PDABB328
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AID 1020-25 (10-70)

REPORT U-446

PAGE 1

PROJECT APPRAISAL REPORT (PAR)

1. PROJECT NO. 664-11-995-268	2. PAR FOR PERIOD:	3. COUNTRY	4. PAR SERIAL NO.
PIO/T 664-268-3-00102	6/13/70 TO 5/15/72	Tunisia	72-1

5. PROJECT TITLE

Tunisian Reconstruction (Pump Installation & Chenchou Irrigation Perimeter)

6. PROJECT DURATION: Began FY 1971 Ends FY 1972	7. DATE LATEST PROP	8. DATE LATEST PIP	9. DATE PRIOR PAR
	Not prepared	N/A	N/A

10. U.S. FUNDING	a. Cumulative Obligation Thru Prior FY: $ 200,000	b. Current FY Estimated Budget: $ -0-	c. Estimated Budget to completion After Current FY: $ Zero

11. KEY ACTION AGENTS (Contractor, Participating Agency or Voluntary Agency)

a. NAME	b. CONTRACT, PASA OR VOL. AG. NO.
The Ralph M. Parsons Company	Contract with Min. Agric.

I. NEW ACTIONS PROPOSED AND REQUESTED AS A RESULT OF THIS EVALUATION

A. ACTION (X) USAID	AID/W	HOST	B. LIST OF ACTIONS	C. PROPOSED ACTION COMPLETION DATE
	X		**Recommendation:** In considering The Ralph M. Parsons Co. for any future work in irrigation development, AID should consider only the qualifications of personnel definitely available and not rely on future recruitment since performance on the Chenchou Irrigation Pilot Project was only marginally acceptable due largely to recruiting difficulties and inadequate home office backstopping by Parsons.	

THE ATTACHED REPORTS SUBSTITUTE FOR A REGULAR PAR COVERING THE PERIOD FROM JUNE 1, 1970-MAY 30, 1972, INCLUSIVE.

THE RECONSTRUCTION ACTIVITIES EVALUATED IN THESE REPORTS WERE UNDERTAKEN AS A SUB-PROJECT (664-11-995-268)1) OF THE TUNISIAN RECONSTRUCTION PROJECT, 664-11-995-268 WHICH WAS FINANCED FROM A.I.D. CONTINGENCY FUNDS DURING THE AFTERMATH OF THE DEVASTATING 1969 FLOODS. THESE REPORTS ARE ALSO RESPONSIVE TO AUDIT REPORT 72-21 (AAG TANGIER) IN WHICH AN EVALUATION OF THESE ACTIVITIES WAS RECOMMENDED (RECOMMENDATION # 1). (SEE INTRODUCTARY STATEMENT PP 5-6 OF PAR).

Attachments:
1) Performance Evaluation-Borrower/Grantee Professional Services Consultant, AID 1440-4
2) Inspection of the Chenchou Irrigation Development Perimeter Gabès, Tunisia - January 19-21, 1972.

D. REPLANNING REQUIRED REVISED OR NEW: ☐ PROP ☐ PIP ☐ PRO AG ☐ PIO/T ☐ PIO/C ☐ PIO/P

E. DATE OF MISSION REVIEW: N/A

PROJECT MANAGER: TYPED NAME, SIGNED INITIALS AND DATE: A. W. Plummer

MISSION DIRECTOR: TYPED NAME, SIGNED INITIALS AND DATE: Sumner Gerard 6/15/72

AID 1020-25 (10-70) PAGE 2 PAR	PROJECT NO. PIO/T 664-268-3-00102	PAR FOR PERIOD: TO 6/13/70-5/15/72	COUNTRY Tunisia	PAR SERIAL NO. 72-1

II. PERFORMANCE OF KEY INPUTS AND ACTION AGENTS

A. INPUT OR ACTION AGENT — CONTRACTOR, PARTICIPATING AGENCY OR VOLUNTARY AGENCY	B. PERFORMANCE AGAINST PLAN: UNSATISFACTORY 1	2	SATISFACTORY 3	4	5	OUTSTANDING 6	7	C. IMPORTANCE FOR ACHIEVING PROJECT PURPOSE (X): LOW 1	2	MEDIUM 3	4	HIGH 5
1. The Ralph M. Parsons Co. (Pump Work)					X					X		
2. The Ralph M. Parsons Co. (Irrig. Work)			X									X
3.												

Comment on key factors determining rating

See attached PER

4. PARTICIPANT TRAINING On job locally	1	2 X	3	4	5	6	7	1	2	3	4 X	5

Comment on key factors determining rating

See attached PER

5. COMMODITIES provided by GOT	1	2	3 X	4	5	6	7	1	2	3 X	4	5

Comment on key factors determing rating

See attached PER

6. COOPERATING COUNTRY		1	2	3	4	5	6	7	1	2	3	4	5
	a. PERSONNEL			X									X
	b. OTHER		X										X

Comment on key factors determining rating

a. GOT provided adequate technician grade personnel, but were unable to provide any fulltime engineer level personnel or experienced procurement and expediting personnel.

b. GOT provided all materials and equipment and executed and administered the contract for main construction. GOT was very late (Oct. 1971) in providing dinar support for the irrigation work and slow in mobilizing certain vital machinery. The contractor took approximately 5 to 8 months to do critical work he contracted to do in 2 months.

7. OTHER DONORS N/A	1	2	3	4	5	6	7	1	2	3	4	5

(See Next Page for Comments on Other Donors)

AID 1020-25(10-70) PAGE 3 PAR	PROJECT NO. PIO/T 664-268-3-00102	PAR FOR PERIOD: 6/13/70-5/15/72	COUNTRY Tunisia	PAR SERIAL NO. 72-1

II. 7. Continued: Comment on key factors determining rating of Other Donors

III. KEY OUTPUT INDICATORS AND TARGETS

A. QUANTITATIVE INDICATORS FOR MAJOR OUTPUTS		TARGETS (Percentage/Rate/Amount) CUMULATIVE PRIOR FY	CURRENT FY 72 TO DATE	CURRENT FY 72 TO END	FY___	FY___	END OF PROJECT
(1) Field supervision of installation of water pumping plants	PLANNED	29	29				29
	ACTUAL PERFORMANCE	29	29				
	REPLANNED						
(2) Development of small irrigation areas	PLANNED	1000(A)	200(B)				
a. Distribution system designs (ha.)	ACTUAL PERFORMANCE	0	200				
	REPLANNED						200
b. Distribution system construction supervision (ha.)	PLANNED	600(A)	200(B)				
	ACTUAL PERFORMANCE	0	200				
	REPLANNED						200
c. Rough land shaping (ha)	PLANNED c.	1000(A)	200(B)				
d. Crops established (ha)	PLANNED d.	400(A)	200(B)	0			
	ACTUAL PERFORMANCE c.	0	200				
	ACTUAL PERFORMANCE d.	0	200				
	REPLANNED						200 200

Footnotes
(A) As planned in 11/1970 drafts
(B) 1972 replanned targets.

B. QUALITATIVE INDICATORS FOR MAJOR OUTPUTS	COMMENT:
1. Satisfactory operation	Except for a minor correction at one pump the 29 pumping plant installations have apparently been well installed and all but 9 have been tested satisfactorily
2. a) System design drawings of economical and practical professional quality	COMMENT: A majority of the initially presented design drawings were of inadequate professional quality. After making major revisions the drawings became adequate.
b) Good specifications, work constructed to specifications and completed on well planned schedule.	Specifications were prepared by GOT engineers using their normal standards. Specifications were weak concerning curing concrete and project management was unable to adequately control construction contractor. Contractor took 6 months to complete work scheduled for 2 months.
c) Land shaped to within 5 cm of prescribed elevations.	Leveling was done by government forces that ignored grade stakes, and leveled by eye using bulldozers and road graders.

AID 1020-25 (10-70) PAGE 4 PAR	PROJECT NO. PIO/T 664-268-3-00102	PAR FOR PERIOD: 6/13/70-5/15/72	COUNTRY Tunisia	PAR SERIAL NO. 72-1

IV. PROJECT PURPOSE

A. 1. Statement of purpose as currently envisaged. 2. Same as in PROP? ☐ YES ☐ NO

To supervise the installation of uncompleted pumping plants and to demonstrate the design, construction, and utilization of an American type low-cost surface irrigation system for efficient border irrigation of alfalfa and forage crops while (a) providing increased agricultural production to replace that eradicated by the 1969 floods, (b) providing an operational test of groundwater resources in a new area, (c) providing on-job training of a Tunisian cadre in surface irrigation technique.

B. 1. Conditions which will exist when above purpose is achieved.	2. Evidence to date of progress toward these conditions.
1. Pumping plant installations will be completed.	29 plants have been installed.
2. Special well drilling techniques will be demonstrated.	One well was drilled by GOT crew with air and water through fractured limestone. One well was deepened by drilling through a flint layer that had stopped GOT drilling attempts.
3. Development of 1,000 ha. of replacement irrigation areas will be designed and agricultural production commenced on 300 ha. of area.	Irrigation system on 200 ha. is complete. 130 ha. of area have been planted and land prepared for planting on remaining 70 ha.
4. Groundwater productivity will have been tested by operational pumping.	Operational pumping started about Oct. 25 and has continued as needed without groundwater problems.
5. A Tunisian cadre will be trained in development and utilization of surface irrigation.	Eighteen Tunisians have received some experience and training, but the extent of training has not reached original expectations or numbers.

V. PROGRAMMING GOAL

A. Statement of Programming Goal

To accelerate agricultural production and increase the over-all efficiency of irrigated agricultural production.

B. Will the achievement of the project purpose make a significant contribution to the programming goal, given the magnitude of the national problem? Cite evidence.

It will make a significant contribution as a demonstration in a new area possibly having large future potential, but the production from the 200 ha. pilot project will be very small in relation to country needs.

Introductory statement concerning preparation of a "PAR" covering that portion of the Flood Reconstruction Project performed by the Ralph M. Parsons Company as recommended by the AID Regional Auditor October 28, 1971 and a "PER" as called for in Manual Circular No. 1443.3 dated September 1, 1971.

The Tunisian Reconstruction Project No. 664-11-995-268 provided $2,000,000 of grant funds from the U. S. Government to assist the Government of Tunisia recover rapidly from the devastating effects of the unprecedented floods of September and October 1969. Since this grant was made as an emergency relief measure, regular program documentation was not used in order to expedite recovery from the floods.

Since the Ralph M. Parsons Company had an active engineering office in Tunisia already assisting the Ministry of Agriculture in developing their groundwater development capability, that company was selected to assist the Ministry of Agriculture in the rehabilitation and completion of irrigation areas damaged or delayed by reason of the floods. On June 13, 1970 the Ministry of Agriculture and the Ralph M. Parsons Company entered into a contract to provide 46 man months of American technician time in Tunisia at an estimated cost of $200,000 to be paid by the U.S. Government and 66,185 Tunisian Dinars for Parsons Company local support costs to be paid out of Trust Funds administered by USAID.

The Parsons Company portion of the Tunisian Reconstruction Project was initially conceived as providing American experts to work cooperatively with the irrigation agencies of the Ministry of Agriculture and assisting them in accomplishing their irrigation rehabilitation and development work programs. USAID reserved "the right to approve the terms of the contract, the contractor, and any or all plans, reports, specifications, subcontracts, bid documents, drawings, or other documents related to this contract and the project of which it is a part."

The Minister of Agriculture requested that the Parsons Company provide the technical direction for development of the Chenchou project which might have a potential for irrigating 1,500 hectares. USAID agreed to approve of the Parsons Company providing the technical direction for the development of the first 200 hectares of the Chenchou project as a pilot project and training area. This was to demonstrate a low-cost American irrigation system for surface irrigation of forage crops and to provide an initial base for mobilizing and developing a cadre of Tunisian men and equipment which could then be dispersed to other areas to work on Tunisian rehabilitation and development programs under Parsons Company technical supervision. On November 4, 1970 USAID transmitted a proposed irrigation development agreement to provide the assistance of the Parsons Company on development of 200 hectares at Chenchou, and 800 hectares at other areas plus some miscellaneous rehabilitation activities. On February 11, 1971 Ministry officials requested that the 200-hectare Chenchou Pilot area be covered by a separate agreement, as it would be administered by the Office of Livestock and Pasturage. If this first development was started well, then another agreement would be drawn up for development of lands in the Ghardimaou area and other areas under the administration of the Hydraulic Works agency. The Chenchou Agreement was drawn up April 16, 1971 after many joint Tunisian-USAID discussions on the technical level and was formally approved by USAID and the Tunisian Foreign Office on June 15, 1971.

Since the Chenchou Pilot Project of 200 hectares was beset with many difficulties and delays as mentioned in the following PAR and PER, the original target of development of 1,000 hectares was abandoned and the Parsons Company activity was confined to the Chenchou Pilot Project plus activities in supervising installation of pumping plants on the Oued Nebaana and El Haouaria Projects and miscellaneous rehabilitation work. The following PAR forms have been filled out on the basis of expectations in November 1970, whereas the PER has been confined to the activities actually undertaken by the Parsons Company. Unexpended dollar funds in excess of $38,000 are expected at the termination of the project before June 30, 1972.

AID 1440-4 (7-71) (FRONT) REPORT SYMBOL U-1440/1

PERFORMANCE EVALUATION-BORROWER/GRANTEE PROFESSIONAL SERVICES CONSULTANT

I. CONTRACT DATA

1. CONSULTANT'S NAME AND ADDRESS: The Ralph M. Parsons Company
617 West Seventh Street
Los Angeles, California 90017

2. PROJECT
- LOCATION: Tunisia
- TITLE: Tunisian Reconstruction (General Engineering)

Project Activity No: 664-11-995-268
XXXX GRANT NO.: PIO/T 664-268-3-00102

3. TYPE OF SERVICE
- [ ] DESIGN
- [ ] CONSTRUCTION SUPERVISION
- [ ] PLANNING
- [X] OTHER (Describe) Irrigation System Devel, & Reconstruction
- [ ] RECONNAISANCE

4. TYPE OF CONTRACT
- [ ] FIXED PRICE
- [ ] COST PLUS FIXED PRICE
- [X] OTHER (Describe) Cost + man month fee

5. COMPLEXITY OF SERVICE
- [ ] DIFFICULT
- [X] NORMAL

6. PERIOD COVERED BY EVALUATION
FROM: 6/13/70
TO: 12/20/71

7. DESCRIPTION OF PROJECT: To assist in the reconstruction of flood damaged irrigation facilities and completion of irrigation perimeters. Work has included 14 man months supervising installation of 29 pumping plants and 30 man months designing and managing construction & startup of agricultural operations on the 200 ha. Chenchou pilot irrigation area. The contractor was expected to guide the engineering for (continued on bottom of page)

8. AMOUNT OF ORIGINAL CONTRACT
U.S.$ 200,000
LOCAL CURRENCY EQUIVALENCY 126,000

9. TOTAL AMOUNT OF AMENDED CONTRACT
U.S.$ 200,000
LOCAL CURRENCY EQUIVALENCY 126,000

10. DATE CONTRACT SIGNED 6/13/70

11. SERVICE COMPLETION DATES
ORIGINAL SCHEDULE 8/12/71
AS AMENDED 6/30/72
FINAL OR ACTUAL

12. LIST AND DESCRIBE TYPE AND EXTENT OF SUBCONTRACTING, USE OF JOINT VENTURES, OR USE OF INDIVIDUAL ASSOCIATE CONSULTANTS OTHER THAN IN-HOUSE STAFF.

None

II. PERFORMANCE For Chenchou Irrigation

RATING FACTOR (X)	YES	NO
1. DID OVERALL TECHNICAL PERFORMANCE BY CONSULTANT SATISFY PROJECT REQUIREMENTS AS SET FORTH IN SCOPE OF WORK?	X	
2. DID CONSULTANT'S FINANCIAL RESOURCES APPEAR ADEQUATE FOR PERFORMANCE OF CONTRACT?	X	
3. WAS CONSULTANT'S TOP MANAGEMENT RESPONSIVE AND EFFECTIVE IN PROVIDING SOLUTIONS TO:		
(a) TECHNICAL PROBLEMS?		X
(b) MANAGERIAL PROBLEMS?	X	
4. WAS CONSULTANT ABLE TO EFFECTIVELY COPE WITH OVERSEAS LOGISTICS?	X	
5. DID CONSULTANT SUPPLY A TEAM OF THE REQUIRED CALIBER AS TO NUMBER, BLEND, AND QUALITY OF PERSONNEL?		X
6. DID CONSULTANT'S PROJECT MANAGER AND OTHER OVERSEAS STAFF ADAPT TO ON-SITE CONDITIONS?	X	

RATING FACTOR (X)	YES	NO
7. WAS CONSULTANT'S PROJECT MANAGER:		
(a) QUALIFIED?		X
(b) EFFECTIVE IN WORKING WITH B/G AND OTHER OVERSEAS PERSONNEL?	X	
(c) EFFECTIVE IN HIS PERFORMANCE?	X	X
8. WAS THE CONSULTANT'S PERFORMANCE FACILITATED BY B/G PERSONNEL REPONSIVENESS AND COOPERATION?		X
9. WAS THE CONSULTANT'S PERFORMANCE FACILITATED BY A.I.D. PERSONNEL RESPONSIVENESS AND COOPERATION?	X	
10. WAS CONSULTANT'S LOCAL ASSOCIATE RESPONSIVE AND EFFECTIVE TO THE NEEDS OF THE PROJECT?	-	-

III. OVERALL PERFORMANCE RATING: [ ] OUTSTANDING [X] SATISFACTORY [ ] UNSATISFACTORY

(Continue on reverse)

7. (cont'd): an additional 800 ha. of irrigation system which was not initiated because of delays on the Chenchou Pilot area.

AID 1440-4 (7-71) (BACK)

IV. EXPLANATION OF RATINGS

1. EXPLANATION OF OVERALL PERFORMANCE RATING. *(Give specific reasons for overall rating assigned.)*

See supplement.

2. DISCUSSION OF RATINGS ASSIGNED TO SPECIFIC FACTORS. *(Explain here any qualifying condition that affected the ratings assigned to the specific numbered factors of the Consultant's performance.) (Begin each explanation with number of rating factor to be discussed.)*

See supplement.

V. RATED BY	TYPED NAME	SIGNATURE	
	TITLE *(Typed)*	ORGANIZATION	DATE

VI. RATING REVIEW

1. RATING REVIEWER'S COMMENTS

Concur.

VII. RATING REVIEWED BY	TYPED NAME Gaylord L. Walker	SIGNATURE	
	TITLE *(Typed)* Senior Sector Advisor - AGR	ORGANIZATION USAID/Tunis-AGR	DATE

VIII. ADDITIONAL COMMENTS *(Indicate author of comments)*

8-

AID 1440-4 (7-71) (FRONT) REPORT SYMBOL U-1440/1

PERFORMANCE EVALUATION-BORROWER/GRANTEE PROFESSIONAL SERVICES CONSULTANT

I. CONTRACT DATA

1. CONSULTANT'S NAME AND ADDRESS

2. PROJECT

-LOCATION:

-TITLE:

LOAN/GRANT NO.:

3. TYPE OF SERVICE	4. TYPE OF CONTRACT	5. COMPLEXITY OF SERVICE	6. PERIOD COVERED BY EVALUATION
☐ DESIGN ☐ CONSTRUCTION SUPERVISION	☐ FIXED PRICE		
☐ PLANNING ☐ OTHER (Describe)	☐ COST PLUS FIXED PRICE	☐ DIFFICULT	FROM:
☐ RECONNAISANCE	☐ OTHER (Describe)	☐ NORMAL	TO:

7. DESCRIPTION OF PROJECT:

8. AMOUNT OF ORIGINAL CONTRACT	9. TOTAL AMOUNT OF AMENDED CONTRACT	10. DATE CONTRACT SIGNED	11. SERVICE COMPLETION DATES ORIGINAL SCHEDULE	
U.S.$ LOCAL CURRENCY EQUIVALENCY	U.S.$ LOCAL CURRENCY EQUIVALENCY		AS AMENDED	FINAL OR ACTUAL

12. LIST AND DESCRIBE TYPE AND EXTENT OF SUBCONTRACTING, USE OF JOINT VENTURES, OR USE OF INDIVIDUAL ASSOCIATE CONSULTANTS OTHER THAN IN-HOUSE STAFF.

II. PERFORMANCE For Pumping Plant Installation

RATING FACTOR (X)	YES	NO
1. DID OVERALL TECHNICAL PERFORMANCE BY CONSULTANT SATISFY PROJECT REQUIREMENTS AS SET FORTH IN SCOPE OF WORK?	X	
2. DID CONSULTANT'S FINANCIAL RESOURCES APPEAR ADEQUATE FOR PERFORMANCE OF CONTRACT?	X	
3. WAS CONSULTANT'S TOP MANAGEMENT RESPONSIVE AND EFFECTIVE IN PROVIDING SOLUTIONS TO: (a) TECHNICAL PROBLEMS?	X	
(b) MANAGERIAL PROBLEMS?	X	
4. WAS CONSULTANT ABLE TO EFFECTIVELY COPE WITH OVERSEAS LOGISTICS?	X	
5. DID CONSULTANT SUPPLY A TEAM OF THE REQUIRED CALIBER AS TO NUMBER, BLEND, AND QUALITY OF PERSONNEL?	X	
6. DID CONSULTANT'S PROJECT MANAGER AND OTHER OVERSEAS STAFF ADAPT TO ON-SITE CONDITIONS?	X	

RATING FACTOR (X)	YES	NO
7. WAS CONSULTANT'S PROJECT MANAGER: (a) QUALIFIED?	X	
(b) EFFECTIVE IN WORKING WITH B/G AND OTHER OVERSEAS PERSONNEL?	X	
(c) EFFECTIVE IN HIS PERFORMANCE?	X	
8. WAS THE CONSULTANT'S PERFORMANCE FACILITATED BY B/G PERSONNEL REPONSIVENESS AND COOPERATION?	X	X
9. WAS THE CONSULTANT'S PERFORMANCE FACILITATED BY A.I.D. PERSONNEL RESPONSIVENESS AND COOPERATION?		X
10. WAS CONSULTANT'S LOCAL ASSOCIATE RESPONSIVE AND EFFECTIVE TO THE NEEDS OF THE PROJECT?	-	-

III. OVERALL PERFORMANCE RATING: ☐ OUTSTANDING ☒ SATISFACTORY ☐ UNSATISFACTORY

(Continue on reverse)

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AID 1440-4 (7-71) (BACK)

IV. EXPLANATION OF RATINGS

1. EXPLANATION OF OVERALL PERFORMANCE RATING. *(Give specific reasons for overall rating assigned.)*

2. DISCUSSION OF RATINGS ASSIGNED TO SPECIFIC FACTORS. *(Explain here any qualifying condition that affected the ratings assigned to the specific numbered factors of the Consultant's performance.) (Begin each explanation with number of rating factor to be discussed.)*

V. RATED BY	TYPED NAME	SIGNATURE	
	TITLE *(Typed)*	ORGANIZATION	DATE

VI. RATING REVIEW

1. RATING REVIEWER'S COMMENTS

VII. RATING RE-VIEWED BY	TYPED NAME	SIGNATURE	
	TITLE *(Typed)*	ORGANIZATION	DATE

VIII. ADDITIONAL COMMENTS *(Indicate author of comments)*

Attachment A to M.C. 1443.3
(TL 13:474) 9-1-71

AID 1440-8 (7-71) (BACK)

IV. EXPLANATION OF RATINGS

1. EXPLANATION OF OVERALL PERFORMANCE RATING. *(Give specific reasons for overall rating assigned.)*

See supplement.

2. DISCUSSION OF RATINGS ASSIGNED TO SPECIFIC FACTORS. *(Explain here any qualifying condition that affected the ratings assigned to the specific numbered factors of the Consultant's performance.) (Begin each explanation with number of rating factor to be discussed.)*

See supplement.

V. RATED BY	TYPED NAME	SIGNATURE	
	A.W. Plummer	A.W. Plummer	
	TITLE *(Typed)*	ORGANIZATION	DATE
	Agricultural Engineering Advisor	USAID/Tunis - AGR	5/30/72

VI. RATING REVIEW

1. RATING REVIEWER'S COMMENTS

Concur.

VII. RATING REVIEWER BY	TYPED NAME	SIGNATURE	
	Gaylord L. Walker	G L Walker	
	TITLE *(Typed)*	ORGANIZATION	DATE
	Senior Sector Advisor - AGR	USAID/Tunis-AGR	5/30/72

VIII. ADDITIONAL COMMENTS *(Indicate author of comments)*

Performance Evaluation Report - 5/25/72

1. Contractor's technical and managerial performance in supervising pumping plant installations has been highly satisfactory and considered to be better than average. Work production has been satisfactory, but could have been materially increased if the Grantee had been more expeditious in providing support materials, equipment, and technicians with higher learning potential.

The Contractor's performance in design of the 200-hectare irrigation system for the Chenchou government forage farm was unsatisfactory until after a series of meetings with AID and GOT engineers produced satisfactory designs in July and August 1972. Construction supervision of the irrigation system and land shaping has been weak as the Grantee's staff has generally done the land shaping their own way and the specifications and contract supervision have been largely performed by the Grantee's staff using their own practices. The construction contractor is far behind schedule. The agricultural start-up operation was delayed several weeks primarily because of delays in obtaining farm tractors with three-point hitches and because of a one-week pump failure. This delayed successful planting of the alfalfa and other forage crops from October 1971 until the spring of 1972 for the first 130 hectares and may delay planting of the last 70 hectares till the fall of 1972.

IV-2.

Item 1. The Contractor's designs for the irrigation distribution system were unsatisfactory until after a series of conferences with AID and Grantee engineers remedied the deficiencies in July and August 1971. The plan to have the Grantee's forces shape land for border irrigation by American methods was not followed and the land was rough leveled with bulldozers and road graders by eye as Tunisians have done in the past instead of being controlled by working off cut and fill stakes and using scrapers to move the earth. After about 60 per cent of the rough leveling was completed, the Tunisians claimed that they had no operators that could level earth to close tolerances with a scraper.

Items 3, 5, 6, and 7. Staffing problems were brought to the attention of the Parsons home office on January 20 when Mr. W. Johnson, Assistant Manager, Systems Engineering Division, was in Tunis and discussed project requirements. This was again brought to his attention by letter of March 18, 1971 after which promises were made that careful attention would be given to correct inadequate staffing. Although subsequent action represented a degree of responsiveness by top management, it was not adequate to the needs of the project. Further details are outlined in the following paragraph.

The deficiencies in the Contractor's performance were largely due to the inability of the Contractor to initially recruit a qualified irrigation engineer. Recruitment started in late summer of 1970. By the end of

November no suitable candidate was recruited. At that time a high school graduate with 16 years of irrigation system maintenance and water master experience along with private irrigated farming and some land shaping experience was recruited with AID and GOT approval. He was to assist primarily in land shaping and irrigation start-up operations. He arrived in Tunisia January 8, 1971 to join the well driller-pumpist technician and the Project Manager who were held over from the Contractor's previous well drilling and pump setting training program. The Project Manager was primarily a well drilling and construction engineer. Delays in land acquisition and uncertainty as to when the Tunisian construction funds would become available made the Contractor's Project Manager reluctant to press for the fourth member of his team, the irrigation engineer. In January 1971 USAID Project Manager verbally urged the Contractor's home office Assistant Manager, Systems Engineering Division, to continue to recruit a well qualified irrigation engineer. The Contractor's Project Manager was very competent as a manager on well drilling and had several years' management experience in Tunisia. However, he was not competent technically to manage an irrigation system design and agricultural development program without a qualified irrigation engineer. He proceeded with his new irrigation technician (designated Irrigation Engineer) to design the irrigation system. By the end of February it was apparent to USAID that they were not qualified to design the irrigation system. USAID informed the Contractor's home office and local Project Manager of this on March 18. On May 13 the Project Manager presented some sketchy design drawings at a meeting with Grantee and USAID, but they were generally unacceptable and incomplete. On May 18 the Contractor presented a report with some improved drawings to the Grantee and USAID, but the structure designs were still inadequate. On May 6 USAID and Grantee approved the nomination of an irrigation engineer. He arrived in Tunisia on May 27. He had very little knowledge of French. On June 11 the Contractor's Project Manager departed for the U.S. for medical check up and home leave, leaving the new Irrigation Engineer as Acting Project Manager. In June the Grantee prepared construction specifications and issued call for construction bids which were opened July 20, 1971. The new Irrigation Engineer, with some assistance from USAID and Grantee, produced satisfactory project designs by mid-September. The Grantee ordered the construction contractor to proceed in mid-August with 60 days to finish the work, but changed the starting date to September 13 because of revisions in construction drawings. During the period July through September 1971, the Contractor's trilingual Tunisian office manager-interpreter was on sick leave most of the time. The Project Manager returned from home leave August 1, but left for a new assignment August 29. In order to stretch out available dollar funds to extend project coverage through the first agricultural season, the driller-pumpist departed July 28, 1971 and the irrigation technician (Irrigation Engineer) left September 15, 1971. Hence, the Contractor's team never jelled as an integrated team and no short-term technical backstopping or assistance was forthcoming from the Contractor's home office to help it over its emergency needs. The Contractor's Irrigation Engineer and present Project Manager inherited both

the technical and managerial responsibilities for the project almost immediately upon arrival and before becoming familiar with local practices, personnel, and language. The work load prevented him from giving detailed attention to all aspects of the work and the Grantee's technicians and engineers proceeded to use their own practices and standards for major elements of the work. As the project has progressed and the latest manager has become familiar with the working situation, material improvement has been evident in the project management.

As a consequence of the foregoing, the Contractor's over-all performance in irrigation development was generally weak, although it now appears that by the fall of 1972 the Chenchou project of 200 hectares can be completely cropped and in operation with the flood protection and electrification of the pumps, the only major unfinished items. The cost of the Contractor's engineering and management services to April 21, 1972 for the 200-acre Chenchou pilot development is approximately $117,000 plus about $100,000 equivalent in local currency support costs, which are excessive for the results obtained.

Item 8. The Contractor's performance on the Chenchou pilot area was slowed by a number of Grantee actions which caused major uncertainties and delays, drastically reducing the Contractor's efficiency. When conceived in July 1970, the irrigation development on the pilot area at Chenchou was to be done on private land by government forces under agreements with the landowners in order to provide substitute irrigation areas to compensate for agricultural production losses due to flood eradication of other irrigated farming. On November 4, 1970 USAID, at Grantee's request and with the Contractor's assistance, presented a draft of an agreement to the Ministry of Agriculture describing the expected activities of the Contractor and Grantee. This appeared to be satisfactory to the Grantee and signing was apparently held up until the Tunisian supporting budget for 150,000 Dinars ($285,000) was approved for carrying out the activities. The budget was approved early in January. About February 10, 1971 a new Tunisian law was passed permitting government expropriation of unirrigated lands for government irrigation projects under special conditions. On February 24 the Grantee stated its intention to expropriate the Chenchou land for a government livestock and forage station. The Grantee shifted primary responsibility for the Chenchou development from the irrigation agency to the government livestock and pasture service, while leaving other proposed activities with the irrigation service. After many meetings by all concerned, an agreement was signed on June 15, 1971 concerning development of a 200-hectare pilot irrigation development at Chenchou. Detailed topographic surveys and land clearing started about this time.

The regular government budget for the Chenchou pilot area provided for 150,000 Dinars of which only 75,000 D. could be paid in 1970 and the rest would be paid later. The 75,000 Dinars did not actually become available

to the project management until released by the Treasury on October 2, 1971. A special 20,000-Dinar Trust Fund for the project became available in July. Time lost in program discussions, technical approval discussions, searching for appropriate materials and equipment, and in the general administrative complications and traveling back and forth to Tunis greatly depleted the Project Manager's time for doing the technical work and directly managing the field activities. The Grantee never supplied full-time Tunisian engineers in the field office as contemplated, thus increasing the over-all burden on the Contractor's team.

Inspection of the
Chenchou Irrigation Development Perimeter
Gabes, Tunisia

January 19-21, 1972

An inspection of the Chenchou Project was made January 19, 20 and 21, 1972 in accordance with Paragraph III b) of the Agreement on Irrigation Development, dated April 16, 1971, which reads as follows: "III b) Inspection A joint team of personnel not assigned to the project, designated by the USAID and the Ministry of Agriculture, will conduct a detailed inspection after 6 months. The team will recommend to the Ministry of Agriculture the continuation, modification or termination of the project."

Assigned to make this review were the following named personnel:

GOT M. Mohamed El Hedi Barkia, Coordinateur du Projet
M. Khemais Alouini, Chief Engr. of G.R. and R.E.P.I.
M. Mahmoud Ghelici, Chef de la Division de la Prod. Animale

USAID M. Orvil Godman, AGR - Project Manager, Acc. Livestock Project
M. Paul Corak, Irrig. Adv., Acc. Livestock Project

M. Alouini and M. Ghelici were unable to participate. M. Alouini appointed M. Khelifa Frikha, Engr. Chef du Bureau des Etudes, H.A.R., who in turn was unable to attend. Thursday morning, the group met M. Taoufik Acoundlah, Civil Engineer, R.E.P.I. for the Gabes, Gafsa, Medenine Gouvernorats, who agreed to participate in the inspection.

The team left Tunis at 0900 hours and arrived in Gabes at 1700 hours, going directly to the new Chenchou office located at 25, Rue Mohamed Ali, Telephone Nos. 196 and 234. Here, with M. Daniel McLellan, Manager, Parsons Company, Chedli Slama, Farm Manager and Co-Director of the Project, and M. Amor Medimegh, Parsons Company interpreter, a work schedule and an inspection and discussion outline was agreed upon for the next two days as follows:

I. Training

II. Infrastructure

a) Contractor
b) Windbreaks
c) Leveling
d) Construction of roads
e) Diversion Drainage
f) Electricity
g) Sondage and Equipment
h) Buildings

III. Agronomic

a) Farming equipment
b) Chiendent control
c) What has been carried out

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d) Results of what has been carried out
e) Pressures met with
f) Future recommendations
g) Establishment of schedule in carrying out work still to be done

IV. Miscellaneous Problems

a) Land owner problems
b) Pollinization
c) Weather observations
d) Study of water table for determination of aquifer potential
e) Machine maintenance specialist

V. Cost Estimates

VI. Recommendations for Continuation, Modification or Termination of the Project

Thursday, January 20, 1972, Mr. Aoumaliah, C.E., R.E.P.I., joined the group for on-site review and inspection of the work completed and in progress. This field trip revealed that sixty (60) hectares of the total perimeter had been seeded to alfalfa. Of this seeded area, fifty (50) hectares were irrigated twice. Irrigation was in progress using a 110-liter-per-second head of water from Well No. 8. Well No. 4 was operative, but canalization was not completed. The contractor was working on the vertical-sided supply ditch near its junction with the buried conduit from Well No. 8 and on Secondary No. 2. Farm roads had been graded and windbreaks were about 60% completed.

Drifting sand, cold weather, wind, drought or birds, or a combination of all five had eliminated the 30-hectare stand of alfalfa reported in early November and had prevented survival of an additional 30 hectares seeded later. All will have to be reseeded in the Spring of 1972 as weather permits (March). A motor patrol was constructing the earthen lateral irrigation supply ditches in the northwestern sector. Three additional laterals remain to be built (approximately 1500 meters). Two land planes were continuing operation in this area also.

The group returned to Gabes where the afternoon, evening and morning of the following day were spent discussing facts and studying records in accordance with the outline established.

I. Training

The Prodg sets forth the creation of a Tunisian task force as one of the two objectives of this project.

The Agreement proposed that a task force of Tunisians be mobilized and trained to introduce and install water management methods in other irrigated areas of Tunisia.

The inspection team finds that while some good training was provided to at least 19 GOT technicians, that a Tunisian task force was not created. Training was provided to GOT technicians as follows:

2 Agents Techniques, PAV
3 Adjoints Techniques, HAR
5 Agents Techniques, HAR
4 Irrigation Specialists, OMVVM
1 Adjoint Technique, M. Chedli Slama (Co-Director of Proj.), OEP
1 Ingenieur, M. Barkia, Coordinator of Project, OEP
1 Ingenieur, Khelifa Frikha, Engineering Staff of HAR
1 Ingenieur, Tacufik Acunallah, in charge of all work in three gouvernorats for R.E.P.T.
1 Ingenieur, M. Zribi, Agronomist, HAR

Two of the above named trainees are no longer working for the GOT. One Adjoint Technique from HAR, trained in inspection work, and went to work in Libya, and one Ingenieur, M. Zribi, transferred and is now teaching in a school in Moghrane near Zaghouan.

Comments and Suggestions

It is the inspection team's opinion that the mobilization and training of a Tunisian task force in irrigation methods proposed in the Agreement represents a critical need in Tunisia. Since this objective has not been realized to date, we believe the following points are pertinent to future success of any irrigation training program in Tunisia:

1. The GOT should assign Ingenieurs, Adjoints Techniques and Agents Techniques with specific criteria and instructions to create such a task force. The Tunisian Ingenieurs assigned must have capability in civil or agricultural engineering, agronomy, soils characteristics and irrigation land use, and would form the nucleus of an organization with complete control of all phases of the project from start to finish.

2. The USAID Mission should furnish Civil or Agricultural Engineers, Soil Scientists and Agronomists trained in irrigation land use with specific directions on providing technical guidance and administrative management leadership to mobilize and train the Tunisian task force.

II. Infrastructure

a. Contractor - M. Bouchamaoui et Freres, local contractors of Tunis, were awarded the contract for constructing the main supply ditch, complete with the division structures and supply lines from Wells Nos. 4 and 8 for 35,000 dinars. The work started on September 13, 1971 and was scheduled for completion in 60 days. Delay in delivering the final plan of execution plus 7 days added for inclement weather extended the contract time to January 1, 1972. A difference of opinion exists on the time for completion of the contract. Mr. Plummer, C.E., USAID, recognizes only the 7-day extension added for inclement weather, thus ending the contract time on November 20, 1971.

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Included in the provisions of the contract, but not in the contract time, is work awarded to the contractor to construct housing for the pumps and motors. The Regional HAR department (Mr. Aounallah, C.E.) estimated that the contractor could finish all of the contracted work by the end of February 1972.

Necessary items of hardware, such as the swan necks to connect Well No. 4 to the line and the cooling tubes have not been furnished the contractor. It is understood at this date that the coolers are in Tunisia awaiting transportation.

It should be noted that a penalty clause exists in the contract.

With the exception of the buried conduit from Well No. 8, the finished work of the contractor appears good. His equipment, prefabricated concrete forms, mixers, vibrators, water tanks, and front-end loaders are very good as is the aggregate and sand used in the concrete. The inspection is performed by Brahim Beldi, A.T., HAR, who is apparently controlling the quality of constructions adequately. Twelve to 14 sections of the vertical-wall supply ditch were substandard and were redone.

One hundred and seventy-six meters of buried conduit referred to above from Well No. 8 were installed above designed grade and it will be necessary to remove the pipe and excavate to the required grade.

b. Windbreaks - The soils in this 200-hectare perimeter consist of loamy sand with some areas of sandy loams. Therefore, wind erosion is a critical problem and must be controlled.

Project plans for windbreaks are as follows:

(1) Two 4-row east-west outside perimeter plantings consisting of accassia and eucalyptus will be made.

(2) Four 2-row north-south plantings are being made consisting of the same species.

(3) Single-row plantings of reeds (cane de provence) will be made along the tertiary canals.

(4) The above will result in the multiple-row plantings around the boundaries with the single-row plantings generally at right angles to the two-row plantings. This will leave about 500 meters between each multiple-row planting and the single-row planting will be spaced approximately 150 meters apart.

(5) These plantings are about 60% completed and it is proposed to finish them by March 1972.

(6) Single rows of cyprus or Tamarix will also be planted in a north-south direction.

(7) See attached diagram for layout.

Comments and Recommendations

a. Manure at the rate of 20 tons per hectare has been applied on 35 hectares and the plans called for manure on the entire perimeter. An additional 1,300 tons will be available from the Borj El Amri Farm. However, trucks will be needed for transportation from the Farm to Tunis railroad and again from Gabes to Chenchou. The entire area should be manured if possible because it provides organic material needed in this sandy soil as well as aiding in wind erosion control. Sandy soils need organic material to make effective use of mineral fertilizers. However, it was agreed that if the manure could not be obtained, seedings in March should proceed as scheduled.

b. Tree and shrub windbreaks reduce evapotranspiration and will provide adequate protection for a distance of about ten times their height. Based on this a row of eucalyptus trees, 12 meters in height, will furnish protection from the wind for about 120 meters into the field. After the alfalfa is established, it will provide much of its own protection and the system planned for this project should prove adequate.

However, it will take several years for the tree and shrub barriers to reach effective height. Therefore, immediate control of wind erosion during establishment of the alfalfa is the primary need at this time. Temporary emergency wind barriers or fences of reeds, brush, palm branches and other materials to stop the wind and drifting sand may be necessary, because most of the 200 hectares disturbed by land grading have not been covered by irrigation.

The inspection team finds that considerable research on the subject of windbreaks for irrigated perimeters in this area has been done by PNUD FAO No. 17 at Ouled M'Hamed. Their findings are published in Note Technique No. 4 dated September 1970 and can be used as reference in establishing future windbreaks. Research at the Ouled M'Hamed Station also indicates favorable results from the use of Atriplex and Tamarix in windbreaks.

c. Leveling - Carryalls were not used in the land leveling program. One was transported to the job but never used. Land shaping for irrigation was done entirely with bulldozers, motor patrol and land planes without benefit of control by surveyed construction stakes.

The cost of jujubier brush removal was 8,000 dinars and the land shaping with heavy equipment was 17,000 dinars. This does not include the cost of planing by farm tractors pulling Eversman 410 landplanes.

Equipment such as the 'dozer, motor patrol, and land plane are normally used only in the finished work. They do not pick up and transport material cleanly from a point of cut to a point of fill on a predetermined grade. Rather, they drag, push or pull the earth, loading and unloading, not as the need dictates, but by force of gravity, a full blade, or various other forces.

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Mr. McLellan staked, surveyed and planned a unit of land for leveling, but was informed by the equipment operators of the Regie du Material Hydraulic that they were unable to work to construction stakes.

Other problems were also encountered. The first tractor arrived on July 9, the second on July 22, the third 15 days later, but by then the second was already broken down.

Leveling to a planned grade would have provided the benefit of a uniform slope in the direction of irrigation, would have controlled the side slope better and would permit a near constant length of run throughout the 200 hectares. The present length of run varies from 100 to 200 meters.

It was agreed by all present that any future land leveling should be accomplished with a carryall to grid stakes marked with cut and fill.

d. Construction of Roads - All roads have been completed. Suggestions that the center of the road be elevated to permit drainage or that depressions be shaped on the edges of the road to facilitate drainage were discussed. All agreed that this would invite erosion by concentrating the moving water. It is better to leave them flat and to reshape them periodically to remove ruts or small channels.

e. Diversion Drainage - Definite plans to divert the runoff storm water from a large watershed above the irrigated perimeter have not taken shape at the time of our review. It will be a channel, a bank or dyke or a combination of both, and will divert the water into natural stream channels. The need exists. The heavy 1-hour rainfalls of last October caused extensive damage by erosion.

This work should be planned and scheduled at an early date. Mr. McLellan plans to discuss it with M. Frikha the first week of February.

f. Electricity - Electricity should be installed at the earliest opportunity. It will be cheaper to operate and requires less maintenance and repair. The cost to the GOT was estimated at 6,500 dinars for three transformers and installation cost from transformer to pump. The need is now reduced to two transformers. STEG will bear the cost of bringing the line to the transformers. STEG has the specifications for the electric installation.

g. Sondage and Equipment - Well No. 4 is equipped with a CUMMINS Diesel 160 H.P. and 100 H.P. electric motors. The Diesel motor will act as a primary source of power until electricity is installed and then will be relegated to a secondary or emergency source of power. Well No. 8 is equipped with a 160 H.P. CUMMINS Diesel. Obtaining a new gear head for the pump and installing the electric motor similar to Well No. 8 will not be attempted. Rather, the electric motor will be selected to replace the Diesel.

h. Buildings - The exact location and the size of necessary buildings have not been agreed upon. 8,500 dinars have been allocated to construct an office, a machine shed and a silo or granary for storing seed. It was suggested for Mr. McLellan to visit the El Grine Nursery to view the combination granary and machine shed there.

III. Agronomic

a. Agricultural Equipment - Of the 30,000 dinars allocated, expenditures of 8000 have been made. Mr. McLellan and Mr. Slama are planning to buy a Massey-Ferguson 185 of McCormick 434 with 3-point hitch - mowing machines - hay bailers, small combine, two-way plows, etc.

A strong recommendation was made to secure an alfalfa-grass seed drill such as a Nesbitt or Brillion. Preference was placed on the Nesbitt with its depth control bands; however, its purchase would require six months' delay where immediate possession is possible with a 3-point hitch Brillion.

b. Chiendent Control (Cynodon dactylon) - Recommendations for soil and seed bed preparation for alfalfa always call for the elimination of chiendent before planting the alfalfa. This has been partially accomplished but some of this grass remain. However, it is the inspection team's opinion that the remaining grass has a stabilizing effect on the soil against wind erosion and extensive efforts now to eradicate it completely are unnecessary at this time. As soon as the alfalfa is established it can successfully resist competition from this grass and crowd it out. Excessive cultural operations at this time would only serve to make the soil more susceptible to wind erosion.

c. What has been carried out - Sixty hectares have been seeded to alfalfa and 35 hectares have been covered with manure at a rate of 20 tons to the hectare transported from the Borj El Amri Farm at a total cost of 6-7 dinars per ton. Phosphate fertilizer was applied to this area, and 50 hectares have been irrigated two or more times.

d. Results of what has been carried out - All area seeded will have to be reseeded in March. The phosphate fertilizer is still available to another seeding. Manure applied is valuable not only as fertilizer and soil conditioner but will make the commercial fertilizer applied much more available to the alfalfa plants. The state of the soil is good. Land that has been irrigated two or more times should be reworked, regraded with a land plane until all but acceptable side slopes within the 11-meter border spacings have been eliminated, preirrigated, if needed, and planted to alfalfa.

It was agreed that alfalfa should not be seeded over the entire perimeter the first season. A minimum surface area of 70 hectares was set, increasing the area of seeding only if it were found practical to irrigate a larger area frequently enough to maintain optimum growth.

Areas not seeded to perennial crop of alfalfa should be considered for an annual crop where forage could be obtained for one or more cuttings and the last cutting plowed under as a green manure crop. The choice could be sudan grass, barley, or perhaps a suitable annual pulse could be planted. Irrigation would be practiced but priority given to the water needs of the alfalfa.

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This would serve several purposes: (a) Hold the soil from wind erosion; (b) permit irrigation to settle the shaped land prior to reshaping for a perennial alfalfa crop; (c) return a green manure crop to the soil; (d) provide one or more cuttings for forage.

e. Pressures met with - Some of the circumstances that hindered work progress were listed by the Parsons people as: (1) The agreement was not signed until June 15th, after which time the trust fund was available. Prior to that date there was no money to spend. (2) The GOT funds of 150,000 dinars were available on November 13th. Until then Parsons paid labor, manure costs and other small purchases from the trust fund. (3) There was a delay due to Regie du Materiel Hydraulic. (4) Another delay when the HAR topographers were not on the job on schedule to set boundaries, and make precision surveys for ditches and leveling. (5) The topographers were absent for 15 days in July. (6) Underestimating delay and cost of jujubier brush removal of 8,000 dinars at a rate of 7.75 dinars per hour. (7) The time limit set for the Contractor was too short.

f. Future Recommendations - It was recommended that seeding of alfalfa be limited to an area that could be maintained. A goal of at least 70 hectares in one season is presented. Also that no area be seeded to a perennial crop until after it had been irrigated two or more times and reshaping has followed the final irrigation. That seeding alfalfa this spring be over a period of 60 days in March and April, taking into consideration INRAT climatic records. That Well No. 4, the hot well, be used for irrigation only until a cooling system has been installed. That preirrigation precede all seedings where necessary.

g. Establishing a Schedule in Carrying out Work to be done - Establishing a crop of alfalfa over the entire 200 hectares accomplished by October 1972 if feasible.

IV. Miscellaneous Problems

a. Land Owner Problems - To date, the owners have not been paid for the land used in the 200-hectare perimeter. It was explained that, in many cases, land owners claiming reimbursement could not show legal title.

Work on the irrigation development has not been interfered with as a result of the foregoing. The Parsons people have given priority to give work to those land owners. Approximately one half of their work force is presently selected from this group.

The team recommends that such land ownership problems should be solved as soon as possible.

b. Pollinization - Mr. Chedli Slama reported that bees would be brought in from the Borj Toum ranch for pollinisation purposes when sufficient plant life is established to sustain them.

c. Weather Observations - The team recommends that a weather station be established in the Chenchou area and that data obtained should be sent to the Meteorological Department for interpretation.

d. Study of Water Table for Determination of Aquifer Potential - The team recommends that a systematic method of monitoring the aquifer be initiated and that data gathered therefrom be submitted to the Department of Water and Soil Resources for interpretation.

A more precise continuous reading gage could be constructed by drilling 5 cm diameter piezometer holes into the aquifers of Wells Nos. 4 and 8. The cost is estimated at approximately 2,000 dinars per installation. These piezometers are to be constructed by the Department of Water and Soil Resources.

The information supplied by this piezometer installation would be of paramount importance to further development of this irrigated perimeter.

e. Machine Maintenance Specialist - A definite need exists for expertise in maintaining and operating machinery. Suggestion is forwarded to see if the Peace Corps could finish such a specialist to train mechanics and machine operators.

V. Cost Estimates

The inspection team has assembled the following cost estimate for irrigation development to date of the Chenchou Project, exclusive of land costs:

a.	Drilling and casing of Wells Nos. 4 and 8	TD 13,638
b.	2 electric pumps and motors	12,000*
c.	Electric lines	6,500
d.	Irrigation distribution system:	
	(1) lined ditches (contract)	35,000
	(2) windbreaks	3,000
e.	Land leveling, roads and drains	17,000
f.	Jujubier brush removal	8,000
g.	Overhead and general expenses	3,000**
	Total	TD 98,138

Cost/Hectare $\frac{98,138}{200} = 495^{D}690 = \text{TD } 496$

* Diesel stand-by motor 4,000 D has not been included for this cost estimate.

** Taken directly from ProAg (no verification).

VI. Recommendations

Summary of the recommendations of this inspection.

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The ProAg requests this inspection team to determine the continuation, modification or termination of this project. Following the outline used to describe the objectives, we make the following recommendations in two parts, identified with Section I a. and b. of the Agreement:

Ia. The team finds that despite the setbacks and delays encountered in installing this irrigated perimeter, a viable infrastructure and base have been established which make it possible and practical to continue operations until the 200 hectares of alfalfa on the pilot area are established. This can be accomplished by October 1972 if development proceeds as suggested by this inspection.

The team recommends that the project continues in cooperation with USAID. Although Parsons contract ends on April 21, 1972, the Agriculture Division of USAID agrees to continue to provide the technical assistance required by this project.

On the other hand, the inspection team does not have enough basic facts at this time to determine the feasibility for future development of industrial production and processing of alfalfa or if the best economical utilization of production would be in alfalfa, hay, seed or pellets. The team recommends the Ministry of Agriculture and USAID explore the possibility of obtaining an industrial specialist to study pelleting or other uses of alfalfa.

If the present 200-hectare perimeter is expanded as anticipated by the ProAg, a thorough evaluation of the technical requirements and commodities will be required as:

a) Diversion protection for entire expansion perimeter.

b) Equipment to include motors, pumps, pipes and hardware for wells.

c) Acquisition of land.

d) Studies of the effect of continued irrigation upon the salinization of the soil, the water table and the effect on adjoining water developments, the sedimentation and leaching problems.

As soon as these requirements have been met, it is recommended to expand the project.

Ib. Reference is made to the training section (I) of this report for the basic findings and comments of the inspection team. To summarize, we believe that the training of the task force visualized in the Agreement has not been realized. Such a task force could only be established within a vertically

organized agency having the full responsibility of perimeter construction work (as the Regie des Perimetres Publiques Irrigues). Such an agency being the only one capable of establishing a homogeneous task force covering all the activities related to irrigated perimeter development.

USAID: Orvil Godman Date 28 March 72

Paul Corak Date 28 March 72

TUNISIAN GOVERNMENT: Mohamed El Hedi Barkia
Engineer, Project Coordinator, O.E.P.

Date 28 Mars 72

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