start-up, but are proceeding well. An interesting contrast in approach, between Egypt and Israel, is that the Israelis are developing highly sophisticated irrigation systems, while Egypt is utilizing much simpler, but very ingenious and effective, techniques with excellent practical effects.

Pasture and animal research also is showing good progress. Field grazing trials of drought-resistant shrubs, using sheep, will begin in Israel after the 1984-85 rainy season. Delayed field plantings in Egypt, as indicated above, will postpone grazing trials there until 1986. On the other hand, Egypt is well-advanced on a goat improvement program which has not been undertaken in Israel. Neither country considers that major efforts to improve local sheep are needed.

Studies on industrial plants are at roughly the same level in the two countries, taken overall. Israel has concentrated more on possible plant sources of oil replacements (hydrocarbon producers) and has developed extensive information on such plants. The general conclusion thus far is that oil substitution is not economically feasible. Egypt is concentrating its research more on jojoba and buffalo gourd, species which yield useful speciality products.

C. Prospects of Purpose and Goal Achievement

Briefly, all four end-of-project-status conditions outlined in the project proposal appear likely to be achieved. Progress toward some of the EOPS conditions is already highly satisfactory. The greatest limitation is likely to be the time-frame, since the original 5-year plan clearly did not allow all the time needed. Moreover, start-up delays from slow funding have caused a year's setback in Egypt.

The general project goal, to create an ongoing cooperative relationship between Israeli and Egyptian Scientists, appears likely to be achieved, if external conditions do not interrupt or prevent collaboration.

D. Problems Encountered

Only two serious problems have been encountered, so far as the review team is aware. Both have been mentioned previously, but will be reiterated here for clarity.

1. Funds delay. The system of transferring funds to Egypt via a complicated currency transfer system (through Paris) led to a year's loss of progress at the beginning of the project and embarrassing delays in funding the second year's work.

2. Regional tension. Events in 1982 and subsequently have heightened tensions between Israel and Egypt, leading to problems in reciprocal travel of scientists. Hopefully, this situation can be expected to improve, and a reasonable level of contact has been maintained in spite of difficulties.

E. Recommendations

The review team offers the following appraisal and recommendations.

1. The project is proceeding well and should continue to receive AID funding and support.

2 It is strongly recommended that the proposed "add-on" for Bedouin demonstration and technology transfer be approved and funded as soon as possible.

3. Extension of the present project by 3 years (to a total of 8 years authorization) should be made concurrent with the "Bedouin" add-on.

4. An evaluation should again be conducted in approximately 2 years, preferably drawing on some of the experience gained by the present evaluation team.

II. Project Background

Project AID/NEB-0170-A-00-2047-00, "Cooperative Arid Lands Agriculture Research" (CALAR) was initiated in mid-1982 as a regional activity of the Near East Bureau, Agency for International Development (A.I.D.), Washington, D.C.

The genesis of the project was in a dialogue between the late President of Egypt Anwar Sadat and former Israeli Prime Minister Menachim Begin. The two met at Ben-Gurion University of the Negev, in southern Israel, to discuss sharing of peaceful pursuits by the two countries. This initiative was followed up by representatives of the Fred J. Hansen Institute for World Peace, a privately-funded foundation with links to San Diego State University (SDSU) and the SDSU Foundation.

It became apparent during discussions and studies in 1980 that a major area of common concern to Egypt and Israel was arid land agriculture. Mutual interests were obvious in the solution of such problems as the production of crops and animal products on desert land, and irrigation with limited water supplies and poor-quality irrigation water to produce human food, animal fodder and industrial plant products.

Later in 1980 and during early 1981, agreement was reached in the Egyptian-Israeli Joint Commission on Agricultural Cooperation to hold a trilateral meeting of Egyptian, Israeli and United States experts, to discuss these areas of mutual concern. Dr. Youssef Wali (now Egyptian Minister of Agriculture) and Dr. Samuel Pohoryles (Israeli Director of Rural Development and Planning) jointly approved and participated in the planning. This approval was based on a Memorandum of Understanding (see Appendix 5), signed between Israel and Egypt on March 24, 1980.

The conference, held in San Diego, CA in June 1981 and hosted by the SDSU Foundation with the assistance of the Hansen Institute, produced a proposal to A.I.D. for support of the trilateral project which became CALAR (the Arid Lands project now under review). Originally proposed at the $10 million funding level for 5 years, it was approved in mid-1982 for $5 million funding over a five-year period.

The project is carried out in Egypt and Israel, with United States scientists involved in consultation and internal project evaluation. Headquarters is at the San Diego State University Foundation, which also acts as the fiscal agent. Technical oversight is carried out by a steering committee composed of two representatives from each of the three countries. The Program Coordinator is responsible for day-to-day internal coordination and serves as the inter-country link.

Three major areas of research are actively pursued in both Egypt and Israel. These are:

- studies of the use of saline water to produce crops in arid environments;
- the production of drought-tolerant fodder plants with high nutritive value, to produce feed for small ruminant animals; and
- trials of arid-adapted plant species not native to the region, which show economic promise for the production of industrial raw materials.

Funding at the operational level did not become available in time for planting the 1982-83 field trials in this winter-rainfall climate. As a result, only some specialized research on salinity problems was actively underway before the 1983-84 planting season. Both in Israel and Egypt, nurseries and field trials were planted

in the autumn and winter of 1983, but low rainfall and unfavorable growing conditions were detrimental to these trials, particularly in Egypt.

Nevertheless, successful nurseries and field plots were established and are growing acceptably well. The shrubs being most intensively used for fodder studies will require two growing seasons for preliminary evaluation and a third season before grazing trials can begin.

Industrial plant trials also have been established in both countries, with nurseries at research institutes and larger field trials at outlying locations. The Israeli component of this sub-project appears somewhat more advanced than the Egyptian component, probably because Israel has for some years had an intense interest in searching for replacements for oil as a fuel.

Field and laboratory studies on the use of saline water in irrigation appear to be progressing well in both countries. The Israeli work has tended to utilize that country's great strength in laboratory facilities and technical staff; in Egypt, ingenious use has been made, at a relatively lower level of sophistication, of an excellent practical skill in sand dune technology. This has led to farmer adoption, on a fairly large scale, of saline water irrigation for culture of melons, tomatoes and certain fruit trees. The project is actively involved in close cooperation with these farmers.

In considering progress to date, it must be emphasized that most of the studies undertaken are long-range by their nature. Progress to date has been good, especially considering the funding delay at the beginning. Several years will necessarily be required before definitive results are achieved.

III. Evaluation Methodology

A. Reason for Evaluation

This is a mid-term evaluation, as provided in the evaluation plan of the approved project. This plan called for three external evaluations of the project and its sub-projects, at intervals of approximately 18 months, during the 5-year project life.

B. Timing of Evaluation, with Reference to Plan

The project was initially funded in mid-1982, but late transfer of funds to field operating units, particularly in Egypt, delayed the actual beginning of full-scale field work until the 1983 season. Timing of this external evaluation, the first conducted since inception of the project, is therefore appropriate. Even though more than 2 years have lapsed since project approval, this mid-term evaluation took place within 15 months of the active beginning of project operations.

C. Methodology

The basic methodology used was direct inspection of project documentation, reports and field and laboratory sites, by a 3-person team of qualified and experienced agricultural development professionals. Research sites in Egypt and Israel were visited by the team, accompanied by senior project personnel, and special efforts were made to personally interview almost all participating researchers. Senior officials of both participating overseas countries were contacted, as well as concerned A.I.D. officers both in Near East Bureau and USAID/Cairo.

All available project outlines, work plans and progress reports were examined by team members. Major items of significance in these documents were discussed with project coordinators and principal investigators.

Special efforts were made to examine the actual field experiments being undertaken as part of the project. Additionally, farmers and herdsmen likely to be affected by results of the research were visited both in Egypt and Israel.

D. Detailed Documentation

Appended to the main body of this report are:

1. Composition of the evaluation team (Appendix 4).
2. Scopes of work for the team and its members (Appendix 3).
3. List of key individuals contacted (Appendix 8).
4. Condensed team itinerary (Appendix 10).
5. Bibliography of principal reports and documents consulted (Appendix 9).
6. Technical reports of the two technical-specialist team members, Drs. Eberhardt and Davis (Appendices 6 and 7).

IV. External Factors

The key external factor affecting both the rationale for and the progress of this project is the continuing tension between Israel and its Arab neighbors (including Egypt) in the Middle East. As is generally known, this tension showed signs of diminishing when the Camp David agreements were reached in 1979 and because of subsequent developments in 1980 and 1981.

The Israel incursion into Lebanon in 1982, exacerbation of tensions by subsequent events, the continuing Israeli occupation of southern Lebanon to date (September 1984) and uncertainties concerning the composition of the Israeli government, all have had significant, and unfavorable, effects on the general atmosphere surrounding the project. Nevertheless, cooperative activities have continued, reciprocal visits of project personnel have occurred, and joint working according to the project plan has moved forward.

At all levels contacted, from high officials to farmers, the hope was repeatedly expressed that a lessening of tension would soon occur, and that cooperation between Israel and Egypt at the working level would be accelerated.

Clearly, the external factors which have had the most influence on the project since its approval are totally outside the control of project personnel, or for that matter of the Agency. The maintenance of contact and actual working connections during a period of continuing tension speaks very well indeed for the likelihood of project success as tensions in the area ease.

V. Key Project Assumptions

A. Summary

To summarize, all key assumptions expressed in the Log Frame of the project, as approved, appear to be valid. A minor exception is that Assumption #4 of "Outputs" indicates that time (presumably the 5-year project period) is sufficient to identify development potentials of the research material. A more detailed comment on this assumption will be made below.

B. Inputs

1. Log Frame Statement: "Technology, skills, commitments and financial resources available are sufficient for the project."

2. Comment: These assumptions seem entirely valid. In particular, technology and skills demonstrated probably have exceeded original expectations.

C. Outputs

1. Log Frame Statements:

"--Resources and attitudes are such that cooperation will proceed.

"--Research results will provide usable data.

"--Sufficient work has been done and technology exists to provide tangible results.

"--Time is sufficient to identify potential."

2. Comments: The team finds no difficulty with these assumptions, except for the "time" element which should be clarified. The other assumptions have proven fully valid and progress toward goals and purpose completely verifies this appraisal.

The 5-year time period for the project, as originally approved, clearly is insufficient to yield reliable research evaluation of some significant objectives. Specifically, the late start-up

caused by slow A.I.D.-USAID/Cairo transfer of funds delayed planting of potential fodder crops by one full year. Three years are required for establishment before grazing can begin and two years of grazing data will barely be enough for preliminary feasibility evaluation. An eight- to ten-year project time frame (3 to 5 years extension on the original plan) would be a sensible expectation for achievement of satisfactory research evaluation of these obviously long-term, biologically limited activities.

D. Project Purpose

1. Log Frame Statements:

"--Science professionals are able to cooperate in research, disallowing political differences.

"--Plants can be produced to tolerate higher levels of salinity.

"--Species are available to increase the production of dry land fodder.

"--Industrial crop species are available which can be produced in arid conditions."

2. Comments: The above assumptions are fully valid and do not require amendment. It is true, in regard to the first assumption, that cooperation of scientists would be enhanced if physical cooperation (i.e., travel between countries) were made less difficult by special attention from security agencies, etc.

The third and fourth assumptions, regarding availability of suitable biological material, were repeatedly seen by the team to be fully valid in actual field trials in both Egypt and Israel.

E. Program Goal

1. Log Frame Statement: "That cooperation between people can remove barriers to professional and eventual social interaction."

2. Comments: This assumption has been shown fully valid by direct project experience. As an example, Israeli scientists in particular expressed a desire for more actual visits to Egypt. Moreover, Israeli administrators went to considerable lengths to stress the great improvement in scientific cooperation within Israel (between different institutes) which the project has engendered.

VI. Progress Since Project Inception

In the recommended evaluation format, this section is listed as "Progress since Last Evaluation". The evaluation reported here is the first for the project, therefore all progress is "since project inception."

Most of the identifiable progress is reported in other sections of this report. The achievements to date can be summarized as follows:

A. Overall Structure

1. A workable, effective project management system has been put in place.

2. A trilateral steering committee is in place and meeting regularly.

3. Each participating country has organized an effective, multi-institutional project structure, and scientists are cooperating well.

4. Satisfactory direct links have been established between scientists of the two countries (though more activity in this regard is needed).

5. Contacts with farmers, other agricultural groups, and nomad herders are excellent in both countries.

B. Saline Water Component

1. Israel. The following research or activities are underway.

   a. Studies of the effect of salinity on nitrogen uptake.

   b. Selection of melons and tomatoes for salinity tolerance.

   c. Genetics of salinity tolerance.

d. Agro-management of crops irrigated with brackish water.

2. Egypt

a. Screening crops, under field and greenhouse conditions, for salt tolerance.

b. Breeding salt-tolerant varieties, especially of melons and tomatoes.

c. Identification of markers associated with physiological tolerance to salinity.

d. Agro-management techniques under saline conditions, with special emphasis on deep-sand culture at the practical level.

C. Fodder/Livestock Componemt

1. Israel

a. Screening potential fodder species.

b. Extensive grazing trial on *Atriplex* and other shrubby species, using sheep.

c. Survey of grazing practices among Bedouin.

2. Egypt

a. Nursery establishment at Nubeiria, to propagate species with fodder potential under arid conditions.

b. Early establishment of *Atriplex nummularia* and a few other species, in a large field site at Fuka, to make grazing trials possible in 1986.

c. Improvement of local goats by introducing Damascus and Nubian bloodlines.

d. Survey of Bedouin grazing practices, closely coordinated with the Israeli survey.

D. Industrial Crops Component

1. Israel

a. Seed collection of potentially useful species.

b. Establishment of field trials of selected species at two locations.

c. Literature survey and analysis of potential for fuel-producing plants.

2. Egypt

a. Establishment of nursery for propagating plants (some seed received from Israel).

b. Establishment of two field trials, one in coastal area, one in a remote oasis.

E. Training

Two Egyptian students are studying in Israel and two more in the United States.

Israeli scientists are spending sabbaticals at U.S. institutions involved in the project

VII. Inputs

A. Plan

Specific inputs proposed for the project are shown in the log frames at Appendix 1.

Budget summary and estimated host country contributions are shown in Appendix 2.

B. Input Performance

At the time of the evaluation (September 1984), no significant shortfall in planned inputs is apparent. In fact, contributions from host countries, in terms of facilities and manpower, appear to have exceeded the planned levels.

As previously mentioned, availability monetary input from A.I.D. funds was seriously delayed at the beginning of the project. This delay resulted from the required, but somewhat awkward procedure involved in converting U.S. dollars to foreign currency, especially Egyptian pounds. Several months elapsed between the time that SDSU Foundation initiated funds transfer and the time that money actually was on hand in Egypt. As a result, planned field operations for the 1982-83 growing season could not be carried out, and major portions of the project therefore had nearly a full year delay imposed.

It also appeared to the evaluation team that the project budget is insufficient to adequately sustain the level of works actually underway. Severe inflation, particularly in Israel, has exacerbated this situation. Substantial increases in travel funds, particularly for mutual visits of investigators back and forth between Egypt and Israel, would greatly enhance project performance.

C. Recommen ations

1. Every effort should be made to insure timeliness in the flow of funds to field project operations.

2. AID/W and SDSU should seriously consider substantially increasing project funds for the remaining period of the present project. An increase of approximately $250,000 per year is suggested.

3. Any extension of the project (which appears essential if the project goal is truly to be met) should be at a sharply increased funding level.

VIII. Outputs

Since the project log-frames do not specify any time-frame for outputs, other than end-of-project status, the evaluation team found some difficulty in comparing the "objectively verifiable indicators" of the log-frame with observed performance. The tabular presentation below, therefore, should be read with this fact in mind.

A. General

Project outputs, in general, seemed satisfactory. As expected for a research project, virtually none of the outputs were completed, and the accumulative nature of research makes evaluation of the output rate difficult.

B. Bottlenecks and Delays

The major delay in project activities occurred at the beginning when funds for Egypt, though received by SDSU, could not be transferred through the complicated USAID money-exchange mechanism in time for field planting activities to begin during the short rainy season. This resulted in a full year's delay in many of the component activities.

C. Time Frame

As stated in several other parts of this report, the review team is convinced that the five-year time frame set for this project is too short. The one-year delay mentioned above accentuates the need for extension.

The recommendation (set forth in more detail in XIII. below) is for extension of the project to at least an 8-year total period (3-year extension), without substantial change in the output expectations.

D. Tabular Appraisal of Outputs

End-of-project Expectation	Mid-Term Apparent Condition
1. General Project	
a. 15 "joint meetings"	a. 3 held, 1 planned
b. 30 reports or papers	b. At least 20 shown to team
c. At least 3 types of plant materials	c. Already achieved
d. At least 12 student exchanges	d. 4 students, 5 staff
2. Saline Water	
a. Increased Knowledge	a. Already well-achieved
b. Improved plant varieties	b. In process of development but not yet available
3. Pasture and Livestock Improvement	
a. Increased fodder production	a. Not yet noticeable
b. Increased milk from Barki goats	b. Not yet noticeable; potentially possible
c. Improved wool from desert sheep	c. Not yet achieved
d. Increased meat production	d. Beginning to be apparent in crossbreds
e. Better knowledge of fodder shrubs	e. Significantly improved
f. Response of sheep to shrubs	f. Not yet determined
4. Industrial Plants	
a. 2-3 species; identified as useful	a. At least 4 identified as potentially useful
b. Facilities and techniques to evaluate new species	b. Completely available in Israel, partially available in Egypt

c. Technical staff to test these plants	c. Available in Israel, partly available in Egypt
d. 7-8 meetings of cooperating scientists	d. 2 meetings held to date

IX. Purpose

A. Approved Project Purpose

"To conduct cooperative research, between Egyptian and Israeli scientists, to improve production of specialized arid lands, agricultural crops and use of arid lands for agricultural production."

B. Progress toward End-of-project Status Conditions

1. Summary. Four end-of-project status (EOPS) conditions were set out in the project log frame. Progress toward all is considered satisfactory to excellent, considering the time elapsed, the essentially long-term nature of most of the research, and delays occasioned by slow flow of project funds, as discussed above. Details follow.

2. EOPS 1.

"Joint participation in professional exchanges."

This condition has already been met well, since frequent reciprocal visits between Israeli and Egyptian lead scientists are occurring. Meetings of all principal investigators have been held at San Diego, CA and Marsa Matruh, Egypt, and a third meeting is planned for Israel in the near future.

Some Israeli scientists expressed the concern that not enough "working level" (i.e., junior scientist) reciprocal visits have been made. The evaluation team, recognizing political tensions which have been severe since mid-1982, believes that progress in exchanges has been very good. It agrees, however, that more exchanges should occur, and recommends:

a. that ample budget funds be provided for such visits.

b. that senior officials encourage reciprocal visits between the more junior scientists.

A highly encouraging aspect is the current presence of two Egyptian project junior scientists in training at Ben-Gurion University of the Negev, in Israel. Two more are in training in the United States, and several Egyptian and Israeli senior scientists have had orientation/training visits to U. S. institutions.

The team believes that training aspects are important, and recommends further use of this tool to further project achievement.

3. EOPS 2.

"Crops that can be successfully irrigated using saline water."

Excellent progress toward this objectives is being made in both countries, and information, techniques, and germ plasm plant materials are being exchanged.

Specifically, both countries show success with melons, tomatoes and some fruit crops, using somewhat different techniques. Israel, which emphasizes a rather sophisticated drip irrigation system, is using saline water also on peanuts, asparagus, grapes, and some fruit and nut species, with fair success. Egypt, using less sophistication but a highly ingenious system of sand-dune cultivation, already has hundreds of acres in practical production of melons and tomatoes, in the sea-shore sand dune belt.

4. EOPS 3.

"Successful production of palatable dry land fodder species and improved small animal production potential."

Here again, quite satisfactory progress is being made despite serious delays in beginning field work because of slow funds flow and highly unfavorable weather conditions.

Both countries have established nurseries, and exchanged plant and seed materials, of promising drought-tolerant shrubs and forage plants. Special emphasis is being placed on shrubby species of Atriplex, which have shown promise in Australia and elsewhere.

The Israeli field trials, established in 1982, will be ready for first grazing experiments after the rainy season in early 1985. Egypt has a large experimental area planted, but since planting was delayed until 1983, no significant grazing can be undertaken until 1986.

Egypt is placing heavy emphasis on crossbreeding the local Bedouin ("Barki") goats with "Damascus" and "Nubian" strains, to improve productivity. The work is being conducted not only at experimental stations, but also in the Bedouin flocks directly. Results are highly encouraging and the improved types are accepted well by the herdsmen.

Israel has thus far not undertaken much improvement work with goats. Scientists from both countries agree that the indigenous sheep are well adapted and productive, and do not foresee a near-term need for breed improvement.

5. EOPS 4.

"Identification of industrial crops with potential production value."

Excellent progress toward this objective is apparent in both countries, partially because scientists have been able to utilize information and experimental materials from earlier projects supported by other funds. Both intensive nursery/laboratory studies and larger scale field trials are underway, in both countries. Egypt has two major field sites, one on the Mediterranean coast and one in a remote oasis (not seen by the team). Israel

has a site near Beer Sheva and another deep in the Negev Desert (also not seen).

Specific objectives are slightly different in the two countries, though related. Egypt, with a local production of petroleum products, has emphasized specialty crops like jojoba. Israel, lacking petroleum, has put heavy emphasis on "plant petroleum (hychrocarbon)" producers. Of these, Euphorbia, Calotropis, and guayule have been most thoroughly investigated.

Preliminary results show good production levels by several species, but serious economic problems remain to be solved.

C. Validity of EOPS Conditions

The review team believes that the EOPS conditions as stated in the approved project paper are still valid, and describe well conditions which should exist when adequate time for project performance has elapsed.

D. Time-Frame for EOPS Achievement

Realistically, the 5-year time frame presently approved for the project cannot permit full realization of the stated EOPS conditions 2, 3 and 4 above. The biological cycle involved, with a single, short rainy season limiting plant growth and grazing; the 3- to 4-year establishment period required by many of the plant species; and a minimum of 2 years grazing or industri evaluation trials, all indicate that a total of 8 to 10 years will be required for truly satisfactory attainment of the stated EOPS conditions. Nothing can be done by the scientists or adminis trators to speed up this process.

E. Recommendations

The team recommends:

1. that work be continued as at present, toward all stated EOPS conditions, but that an extended

project time-frame (to at least 8 years total, preferably 10) be approved in the near future.

2. Additional funding, on the order of $250,000 more per year, would greatly enhance the attainment of EOPS 1 (scientific collaboration and exchange).

X. Goal

A. Approved Program Goal

"To achieve cooperation between Egypt and Israel in scientific research, with interaction between scientists and technical professionals."

B. Current Status and Progress

As already indicated in IX above, cooperation, within the project framework, between the Egyptian and Israeli principal scientists is already well advanced. More efforts need to be made to broaden and deepen cooperation among the more junior scientists, but to all indications, this will develop and grow as the project matures.

A clear "spread effect" of this project, and an indication of its perceived success, is the very recent (September 1984) formulation of a new trilateral project, "Patterns of Agricultural Technical Exchange and Cooperation." This project, to be funded by A.I.D. at $3.49 million for 4 years, combines efforts of the Egyptian Ministry of Agriculture, the Hebrew University of Jerusalem and the Israeli Ministry of Agriculture, and the United States Department of Agriculture. Close relation to CALAR, but no project overlap, is expected from this new project.

C. Reasons for Current Status

The review team considers that dedicated efforts by project personnel at all levels, and by senior administrators in both the Egyptian and Israeli governments, have contributed to the excellent status and bright prospects for project success. This is all the more true because severe new tensions arose in the Middle East after the project was approved, and have continued to the present time with little alleviation. If a significant decrease does occur in tensions between Israel and

its neighboring countries, even more satisfactory and rapid progress toward the program goal can be expected.

D. Recommendations

The team's operating recommendations have essentially been stated in earlier sections of this report. Enthusiastic support by A.I.D. officials for this and related projects is likely to have a beneficial effort on project progress.

XI. Beneficiaries

A. Population Sectors Benefitting

This project has implications for international relations which go far beyond the normal range of A.I.D. project beneficiaries. If, in fact, close working between Israeli and Egyptian agricultural scientists is achieved and sustained on a continuing basis, the project is almost certain to influence national policies in the two countries, and possibly in other Middle East countries as well.

Pragmatically the optimistic situation expressed above will be likely to occur only if both countries, at the policy level, perceive significant national interests in continuing collaboration. At present, there is good reason for believing that this may actually be the case, on at least two grounds:

1. It is clear that each country can learn from the technology and practice in the other country, as it relates to arid land agriculture.

2. Both countries have a major problem concerning development of their nomadic (Bedouin) populations. Though the specific cases are slightly different, each country currently has considerable political concern regarding the situation of the Bedouins. Through this project, and a recommended follow-on component (see XIII. below) sign icant and favorable impacts on Bedouin life are likely to be attained quickly.

From the above, it may correctly be deduced that this project will benefit not only scientists and policy makers, but is likely to have quite direct, favorable effects on the life of Egyptian small farmers, Bedouins in both countries, and the members of Israeli kibbutzim, who are presently the chief settled agriculturists in the Negev.

B. Nature and Focus of Benefits

In its limited time frame, the review team did not have the capability of making a detailed assessment of benefits by production estimates, monetary value, or areas to be involved. However, some relevant statistics were presented, and these appear to amply justify the technical efforts, quite apart from any effects on overall national relations, etc.

1. Egyptian Small Farmers

The team saw practical work, at the farm level, in sand-dune culture using saline water. Over half a million acres of the Egyptian north coast, from Alexandria east almost across Sinai, potentially could be brought under cultivation of salt-tolerant food plants by this method. Something approaching 6,000 acres, in a limited area between Alexandria and the Nile Delta, already are being used in this way. The potential effects on food production, are obviously large.

2. Israeli Kibbutzim

Israel has made a determined effort to establish kibbutzim in the Negev. Several are operating successfully; more are planned, since this is virtually the only land available to absorb new immigrants, to deal with population growth, and to replace agricultural land lost to urbanization.

It is estimated by Israeli authorities that 100,000 acres or more of arid land lies over brackish (somewhat salty) underground water sources which might be used for crop production. If in fact this area could be brought under economically-viable cultivation, it would have a major effect on the future capacity and stability of Israeli farm production.

3. Bedouins

This traditionally-oriented, nomadic group numbers

at least 250,000 in the Western Desert of Egypt, an estimated 280,000 in Sinai, and at least 50,000 in the Israeli Negev. Tribal links and migratory patterns are such that Bedouin ties reach into neighboring countries (Libya, Jordan, etc.) as well.

The long-established Bedouin bases of sustenance and income were camel caravans and migratory herding. Caravans have become obsolete, and herding in the traditional pattern is beset with problems such as overgrazing, border restrictions, and lack of technological progress. Particularly in Israel, it appears necessary that the Bedouin adopt settled agriculture, at least in part, if they are to survive.

Research proposed and underway in the CALAR project is directly aimed, in part, at improving animal production and living standards of the Bedouin. A proposed add-on sub-project (see XIII below) would have an even greater and more rapid effect on these people.

C. Possible Spread Effect

Results from project research would be likely to be directly applicable in nearby countries of the Middle East. Principles developed would be useful in arid land agriculture throughout the world. Equally important is the pattern of cooperation between national groups, even where serious tensions exist.

XII. Unplanned Effects

Israeli scientists in particular, commented to the evaluation team that this project had provided a unique stimulus to intra-country cooperation among scientists from different Israeli universities. Although such comments were not volunteered by the Egyptian group, it appeared likely that this effect also was being felt in that country. This is likely to have a positive influence on agricultural research in both countries, and on the direct transfer of research results to form practice.

These effects are considered to be entirely favorable. They require no change in project design or operation, but should be encouraged wherever the opportunity to do so is presented.

XIII. LESSONS LEARNED

A. Relation to Other Development Problems

In the opinion of the review team, this project has already demonstrated that meaningful, collaborative research can be fostered between scientists even from countries with a considerable history of political hostility. Insofar as such cooperation may lead to the easing of regional tensions, and also lead to findings of practical benefit to farmers and consumers, it is an excellent model.

The team believes that the highly professional but low-key method of working by the U.S. contractor (SDSU), and the participation of a private foundation (the Hansen Trust) have been significant factors contributing to project success thus far. There is every evidence of sensitivity to national concerns and potential tension-producers, and as a result almost all expected difficulties have been avoided.

B. Desirable Follow-on Activities

The team was repeatedly made aware of the special concern in both countries for needs of the Bedouin population. As outlined above, these traditional nomads find themselves caught up in a need for major change, and neither the required information nor an adequate transfer method has to date been available to help them meet this need.

Fortunately, Egypt and Israel, with SDSU and the Hansen Trust, have developed a plan for a collaborative demonstration and technology transfer activity directed specifically at Bedouin needs. This "project," planned for a 5-year period to begin as soon as approved, requests $2.5 million additional support, primarily for the establishment and operation of demonstration

and training centers directly in Bedouin territory in both countries. Active Bedouin participation has already been assured by responsible tribal leaders. The team met with leading Bedouins in both countries, and is convinced that the proposed activity is sound and should be approved and funded at an early date.

C. Evaluation Methodology

The team considers the methodology and general approach of this evaluation to be satisfactory. Time allowed was quite short, and a few more days in each country could likely have contributed to a more thorough appraisal.

It is suggested that evaluation/design of the proposed add-on, and the next evaluation of the overall project, should include at least a proportion of persons familiar with the project.

D. Recommendations

1. AID/NE Bureau is strongly recommended to approve and fund the proposed Bedouin demonstration and technology transfer activity. This should be done as an "add-on" to the present project and not as a separate operation.

2. It is now time for AID and the project participants to begin planning for at least a 3-year extension of the main project. If the Bedouin project is approved and funded early in calendar 1985, for 5 years, a 3-year extension of the original CALAR project would result in all components having the same targeted completion date.

XIV. COMMENTS/REMARKS

The team has no particular comments or suggestions, other than those set forth above. It found the reception and arrangements for its visits smoothly and efficiently handled by all concerned. We were particularly impressed with the knowledge and abilities exhibited by Dr. Mohamed el-Assal (SDSU Program Coordinator) and the two Technical Coordinators for the participating countries, Dr. Adel el-Beltagy of Egypt and Dr. Yosef Mizrahi of Israel. Dr. Mizrahi perhaps deserves a special recognition because he was in the first week of assignment to the project, replacing Dr. Dov Pasternak who will be on sabbatical leave.

All attachments are submitted as "Appendices" and are listed in the report outline.

APPENDIX 1

LOG FRAMES FOR MAIN PROJECT AND SUB-PROJECTS

Appendix 1

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: Arid Lands Agricultural Research Program

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: Cooperation between Egypt and Israel in scientific research with interaction between scientists and technical professionals.	Measures of Goal Achievement: Interaction both within as well as outside program auspices and continuity of these interactions upon program completion.	• Observations by program staff • Records of events, such as paper, reports, etc.	Assumptions for achieving goal targets: That cooperation between people can remove barriers to professional and eventual social interaction.
Project Purpose: Conduct cooperative research between Egyptian and Israeli scientists to improve production of specialized arid lands agricultural crops and use of arid lands for agricultural production.	Conditions that will indicate purpose has been achieved: End of project status: 1. Joint participation in professional exchanges. 2. Crops that can be successfully irrigated using saline water. 3. Successful production of palatable dry land fodder species and improved small animal production potential. 4. Identification of industrial crops with potential production value.	1. Cooperative participation 2. Selected plant growth and vigor indicators 3. Measure weight gain and plant materials produced 4. Plant growth, vigor and processed materials results	Assumptions for achieving purpose: 1. Science professionals are able to cooperate in research disallowing political differences. 2. Plants can be produced to tolerate higher levels of salinity. 3. Species available to increase production of dry land fodder. 4. Industrial crop species are available which can be produced in arid conditions.
Outputs: 1. Continuity of professional cooperation, joint research projects. 2. Data from development of adapted species/varieties. 3. Information on production of selected crops. 4. Production of plant materials for replication. 5. Trained production/research staff. 6. Improved production from desert adapted sheep and goats.	Magitude of Outputs: 15 meetings during program. 30 report segments or papers during program. Minimum of three types of plant materials. Minimum of 12 student exchanges during the program.	Program reports and outcome of external evaluations will indicate results.	Assumptions for achieving outputs: 1. Resources and attitudes are such that cooperation will proceed. 2. Research results will provide usable data. 3. Sufficient work has been done and technology exists to provide tangible results. 4. Time is sufficient to identify potential.
Inputs: 1. Professional, technical resource specialists. 2. Project administration. 3. Equipment, supplies, research facilities. 4. State of the art technical information.	Implementation Target (Type and Quantity): 1. Tomatoes, melons (plus other selected species) for saline irrigation. 2. Atriplex and other species for fodder development. 3. Selected variety of possible industrial crops for introductory work. 4. Barki goats and sheep.	Records of participating institutions, external evaluators, published reports and on-site visits and project documentation.	Assumptions for providing inputs: Technology, skills, commitments and financial resources available are sufficient for this project.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: The Use of Saline Water for Production of Crops in Arid Lands (Continuation)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: 1. Field and laboratory facilities of the institutes involved in the project; Ain Shams University and its experimental farm at Shalakan and the Salinity Laboratory at Alexandria. 2. Experience and expertise of scientists of the participating institutes in agromanagement and breeding for salinity. 3. External budget.	Implementation Target (Type and Quantity): Man — Years 8 — 6 Research scientists 17.5 — 5 Technicians 10 — Field workers Vehicle irrigation equipment, equipment for mixing salts, field salinity detectors, water culture set up, field chemicals, salts, laboratory supplies. (See Budget)	1. Ain Shams University and Ministry of Agriculture reports. 2. On-site visits.	Assumptions for providing inputs: 1. The project will require a high level of both in-country and between-countries cooperation. 2. Experimental sites will reflect the conditions prevailing in the areas to be developed.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: The Use of Saline Water for Production of Crops in Arid Lands — Egypt

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: Develop the use of the saline water resources of the Israeli and Egyptian arid lands for crop production.	Measures of Goal Achievement: Increased commercial production of tomatoes, melons and other crops with saline water irrigation.	1. Reports to the Steering Committee. 2. Annual progress reports. 3. Spot verification of progress. 4. Periodical meetings by the research scientists involved.	Assumptions for achieving goal targets: 1. The R & D goals are in line with the economical structure of the region's settlements. 2. The crops and procedures to be developed should suit the local climatical and other production conditions.
Project Purpose: 1. To develop appropriate agromanagement procedures under saline water irrigation. 2. To produce salt resistant varieties of important vegetable crops. 3. To further develop the existing infrastructure of saline water research. 4. Develop uses for drainage water and springs at Siwa.	Conditions that will indicate purpose has been achieved: End of project status: a. Increased knowledge on saline water irrigation. b. Plant varieties better suited for growth under salinity.	1. Publication of production manual for tomatoes, melons and other crops with saline water irrigation. 2. Use by the farming community of the R & D results.	Assumptions for achieving purpose: 1. The agromanagement procedures will be made available to the farming community of the area. 2. The varieties will be superior under salinity to existing varieties. 3. Research facilities will be improved in relation to present status.
Outputs: ● Optimal use of saline water for irrigation of crops in the arid lands of Egypt. ● Data to assist others in similar use functions. ● Increased salt tolerance of selected crops.	Magnitude of Outputs: 1. Salt resistant varieties of tomatoes, melons and other agricultural crops. 2. A trained team (2 scientists and 2 technicians) on breeding for salt resistance. 3. Production manual for saline water irrigation in arid lands.	1. Annual project evaluation. 2. On-spot evaluation.	Assumptions for achieving outputs: 1. There is a need to supply production information and salt resistant germ plasm for the development of the saline water resources. 2. The R & D program will be designed to meet these needs.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: The Use of Saline Water for Production of Crops in Arid Lands (Continuation)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: 1. Field and laboratory facilities of the institutes involved in the project; the Agricultrual Research Organization and the Applied Research Institute. 2. Experience and expertise of scientists of the participating institutes in agromanagement and breeding for salinity. 3. External budget.	Implementation Target (Type and Quantity): Man — Years 8 — 6 Research scientists 17.5 — 5 Technicians 10 — Field workers Vehicle irrigation equipment, equipment for mixing salts, field salinity detectors, water culture set up, field chemicals, salts, laboratory supplies. (See Budget)	1. Ben-Gurion University reports. 2. On-site visits.	Assumptions for providing inputs: 1. The project will require a high level of both in-country and between-countries cooperation. 2. Experimental sites will reflect the conditions prevailing in the areas to be developed.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: The Use of Saline Water for Production of Crops in Arid Lands — Israel

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: Develop the use of the saline water resources of the Israeli and Egyptian arid lands for crop production.	Measures of Goal Achievement: Increased commercial production of tomatoes, melons and other crops with saline water irrigation.	1. Reports to the Steering Committee. 2. Annual progress reports. 3. Spot verification of progress. 4. Periodical meetings by the research scientists involved.	Assumptions for achieving goal targets: 1. The R & D goals are in line with the economical structure of the region's settlements. 2. The crops and procedures to be developed should suit the local climatical and other production conditions.
Project Purpose: 1. To develop appropriate agromanagement procedures under saline water irrigation. 2. To produce salt resistant varieties of important vegetable crops. 3. To further develop the existing infrastructure of saline water research.	Conditions that will indicate purpose has been achieved: End of project status: a. Increased knowledge on saline water irrigation. b. Plant varieties better suited for growth under salinity.	1. Publication of production manual for tomatoes, melons and other crops with saline water irrigation. 2. Use by the farming community of the R & D results.	Assumptions for achieving purpose: 1. The agromanagement procedures will be made available to the farming community of the area. 2. The varieties will be superior under salinity to existing varieties. 3. Research facilities will be improved in relation to present status.
Outputs: • Optimal use of saline water for irrigation of crops in the arid lands of Israel. • Data to assist others in similar use functions. • Increased salt tolerance of selected crops.	Magnitude of Outputs: 1. Salt resistant varieties of tomatoes, melons and other agricultural crops. 2. A trained team (2 scientists and 2 technicians) on breeding for salt resistance. 3. Production manual for saline water irrigation in arid lands.	1. Annual project evaluation. 2. On-spot evaluation.	Assumptions for achieving outputs: 1. There is a need to supply production information and salt resistant germ plasm for the development of the saline water resources. 2. The R & D program will be designed to meet these needs.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: Pasture and Livestock Improvement Program — Egypt (Continuation)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs: 1. Increased fodder production of rain-fed pastures in northern Egypt. 2. Increased production of small ruminants (sheep and goats). 3. Increased milk production by improved Barki goats. 4. Improved quality of wool provided to market.	Magnitude of Outputs: ● Quantity and seasonal distribution of fodder production. ● Quality of fodder production by improved types and fertilization, etc. ● Increase milk production to approximately 80 kgs/14 weeks lactation. ● Increase lamb and kid production. ● Increase the price paid for desert wool.	● Field and nursery observation and verification. ● Measures of milk, lamb, kid and weight yield. ● Measures for wool quality evaluation.	Assumptions for achieving outputs: ● Geo-climatic conditions will remain "normal" over span of next 5 years and provide "average" rainfall — or supplemental irrigation can be installed. ● Cooperation of sheep and goat producers has already been gained. ● Sites for research will be approved.
Inputs: ● Expertise and experience of project scientists in evaluations and selection. ● Research facilities near Burg al-Arab and Matrouh. ● External Budget. ● Extrapolation of current research both local and regional.	Implementation Target (Type and Quantity): ● Two research sites: Burg al-Arab Matrouh. ● Five research scientists from animal production and from pasture improvement. ● Data from Matrouh evaluation. ● 2-3 flocks for observation in first year.	● Ministry of Agriculture reports ● Evaluation of field data. ● Communications with research scientists.	Assumptions for providing inputs: Cooperating agencies in Egypt have approved research plan and cooperating scientists have agreed to share data and government has granted preliminary approval to selection of sites.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: Pasture and Livestock Improvement Program — Egypt

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: The improvement of rain-fed pasture conditions and productivity of sheep and goat herds in northern Egypt through the collaboritive/cooperative research efforts of Egyptian scientists cooperating with their Israeli counterparts.	Measures of Goal Achievement: Increased capacity of rain-fed range/natural pasture under arid conditions and provide satisfactory nutrient levels for appropriate stocking rates and hence improve livestock productions and reduce "over grazed" conditions. Increase in the milk production ability and wool quality of arid adapted types of sheep and goats.	Increased cover and density of fodder plants on rain-fed natural pastures of Egypt's 200-250 mm rainfall area, reduced overgrazing evidence. Increased milk production and increased price from wool sales/ unit sold. Experimental station observation and extension follow-up with producers.	Assumptions for achieving goal targets: • Cooperative research will enhance the ability of individual research efforts through mutual support. • Evaluation, selection and introduction of high quality grasses and shrubs will improve natural pasture and hence animal production in arid environments. • Selection and crossing will improve milk productions and retain desert adapted characteristics. • Training will provide a better grade of wool to be marketed.
Project Purpose: To achieve these goals: 1. Comparitively examine the productivity of natural pastures vs. improved pastures. 2. Examine the behavior of native and some introduced species in a nursery setting: for growth and nutrition. 3. Examine the interaction between plants and animals under grazing conditions. 4. Screen selected forage shrubs for salinity tolerance. 5. Study the value of using halophytes as fodder by sheep and goats. 6. Improve the production potential of the desert Barki goat and sheep from increased fodder production and genetic improvement of the animals. 7. Evaluate the productivity of Barki sheep and goats under breeders conditions as basic information and base line data for other activities. 8. Establish a wool grading procedure.	Conditions that will indicate prupose has been achieved: End of project status: • Increased fodder/pasture production in 200 — 250 mm rainfall climatic environment. • Increased milk production of desert adapted Barki goat. • Improved wool quality from desert adapted sheep. • Increased lambing and meat production.	• Measures of plant density, vigor and regrowth under nursery, protected pastures and grazed conditions. • Measure lamb and kid production and milk and wool production in experimental and production conditions.	Assumptions for achieving purpose: • Selection procedures will produce shrubs and grasses more drought resistant, of higher nutritive value, better regrowth potential and can be produced in 200 — 250 mm rainfall, with Mediterranean distribution pattern. • Egyptian Nubian goat and Barki goats can cross successfully and enlarge Barki goat milk production potential. • Selection of Barki sheep on production criteria will improve the production line.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: Evaluation of the Use of Introduced Shrubs in Agro-pastoral Systems in Arid and Semi-Arid Regions — Israel (Continuation)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: 1. Field and laboratory facilities of the institutes involved in the project. 2. Experience and expertise of scientists and technicians involved in research 3. Previous research on establishment in palatibility of shrubs in the Negev. 4. Previous experience in management of agro-pastoral system at the Migda Farm.	Implementation Target (Type and Quantity): 6 Research Scientists 4 Technicians 1 Worker Temporary Workers Plant propagation facilities, fenced grazing areas, sheep, water supply, fertilizers, veterinary care, laboratory facilities and computer services.	• Records of reports and publications of the Applied Research Institute, the Migda and Gilet Stations and the Facility of Agriculture. • Visit in the above mentioned institutes.	Assumptions for providing inputs: • Information on selected fodder shrubs, palatability, recoverability, etc. is available as well as knowledge on plant propagation establishment, etc. • Rich information on various agro-pastoral systems is available as well. • Experimental facilities are at disposal of trials. • The results obtained and the agrotechnologies developed can be applied to other regions.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: Evaluation of the Use of Introduced Shrubs in Agro-pastoral Systems in Arid and Semi-Arid Regions — Israel

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: Introduction of fodder shrubs in existing agro-pastoral systems of Israel (and Egypt) to alleviate the need for purchase of extensive supplementary feeds and to reduce losses in a drought year or years.	Measures of Goal Achievement: ● Improved primary production of pastoral systems. ● Improvement of secondary production in systems in which supplements are given to sheep. ● Subsitiution of supplements in more intensive pasture systems, and secondary production remaining unchanged. ● Reduction of costs and losses in drought years.	1. Presentation of results in quarterly and annual reports. 2. Verification of results in visits to the experimental sites. 3. Discussion of results in meetings with the scientists involved in research.	Assumptions for achieving goal targets: Selected fodder shrubs introduced in arid land agro-pastoral systems are expected to increase their primary production, increase secondary production or replace purchased supplements, serve as a stabilizing factor in the production systems, avoid heavy losses in drought years.
Project Purpose: 1. To determine the supplement or substitution value of shrubs in grazing systems managed at different degrees of intensity in the Negev. 2. To develop a management system to utilize forage shrubs in drought years. 3. To investigate the long term effects of sheep grazing, drought and soil fertility on the production and regrowth of shrubs. 4. To develop a production model for application in other regions. 5. Examine response of pasture grasses to enhanced nitrogen supply.	Conditions that will indicate purpose has been achieved: End of project status: ● Knowledge on management of fodder shrubs in various sheep grazing systems and in drought years. ● Response of sheep to shrubs. ● Contribution of shrubs in terms of animal production. ● Response of shrubs to sheep in terms of fodder production under grazing conditions.	1. Results appear consistant over a reasonable length of time and reliable enough to serve as a basis for the improvement of fodder production in dry lands grazing systems. 2. They appear applicable in commercial enterprises and can be extrapolated to other regions.	Assumptions for achieving purpose: The fodder shrubs suggested in these experiments are drought and salinity resistant; palatable; capable of recovery after heavy grazing, to survive drought years, not dependent on animal or rainfall distribution.
Outputs: Use, management and contribution of fodder shrubs in sheep grazing systems in arid lands. Reduction in costs and losses by production in situ of protein and vitamin rich fodder from plants resistant to harsh dry-land conditions.	Magnitude of Outputs: Fodder shrub species resistant to dry-land conditions, rich in vitamins and protein, resistant to and recovering from sheep grazing; contributing to secondary production either as supplement or as replacement of expensive supplements.	● Preparation of the contribution of shrubs in terms of sheep weight, lambing, etc. ● Measurement of forage production manual on the use of forage shrubs in arid land agro-pastoral systems.	Assumptions for achieving outputs: Arid lands are capable of yielding fodder to improve primary and secondary production, reduce supplementary costs, damages from drought years, etc. provided that suitable material has been selected and is properly managed.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: Introduction of Arid Lands Species as Sources of Industrial Raw Materials — Egypt (continued)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: ● Experience brought forth from extensive work on jojoba and other potential crops. ● Budgeted financial resources. ● Research sites near Matrouk and Baheria Oasis. ● Seeds collected from various sources. ● Data from other similar research which can be extrapolated.	Implementation Target (Type and Quantity): ● Gums, fuel and latex producing plants. ● Two research scientists. ● Agricultural worker. ● Seasonal workers. ● Research sites at Matrouh and Baheria Oasis.	● Quarterly and annual reports. ● Site visits and previous reports of research.	Assumptions for providing inputs: ● Seeds for various plants are available to be collected. ● Previous experience, data in their field will extrapolate to the establishement of this research. ● Facilities and personnel have been allocated and their availibility verified.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: Introduction of Arid Lands Species As Sources of Industrial Raw Materials — Egypt

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: Improve the economic potential of the use of arid lands resources through agricultural production while increasing the interaction between scientists of Egypt and Israel working on similar problems in their respective countries and supporting each others work.	Measures of Goal Achievement: Identification or improvement of crops with potential to enhance the economic use of arid lands soil, water and climactic resources and measurable interaction and exchange of pertinent data between Egyptian and Israeli scientists.	Project reports laboratory tests of products and field observation will be recorded in project report correspondence and project papers will verify interactive component.	Assumptions for achieving goal targets: Selected crops provide renewable natural sources of industrial raw material on an economical basis and enhance production of arid lands. Cooperative research will buttress efforts of both with exchanges of data and research results.
Project Purpose: 1. To introduce and screen plant species as sources of fuels, gum and latex and evaluate their growth and production potential under arid lands conditions. 2. To test these plants' ability to grow and produce in the introduction areas with and without supplementary irrigation and saline water.	Conditions that will indicate purpose has been achieved: End of project status: Identification of new plants which have potential as natural sources of raw materials and are also well adapted to arid conditions.	Field observation of vigor, dry matter production, laboratory results of product testing, variance in output as a function of irrigation water or salinity.	Assumptions for achieving purpose: Some plants are better adapted to arid lands conditions and also respond differently to variance of inputs (quantity and quality).
Outputs: 1. To have screened promising species and identify the details of their characteristics and requirements. 2. Preliminary determination of natural products 3. Recommendations for in-depth research and development on promising candidate species. 4. Expanded infrastructure for industrial crop research. 5. Data from examination to extrapolate to other areas.	Magnitude of Outputs: • 2 - 3 plants identified as well adapted. • Facilities, techniques to evaluate new types of plants. • Technicians and laboratory staff to field and lab test these plants. • 7 - 8 meetings of cooperating scientists	• Project reports on periodic and final basis. • Continuity of research capability. • Meeting, conference and records of exchanges.	Assumptions for achieving outputs: Crops will be identified that will have adapted to arid lands conditions which produce a viable level of industrial raw materials. The system for conducting this type of research currently exists and can be readily expanded to accommodate these tests and will remain in effect.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: Introduction of Arid Lands Species as Sources of Industrial Raw Materials — Israel (continued)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: ● Experience brought forth from extensive work on jojoba and other potential crops. ● Budgeted financial resources. ● Facilities of introduction nursery at Applied Research Institute at Ben-Gurion University and associated laboratories. ● Seeds collected from various sources ● Data from other similar research which can be extrapolated.	Implementation Target (Type and Quantity): ● Oil, wax, gum, rubber, fuel, fiber, pharmaceutical and micro algae producing plants. ● 2 research scientists. ● Agricultural worker. ● Seasonal workers. ● Facilities of the Applied Research Institute introduction nursery.	● Quarterly and annual reports. ● Ben-Gurion University reports. ● Site visits and previous reports of research.	Assumptions for providing inputs: ● Seeds for various plants are available to be collected. ● Previous experience, data in their field will extrapolate to the establishement of this research. ● Facilities and personnel have been allocated and their availibility verified.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title: [illegible] ces of Industrial Raw Materials — Israel

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: Improve the economic potential of the use of arid lands resources through agricultural production while increasing the interaction between scientists of Egypt and Israel working on similar problems in their respective countries and supporting each others work.	Measures of Goal Achievement: Identification or improvement of crops with potential to enhance the economic use of arid lands soil, water and climactic resources and measurable interaction and exchange of pertinent data between Egyptian and Israeli scientists.	Project reports laboratory tests of products and field observation will be recorded in project report correspondence and project papers will verify interactive component.	Assumptions for achieving goal targets: Selected crops provide renewable natural sources of industrial raw material on an economical basis and enhance production of arid lands. Cooperative research will buttress efforts of both with exchanges of data and research results.
Project Purpose: 1. To introduce a number of plant species with value as sources of oils, waxes, gums, fiber and fuels and evaluate their growth and production potential under arid lands conditions. 2. To test these plants' ability to grow and produce in the introduction areas with and without supplementary irrigation and saline water.	Conditions that will indicate purpose has been achieved: End of project status: Identification of new plants which have potential as natural sources of raw materials and are also well adapted to arid conditions.	Field observation of vigor, dry matter production, laboratory results of product testing, variance in output as a function of irrigation water or salinity.	Assumptions for achieving purpose: Some plants are better adapted to arid lands conditions and also respond differently to variance of inputs (quantity and quality).
Outputs: 1. To have screened promising species and identify the details of their characteristics and requirements. 2. Preliminary determination of natural products 3. Recommendations for in-depth research and development on promising candidate species. 4. Expanded infrastructure for industrial crop research. 5. Data from examination to extrapolate to other areas.	Magnitude of Outputs: ● 2 - 3 plants identified as well adapted. ● Facilities, techniques to evaluate new types of plants. ● Technicians and laboratory staff to field and lab test these plants. ● 7 - 8 meetings of cooperating scientists.	● Project reports on periodic and final basis. ● Continuity of research capability. ● Meeting, conference and records of exchanges.	Assumptions for achieving outputs: Crops will be identified that will have adapted to arid lands conditions which produce a viable level of industrial raw materials. The system for conducting this type of research currently exists and can be readily expanded to accommodate these tests and will remain in effect.

APPENDIX 2

BUDGET PLANS, FROM APPROVED PROJECT PAPER

Appendix 2

ARID LANDS AGRICULTURE RESEARCH PROGRAM

SUMMARY BUDGETS

	Estimated Person Months	*Total*	*Management/ Coordination*	*Saline Research*	*Fodder Research*	*Industrial Research*
Phase I (2/15/82 to 4/30/82)	*9*	$ 71,414	$ 71,414			
Phase II (5/1/82 to 1/31/83)	*891*	928,586	178,586	$420,000	$280,000	$ 50,000
Total/YEAR ONE	*900*	$1,000,000	$250,000	$420,000	$280,000	$ 50,000
Total/YEAR TWO	*875*	1,000,000	250,000	420,000	280,000	50,000
Total/YEAR THREE	*850*	1,000,000	250,000	420,000	280,000	50,000
Total/YEAR FOUR	*825*	1,000,000	250,000	420,000	280,000	50,000
Total/YEAR FIVE	*800*	1,000,000	250,000	420,000	280,000	50,000
Total/Five Years	*4,250*	$5,000,000	$1,250,000	$2,100,000	$1,400,000	$250,000

*Assumes reduction in level of effort due to inflation.

ESTIMATE OF CURRENCIES TO BE USED

	U.S.	*Egyptian*	*Israeli*
Year One	$ 71,414	$168,227	$206,390
	230,979	136,000	136,390
		25,000	25,000
	$302,393	$329,827	$367,780
Year One (Rounded)	$300,000	$330,000	$370,000
Year Two	300,000	330,000	370,000
Year Three	300,000	330,000	370,000
Year Four	300,000	330,000	370,000
Year Five	300,000	330,000	370,000
	$1,500,000	$1,650,000	$1,850,000

HOST COUNTRY CONTRIBUTIONS

It is expected that the Arab Republic of Egypt and Israel will contribute approximately one million dollars each toward the project. Contributions will be in-kind, including:

- salaries and benefits for professional staff
- salaries and benefits for support staff (clerical assistants, technicians)
- office and laboratory space
- field space
- office equipment
- field and laboratory equipment
- chemicals, seeds, and materials
- travel
- other direct costs, such as duplicating, telephone, postage, computer time.

As a result of the planning sessions held in Cairo in March 1982, a detailed listing of expected in-kind contributions follows.

ARID LANDS AGRICULTURE RESEARCH PROGRAM

May 1, 1982 - January 31, 1983

Contributions — Arab Republic of Egypt

		Saline Research (a)	*Fodder Research (b)*	*Industrial Research (c)*
1.	Office Space			
	a. 15 rooms @ $2,500/mo. rental	$22,500		
	b. 6 rooms @ $1,000/mo. rental		$ 9,000	
	c. 3 rooms @ $500/mo. rental			$ 4,500
2.	Office Equipment			
	a. 5 file cabinets @ $30	150		
	b. 2 typewriters @ $1,000		2,000	
	4 file cabinets @ $30		120	
	c. 1 typewriter @ $1,000			1,000
	3 file cabinets @ $30			90
3.	Local Transportation and Official Vehicles			
	a. Ministry vehicle @ $5,000/yr.	3,750		
	Motorcycle for postage, etc. @ $1,000/yr.	750		
	b. Ministry vehicle @ $5,000/yr.		3,750	
	Motorcycle @ $1,000/yr.		750	
	c. P.I. vehicle 2,000 kilometers/mo. @ $400 (5km = $1)			3,600
	Motorcycle @ $1,000/yr.			750
4.	Interpreter Services			
	Based on $40/day; used for 6 meetings/yr. x 2 interpreters per mtg. x 3 days	480	480	480
5.	Travel Arrangements			
	Based on $30/mo. for each project	270	270	270

	Saline Research (a)	Fodder Research (b)	Industrial Research (c)
6. Research Laboratories and Equipment			
a. Stress Physiology Laboratory, Aim Shams University, @ $500/mo.	$ 4,500		
Ministry of Agriculture Salinity Laboratory, Alexandria @ $500/mo.	4,500		
Product Quality Laboratory, Ain Shams University @ $500/mo.	4,500		
b. Agronomy Laboratory at Nobaria @ $500/mo.		$ 4,500	
Physiology Laboratory at Giza @ $500/mo.		4,500	
Animal Nutrition Laboratory at Giza @ $500/mo.		4,500	
Water Technology Laboratory at Sakha @ $500/mo.		4,500	
c. Morphology Laboratory at Cairo @ $250/mo.			$ 2,250
Physiology Laboratory at Matruh @ $250/mo.			2,250
7. Field Stations			
Contributions are calculated at $15(per acre per year, except for the Borg Arab Station, where there are buildings and sheds in addition to land usage costs.			
a. Marsa Matruh, 25 acres	2,812		
Ed-Boseily, 25 acres	2,812		
b. Borg Arab Animal Station $500/mo.		4,500	
Maruit, 10 acres		1,125	
Noberia, 10 acres		1,125	
c. Marsa Matruh, 3 acres			338
Baheria, 3 acres			338

	Saline Research (a)	Fodder Research (b)	Industrial Research (c)
8. Research Supplies			
b. Animals, 400 heads @ $70		$28,000	
Food stuff, $80/da.		21,600	
Seeds, peat moss, organic matter		300	
c. Fertilizer, peat moss			$ 300
9 Duplicating/Printing			
Contributions are calculated at $100/month, divided among projects.	$ 360	270	270
10. Personnel			
See salaries asterisked (*) in the subrecipient project budgets. The Ministry and University employers are contributing an amount for each of these employees equal to the amount charged to the cooperative agreement.			
a. Saline Personnel			
Dr. El Beltagy	1,080		
Others	18,684		
b. Fodder Personnel		13,230	
c. Industrial Personnel			1,350
For these same employees, the Ministry is providing all benefits (government Workers' Insurance). The contributions are based on 30% of the budgeted and contributed salaries.			
a. Saline ($19,764 @ 30%)	5,929		
b. Fodder ($13,230 @ 30%)		3,969	
c. Industrial ($1,350 @ 30%)			405
Totals	$73,077. .	$108,489 . .	$18,191

Estimated Contributions — Five Year Program	
Year 1 (9 months)	$199,757
Year 2	200,000
Year 3	200,000
Year 4	200,000
Year 5	200,243
	$1,000,000*

*This is a conservative estimate. It is probable contributions will be higher, as the first year calculations were based on 9 months (May 1, 1982 - January 31, 1983) of resources, rather than a full year.

ARID LANDS AGRICULTURE RESEARCH PROGRAM

May 1, 1982 - January 31, 1983

Contributions — Israel

		Saline Research (a)	Fodder Research (b)	Industrial Research (c
1.	Office Space			
	a. 150 sq. meters @ $4/mo./meter	$ 5,400		
	b. ARO, 85 sq. meters		$ 3,060	
	BGU, 30 sq. meters		1,080	
	HUJ, 200 sq. meters		7,200	
	c. 35 sq. meters			$ 1,260
2.	Office Equipment			
	a. Typewriter	1,000		
	b. ARO, Typewriter, Photocopy and Terminal		5,000	
	BGU, Typewriter and Photocopy two stations		7,000	
	HUJ, Typewriter, Word Processing, Photocopy, Terminals		10,000	
	c. Typewriter			1,000
3.	Local Transportation and Official Vehicles			
	b. ARO, Pick-up Truck		9,000	
	Official cars		1,000	
	Tractors		1,000	
	BGU, Car-Small Van		4,000	
	HUJ, Official Cars		1,000	
4.	Research Laboratories and Equipment			
	a. Laboratory, 40 sq. meters @ $20 sq. mtr./mo.	7,200		

	Saline Research (a)	Fodder Research (b)	Industrial Research (c)
4. Research Laboratories and Equipment (continued)			
b. Bet Dagan-Volcani Center 40 sq. meters @ $20/mo.		$ 7,200	
Gilat Substation 20 sq. meters @ $20/mo.		3,600	
BGU Soil Laboratory 30 sq. meters @ $20/mo.		5,400	
BGU Plant Laboratory 30 sq. meters @ $20/mo.		5,400	
HUJ Microbiology Laboratory 30 sq. meters @ $20/mo.		5,400	
HUJ Agronomy Laboratory 30 sq. meters @ $20/mo.		5,400	
c. Laboratory, 20 sq. meters @ $20/mo.			$ 3,600
5. Field Stations			
a. 4 acres @ $10/acre/mo.	$ 360		
b. Migda Experimental Farm 250 acres @ $10/acre/mo.		22,500	
BGU Nursery 5,000 sq. meters @ .5/sq. meter/mo.		22,500	
BGU Greenhouse 40 sq. meters @ $20 per sq. meter/mo.		7,200	
HUJ Greenhouse		3,000	
6. Research Supplies			
b. ARO, 450 sheep at $180 (First year contribution only)		81,000	
Maintenance of sheep, 450 @ $2/mo.		8,100	
Fencing (Depr. $50,000 @ 10%)		5,000	
BGU, Ph Meters, Balances, Nitrogen Measurements		3,750	

7. Personnel	*Saline Research (a)*	*Fodder Research (b)*	*Industrial Research (c)*
a. J. Mizraki (10%) Res. Scientist, Gr. A	$ 2,650		
J. Rudich (5%) Res. Scientist, Gr. A	1,324		
D. Zamir (50%) Res. Scientist, Gr. B	13,780		
Y. De Malach (80%) Sr. Researcher	21,175		
Agromanagement Lab Technician (25%)	3,100		
b. ARO, Contributions as Listed in Subrecipient Budget		$13,101	
Farm manager and 3 Shepherds (ARO)		48,000	
Volcani Institute, Technician (50%)		6,000	
BGU, Secretary (50%)		6,000	
BGU, Typist (0%)		5,250	
c. M. Forti (25%)			$ 5,859
Totals	$55,989 . .	$313,141 . .	$11,719

Estimated Contributions — Five Year Program

Year 1 (9 months)	$380,849
Year 2	150,000
Year 3	150,000
Year 4	150,000
Year 5	169,151
	$1,000,000*

*This is a conservative estimate. It is probable contributions will be higher, as the first year calculations were based on 9 months.

APPENDIX 3

EVALUATION TEAM SCOPE OF WORK

APPENDIX 3

SCOPE OF WORK

ARTICLE I - TITLE

Arid Lands Agriculture Research Project (Project No. 298-0170)

ARTICLE II - OBJECTIVE

The objective of this work order is to perform a mid-term evaluation of the above project. This external mid-term evaluation is being conducted to assess the success of the project in developing cooperation between Egypt and Israel and addressing arid land problems which are common to both countries. The evaluation recommendations will be used by the Ministries of Agriculture in Egypt and Israel to guide the project to successful completion. The timing of the evaluation (mid-term) permits an assessment of the achievements of the project over the past two years.

ARTICLE III - STATEMENT OF WORK

The Cooperation Specialist shall be the leader of the evaluation team and shall be responsible for finalizing the Evaluation Report.

The team leader will also evaluate the project's efforts in promoting regional cooperation. The remaining team members will evaluate the technical and research activities of the project. The objectives and specific tasks for the individual team members are as follows:

A. Cooperation Specialist/Team Leader

Objectiv e: The objective of this section of the evaluation is to determine the success of the Arid Lands Research project in developing cooperation between Egypt and Israel. The grant agreement states that one of the two purposes of the agreement is "to enhance scientific and technical cooperation betwen Egyptian and Israeli Agricultural Scientists" (I-A). SDSUF is to "insure that the above described research activities are conducted in a true collaborative manner and that contact and cooperation between the Egyptians and Israelis participating in the project is maximized" (I-B, para. 3).

On the purpose level, the evaluation will measure and analyze the extent to which the project has contributed to developing contacts and linkages between Egyptian and Israeli scientists and institutions. On the output level, the evaluation will examine the type and nature of the contacts, relationships and

collaboration between those countries which have resulted from this project.

Among the specific tasks necessary to accomplish the objective are to:

-- Develop a methodology for evaluation of this kind of regional project, including indices of success in meeting the regional cooperation goals.

-- Evaluate the extent to which project objectives have been met.

-- Describe and evaluate the effects of exogenous events, such as political developments, on the success of the project.

-- Evaluate how well the project has been managed and how project management could be improved.

-- Evaluate the effectiveness and usefulness of the U.S. role in supporting the cooperative aspects of the project as well as the usefulness of the technical and scientific involvement of U.S. consultants.

-- Provide recommendations and lessons learned that will help to improve the performance of this project and to assist in appraising regional project proposals and in designing new regional projects.

-- Review the implementation plan for the procurement of technical advisors, equipment and travel for the purposes of determining whether the project goal and purpose can be achieved by the end of the project.

B. Saline Water Irrigation Specialist and Production Horticulurist/Agronomist: These two specialists will jointly determine the success of the following research activities:

(1) The use of saline water for crop production.

Objective: The objective of this section is to determine the success of the project in developing two important cash crps, tomatoes and melons, for maximum productivity under salinity in Egypt's and Israel's arid zones. An assessment shoud be done to determine the progress in: 1) initiating a selection program for salt resistance among additional important agricultural crops and 2) introducing and selecting halophytic species for utilization of soils and waters with very high salinity.

The specific tasks necessary to accomplish the objective are to:

-- Develop a methodology for evaluating this type of research activity, including indices of success in attaining the objectives.

-- Evaluate the extent to which the following tomato and melon activities have been accomplished.

-- Collecting plant material through joint seed collection missions in arid Africa, Asia and South America and acquiring genotypes from established seed collections and current salt tolerance breeding programs.

-- Screening plant material under field conditions at high and controlled salinity levels, taking into account traits like fruit quality, heat resistance, and other environmental constraints.

-- Identifying morphological, physiological and biochemical salinity tolerance markers to speed up the selection process.

-- Conducting agronomanagement by production under field conditions of salt response functions for a range of selected genotypes; developing sowing and planting technologies (seed-bed preparation, seedling preparation, sowing depth, mulching); irrigation and fertilization management; and adapting irrigation technology to saline conditions.

-- Other Crops - the establishing of experimental plots for identification and selection of promising genotypes from conventional crops and new crop candidates, including halophytes.

-- Describe activity accomplishments in terms of regional cooperation.

-- As an indicator of achieving activity objectives, review the budget and expenditure of funds for this activity.

-- Evaluate the training program to determine the relevancy of subjects studied and the ability of having Egyptian and Israeli scientists study together.

-- Provide recommendations that will help to improve the performance of this activity.

-- Evaluate the implementation plan to determine whether the objectives can be met by the end of the project.

(2) The development of arid land plants of high nutritive value whch can be grown in minimal amounts of water for use as fodder for small ruminants.

Objectives: The objectives of this section are to determine the success of the project in:

-- Studying the plant-soil-moisture (including saline water) animal aspects and their interactions, including management aspects, in the 200-250 mm rainfall belt of Israel and along the coastal areas of Egypt where similar rainfall occurs.

-- Collecting quantitative data on both animal and plant production which can be utilized for economic feasibility studies after the demonstration of the biological boundaries of the system.

-- Demonstrating the feasibility of the research findings in the form of plots to the extent practicable within the funding constraints.

-- Striving for similar, if not identical, research to be carried out in Egypt and in Israel for the benefit of both countries, as well as other arid regions.

-- Interchanging of knowledge and information and to promote technical and conceptual skills between these three parties through exchange of professional personnel.

To accomplish the objectives, the following tasks shall be performed.

-- Develop a methodology for evaluating this type of research activity, including indices of success in attaining the objectives stated above.

-- Evaluate, in relation to the objectives, the research topics which are subdivided in the following fields:

o Plants (including annuals, perennial grasses, shrubs, and trees): Species, varieties, propagation and multiplication, establishment, persistence, response to cutting and/or grazing, and nutritional value.

o Moisture Supply and Water Quality: The hydrological environment of rain-fed vegetation, the feasibility of

improving the moisture supply (including contour planting, water harvesting and micro-attachments), and if funding permits, the use of brackish or sea water as a supplementary source. Rain simulators will be used to mimic natural as well as experimental conditions where possible.

- Animals: Sheep for the trials will be of a breed suitable for both meat and milk production. The animals will be selected after consultation with sheep specialists in both Egypt and Israel. The animals should be as similar as possible in type, if not in breed. In the future, after a feed production and animal management program is adapted to the various sites, animal breeding and breed improvement projects, including the use of semen from proven sires, may be added to the program.

- Plant-Animal Interaction: In environments with limited moisture available to the plant populations, defoliation by grazing animals may seriously hamper the growth and survival of the more palatable and nutritious plant species. In these studies, particular attention will be given to plant-animal interactions by measuring and recording:

  frequency of grazing
  stocking rate
  season of grazing
  regrowth of plants after grazing or cutting
  nutritive value of various plant parts and seasonal variation

-- Describe activity accomplishments in terms of regional cooperation.

-- As an indicator of achieving activity objectives, review the budget and expenditure of funds for this activity.

-- Evaluate the training program to determine the relevancy of subjects studied.

-- Provide recommendations that will help to improve the performance of this activity.

-- Evaluate the implementation plan to determine whether the objectives can be met by the end of the project.

(3) The section of foundation stocks of industrial source plants for more intensive research and development.

Objectives: The objectives of this section are to determine the success of the project in establishing a wide genetic base for observation and selection of suitable and promising industrial species. It is envisioned that by the end of the five-year period of this research activity sufficient information will have been obtained from the base material to identify one or more species as candidates for more intensive research and development.

The following tasks shall be accomplished:

-- Develop a methodology for evaluating this type of research activity, including of success in attaining objectives stated above.

-- Evaluate plant introduction plots established in Egypt and Israel and the success of identifying promising species. These would include:

  o Crops for industrial oils, waxes and gums.
  o Rubber-containing species.
  o Fiber plants.
  o Pharmaceutical species.
  o Latex-bearing plants for energy or other valuable chemicals.

-- Describe activity accomplishments in terms of regional cooperation.

-- As an indicator of achieving activity objectives, review the budget and expenditure of funds for this activity.

-- Evaluate the training program and the relevancy of subjects studied and the ability to have Egypt and Israeli scientists study together.

-- Evaluate the implementation plan to determine whether the objectives can be met by the end of the project.

-- Provide recommendations that will help to improve the performance of this activity.

ARTICLE IV - EVALUATION METHODOLOGY

The evaluation will examine documentary evidence and interview participants and observers in the U.S., Egypt and Israel. The

cooperation aspects of the project can be politically sensitive in the Middle East and sensitivity and caution will have to be exercised at times.

In the U.S.

-- discuss project with AID officials and examine documents at AID.

-- examine documents and discuss project with project managers and others at San Diego State University Foundation.

-- discuss project with other U.S. participants and with the Hansen Foundation in San Diego.

-- discuss project with others in the U.S., including Egyptians and Israeli residents here, whose view may be useful in the evaluation.

In Egypt and Israel

-- discuss project with U.S. Embassy and AID officials.

-- discuss project with Egyptian and Israeli coordinators and participants.

-- examine available documents and visit major project sites.

-- discuss project with other appropriate Government of Egypt and Government of Israel officials and members of the scientific community in those countries.

In order to provide the services required herein above, the Contractor shall be required to travel to San Diego State University Foundation, San Diego, California, Egypt and Israel to meet with an discuss the contract with knowledgeable officials.

ARTICLE V - REPORTS

Upon completion of the evaluation described herein, and, prior to departure, the Contractor shall prepare and submit twenty-five (25) copies of the final report to Arnold Radi, USAID/Egypt. Another ten (10) copies shall be submitted to Wilbur Thomas, NE/TECH/AD, AID/W, upon return to Washington.

The said report shall describe the methodology, conduct and results of the evaluation. The report shall reflect the utilization of funds on both the technical advances and collaborative aspects of the contract.

ARTICLE VI - RELATIONSHIPS AND RESPONSIBILITIES

The Contractor shall be responsible for organizing the team and the team leader shall be responsible to Mr. Wilbur Thomas, NE/TECH/AD in AID/W. The team is expected to work closely and cooperatively with personnel associated with the project in the Ministry of Agriculture of the Arab Republic of Egypt and the Research and Development Authority of the Ben Gurion University of the Negev in Israel. The Contractor will be provided a copy of the Project Agreement and the technical proposal Mr. Thomas. Additional project information will be provided by host country project researchers and from San Diego State University Foundation.

ARTICLE VII - TERM OF PERFORMANCE

The effective date of this work order is August 28, 1984 and the estimated completion date is October 31, 1984.

Subject to the written approval of the Project Manager (see block 5 on the Cover Page), the estimated completion date of this work order may be extended provided that such extension does not cause the elapsed time for completion of the work, including furnishing of all deliverables, to extend beyond 30 calendar days from the original estimated completion date. The contractor shall attach a copy of the Project Manager's approval for any extension of the term of this order to the final voucher submitted for payment.

It is the contractor's responsibility to ensure that Project Manager-approved adjustments to the original estimated completion date do not result in costs to the Government which exceed the total amount obligated for the performance of the work. Under no circumstances shall such adjustments authorize the contractor to be paid any sum in excess of the total amount obligated in this order for the performance of the work.

Adjustments which will cause the elapsed time for completion of the work to exceed the original estimated completion date by more than 30 days must be approved <u>in advance</u> by the Contracting Officer.

APPENDIX 4

EVALUATION TEAM COMPOSITION

Appendix 4

COMPOSITION OF CALAR EVALUATION TEAM

The team for this external evaluation was furnished by RONCO Consulting Corporation, Washington, D.C. and Kensington California. It consisted of the following three persons, each having significant professional experience related to technical aspects of the project and to agricultural development problems.

Team Leader and Agricultural Research Specialist

Dr. Earl R. Leng, Ph.D.
Private consultant, retired Professor of Agronomy, University of Illinois and University of Nebraska

Over 30 years of professional experience in agricultural development and participation in various aspects of A.I.D. projects. From 1975 to 1977, Chief, Crops Research Division, Office of Agriculture, A.I.D./Washington. Retired June 30, 1984 after 5 years service as Program Director, Sorghum/Millet Collaborative Research Support Program (CRSP).

Saline Water Irrigation Specialist

Dr. Paul J. Eberhardt, Ph.D.
President, Inter Ag Services, Inc.
Phoenix, Arizona (Soil, Water, Plant Analysis and Consulting)

Fifteen years teaching and consulting experience in Soils and Saline Water interactions. Private consultant in Arizona on more than 100,000 acres of crop land. Nearly 50% of Arizona drip irrigated land under consultation. Adjunct Professor to Arizona State University in Soil Fertility. Both national and international paper presentations and publications. Consultant to the Jojoba Growers Association in Arizona.

Specialist, Forage Crops and Horticulture

Dr. Glenn Davis, Ph.D.
Professor of Agronomy and Horticulture, Tennessee Technological University, Cookeville, Tennessee (Forage Crops, Weed Control, Plant Propagation)

Extensive overseas experience in conduct, planning and evaluation of agricultural development projects, with hands-on participation in AID-sponsored projects in Brazil, Morocco, and Guinea Bissau. Research, teaching and extension background in forage crop production, weed control, and the propagation of horticultural and forage crops.

APPENDIX 5

ISRAEL - EGYPT MEMORANDUM OF UNDERSTANDING

Appendix 5

MEMORANDUM OF UNDERSTANDING

The Ministry of Agriculture of the State of Israel, and The Ministry of Agriculture of the Arab Republic of Egypt, desiring to promote agricultural cooperation in a manner advantageous to the parties, and after the two delegations having met in Tel Aviv from the 12th - 24th of March 1980 and conducted observation visits in different agricultural development activities in Israel,

the parties have come to an UNDERSTANDING as follows:

I.

1. Joint project identification and preparation.
   Each party may suggest the development of a project for possible cooperation involving in the first phase a joint appraisal of potentials and problems to be solved.

2. Joint activities in operational projects.
   Both parties agree to cooperate in implementing operational projects for which the parties have competence and experience. Such projects may then be considered initial phases of a pilot or pre-development character.

3. Joint applied research programs.
   Recognizing the research skills and experience of both countries the parties agree to undertake joint research programs in fields of mutual interest, including the exchange of scientists, joint seminars and symposia and exchange of research information.

4. Extension and transfer of knowledge.
   Recognizing the importance of extension methods and transfer of technology to reach the farmer, both parties agree to place emphasis in cooperating to develop new approaches in transfering know-how and skills.

5. Exchange program and training fellowships.
   Both parties agree to arrange training facilities offered by the respective international training and fellowship agencies in each country.

The outline of the previously mentioned five modalities are contained in the Annex of this Memorandum which constitutes an integral part of the Memorandum of Understanding.

II. Implementation:

1. For the implementation of this Memorandum, a Joint Commission will be set up within which professional work-groups will elaborate detailed plans of cooperation for each sphere of activities mentioned.

2. Bearing in mind the fact that some additional subjects of mutual interest such as irrigation, land reclamation, regional development etc. do not always fall in the competence of the two ministries, it is agreed that each party will offer its good services to coordinate and initiate relevant contacts for a wider coverage of subjects of common interest.

This Memorandum of Understanding will enter into force upon signature by both parties and its implementation will be in accordance with the laws and regulations prevailing in each country.

Done at Tel Aviv on March 24, 1980

Professor S. Pohoryles
Head of the Israeli Delegation

for the Ministry of Agriculture
of the State of Israel.

Dr. M.A. Kheireldin
Head of the Egyptian Delegation

for the Ministry of Agriculture
of the Arab Republic of Egypt.

ANNEX to Memorandum of Understanding

I. The parties shall cooperate in the following fields of agricultural development:

1. Field and horticultural crop development.
Both parties agreed to cooperate in promoting field crops, vegetables, fruit, floriculture, spices and medicinal plants production. The cooperation would also involve activities to improve agrotechniques and multi-crop practices.

2. Animal production: poultry, dairy, sheep and goats with emphasis on breeding, nutrition and management as well as the organization of artificial insemination.

3. Fishing and Aquaculture: study of Pelagig fish population; survey of off-shore fishing ponds leading to the improvement and efficiency of their production; improving the stock and catch of other fish.

4. Veterinary Services:

a. efforts to prevent, control and eradicate the animal diseases affecting the animal population of the two countries;

b. veterinary certification of animals and animal products;

c. development and manufacture of veterinary pharmaceuticals and vaccines.

5. Plant Protection.

Coordination of plant quarantine inspection procedures and phytosanitary measures of direct interest to both countries as well as the exchange of know-how, materials and methods to control crop diseases.

6. Post harvesting and processing activities including technologies related to production and cleaning of seeds, grading, packing houses, pre-cooling, grain storage, cotton gins, slaughter houses, feed mills etc.

7. Cooperative organizations for the supply of inputs, production and marketing.

8. Agricultural planning and integrated farm development:

exchange of experience in agricultural planning methodology and practices; this would include methods and techniques of integrating production and post harvest activities both at the farm and on other levels.

Both parties agree that subject to further consultations in their respective countries a list of priorities would have to be agreed upon to initiate specific cooperation activities, bearing in mind the mutual desire to attain early practical results.
This subject matter priority should be finalized in future meetings of the two delegations.

II. Agricultural Extension Methods and Transfer of Technologies.

The parties shall promote joint programs and exchange of experience, methods and know-how between the respective agricultural extension services and institutions.

Possible areas of joint work and exchange are:

1. Methods of organizing extension services nationally, regionally and locally to meet the needs of farmers at all levels;
2. Methods of extension most effective in working with farmers using individual, group and mass methods;
3. Pre-service and in-service training of extension workers;
4. Means and methods of adopting agricultural technology to local needs;
5. Methods of organizing and of training farmers to be receptive of extension advice;
6. Monitoring and evaluation of extensive techniques.

III. Joint Research Program:

The parties will establish programs of cooperation such as:

1. Improvement of the management and exploitation of integrated intensive and extensive agro-ecosystems;
2. Joint applied agricultural arid and semi-arid zone research;

3. Plant breeding and production of field crops;

4. Plant breeding and production of selected vegetable crops;

5. Environmental conditions for seed production;

6. Survey of wild species, breeding and improved cultural practices of medicinal plants;

7. Biological control of pests in field crops and orchards;

8. Epidemiology and control of fungi, bacterial, viral and nematode disease in crops;

9. Endogenous factors controlling rooting of fruit tree cuttings;

10. Clonal selection of fruit crops for growing under high temperature, salinity and pH;

11. Breeding and husbandry of high producing poultry and ruminants under climatic stress conditions;

12. Nutrition of high-producing poultry and ruminants, including the use of industrial and agricultural waste products;

13. Breeding and management for increased production in aquaculture;

14. Improved methods of disease and pest control in grain storage.

APPENDIX 6

TECHNICAL REPORT OF DR. PAUL EBERHARDT

Appendix 6

Arid Lands Agriculture Research Project

(Proj # 298-0170)

Mid-Term Evaluation Report

by

Dr. Paul J. Eberhardt

Saline Water Irrigation Specialist/Soil Scientist

Evaluation Trip Commencing August 26, 1984

Through September 15, 1984

INTRODUCTION

As with most evaluation projects, time was the most limiting factor in conducting this evaluation. During the short visits to research sites Dr. Davis and myself were able to learn and then evaluate the scientific validity of the initiated projects.

It is interesting to note the degree of cooperation between the countries of Egypt and Israel and how it is perceived by each. For example, the transfer of two students from Egypt to Israel to study in Israel is considered a great step forward by the Egyptians. In contrast, the Israelis would consider it as a small step and ask "When will a professor be transferred to study in Israel."

Cooperation between universities is difficult in the U.S. where culture and language are similar. Imagine the difficulties where culture and language are different. However, despite these differences, a remarkable degree of cooperation does exist; notably seed and technology transfer.

One very interesting aspect of the joint project is the approach taken by each country to solve the same problem. For example, in Israel the approach was completely scientific where it is assumed that nothing was known about salinity. In such cases, factorial designs yield the most knowledge and this was the scientific approach taken.

In Egypt, the scientists are approaching it from the practical side. They found out what was already working for the farmers and are now trying to improve the management. Both methods, though different, are scientifically valid. The Egyptian method

may lead to faster adoption of information by farmers since some of the work is being done "on farm." It is also classed as appropriate technology.

With this background information, we can now begin the detailed evaluation.

Research Evaluation

1. Use of saline water for crop production: tomatoes and melons.

The methodology developed by the team for evaluating this type of research includes the following:

a) Scope of work proposed.

b) Estimated time needed to complete research work.

c) Amount of elapsed time from start of funding.

d) On-site visits to research areas to talk with investigators and view completed work.

e) Review written reports on completed work.

f) Correlate written reports with on-site visits.

g) Allow for environmental considerations limiting progress.

h) Estimate if research goal is attainable with remaining time and budget.

i) Recommendations (if any) that may help researchers meet goal on time.

The collection and exchange of plant material is progressing adequately whereby genotypes from established seed collections, seed companies, and government agencies are being evaluated for salt tolerance. In some instances, the quantity of seed

sent was too small for screening purposes. In all cases at least 1/2 kg of seed should be sent. Otherwise, one growing season is lost building seed supply by growing a crop for one season.

The screening progress in both Egypt and Israel is at a satisfactory stage of development. However, since screening must take place before crossing to produce better varieties, the genetic work will need more time to develop. Fruit quality work, however, must be current in order to be used in the breeding work.

In the melon work, three local varieties, Kahera A, Ananas Dokki, and Shahd Dokki may have some promise. Chilean Black Seeded watermelon is a standard for Egyptian watermelons and would be difficult to change with local farmers. The quality is high with exceptional sugar content.

In tomato production the Karr variety has been found to have exceptional salt tolerance. Unfortunately, the shape is not consistent. Through breeding this may become a major commercial variety.

The Israeli scientists are studying the genes of tomato varieties and hope to define the gene for salt tolerance. If found, it may be incorporated into better quality varieties making them salt tolerant.

The area where immediate progress for increasing yield of tomatoes and melons is most likely is in the management area. In Israel, well designed experiments (both field and greenhouse)

were observed at the Volcani Institute and Ramat Negev. Both tomato and melon varieties were being grown at 3 salinity levels, using several drip irrigation practices, planting rates, and fertility practices. Initial results are promising since significant yield increases have been noted. However, as with all agronomic research, at least three years data is necessary to determine validity of research results.

In Egypt, drip irrigation technology has been transferred from Israel and is now operational at Shalakan. A mixing chamber will allow water of several salinity levels to be distributed to crops under field conditions. The salt brine is made of local salt (96%, NaCl). This is very important since it fits local conditions, not some theoretical model.

Initial selections of melon varieties have been made from an ingeneous set up of lysimeters. Each may create a static water table, similar to local conditions. These high water table conditions don't exist in Israel but are common in the El-Buseili region of Egypt. In areas with high water table, salinity is of paramount importance, since it is impossible to leach away excess salts.

The use of very small irrigation pumps and drip irrigation in the El-Buseili region is the utmost in adaptation of irrigation technology to saline conditions. In this region, a very small film of less salty water floats on top of extremely saline water. Generally, the hand dug wells allow for a small quantity of water to be removed by buckets or <u>shadouf</u>. Water is not removed

so fast that the very saline water becomes a problem. With the introduction of the mechanical pump, the very saline water could become a problem. However, with drip irrigation and the pump an excessive amount of water need not be removed and should keep the salinity problem to a minimum.

This type of research also has promise of being used in the Marsa Matrouh area where catchments are currently being used for trapping rain water which is used for figs, tomatoes, and other crops. These are Bedouin communities that are beginning to farm in a sedentary fashion. This is inevitable due to expanding and shrinking land area.

This inclusion of the Bedouin in the research project will strengthen the communication between Egypt and Israel since the Bedouin roam throughout both countries as well as several others in the Mideast.

In addition to the main experimental objectives we observed experimental plots in both regions where other crops, including halophytes, were being tested for salinity tolerance. There was some degree of success but results were not conclusive at this time.

In terms of regional cooperation, the activity accomplishments include some technology transfer from Israel to Egypt in the form of drip irrigation, transfer of ideas and papers at technical meetings, seed and plant material transfers in both directions, and exchange students from Egypt to Israel. At this stage of the project this was much more than expected. Scientists generally

will share ideas but do not excessively cooperate in a collaborative fashion. They prefer to work on their own ideas and not someone elses.

The budget for achieving the activity objectives is spartan by anyone's criteria. The amount of scientific activity achieved for such a small expenditure gives credit to all participants and shows a willingness to meet project outlines. The salinity lab has a great need to update both equipment and library material. This would improve the performance of the researchers and make the objectives more attainable.

Funding for travel between Egypt and Israel should be increased if necessary cooperation is expected. Scientists from Egypt are grossly underpaid and cannot be expected to travel on their own funds. Likewise, with the runaway inflation in Israel, the scientist cannot afford the excessive cost of travel.

All subjects studied in this project appear extremely relevant to the problems in the areas' agricultural regions. The experiments of both Egyptian and Israeli scientists seen well conceived and, with minor exceptions, well executed. Lysimeter studies in Egypt equal anything I have seen in the U.S. Solution cultures and irrigation management techniques of Israel exceed any in the Western U.S. Some of these techniques have already been exported to the U.S. from Israel. This type of salinity research has been needed in the U.S. for some time since it is from a practical standpoint.

The main recommendations that can be made that will help improve the research activity performance would be to supply proper funding for equipment, library, and personnel. The scope of the research is vast, for the allowed expenditure. Without additional funding, some projects will not meet full scientific fruition.

The implementation plan for use of saline water is already behind schedule, mainly for two reasons: problems with initial funding and environmental problems (a poor rainy season). The first has been resolved. The second is partially being overcome by supplemental irrigation where it normally would not have been used. It is noted that the implementation plan allows for adjustments of the work plan in each year's annual progress report.

In some areas the implementation of scheduled research is ahead of the plan (i.e. onions), in others it is somewhat behind. This is difficult to estimate but perhaps 70% is on schedule or ahead. In some cases, what appears behind at this point may not in reality be as far behind as one considers. Often as research proceeds certain areas are delayed but catch up quickly as momentum builds. In the area of salinity research proposed, if the political situation improves, nearly 90% should be obtainable by project end. This, of course, assumes progress continues at a rate equal to or greater than the current progress. This also assumes no road-block arises that prevents completion of one area on which another also depends.

2. Development of arid land plants of high nutritive value on minimal water for small ruminants.

The methodology used to evaluate this section of the project is similar to that applied to the saline water section and need not be repeated.

The activity in the area of arid land plants for fodder probably has the highest potential for regional cooperation due to the need of the Beduoin communities in both Egypt and Israel. Cooperation in plant material exchange, spacing information, fertility, and propagation techniques have already been completed. Due to budget problems the grazing portion of these studies will be delayed at least one year and possibly more due to a drought season which allowed little growth.

The project animals will be somewhat different in Egypt versus Israel since goats are more popular in Egypt than Israel. The breeding of high quality goats in Egypt is progressing rapidly and have already been introduced into the native populations.

Since the project is not sufficiently complete to discuss the plant-animal interaction, I can only comment on the planted areas and the plan. Both Israel and Egypt have sizeable areas planted and grazing will begin when plants have reached suitable size. Since the plantings in Egypt are in the Bedouin communities the information, if successful or not, will spread rapidly throughout the countryside.

The budget cost for establishing these arid land plants seems somewhat excessive. For example, in Israel, the cost

for land preparation alone was $76 per hectare. Cost in the U.S. for Disc cultivation would not exceed $24 per hectare. Furthermore, the $566 per hectare minimum cost makes it doubtful that this project could become economically feasible for the average farmer or herdsman. In Egypt, where costs are lower, this project has more promise.

The training program is focused on the most relevant problem facing the Bedouin people - providing adequate forage for animals in the dry season. In Israel, with the use of chicken litter, the problem is not as severe as in Egypt where forage must be imported from the Nile valley. The ammoniation of wheat straw appears to have merit in Egypt where grain is the current supplement. The supply of chicken litter is not as great in Egypt as in Israel.

Due to problems with funding and later the drought in the winter of 1983, this project is not as far along as was hoped. The establishment of shrubs will take 2 to 3 years before grazing studies can be started. This means that 1986 will be the first possible date for grazing data. Thus it appears that 2 or 3 additional project years will be necessary for meaningful information to come from this activity. Due to the slow growth of desert species, there is no way this can be speeded up.

3. Industrial plants research and development.

The areas of industrial plants is more closely tied to Dr. Davis' area of expertise and I will leave most of the evaluation to him. I will comment on some aspects since I have consulted

on several of the industrial crops now being introduced in Arizona.

The attempt to develop a uniform variety of Jojoba is very important for the success of this crop. In this way the project is approaching Jojoba correctly. The time constraint for doing this in 5 years is very difficult since no meaningful production comes from Jojoba for 3-5 years after establishment. However, once a uniform plant is developed this will enable regional cooperation to improve since a common marketing scheme would help exports from both countries. In order to have a market, a uniform plant is necessary for consistent production.

Other crops of possible industrial use are Guayule, Euphorbia, Asclepias, and Sissad. Both Israel (Negev) and Egypt (Fouka and El-Bahriya) have established test sites. It is too early to determine the success of these sites since some plants are barely 6" tall in Egypt. The training for industrial crops was a brief 2 month stay at the University of Arizona. This should be considered as an initiation only into this very new field of agriculture.

In Israel, research on Euphorbia is being completed since it appears that it will not be economically viable. The Buffalo gourd, however, appears promising since it can provide oil, protein, and roots high in starch. The oil and protein from the seed is comparable to plant production but with much less water. The root starch is comparable with potatoes in yield.

Rubber from Guayule is one additional industrial crop that may provide export potential but uses little water.

The budget for this type of activity appears adequate since it is mainly a first step approach to see if these crops can be grown and the economic feasibility of production. In the area of cooperation, more could be gained from cooperation of scientists than either working alone. It is fairly easy to determine if a plant can be grown but it is more difficult to determine the yield of wax, oil, etc. In the analysis of waxes and oils, both cooperation and saving of research funds could be done by having analysis performed at one institution by both scientists.

The implementation plan seems reasonable and should be able to be complete by the end of the planned termination date.

Conclusion and Summary

In reading this Evaluation Report, the reader must realize that a short period of time has elapsed in what is considered a 5 year project. More realistically this project should cover 7 or 8 years to produce the desired end result. This is especially true in Egypt where a late start, due to funding problems, missed the first growing season. The second year drought also caused a delay in parts of the planned project.

One very important aspect of this project is that useful results are being obtained through cooperation. This is rare even in the U.S. This is good since both countries have much to learn from each other. For example, few figs were seen in Israel but are being grown without irrigation in parts of Egypt. Likewise, drop irrigation techniques are being transferred from Israel to Egypt for melon and tomato production.

One suggestion for improving the chance for success of the project would be additional funding to upgrade the library at the Salinity Lab in Egypt. This would save the scientists time since they wouldn't need to "reinvent the wheel" every time a project was started. Some additional analytical equipment is also necessary for salinity and nutrition work.

Probably the most needed of all is extra travel funds for scientists. If they are expected to cooperate they need to be able to travel from one country to the other. Egyptian scientists are grossly underpaid and cannot afford to travel on their own.

Israeli scientists, cue to rampant inflation, also cannot afford travel as they need.

As projects go, I would give this one high marks for the enthusiasm with which it is being carried out at all levels from the coordinators to San Diego to the government officials in Egypt and Israel to the scientists working on the project.

For the short-term, the salinity project is most promising from the research standpoint. For the long-term, the grazing, and shrub work may provide the cooperation benefits A.I.D. is so actively seeking.

APPENDIX 7

TECHNICAL REPORT OF DR. GLENN DAVIS

ARID LANDS AGRICULTURE RESEARCH PROJECT

(Project No. 298-0170)

CALAR
MID-TERM EVALUATION

PRODUCTION HORTICULTURIST/AGRONOMIST

Glenn G. Davis, Ph.D.

September 15, 1984

INTRODUCTION

The objective of the project is to establish greater cooperation between Egypt and Israel and among the United States and these nations. The approach to this objective involved joint participation of agricultural specialists of the nations in a project on arid land agriculture. The elements of the project were selected through joint conferences of the three nations. The project was planned for a five-year period. The three major elements of the project in order of priority are:

- research on use of saline water in crop production;
- development of arid land plants of high nutritive value for ruminants; and
- examiniation of arid land plant species for industrial products.

The contractor for the project is the San Diego State University Foundation (SDSUF). The subcontracting agency in Egypt is the Ministry of Agriculture of the Arab Republic of Egypt. The subcontracting agency in Israel is the Research and Development Authority of Ben-Gurion University of the Negev. The funding agency is the Near East Bureau of the Agency for International Development.

Leading agricultural institutions of the three nations participate in the project. A Steering Committee has been selected from these institutions. Periodic reviews are conducted by representatives of the institutions involved in the project. This mid-term evaluation was conducted by agricultural scientists who are independent of the participating institutions, the contracting institutions and the funding agency.

This mid-term evaluation was conducted after the first two years of the five-year project. The three members of the evaluation team were: Dr. Earl Leng, Cooperation Specialist and Team Leader, Dr. Paul Eberhardt, Saline Water

Irrigation Specialist, and Dr. Glenn Davis, Production Horticulturist/Agronomist This evaluation was conducted according to the guidelines of a Scope of Work which was written by the contracting agency, the funding agency, and the two subcontracting agencies and the guidelines of the Project Evaluation Sheet of the Near East Bureau of AID.

EVALUATION REPORT AND
EVALUATION METHODOLOGY REPORT OUTLINE

The evaluation team conducted the series of tasks related to each element of the project. The Scope of Work combined the tasks of the saline water irrigation specialist and the horticulturist/agronomist. The evaluation report of the water specialist was written by Dr. Paul Eberhardt and is included as a section of the team report.

The evaluation report of the horticulturist/agronomist follows the general outline below. The three major sections are the same as the three principal elements of the project.

I. The Use of Saline Water for Crop Projection

   A. Progress in initiating a selection program for salt resistance in

      1. Tomatoes and melons

      2. Other crops.

   B. Progress in introducing and selecting halophytic species.

II. Development of Arid Land plants of High Nutritive Value as Fodder

   A. Success in studying plant-soil-moisture-animal interactions in the 200-250 mm rainfall belt of Israel and the northwest coast of Egypt

   B. Success in collecting data on animal and plant production

   C. Plot work success and direction

   D. Similarity of research in Israel and Egypt for the benefit of both countries

E. Interchange of knowledge through interchange of personnel.

III. Development of a Wide Genetic Base for Observation and Selection of Suitable Industrial Species

A. Success in identifying promising species for:

1. Crops for oils, waxes, and gums

2. Rubber-containing plants

3. Fiber plan

4. Pharmaceuticals

5. Latex-bearing plants for energy or other chemicals

B. Accomplishments in regional cooperation.

This report includes a suggested methodology for evaluating the type of research included in the project. Recommendations for improvement are included.

EVALUATION METHODOLOGY

Extensive background preparation was provided to the evaluation team. The team leader and the saline irrigation water specialist visited the San Diego State University Foundation (SDSUF). The three-person team and representatives of SDSUF and RONCO reviewed the status of the project with the project director and Near East/MEUR at AID Washington. Reports from each subcontracting nation and from the contractor were reviewed before the on-site visits were initiated. The team interviewed AID personnel and the project leaders for Egypt and Israel before visiting the institutions and project field sites in the two nations. All institutions involved in both nations provided the fullest orientation possible in the short time available to the team. All major researchers on the project were interviewed in both nations. Producers, local officials, and extension service personnel were visited by the team in Egypt and Israel. The team visited laboratories, plant nurseries, greenhouses, experiment stations, and many remote field sites which had direct bearing on the project.

Each institution involved in the project provided adequate documentation to inform the team of its work on the project. Project directors and well-informed officials of the governments and institutions were constantly avaliable to the team to provide orientation and to answer questions. Field studies were explained at the field site by the principal investigators on the studies.

METHODOLOGY FOR EVALUATION OF THIS KIND OF REGIONAL PROJECT

The first task stated in the Scope of Work for each of the major elements of the project is "develop a methodology for evaluating this type of research activity."

A primary objective of a regional project such as this is to foster free interchange of plans, materials, personnel, and information among the participating countries. In later evaluations during the life of the project, the criteria for evaluation will be closely related to outcomes. This evaluation is being conducted two years into the project's life. Criteria for evaluation must be based on the level of activity of each participating nation in each of the three sections (elements) of the project. The activities to be considered included the following: designation of personnel and facilities (office, laboratory, field area), development of survey instruments, initiation of plant production, installation of field and laboratory experiments, creation of contacts with corresponding personnel in the other nation, establishment of cooperative arrangements with producers, and written progress reports on activities performed. The Logical Framework of the project includes a statement on means of verification and verifiable indicators for each project.

The methodology of evaluation will be to establish a baseline of activity level on the subject of the project within each nation and between the two nations.

Activity beyond the baseline in each criterion listed in the paragraph above will be considered as progress. The relative value of the progress in each criterion will vary with the importance of the section to to the project (% of the project effort in the section) and the intensity of the activity. The level of importance of the section within the project has been described in the program of work (PID; Log frame; Budget). The level of intensity of the activity was determined by the evaluator from reading progress reports, interviewing project personnel in each country, and by on-site visits to fields and laboratories.

I. Use of Saline Water for Crop Production
(Note: See report by saline water irrigation specialist.)

Egypt has more project work on melons than on tomatoes, and Israel has more work on tomatoes than on melons. Both nations have projects on measuring the quality of the fruits produced with various levels of salinity in the irrigation water. The most successful melon under saline water conditions in Egypt is Chilean black, which is commercially available from Northrup King Seed Company. The most successful tomato in the most extensive field tests in Israel is M 8218. The leading commercial melon and tomato variety are well known to both countries. Varieties and landraces that have come under testing within the life of the project have not been tested simultaneously in both nations. Plans for exchanging seed stock for research purposes are being formed. The researchers in each nation are not well aware of the old line native material (landraces) that are being used in the other nation.

A wide range of other crops is included in the acclimatization plots and specimen collections of each nation. The same species of saltbush, Atriplex nummularia, has been selected by researchers in each nation as the best type of saltbush for forage. Many of the same plant species were encountered in project tests in each nation.

Regional cooperation has been initiated by the two nations. The directors of the project in each nation have exchanged several visits to observe project activity and to exchange ideas. An Egyptian student is studying for an advanced degree in Israel. Researchers from both nations expressed definite interest in visiting the other nation in order to exchange information. This interest should be encouraged by the project directors. Travel funds should be provided for these exchanges. Travel logistics should be resolved.

The steering committee meeting scheduled in Egypt early in 1985 should increase the amount of interchange between personnel on the project in the two nations.

II. Development of Arid Land Plants for Fodder

The development of arid land plants and their subsequent testing under grazing conditions is multifaceted undertaking. The plants have been propagated under shadecloth in both nations. Successful transplanting has been accomplished on about 20 acres in each nation - at Fouka near Marsa Matrouch in Egypt and at Migda near Beer-Sheva in Israel. The transplants will be approximately one year old in November 1984. Grazing trials have not been conducted in either country, but grazing herds are being selected for field trails during the 1984 season. Goats will be used in Egypt, and sheep will be used in Israel. The environment is harsher at the test site in Egypt than in Israel. *Atriplex nummularia* is the primary forage halophyte under field study in both nations.

Quantitative data has been collected on seedling and cutting survival of several species under shade cloth housing in each nation. Data has been collected on survival rates of field transplants. Two planting dates for two species were used in the field in Egypt. Several species were transplanted in

Israel. In the field trials in Egypt, a single species of salt-bush was transplanted into each sub-block of ten acres. In Israel, five forage species of Atriplex and Acacia were transplanted in a mixed species block of 200 per type per hectare summing to a total of 1000 plants per hectare. Volunteer plants of various species are growing in the test fields in both nations. In Israel, rotational grazing of sheep on small grains (barley and wheat) and the five transplanted forages will be compared with continuous grazing on the transplanted forages. In Egypt, goats primarily will be grazed on the transplanted Atriplex species. The results from each nation will be of value to the other nation.

The goat improvement program in Egypt has produced heavier kids at weaning time in comparison with kids of the native Barki goats. A detailed survey of production practices in Bedouin flocks is being conducted by principal investigators in the project in Egypt. The data from the first flocks surveyed has been reported. The results provide guidelines for further research. Close contact has been established between researchers in the project and the Bedouin herders Research results are being transmitted to producers through demonstrations in the flocks of cooperating producers.

Because of the time required to propagate the improved plant selections and establish plant populations of sufficient size for grazing, field trials cannot begin until the 1984-85 grazing season. Several years of grazing trials will be required to generate sufficient data to establish the economic feasibility of a transplanting system for forage production. The research system appears to be adequate to generate valid data from which conclusions may be derived. Project objectives can be expected to be met if the project is extended three years.

III. Development of Wide Genetic Base for Selection of Industrial Species

This is the element that received the least emphasis in the project. The participating institutions in both nations have previous experience in collection and observation of industrial crop species. Plant species have been collected at Al-Azhar University at Alexandria and at the Applied Research Institute of Ben-Gurion University of the Negev at Beer Sheva. Screenings for survival are being conducted in the nurseries. Sisal, cassia, and buffalo gourd (for oil) will receive more extensive research in Egypt. Buffalo gourd is being selected for starch content in Israel. Euphorbia lathyris has been de-emphasized in both countries because of reported carcinogenic effects of its latex.

Israel has collected a side variety of potential industrial plant species. The collection is maintained in excellent condition. A few species have been field tested. A primrose for oilseed production has been screened for early bolting and annual seed set. Calotropis procera has been studied as an energy source in Israel but work on this species will be discontinued in 1985. A promising species and cultivar of Euphorbia (E. obtusifolia, var. regisjuba) from the Canary Islands has been introduced into the nursery in Israel. Jojoba has been exploited in Israel for industrial use. A plot of uniform Jojoba plants has been produced by tissue culture.

The industrial plant collection in Israel is more extensive than the collection in Egypt. Plant species that are well adapted to the arid climates and salinity conditions of both countries have been identified in both nations. Further development of these species will depend on the potential for successful industrialization of the individual species. The selections of industrial

plant are available in both nations. Their use depends on the development of a commercial demand for their products.

Interchange of information on industrial crop species between the two nations has been limited, but has not slowed the process of plant selection. At this point a more active interchange would be useful to the industrial crop program in both nations. Possible duplication of research activities could be avoided in the project personnel could visit each others' work sites.

The implementation plant is being followed. Considering the great number of years required to industrialize introduced palnts, it is difficult to predict the time frame in which a plant studied in the project will be successfully industrialized. This element of the project should be continued for a period of ten years.

APPENDIX 8

LIST OF KEY INDIVIDUALS AND AGENCIES

APPENDIX 8

KEY AGENCIES AND INDIVIDUALS CONTACTED

San Diego:

El-Assal, Dr. Mohammed -	San Diego State University (SDSU), Program Coordinator, CALAR
Prudhomme, Thomas I. -	SDSU, Technical Coordinator, CALAR
Albers, Harry -	SDSU Foundation, General Manager
Ontell, Dr. Robert -	Executive Director, Fred J. Hansen Institute for World Peace

Washington, D.C.:

Bittner, Dr. Gary -	Near East Bureau, AID/W, NE/TECH
Gooch, Ms. Ann -	Project Officer, Near East Bureau, AID/W

USAID/Cairo:

Radi, Arnold -	Acting Chief, Agriculture and Rural Development
Moore, Frank -	Project Officer, CALAR

Ministry of Agriculture, Egypt:

Wali, Dr. Youssef -	Minister of Agriculture
Kheireldin, Dr. M.A. -	First Undersecretary of Agriculture
Dessouki, Mohamed -	Undersecretary of State, Foreign Relations

CALAR Project Personnel, Egypt:

El-Beltagi, Dr. Adel -	Technical Coordinator; Associate Professor, Ain Shams University, Cairo
El-Barkouki, Dr. Mahmoud -	Principal Investigator (Industrial Crops), Al Azhar University, Cairo
Aboul-Naga, Dr. Adel -	Principal Investigator (Sheep and Goats), Ministry of Agriculture

Rammah, Dr. Ahmed -	Principal Investigator (Forage Crops), Agricultural Research Center, Giza
Hassan, Dr. Mohamed T. -	Director, Forage Research Station, Nubeiria
Governor -	Marsa Matruh Province

Ministry of Agriculture, Israel:

Pohoryles, Dr. Samuel -	Director, Rural Planning and Development Authority

CALAR Project Personnel, Israel:

Mizrahi, Dr. Yosef -	Technical Coordinator; Research Officer, Institutes of Applied Biology, Ben Gurion University, Beer Sheva
Pasternak, Dr. Dov -	Former Technical Coordinator (on leave); Director, Boyko Institute, Ben Gurion University
Forgacs, Dr. Chaim -	Director, Institutes of Applied Biology, Ben Gurion University
Forti, Dr. Meir -	Principal Investigator (Industrial Crops), Ben Gurion University
Aronson, Dr. Jsmes -	Plant Introduction Officer (Industrial Crops), Ben Gurion University
Benjamin, Dr. Roger -	Division of Range Science, Volcani Institute, Bet Dagan
Dovrat, Dr. Amos -	Principal Investigator (Salinity), Hebrew University, Rehovot
Feigin, Dr. Amos -	Salinity Research, Volcani Institute
De Malach, Yoel -	Director, Ramat Negev Experiment Station, Revivim
Seligman, Dr. No'am -	Fodder Research, Department Head, Volcani Institute

APPENDIX 9

BIBLIOGRAPHY OF KEY DOCUMENTS

APPENDIX 9

BIBLIOGRAPHY OF KEY DOCUMENTS

The documents listed were examined in the review process. Copies of these documents are on file with RONCO.

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APPENDIX 10

ITINARARY OF CALAR REVIEW TEAM

APPENDIX 10

ITINERARY OF CALAR MID-TERM REVIEW TEAM

The team consisted of three members: Dr. Earl R. Leng (Leader), Dr. Paul Eberhardt and Dr. Glenn Davis (more detailed information in Appendix 4).

(Sunday) August 26, 1984:	Travel by Drs. Leng and Eberhardt to San Diego, California.
(Monday) August 27:	Conferences with San Diego State University (SDSU) Foundation officials and executive director of the Hansen Trust, in San Diego.
(Tuesday) August 28:	Travel of all team members to Washington, D.C.
(Wednesday) August 29:	Brief orientation at RONCO headquarters. Conference and briefing in Near East Bureau, AID/W. Departure from Washington, via New York and Rome for Cairo.
(Thursday) August 30:	Enroute. Arrival in Cairo 4:00 p.m. Meeting with Dr. el-Beltagy, CALAR Technical Coordinator, Egypt. To hotel.
(Friday) August 31:	Meeting in morning with officials of USAID/ Cairo. Afternoon free.
(Saturday) September 1:	Visits to Al Azhar and Ain Shams Universities, Cairo. Inspection of nurseries at experimental farm. Trip by road through Nile Delta to Alexandria.
(Sunday) September 2:	Visit to Salinity Research Institute, Maryut (near Alexandria). Detailed inspection of field sites and farmers sand dune culture in coastal area east of Alexandria. Return to Alexandria.
(Monday) September 3:	Visits to Nubeiria experiment station (fodder crop nurseries), and CALAR experimental sites at Bourg -el-Arab (sheep and goats), Fouka (fodder shrub plantings) and near Marsa Matruh (field trials on saline soil). Visits to Bedouin sheep and goat operation and farmers' fields. Meeting with Governor, Marsa Matruh province. Over-night in Marsa Matruh.

(Tuesday) September 4:	Visits to CALAR field research site west of Marsa Matruh, and to Bedouin leaders of Beni Ali tribe. Return to Cairo via "Desert Highway."
(Wednesday) September 5:	Departure Cairo 7:00 a.m. to Tel Aviv, Israel; met by Dr. Josef Mizrahi, Israeli Technical Coordinator for CALAR. Visit to Volcani Institute, Bet Dagan (near Tel Aviv). Visit to Agricultural Faculty, Rehovoth. Arrival and over-night in Beer Sheva.
(Thursday) September 6:	Visits to Ramat Negev salinity experiment station (major CALAR site) and inspection of agriculture in Negev Highlands. Visit to Ben Gurion University of the Negev, Beer Sheva, and to industrial crops nurseries near Beer Sheva. In evening, meeting with Bedouin sheikhs and tribal leaders, near Arad. Return to Beer Sheva.
(Friday) September 7:	Meetings with Institute Director and other staff at Applied Research Institute, Beer Sheva. By car, via settled Bedouin area, to Tel Aviv. Meeting with Dr. Samuel Pohoryles, Ministry of Agriculture. Over-night in Tel Aviv.
(Saturday) September 8:	Early monrning departure of Dr. Davis for U.S. Free day (Israeli Sabbath).
(Sunday) September 9:	Work on report and travel arrangement, departure for Cairo.
(Monday) September 10:	Work on report, made further travel arrangements; discussions with SDSU Program Coordinator.
(Tuesday) September 11:	Conferences and completion of draft, main team report. Discussion with Dr. el-Beltagy (Egyptian Technical Coordinator).
(Wednesday) September 12:	Meeting with Dr. Youssef Wali, Egyptian Minister of Agriculture, and other senior officials of Ministry. Preparation of report appendices. Proofreading of typed main report.
(Thursday) September 13:	Proofreading of appendices. Finalized travel arrangements. Took delivery of typed report draft, gave copies to USAID/Cairo and SDSU representative. Meeting with Mr. Radi and Mr. Moore, USAID/Cairo.

(Friday) September 14:	Departure of Dr. Leng, travel to Lincoln, NE.
(Saturday) September 15:	Departure of Dr. Eberhardt, travel to Phoenix, AZ. Free day for Dr. Leng.
(Sunday) September 16:	Free day.
(Monday) September 17:	Drafting of four appendices and final trip documents (Dr. Leng).
(Tuesday) September 18:	Travel to Washington, D.C.; conferences with RONCO officials (Drs. Leng and Davis).
(Wednesday) September 19:	Finalize report draft. Discussions with personnel of Near East Bureau, AID/W.
(Thursday) September 20:	Conferences and briefing on report, AID/W.
(Friday) September 21:	Return to Lincoln, NE (Dr. Leng). Final copies of complete evaluation report submitted to AID/W and USAID/Cairo by RONCO officials.