

ISN - 31503  
6030001/15  
PS-AAN-210

UNCLASSIFIED  
CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-447

1. PROJECT TITLE  Water Resources & Soils Analysis			2. PROJECT NUMBER 603-0001	3. MISSION/AID/W OFFICE Djibouti
			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) <u>603-83-02</u>	
			<input checked="" type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION	
5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING	
A. First PRO-AG or Equivalent FY <u>78</u>	B. Final Obligation Expected FY <u>81</u>	C. Final Input Delivery FY <u>83</u>	A. Total \$ <u>542,000</u>	7. PERIOD COVERED BY EVALUATION From (month/yr.) <u>11/81</u> To (month/yr.) <u>3/83</u>
			B. U.S. \$ <u>542,000</u>	Date of Evaluation Review <u>12 March 1983</u>

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
J. Outstanding Actions under the Project		
A. Provide supplemental Lab equipment, presently under order, namely, Ierkins-Elmer compressor, conductivity meter. If necessary obtain extension of PACD to 6/30 and amend PIO/C accordingly	USAID/AID/W USDA, REDSU	March 83
B. Furnish computer software procured under PIO/C 90013 (A)	USAID/AID/W	March 83
C. Submit RDA Final Report, maps (English/French) to MADR	USAID/RDA	May ' 83
II. Post Project Actions :		
A. Technical assistance to be furnished by USDA Soil conservation service 1983 thru 1985 under AID ST/AGR PASA with Soil Management Support Service (SMSS)		
1. Two three week TDY's annually by a Soil Scientist from the National Soil Survey Laboratory (NSSL) to assist the Djiboutian Soil & Water Lab technician(s) in interpretation of resulting lab analyses	USAID USDA	March 83 Nov 83 March 84 Nov 84 April 85

(CONT)

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS			10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT	
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify)	A. <input type="checkbox"/> Continue Project Without Change	
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T		B. <input type="checkbox"/> Change Project Design and/or	
<input type="checkbox"/> Logical Framework	<input checked="" type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify)	<input type="checkbox"/> Change Implementation Plan	
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P		C. <input checked="" type="checkbox"/> Discontinue Project (terminate)	
11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)			12. Mission/AID/W Office Director Approval	
Mr. Allen Hidlebaugh SMSS/USDA			Signature: <i>E.M. Amundson</i>	
			Typed Name: E.M. Amundson	
			Date: <u>3/13/83</u>	
			Aid Affairs Officer	

CLASSIFICATION  
PROJECT EVALUATION SUMMARY (PES) – PART I

Report Symbol U-447

1. PROJECT TITLE			2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
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)				
<input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION				
5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING	
A. First PRO-AG or Equivalent FY _____	B. Final Obligation Expected FY _____	C. Final Input Delivery FY _____	A. Total \$ _____	
			B. U.S. \$ _____	
			7. PERIOD COVERED BY EVALUATION	
			From (month/yr.) _____	
			To (month/yr.) _____	
			Date of Evaluation Review _____	

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.)	9. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
<p>2. An annual visit (2-3 weeks ea) of SMSS Soil Scientist to review and advise re; mapping, recommendations and overall management and operations of the S&amp;W Laboratory</p> <p>B. Training - ( to be funded under AMDP)</p> <p>1. Short-term training of lab technician at the NSSL</p> <p>2. Masters degree training of degree trained Djiboutian (AFGRAD)</p>	<p>USAID</p> <p>USDA</p> <p>USAID USDA</p> <p>USAID</p>	<p>March 83</p> <p>Jan 84</p> <p>April 85</p> <p>July 83</p> <p>to be determined</p>

<p>9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS</p> <table style="width: 100%;"> <tr> <td><input type="checkbox"/> Project Paper</td> <td><input type="checkbox"/> Implementation Plan e.g., CPI Network</td> <td><input type="checkbox"/> Other (Specify) _____</td> </tr> <tr> <td><input type="checkbox"/> Financial Plan</td> <td><input type="checkbox"/> PIO/T</td> <td>_____</td> </tr> <tr> <td><input type="checkbox"/> Logical Framework</td> <td><input type="checkbox"/> PIO/C</td> <td><input type="checkbox"/> Other (Specify) _____</td> </tr> <tr> <td><input type="checkbox"/> Project Agreement</td> <td><input type="checkbox"/> PIO/P</td> <td>_____</td> </tr> </table>	<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____	<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____	<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____	<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____	<p>10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT</p> <p>A. <input type="checkbox"/> Continue Project Without Change</p> <p>B. <input type="checkbox"/> Change Project Design and/or <input type="checkbox"/> Change Implementation Plan</p> <p>C. <input type="checkbox"/> Discontinue Project</p>
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____											
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____											
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____											
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____											

<p>11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)</p>	<p>12. Mission/AID/W Office Director Approval</p> <p>Signature </p> <p>Typed Name _____</p> <p>Date _____</p>
---	---

## T A B L E O F C O N T E N T S

I.	Summary	
	A. Project Status based on PES-82-03	2
	B. Project Status based on Hidlebaugh & Holmgren Report	4
	C. Project Status Sept-Feb 1983	5
	D. EOP Status & Future AID Support	6
II.	Evaluation Methodology	9
III.	External Factors	10
IV..	Project Inputs	11
V.	Project Outputs	13
VI.	Project Purpose/Goal	14
VII.	Beneficiaries	15
VIII.	Exhibits	16

iii

SUMMARY . :

Overview -

The overall purpose of the Water and Soils Laboratory project was to institutionalize within the MADR the capacity to (1) analyse ground and surface water quality as well as to compile, catalogue and disseminate hydrological information, and (2) classify soils, prepare soils maps and provide evaluation concerning the proper utilization of soils.

In practical terms, farmers can be advised on soil treatments to obtain sustainable yields. Achievement of this project purpose should impact on the sector goal of developing an information base for use by the GROD in national agricultural planning, and its dissemination to farmers through the agricultural extension service.

By the end of the project, the laboratory staff was to ...

- possess equipment and technical expertise to independently analyze all water and soils types in Djibouti.

Comment - Equipment provided to date under the project limits the lab to certain analyses, admittedly the most crucial for ag development. Supplementary equipment is on order, and once received and training given in its use, the lab should be able to undertake all analyses as had been planned. The lab technician will have to receive additional training beyond the scope of this project. USDA will furnish additional TDY assistance under an AFD PASA and provide lab training exposure at its NSSL via USAID AMDP funding.

- Have necessary data upon which to base recommendations for water/soil use for crop production and provide guidance for subsequent soils/water analyses in the field.

Comment - satisfaction of this element is pending completion by the lab's staff of lab analyses of the site samples collected. USDA intervention should assure this objective's being satisfied within the year .

- Have under taken a soil inventory and developed a land classification system in selected priority areas.

Comment - This objective has been fully realized if not exceeded . The chief of the laboratory is a trained Soil Scientist who given the additional training received under the project is in a position to continue detailed mapping and classification work already begun under the project. The individual will require only occasional oversight and review of his work. Such assistance will be provided by USDA.

The outstanding aspect of this project has been the success to date on the part of the GROD to institutionalize what was provided under the project. The lab has been declared autonomous, given requisite staff and initial budget. This project marks the first donor activity in Djibouti, to date, which has effectively created an entity operated by trained Djiboutians.

Nevertheless, in spite of such success, the AID Office is not entertaining any further assistance in this area out side of USDA short-term follow-up support. The reasons are that ...

- The individuals have attained the necessary skills and materials to do the job at hand. Therefore, to provide full-time assistance would be redundant and establish a bad precedent vis-a-vis future AID activities ;
- The Chief of the laboratory's motivation and initiative is questionable ; hence full-time technical assistance would tend to encourage him to perform less ;
- Finally, it appears that the GROD, against the evidence at hand, is intent upon embarking on large scale irrigation activities. USAID does not believe it prudent to become directly involved - especially given that the laboratory will probably be placed in the difficult position of having to advocate activities, which, though perhaps technically sound, would result in a misuse of scarce developmental resources.

#### A. Project Status based on PES 603-82-03

##### Recommended Actions and Results

To issue a decree establishing the Soils and Water Laboratory as an independent entity with adequate operating budget within the Ministry of Agriculture and Rural Development (MADR).

Comment - Such a decree was issued, however no budget was provided until CY 1983. This present year's operational budget is Dols 6,000 equivalent and is sufficient

only for routine supplies/maintenance. Staff salaries are still being funded from the Agriculture Service. The S & W Lab plans to have a budget in 1984 which fully reflects its autonomy that is, one that covers all staff salaries, O&E on vehicles and lab equipment as well as funds to cover recurring chemical requirements for undertaking analyses. Failure to provide such a budget will cripple the institutionalization component of the project.

To verify that all laboratory equipment is operational

Comment - Due to delays in the arrival of the USAID procured equipment the contractor was able to undertake this task only near the time of his departure .

Moreover, some of the equipment that was of 60HZ was inoperable (this equipment was inadvertently supplied by the PSA in spite of instructions to the contrary). The contractor responded by supplying a generator from within his other direct cost line item of his contract. The generator, now assures proper functioning of all 60HZ equipment during working hours. The contractor tested all equipment furnished by USAID with the exception of the computer, found them operational and carried out some limited tests.

To revise the contractor's work plan in accordance with evaluation recommendations.

Comment - The work plan was revised, however, lab operations were relegated to secondary priority given the delay in arrival of equipment, the need for a generator to assure that equipment could function properly, as well as delays in site sampling which necessitated these being given exceptional priority as part of the soils classification/mapping component.

To initiate lab start-up operations NLT February 1982.

Comment - Lab operations and c-j-t therein was provided only after the delivery of a generator and the balance of the outstanding USAID procured lab equipment. Due to delays (see above) the contractor undertook this task on a very limited basis a month prior to his departure . The contractor established lab testing procedures but confined his instruction to only what might best be termed " familiarization" training . This was condoned given that the mapping was of higher precedence

and that USAID had obtained AID/W concurrence to USDA's Soil Conservation Service supplying follow-up assistance to the contractor in instructing the Djiboutian staff in lab operations prior to and in post project TDYs funded under a PASA.

TDY of USDA Soil Scientists for overlap with RDA and in preparation for continuing USDA intervention.

Comment - USDA's Soil Conservation Service under an ongoing PASA arrangement for provision of Soil Management Support Service (SMSS) responded to this element by providing two Soil Scientists; Allen Hidlebaugh arrived in July 92 to review the project's status, specifically the contractor's preliminary Final Report ; Dr. George Holmgren of the National Survey Laboratory to review the lab equipment and testing procedures established by the contractor and to assist the Djiboutian staff in preparing the tests to be Run on samples collected during the life of the project. These TDYs resulted in further recommendations and work schedules which are addressed below.

- B. Project Status based on Hidlebaugh trip report of 7/30/82, and Holmgren trip report of 8/27/82.

The former's report confirmed that the project's contractor had satisfied the objectives of his contract and that of the project. The report cites the contractor's preliminary report as being satisfactory. The report goes on to recommend continuing support from USDA at the time of the submission of the contractor's final report and thereafter. Moreover it recommended that the Chief of the Laboratory be provided short-term training in lab operations at the NSSL prior to the end of the CY.

Comment - The training which was recommended was provided November 1982 under USAID African Manpower Development Project funds.

Dr. Holmgren's visit resulted in the recommendation that USAID procure additional lab equipment to maximize the capability of the lab to carry out a wide spectrum of Soils and Water tests. Of the equipment suggested, USAID proceeded to procure only the most essential items : Perkin-Elmer compressor, conductivity meter, electrodes, isolator. The Lab tech.

was provided additional training in the use of the lab's equipment and was prepared to initiate tests of the Soil samples previously taken by the contractor.

It was generally understood that both Mssrs. Hidlebaugh and Holmgren would return at the close of the project to review the contractor's final report and the status of the lab respectively.

C. Project Status September-February 1983

- . USAID amended the RDA contract for an additional DoIs 11,000t to cover contract requirements for preparing the final report.
- . USAID with REDSO assistance amended PIO/C 00013 to provide sufficient funds so that PSA (FETCO) could procure computer software.
- . USAID began translating those elements of the contractor's preliminary report which would be included in the final Fench report.
- . USAID (under AMDP) funded the short-term training of Chief of the S & W lab at NSSL.
- . USAID initiated Purchase Orders on essential supplementary equipment for the S & W lab as recommended by Dr. Holmgren.

#### D. End of Project Status and future AID Support.

The contractor, Resources Development Associates and its contract consultant Dr. Joseph Goebel, are to be commended for exceeding contract requirements on the Soils inventory portion of the project. An excellent set of base maps of 1:300,000 and 1:100,000 scales have been developed and will be of tremendous value for any future inventory effort. The general soil map of 1:300,000 scale and the reconnaissance soil survey 1:100,000 scale will serve Djibouti well for several decades. The semi-detailed soil surveys of 1:25,000 scale of selected watersheds have established a pattern both for the mapping and the reporting (including interpretations) that can be followed for other priority areas of the Nation. The preparation of more than 100 detailed soils descriptions and the collection of soil samples from each of the sites and the preparation of mapping unit descriptions for the important soils provide a good initial inventory of the soils of Djibouti. Sufficient training of Djiboutian counterparts has been accomplished so that they feel comfortable with the continuation of the soils inventory. The additional map series prepared: Slope maps, climate maps, topographic maps, physiographic province maps, and the series of interpretive maps for irrigation potential range production, suitability for various forms of agriculture, and land capability maps will be very useful to decision makers for many years.

GROD has decided to develop five new agricultural projects. Each of these is on the order of 10 to 20 hectares in size. Each of these areas will require a semidetained 1:25,000 soils inventory and report similar to the maps and reports completed for the Dey Dey Watershed. The Djiboutian staff has the necessary training needed to make the soils inventories of the five projects and should proceed to do the job this year. There is need for about 4 weeks of a SMSS UDSA TDY Soil Scientist late in 1983 (December) or early in 1984 (January) to provide assistance on making sure that these inventories have proceeded according to acceptable soil survey standards and to assist with any soil classification, photo interpretation, or other soil survey problems encountered during the inventory of the project areas. This would be good follow-up to the training provided during the Water and Soils Analysis Project.

The laboratory portion of the project was lagging behind contract requirements in part because of delays in receiving equipment, at the time of the mid term evaluation, and it still is. The equipment necessary to conduct the tests (and the training to do these tests) that are needed on soils and water to answer most of the day to day questions on use of Soil and Water for irrigated gardens is operational, however.

With the technical assistance supplied by the Soils Conservation Service in the form of Dr. Holmgren of the National Soil Survey Lab between 9-27 March the lab technician will have been fully trained in carrying out soils and water tests such as the following :

SOIL

- Particle Size
- Soluble Salts
  - Calcium
  - Magnesium
- Conductivity

-pH

- Phosphorus Index
- Gypsum Requirement

WATER

- Conductivity
- Calcium
- Magnesium
- Sodium & Potassium (estimates)
- SAR

The arrival of the Perkin Elmer will permit detailed analysis to be conducted for sodium and potassium.

Further training will be provided at NSSL in the following :

- Saturation Extract
- Carbonate Equivalence
- Cation Exchange Properties
- Organic Carbon
- Gypsum
- Sulfate
- Chloride
- Carbonate, Bicarbonate
- Boron
- Nitrates

These are tests that are used to answer special classification questions and to answer special problems that may exist in a small percentage of the Djibouti Soils - Particularly boron or gypsum.

So in short the laboratory Analyses needed to address routine issues for soil and water for irrigated gardens are operational. The remaining analyses will be operational this year with the assistance of USDA (SMSS - SCS) TDY NSSL Soil Scientist help of about 3 weeks this fall.

It is essential that the lab technician Farah Omar go to the U.S. for 4 weeks training at the USDA - SCS National Soil Survey Laboratory. He needs this additional hands on training to achieve the necessary proficiency in laboratory analyses.

Periodic TDY of 2-3 weeks of SMSS USDA-SCS Soil Scientist's (NSSL representative) should be requested to assure that the laboratory and soils inventory are running smoothly. Evaluator's judgement is that this assistance

will be needed through FY 1985.

The GROD Ministry of Agriculture and Rural Development (MADR) is to be commended for the interest and cooperation in making the project a success to this point : specifically the establishment of the laboratory (by law and budget) as an entity within MADR and the financing of construction for the facility. They should be encouraged to fill authorized positions particularly as the work load increases. However, staffing appears adequate given the present workload.

During previous evaluations the possibility of the laboratory becoming a regional facility was brought up with the MADR to see if they might be interested in serving in that capacity. In the evaluator's opinion any decision to proceed with this proposal should be delayed for at least one to two years. The laboratory needs to demonstrate that it has the necessary management and production ability to serve its own needs as well as those of other countries within the region.

The formal Water and Soils Analysis Project (603-0001) will terminate 3/31/83. Certain follow-up assistance can be met in the form of short term TDY assistance from Soil Management Support Services USDA - SCS Soil Scientists (from the NSSL and possibly from National Headquarters or State Office Staffs). Request for such assistance will need to be made for each trip and an evaluation of progress made at the end of each trip. The training requirements discussed in the Appendices is quite optimistic. SMSS may not have the resources to provide this much assistance in one year and some of the assistance may have to be delayed until next year.

Perhaps, the most serious constraint to the laboratory's long-term viability will result from the projects having procured American equipment. To have procured such specialized equipment from France rather than the U.S. would have established a familiar channel and supplier by which the Government could have more easily effected replacement of spares and maintenance. To have supplied U.S. equipment through a middle man such as a procurement supply agent to a degree has mitigated against developing the entity's logistical institutional capacity. In a country such as Djibouti, almost totally dependent on France or Japan for commercial products, to procure American is a disincentive to institution building.

## EVALUATION METHODOLOGY

USDA TDY Soil Scientist Allen Hidlebaugh conducted the close-out evaluation of the Water and Soils Analysis Project. The evaluation addresses the performance of the contractor (Resources Development Associates) against the "Statement of Work" provided in the PIO/T. The PIO/T delineates the up-to-date objectives and contractors tasks.

The scope of the evaluation included review of all of the requirements stated in the PIO/T and comparison of these with the Final Report submitted by the contractor along with interviews with Dr. Joseph Goebel, Aboubaker Douale, Djiboutian Chief of Soils & Water Lab, and others. The evaluator's previous reviews of the project also provided background data for use in this evaluation.

The predominant part of the evaluation time was used in a critical review of the 5 volumes and maps of the final report submitted by the contractor as the final element of its contractual obligation.

The evaluation is based on all of the documentation and observations available during the evaluation period in Djibouti.

### EXTERNAL FACTORS

Refer to the mid-term evaluation (Exhibit 7) for a discussion of the external factors up to that date. The electrical problems have been resolved and all of the essential laboratory equipment is in place. Desirable supplemental equipment identified at the time of previous evaluation has been ordered by USAID, although one important item has yet to be received. There remains to be installed the venting hood for the Perkin-Elmer instrument. The problem of base maps was resolved. The Laboratory has been established as a separate entity within the MADR by law and a budget has been approved. Aboubaker Douale has yet to be named officially as the "Chief" of the Laboratory. This has caused considerable loss of time because Aboubaker must obtain clearance for purchases involving even the smallest expenditure. The MADR has yet to recognize that certain laboratory supplies are continually used in operation of the laboratory and must be replaced periodically.

A secretary has been hired. The staff required for the laboratory is still deficient. An additional degree trained staff member and one more laboratory assistant had been planned for. Moreover, it is the evaluator's understanding that Farah Omar is still assigned to the Agricultural Service and budget for this position must be assured in order for the laboratory to retain his services. Nevertheless, staffing is adequate given the present work load.

The delays in installing some of the laboratory equipment will require TDY USDA Soil Scientist assistance to provide training in operation of some pieces of analytical equipment over the next two years. This was foreseen at the time of the previous evaluation.

## PROJECT INPUTS

The mid-term Evaluation report provides a complete report of the personnel and funding of the Project. GROD has provided a secretary to the Laboratory since last evaluation report was prepared.

Inclusive to date, a total of 13 weeks of TDY USDA Soil Scientist's assistance has been provided to the project through the Soil Management Support Services of the U.S. Department of Agriculture - Soil Conservation Service.

Additional SMSS USDA TDY Soil Scientist's assistance will be needed for the next 2½ years - probably two trips per year of about 3 weeks. This assistance is necessary to keep the laboratory and Soils inventory proceeding as planned.

TDY assistance late this year is needed in two major areas. These are as follows :

### 1. Laboratory function

The last of the analytical equipment will be in Djibouti by June. TDY assistance from NSSL Soil Scientist is needed to get this equipment functional and provide training in its use. Additional assistance is needed in the interpretation of laboratory results. About 4 weeks time is needed.

### 2. Soil Inventory Function

The Djiboutian staff will be doing the Soils inventory including report, for 5 project areas this year. These projects represent a sizeable Work load for the staff. They need assistance from a TDY Soil Scientist if these project inventories are to proceed according to acceptable Soil survey standards. This assistance should come late in 1983 (December) or in January of 1984.

- 12 -  
B U D G E T S U M M E R Y

Water Resources & Soils Analysis ( 603-0001)

<u>ITEM</u>	<u>DOCUMENT</u>	<u>DISBURSED</u>
<u>I. Technical Assistance</u>		<u>\$ 348,092</u>
A. REDSO/EA Consultant	P.O.	1,603
B. RDA Contract	PIO/T 90002	335,754
C. RDA Contract Extensions	PIO/T 0008	10,735
II. C		
<u>II. Commodities</u>		<u>\$ 122,377</u>
A. Vehicle	PIO/C 90001	15,999
B. Lab Equipment	PIO/C 90005	62,062
C. Vehicle	PIO/C 90006	4,000
D. Air Conditioners	PIO/C 90007	2,975
E. Lab Chemicals/equipment	PIO/C 90013	26,959
F. Maps	PIL - 0022	2,882
G. Sp'l Lab Equipment	P.O.s	3,500
<u>III. Training</u>		<u>- 0 -</u>
(Provided under AMDP Funding)		
<u>IV. Other Costs</u>		<u>\$ 71,531</u>
A. House Rehab	PIL 0005	2,835
B. House Rent	PIL 0014	33,041
C. House Maintenance	PIL 0006	14,220
D. Reconnaissance Flight	PIL 0020	527
E. House Rent/Maintenance	PIL 0024	16,616
F. Unobligated	- -	(292)
TOTAL		<u>\$ 542,000</u>

\* Includes \$ 3,615 for books

## Project Outputs

The following discussion covers outputs in addition to those listed in the mid-term evaluation.

### 1. Laboratory

The Laboratory phase of the project is still lagging. No analyses of soils and water samples have been conducted since USDA's last TDY. This has been disappointing to all concerned. The Laboratory is functional and most essential analyses can now be made. There are a couple of pieces of analytical equipment to be put into operation but these are needed for the more esoteric analyses. Continuing short term TDY USDA Soil Scientist assistance will be required at least until FY 85.

USDA TDY Soil Scientist Dr. George Holmgren has prepared an evaluation of the laboratory status and needs appended to this evaluation's report.

At the time of Dr. Holmgren's departure last August the following tests and procedures were fully operational : Water - Salinity : total salts in parts/thousand and conductivity in microhons (mhos), calcium, magnesium, sodium & potassium, SAR, PH

Soils - Particle size analyses, calcium, magnesium, total salts, sodium, SAR, PH and phosphorus index.

With these tests most of the questions on use of soils and water for irrigated gardens could be answered.

### 2. Soil Survey

The contractor has exceeded expectations in this phase of the project and is to be commended for an excellent job.

An excellent set of maps, soil descriptions and interpretations have been prepared and can serve Djibouti well for many years.

1:300,000 scale series

Base maps soil maps, climate, topographic, slope and a series of interpretive maps.

1:100,000 scale series

Base maps, soil maps, climate, topographic, slope and interpretive map series.

1:25,000 scale series

Soils maps of selected watersheds

1:5,000 scale series

Ownership maps of selected agricultural areas

## Outputs (cont)

Additional Watersheds will need to be soil mapped (1:25,000 scale) on a priority basis as the agriculture program develops.

### 3. Library

Books and materials have been received. Shelving is being constructed and will be installed in the office soon.

### 4. RDA - Project Final Report

A discussion of the final report appears in the Appendices.

### Project Purpose

Refer to mid term evaluation for discussion of project purpose. The PIO/T is the principal reference document.

The GROD has established (by law) the Laboratory as a separate entity within the MADR with a budget.

### Project Goals

Refer to mid-term evaluation report.

BENEFICIAIRES

The immediate target group was a Djiboutian infrastructure capable of addressing the needs of present and future farmers for accurate information on the composition and capacity of the soils they farm. The project results with those of the west German donor provide a solid base upon which the GROD can make rational and positive decisions regarding diversification into the agriculture sector and have maximum return for funds invested. The Water and Soils Laboratory has been recognized within the MARD as a separate entity by law and its own budget provided.

EXHIBITS

The exhibits enclosed are as follows

1. Evaluation of Contractor Final report
2. Draft Work Plan for Fiscal year 1983 for Laboratory and Soil Inventory.
3. Training requirements
4. Holmgren Trip Report
5. Bibliography
6. Letter re future plans for Development. USAID will submit with the RDA Final Report to the GROD upon completion of the project. (The final Report as called for in the contract will be provided in 12 English copies - two for the MADR, one for the min. of Foreign Affairs, one for the planning Office, one for ISERST, one for the S & W lab, one for USDA, two for USAID and three for AID/W. Distribution of French copies in an equal number will be prepared and submitted to USAID by RDA for similar distribution.
7. PES 603-82-02, mid-term evaluation - .. not included but on file with original in USAID/Dji Office.

EVALUATION OF CONTRACTOR'S FINAL REPORT

Resource Development Associates Final Report for the Water and Soils Analysis Project documents the project from its beginning to end and also provides the history leading up to the start of the project. The report is good. There are a few errors that need to be corrected before the final version is submitted. The Evaluator is carrying one copy that has the needed corrections annotated back to the U.S. to send to RDA so that they can make the corrections and produce an error free product.

RDA and their representative, Dr. Joseph Goebel, are to be commended for a job well done. The report is a bit optimistic in some of its projections for future agricultural expansion and some of the interpretative maps can easily be misused, but again the report is professionally done.

The contractor has greatly exceeded contract requirements on the soils inventory portion. The excellent base maps support maps such as slope, climate, physiographic province, the general soils map and reconnaissance soil maps and the semidetailed mapping of selected watersheds will serve the nation well for several decades.

The report contains well documented instructions that will be very useful to the Djiboutian staff as they continue the soils inventory and proceed with laboratory analyses.

Future TDY personnel will also have an excellent source of project documentation in the report and the 1:300,000- and 1:100,000 map series and in the 1:25,000 semidetailed mapping of selected watersheds.

The report is too optimistic on the current status of the laboratory. Some equipment is still not operational. The tests needed to answer most day to day problems on use of soils and water for irrigated gardens are however operational. The remaining apparatus that will be operational later this year when the last of the accessory equipment arrives and is installed, will be used to answer classification problems and conduct studies that are not required on a high percentage of the soils. Because of the many delays in laboratory construction equipment problems and problems in shipment, the contractor was unable to complete some phases of laboratory training. These will have to be completed by USDA SMS TDY Soil Scientists during 2-3 week trips over the next couple of years.

The report is repetitious, for example, some detailed profile descriptions appear 4 times. But this does allow the individual volumes of the report to stand alone.

## Evaluation of Final Report (cont)

Some of the blue line maps sent with the report are not legible. All should be checked before the French version is completed and new copies made if necessary. e.g., the Dikhil 1:100,000 Soil map sheet. Also the legends on some of the maps will need attention to make sure the proper translations to French have made. There are also a few errors in symbols, missing symbols and improper joins that should be corrected. See the example maps in the main volume of the report for the types of required corrections.

A little extra effort at this stage to make the needed corrections in text and maps will make an excellent report even better.

### RDA Comment -

Illegibility of some of the 1:100,000 map sheets is due to fact that Dr. Goebel only had poorly made mylar copies on hand, not originals. The originals are to be found at the S & W Lab. In order to get good finals, it will be necessary to transfer the interpretations to good copies. This can be done by the laboratory.

## F O U R T H   A N N U A L   W O R K   P L A N

This is the fourth plan, which covers fiscal year 1983, designed to list the Objectives and means of obtaining those objectives for the Soils and Water Laboratory. It lists job responsibilities and specific tasks, as well as, the timing and who will accomplish those tasks.

This Work plan is a projection of the staff's perception of what they will accomplish this year and how they will do the work. Progress toward that goal will be reported semiannually by the Chief of the Soils & Water Laboratory.

### Objectives of the Soils and Water Laboratory

The Soils and Water Laboratory was established with many objectives in mind. All of the objectives are directed towards developing an agricultural capacity in Djibouti using the soil and water resources to contribute to the social and economic development of the country and reduce the dependency on other countries for food suppliers.

Irrigated agriculture activities will be the major beneficiary of the laboratory effort. The high quality and broad capability of the equipment and personnel makes the laboratory an asset for the other Government agencies which may choose to use its facilities.

The principal analyses will consist of those relating to soil fertility and water quality. The staff is classifying, mapping and describing the soils of Djibouti. It will continue to collect, catalog and disseminate information on ground and surface water and soil analyses data. The staff will interpret the water and soils data for selected agricultural uses as analyses are completed.

Sufficient equipment, materials, space and personnel have been provided and a yearly operating budget should ensure that the equipment can be maintained and routine supplies purchased.

### Means of Achieving the Objectives of the Laboratory

Personnel assigned to the laboratory are initiating the tasks of assessing the agricultural potential of the Nation and the resources required to achieve this potential.

Laboratory personnel will further their expertise by taking advantage of training opportunities to assure continuing growth in their capability to accomplish high quality Analyses and interpretations. The laboratory is a research center directed towards solving problems of soils and water interrelationships in Djibouti. A technical library has been established. Training in providing a user service has been accomplished.

Systems for collecting samples and information on the Soils and Water of Djibouti have been established. Training will continue to be given to personnel associated with the laboratory to maintain and increase the quality and quantity of analyses performed. A preliminary inventory of the soils of the country has been completed using previous studies, current maps, aerial photographs, satellite imagery and field study. Detailed soils studies of selected regions are underway, namely Douda Weyn.

The data being collected from the soils inventory and the soil and water analyses are and will continue to be used to estimate the potentials of the soil and water resources and the requirements to achieve these potentials.

#### Brief Position Descriptions for the Soil and Water Laboratory

##### Chief of laboratory and soil survey -- Aboubaker Douale

This person is responsible for the overall performance of the laboratory and for the soil inventory of Djibouti. He is to assure that the laboratory functions smoothly and meets its objectives. Besides the general management of the laboratory, this person is responsible for the national soils inventory which includes describing, classifying, mapping and interpreting the soils of Djibouti. He will continue to receive training in laboratory management and on procedures used in this laboratory for analyzing soil and water samples submitted. This person will interpret the laboratory analyses and report the results to the Agency or individual that submitted the samples for analyses. He will make general reports to other agencies as well as maintain a technical library of the information about the soils and water of Djibouti. He will establish research projects relevant to the improvement of the usage of soils and water resources. He will, as opportunities arise, take advantage of specific training necessary to fulfill the responsibilities of the position.

##### Soils and Water Analyses - Laboratory Technician -- Farah Omar

This person is responsible for the accurate analyses of the soils and water samples submitted to the laboratory. He is responsible for material and equipment inventories in the laboratory. He is expected to maintain the laboratory facilities and procedures in high quality condition.

assure high-quality test results. He will periodically receive refresher training in soil and water analyses. Further, will maintain a familiarity with the Soils of Djibouti with continued involvement in the soils inventory. He will receive further formal training as is necessary for him to meet his responsibilities.

Technical Assistant - Not selected yet

This person provides assistance in the laboratory and or the soils inventory. He assists in simple routine preparation of samples and materials.

Secretary -- Fatouma Dirieh

This person maintains a capability in French. She receives and processes written and telephone messages. She is expected to type and mail reports and results. This person maintains the library by checking the materials out and in as required. She maintains accurate file system.

Requirements for FY 1983 -

The Water and Soils Laboratory and the Soils Inventory of Djibouti are at a critical threshold. The USAID Mission by means of its Soils and Water Analyses Project has provided two years of on-site U.S. Soil Scientist assistance. This assistance has provided intensive on the job training to the Djiboutian staff setting up and operating the laboratory and in inventorying the soils of the Nation. The on-site project assistance has reached its scheduled termination date and will not be renewed. The USDA Soil Management Support Services will continue to provide training on request, but it will be in the form of 2 & 3 week TDY trips to Djibouti every 6 months. We would expect this assistance to also terminate early in FY 85.

This means that the responsibility for the Laboratory and the Soils Inventory is now in the capable hands of the MADR and specifically in the hands of the Chief of the Laboratory Aboubaker Douale. This is as planned.

A suggested implementation plan for fiscal year 1983 follows :

Fiscal Year 1983

Suggestions for Implementation Plan

Aboubaker Douale -- Chief of Laboratory

Goals for Year :

- a. Soils Inventory - 5 project areas designated by GROD -- will need some assistance to finalize.
- b. Provide leadership to Farah - Laboratory Analyses
- c. Participate in training in Austria
- d. Budget preparation

Farah Omar -- Laboratory Technician

Goals for Year :

1. Assist Aboubaker with Soils inventory in field, office
2. Perform laboratory analyses as directed - see attached . list of soils
3. Receive training U.S. at NSSL - 4 weeks
4. continue water salinity investigations of Houmbouli and Grande Douda agricultural areas-- do a few more samples to see what effect the heavy rains had on salinity levels.

USDA - SCS Soil management support services TDY to Djibouti

2-3 weeks TDY Soil Scientist from NSSL about every 5-6 months to assist Farah with laboratory analysis for next 2-3 years.  
2-3 week TDY Soil Scientist from National Headquarters to assist Aboubaker with soils inventory and interpretations probably every year for next 2 years.

Training at NSSL

4 weeks for Farah in July. This will provide hands on experience with Perkin Elmer apparatus. This will be funded from USAID African Manpower Development Project.

<u>1983</u>	<u>Objective</u>	
March	Project Review - 3 Weeks (AAO Amundson USDA Hidlebaugh Lab's Aboubaker, Farah, RDA's Goebel) Laboratory set up training - 3 weeks NSSL Dr. Holmgren Farah, Aboubaker	
April	Field work on Project areas designated - SWL's Aboubaker and Farah (start on 1 of 5 project area)	
May	FAO - Training courses in Austria Aboubaker remote sensing and irrigation moisture studies 6 weeks - mid may through 2 July	
	Laboratory Analyses of selected soils - Farah 4 weeks	
June	Laboratory analyses selected soils - Farah see attached list - 4 weeks	
July	Map construction, photomatching for selected project areas	Aboubaker
	Laboratory training in U.S. at NSSL 4 weeks	Farah
August	Vacations	
September	Project Area -- Photo interpretation, Map transfer, report writing - 4 weeks	Aboubaker
	Map coloring, map measurement- 2 weeks	Farah
October	Laboratory training - 3 weeks	Farah and USDA- TDY Soil Scientist From NSSL
	Field Work on designated project areas	Aboubaker
November	Budget preparation - 2 weeks Field Work on designated project 2 weeks Laboratory Analysis - 4 weeks	Aboubaker Aboubaker Farah
December	Field Work on priority project area	Aboubaker & Farah & TDY Soil Scientist
	Preparation of displays & exhibits - 2 weeks for project areas	Aboubaker

RECOMMENDED LAB  
ANALYSES SCHEDULE  
( April. 83- Sept.84)

<u>DATES</u>		
1983 April-June	Analyses on all Random Survey site soils	Gypsum requirement conductivity, 1:1, 1:5 extracts PH
July	Farah - MSSL Training	
Aug-Sept.	Continue above analyses	
October	Initiate analyses on selected soils (Holmaren)	Carbonate equivalence Saturation extract
1983 Nov-March 1984	Analysis (all Soils)	Carbonate equivalence Particle size
	Analysis on selected Soils	Saturation extract Phosphorus Index Gypsum
April	Initiate Analyses on selected Soils (Holmaren)	Cation exchange organic carbon
May-Sept.	Analyses (all Soils)	Cation exchange Organic carbon

TRAINING REQUIREMENTS

- 1. Short term training in 1983 in U.S.
  - a. Faran Omar - Laboratory Technician --- July 1983  
4 weeks at USDA - SCS National Soil Survey Laboratory to obtain hands on experience operating Perkin-Elmer Analytical apparatus. Lincoln, Nebraska. (AMDP Funded)

b. New staff --- will depend on their backgrounds.

- 2. SMSS USDA TDY Soil Scientist to Djibouti (PASA Funded)

a. Laboratory function

- 1. Representative from National Soil Survey Laboratory to assist in training in laboratory methods and management and in interpretation of laboratory results. October 83 4 weeks  
twice/year 3 weeks TDY in 1984 and 1985

b. Soils Inventory Function

- 1. Assistance to make sure soils inventory and report writing is proceeding as planned -- Soil Scientist from one of the State Office staffs  
December 1983 or January 1984 4 weeks
- 2. Representative from National Headquarters to assist in training in overall management of Soils inventory & Laboratory  
One/year 3 weeks TDYs in 1984 and 1985

3. Other training ---

Future degree trained personnel may wish to pursue Master's level training in the U.S. under AFGRAD No funding is available for the 1983-84 academic year however. AFGRAD is designed specifically for master's level study in an U.S. University and is subject to the candidate's educational qualifications including English ability and of most importance his acceptance by AFRO-American Institute. Funding for education beyond the master's level would have to be arranged by GROD.

Water salinity investigation of Houmbouli & Grande Douda  
Agricultural areas - continuation of study --  
Only need Analyses on a few samples this year.

1. Depth to Water
2. Depth of Water
3. Temperature
4. Salinity in parts per 1,000 and conductivity in micromhos,  
at surface and bottom of well

Mapping at the Douda Wyn Watershed and others selected  
should :  
Follow procedures outlined in Final Report Volume V  
Appendix K. The main instructions appear on pages  
3 and 4.

## memorandum

DATE: March 24, 1983

REPLY TO  
ATTN OF: George Holmgren, USDA/National Soil Survey Lab (NSSL)SUBJECT: *George Holmgren*  
Djibouti Trip Report : Soil And Water Laboratory, March 6-27, 1983.

TO: E.M. Amundson, Aid Affairs Officer

Accomplishments

The original objectives of this trip were four :

1. To make operational the Perkin Elmer Atomic Absorption apparatus
2. To use this instrument to initiate analysis of the saturation extract
3. To initiate Nitrate analysis with nitrate electrode
4. To initiate computer use

All of these objectives presumed the arrival of certain equipment. Unfortunately, the compressor and air filtration apparatus for the Perkin Elmer did not arrive. Objectives 1 and 2 therefore could not be implemented. The nitrate electrode needed for objective 3 did arrive but the laboratory ph meter also needed for the procedure was not functioning. The computer was tested and found operational but included only the operating system and no basic language capability. Pending arrival of this rudimentary software, nothing could be done with the computer.

We were therefore forced to revise our objectives. The following summarizes our revised program and accomplishments.

1. Repair Ph meter—Mr. Aboubaker arranged for us to take the Ph meter to Comsip. They in turn arranged to have it repaired by a third party who did an excellent job. The meter is now functioning. The meter was not repaired in time for this trip but will be ready for the nitrate procedure next visit.



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

OPTIONAL FORM NO. 10  
REV. 7-78  
GSA FPMR (41 CFR) 101-11.6  
5010-112

2. Initiate sample preparation-Soil sample must be sieved to pass a 2mm screen before analyses. The existing samples had not been so processed. We therefore initiated procedure to process and re-package these samples.

I only expected to initiate the procedure but Mr. Faran and Mr. Ismail on their own initiative worked diligently and completed the preparation for processing of all samples collected to date. This is a major accomplishment and clears the way for all future analyses.

3. Initiate Gypsum requirement test- This procedure is a simple test that gives a good estimate of the amount of exchangeable sodium in the soil. It also is a measure of the amount of gypsum required to displace that sodium. As such it is an excellent procedure for monitoring the changes in the soil under irrigation when sodium may be a problem. The procedure uses techniques developed during my previous visit. A number of soils were analysed by this procedure and the results duly recorded.
4. Refine record keeping- Existing records on the random Soil collection were in loose order. We organized these by site number and placed them in a loose-leaf binder. A procedure was established to incorporate newly collected soils within this system. For the present, laboratory data will be posted on these forms as the analyses are performed. A more formal data sheet can be developed as more analyses become available.
5. Visit Atar Station- Mr Aboubaker took us to visit the Atar Station where we took a series of samples under and between the irrigation rows. These samples are being analyzed for conductivity and by the gypsum requirement test to monitor the sodium and salt status.
6. Review Previous procedures. Water samples were also collected at the Atar station. This afforded us the opportunity to review water analysis procedures developed last time. They were well remembered and I was pleased with the performance. We plan to review the Phosphorus procedure on Saturday & Sunday before my departure.

7. Review culligan desalinizer, we will be looking at this apparatus Thursday to either make it operational or find the missing parts. If as Dr. Goebel indicated, the membranes are punctured by salt crystals after only a few months operation, it may not be profitable to keep it running. Membranes cost over \$100 a piece.
- 8 Objectives for next visit -  
During the next visit , tentatively planned for October, we will address the objectives originally planned for this visit.

#### Laboratory Deficiencies

The laboratory is in reasonable condition but the following are deficiencies that should eventually be corrected :

1. Make the refrigerator operational .

If , As Mr. Amundson suggests the unit will operate at 220-50HZ with a simple transformer, then this should be supplied by the AID mission.

2. Bookcases for the newly arrived books. (the laboratory will construct)
3. Exhaust hood for the Perkin Elmer
4. Replace broken tiles on benches.
5. Find more permanent containers (about 1 liter) for the reference soil collection.

These are valuable samples that will be useful for future research purposes. They should be preserved in a reasonably secure plastic or card-board containers.

#### General Evaluation

I found the laboratory in good order. No analyses were performed since my previous visit but this may be attributed largely to my failure to initiate sample preparation procedures. The previous training was well remembered and I am confident that Mr. Farah will profit from his trip to the NSSL, planned in July 1983.

I was also favorably impressed by Mr. Ismail Waberi He showed interest in the procedures and showed himself adept at mastering them. He also would profit from a training period at the NSSL. His training would also provide needed depth to the laboratory capability

#### Work Plan

Recommended Analysis schedule is presented in Fourth Annual Work Plan.

## BIBLIOGRAPHY

1. Djibouti Water Resources and Soils Analysis - Final Report, Resource Development Associates, 5 vol. , February 1983
2. SMSS USDA TDY Soil Scientist evaluations of Project dated 25 November 1981 and 27 August 1982.



EMBASSY OF THE  
UNITED STATES OF AMERICA  
DJIBOUTI

To : Ellsworth M. Amundson  
Aid Affairs Officer  
Djibouti

March 13, 1983

Subj: USDA TDY Soil Scientist Evaluation of the Potential  
for Expanding Irrigated Agriculture in Djibouti.

Based on a detailed review of the Final Report for the Water and Soil Project submitted by the Contractor, Resource Development Associates, previous on-site evaluations of the project and limited on the ground observations in Djibouti this evaluator has reached the following conclusions about the potential for expanding the irrigated farming (gardens) in Djibouti .

The existing irrigated gardens are dependent on the water supply from the Wadis. The ground water is generally too salty, high in boron, has toxic levels of other salts and the amount of water that can be pumped is too low to justify agricultural irrigation .

Production from the existing gardens has not been high enough & dependable enough for the super markets and other major purchasers of fruits and vegetables to forego importation of these commodities (generally from France and Ethiopia). As a result the farmers have a very uncertain market for their produce. This last season's tomato production was excellent but the prices fell to about 1/4 of the norm because of the large imports of tomatoes. This will be a continuing problem as long as other purchasers are uncertain of the quantity of the supply of produce from the Djiboutian gardens, which is heavily dependent upon a plentiful season of rains.

Gardens (vegetables and fruit) can be expanded along the Wadi Channels in some parts of Djibouti where the water supply can come from the runoff water that collects in the Wadi Channel sediments. This is the only source of good quality water. Care will have to be exercised to avoid areas that are presently supplying the water for the City of Djibouti or the other towns. The water supply in the Wadi sediments is dependent on the runoff from the watershed. So at any given location there might be a few days or a few months supply-all dependent on the rainfall. Some years will have enough to grow successful gardens; others may not at a location along a particular Wadi.

This means that great care should be exercised in any future expansion effort. Any expansion should proceed slowly. Djibouti needs time to develop the required agricultural infrastructure and it needs time for more detailed analyses of the agricultural potential in areas that appear promising to determine how large an area the water supply will support.

There is a very large investment for each new 1 hectare size garden. It is probably on the order of dols 5,000 excluding the initial cost of the land. Start up costs include clearing of the stones and boulders from the surface, digging the well and installing a pump and motor (gasoline or direct), constructing a large storage tank and distribution system, fencing the garden, planting the required shade trees and windbreaks, and hiring guards to keep out animals and human intruders.

It will take time to build the required infrastructure to support the existing and any expansion of irrigated agriculture. Farmers will have to be trained for each new garden. The farmers need help with marketing of their produce. There is no local source of fertilizer. There are no food processing plants. Farmers need support in the form of seeds, planting stock, agricultural chemicals and fertilizers. The importing of agricultural chemicals, fertilizers, and planting stock etc, is very expensive. The farmers also need the support of extension Agents to help solve disease, pest and other problems. There exists an excellent agricultural service, but it has a very small trained staff.

Yes there is a limited potential for expansion fo irrigated Agriculture (gardens for fruits and vegetables) in Djibouti, but great caution will be needed in any expansion effort. My advice is to proceed slowly, building up first the required infrastructure to support existing irrigated gardens before undertaking expansion into other areas.

Allen R. Hidlehaug  
SMSS- USDA-SCS  
TDY Soil Scientist  
National Coordinator  
Soil Survey Research  
Soil Conservation Service  
Washington D.C.

32