LOCAL DEVELOPMENT II — PROVINCIAL

مشروع التنمية المحلية

LD II-P

FINANCED BY U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

PILOT O&M PROGRAM IN MINYA AND GHARBIYA

FINAL ASSESSMENT REPORT

PROPERTY OF LD II-P

Funded Under
USAID Contract 263-0182-C-00-8041-00
Project No.: 263-0182

PILOT O&M PROGRAM IN MINYA AND GHARBIYA

FINAL ASSESSMENT REPORT

June 1992
RS4-04 (E)

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SECTION ONE

Introduction

BACKGROUND

During the past several years, the LD II-P O&M team has been developing a comprehensive maintenance program for rural governorates designed to maintain and manage fixed plant equipment, roads, and rolling stock funded through LD II-P, Basic Village Service Project (BVS) or Decentralization Support Fund Project (DSF). The elements of the maintenance system have been presented to appropriate governorate personnel through training workshops and on-site technical assistance. As a precondition for receiving LD II-P funds, each governorate has submitted equipment and infrastructure maintenance plans based on this system.

During the LD II-P program, 870 village council maintenance workshops (VCWs) and 192 markaz maintenance centers (MMCs) were constructed and outfitted with the requisite tools according to their assigned maintenance and repair responsibilities. At the governorate level, the governorate main maintenance centers (GMMCs) for heavy equipment in Minya and Red Sea governorates have been upgraded and outfitted with tools.

The LD II program has concentrated on the operation and maintenance of infrastructure projects and equipment in the governorates by giving first priority to the establishment of an integrated O&M system. The system identifies the roles and responsibilities of each level and establishes a monitoring and recording system, which reflects the utilization and availability of each project. The system includes buildings, tools, equipment, management organizations and the training of technical personnel at all levels.

To follow up the implementation of the maintenance system, a pilot O&M program was designed for Minya and Gharbiya governorates and subsequently evaluated before being replicated in other governorates (see Appendix A , O&M Pilot Program Implementation). Implementation of the pilot program began in March 1989, its goal to fully test the operations and maintenance program under field conditions.

This report evaluates the results of the O&M pilot program in Minya and Gharbiya governorates. It is submitted in partial fulfillment of the requirements of Task 6.2 in the equipment section work plan.

PROGRAM IMPLEMENTATION STEPS

The implementation of the program included the following steps:

- Selecting two governorates.
- Establishing an O&M committee at the governorate level.
- Selecting pilot marakez (one from each governorate).
- Implementing workshops.
- Providing intensive field TA to the selected marakez (one in each governorate) and their village councils (VCs).
- Establishing inspection and service contracts with equipment dealers.
- Implementing training programs.
- Providing management TA to maintenance workshops.
- Replicating the program in other marakez of each governorate.
- Preparing the assessment report.

PRELIMINARY ASSESSMENT

Two different implementation approaches were tested in Minya and Gharbiya, each responding to the unique characteristics of each governorate. (The rationale of each approach is discussed in detail in section two of this report.) The preliminary assessment report, which examined the status of the O&M pilot programs in both governorates, was submitted to USAID in December 1991. The following recommendations were included in the report.

- Continue the O&M pilot program in Minya and Gharbiya governorates for three months (ending in March 1992). The program should focus specifically on (1) completion of the EQ needs assessment study in Gharbiya Governorate, (2) completion of the O&M computerized system and inventory control system in Minya Governorate, and (3) intensive TA to those marakez in need of further specific training (equipment MMC management, equipment utilization, VCW management, and intensive road maintenance TA).

- Assist the governorate maintenance coordinator with implementation of orientation programs for VCW and markaz chairmen and technical personnel. Topics should include the role and responsibilities of each position, the integrated O&M system, and preparation of the O&M quarterly progress report (QPR).

- Assist the pilot governorates in technical training for O&M personnel, particularly in on-the-job training (OJT) techniques and other required training courses utilizing LD II-P training block grant and/or LD II-P Bab II funds.

- Encourage VCWs and MMCs to be operated as investment/service projects. This will aid cost recovery schemes, as has already been demonstrated in facilities of both governorates.

- Establish service contracts with DSF equipment dealers, encouraging them to maintain 75 percent or more of spare parts inventories at all times. Also, encourage these dealers to provide maintenance and repairs which are beyond the scope of the MMCs and VCWs. OJT in maintenance and repair implementation is recommended for engineers and technicians.

- Maintenance coordinators in both governorates should increase the number of scheduled field visits to ensure sustainability.

This final assessment report assesses the implementation of the O&M system on the governorate, markaz and village levels in both governorates. Section two describes the approach and assessment methodology, and section three examines the system performances of each governorate. Section four presents conclusions and offers recommendations.

SECTION TWO

Approach and Methodology

PILOT PROJECT APPROACH

Because of the unique circumstances in Minya and Gharbiya, regarding the status of O&M, different approaches were implemented and tested in each governorate.

In 1988, a governorate main maintenance center (GMMC) in Minya was designed by a local consultant firm; construction commenced in early 1989, using DSF GOE funds. The governorate plan was to use this GMMC to serve DSF equipment only. The pilot program approach was designed for an integrated O&M system covering the village, markaz and governorate levels. The GMMC would operate as an investment project and handle all types of equipment at all levels. Also, the DSF spare parts Cardex system would be relocated from the road department to the GMMC. Because there was no full-time maintenance coordinator in Minya, a governor's decree was issued to establish an O&M technical office, administered by the secretary general. The decree also provided for a full-time mechanical engineer to assist the O&M coordinator. (See Appendix B, Governor's Directives on O&M Committee.)

The situation in Gharbiya Governorate is substantially different. There are more private O&M firms in Gharbiya than Minya, and technical personnel are available at all levels. In Gharbiya, road equipment is housed at the road department and not distributed among the marakez. Also, the maintenance coordinator works on a full-time basis.

In Gharbiya, the integrated O&M system concentrated on the village and markaz levels, using private firms for maintenance and repair activities beyond the scope of the MMC. The existing road maintenance center had to be rehabilitated to improve road equipment availability. As in Minya, a governor's decree was issued, establishing an O&M committee under the governorate village local development department headed by secretary general. (See Appendix II, Governor's Directives on O&M Committee.)

ASSESSMENT METHODOLOGY

Goals

The goals of the final assessment were to evaluate the following:

- Performance and operationalization of VCWs and MMCs. (Operationalization of VCWs and MMCs is measured by the implementation of preventive and corrective maintenance at the workshop or maintenance center level.)
- Implementation of the O&M system in both governorates at all levels, including use of the recording system.
- Impact of O&M pilot activity on service delivery.
- Management and organization effectiveness.
- Utilization of LD II-P Bab II funds.
- Impact of the equipment needs assessment study in Gharbiya Governorate.
- Impact of the O&M computerized system in Minya Governorate.

Assessment Checklist

The assessment checklist/questionnaire used in the preliminary assessment report was modified to compare each specific activity and evaluate VCWs and MMCs in both governorates before and after the implementation of the O&M pilot program. Field visits and evaluations were made by the governorate maintenance coordinator, maintenance engineers from different sections, and VCW supervisors. Results of the assessment checklist yielded data on the following items:

- Equipment (type and number of pieces).
- Facility staff.
- Implementation status of maintenance and repair for subprojects.
- Operationalization.
- Impact of O&M pilot program on service delivery by area.
- Training.
- Organization and management.

- Finances (LD II Bab II funds).
- Recording and monitoring system.
- Implementation of maintenance plans.
- Share of private sector.
- Sustainability of service delivery (utilization & availability).

Measurement Indicators

Results of the checklist were evaluated through each of the related measurement indicators listed below:

- The indicator for operationalization was a facility's implementation of its role in maintenance and repairs.
- The indicator for the O&M pilot program's impact on service delivery was the change in the level of service delivery and availability of subprojects.
- The indicator for improvement in the amount of produced potable water was the comparison of the quantity of water produced (per pump station per year) before and after the pilot program.
- The indicator for improvement in the utilization percentage of equipment (road, wastewater and solid waste collection) was a comparison of the utilization percentages before and after the pilot program.
- The indicator for training was the percentage of trained personnel assigned to a given facility.
- The indicator for organization and management was the staff's compliance with the organization chart and the presence of a maintenance committee.
- The indicator for utilization of LD II Bab II funds was a comparison of the expenditure of each item in the Bab II groups.
- The indicator for recording and monitoring system usage was whether or not records were complete and up to date, and the date on which recording commenced.

- The indicator for implementation of maintenance plans was the percentage of those items in the plan which were actually completed (as planned).
- The indicator for sustainability of service delivery was a comparison of the percentages of equipment utilization and availability before and after the pilot program.

IMPLEMENTATION OF ASSESSMENT

The three-person O&M assessment team consisted of advisors from the Chemonics EQ and RD sections. One advisor assessed water subprojects, another evaluated equipment status, and the third assessed road subprojects.

Two four-day visits were made to each governorate to assess subprojects. Each day, one markaz was visited to investigate the water, road, and equipment sections at governorate and markaz levels. One village council and a governorate maintenance center were visited per each of the selected marakez

Table 1 shows the type and number of maintenance facilities in each governorate and what was visited in each.

Table 1
Maintenance Facilities Visited in Minya and Gharbiya Governorates (by type)

Type of Facility	Minya		Gharbiya	
	Total	Visited	Total	Visited
1. Village Workshop (VCW)	57	7	53	6
2. Markaz Maintenance Centers (MMCs)				
For Water	6	5	8	6
For Equipment	6	6	8	6
Unified Center	3	1	0	0
3. Governorate Maintenance Center (GMMC)	1	1	0	0
4. Governorate Road Maintenance Center	0	0	1	1
5. Road Sections	9	3	8	5

Table 2 indicates the location, date of visit, and name of visited sites through the assessment period in both governorates.

Table 2
Maintenance Facilities Visited in Minya and Gharbiya Governorates (by name)

Governorate	Location	Date	Sites Visited
Minya	Maghagha	21/4/92	Aba El Wakf VCW MMC for Equipment MMC for Water Road Section
	Samalout	20/4/92	El Bayho VCW MMC for Water MMC for equipment Road Section
	Abu Korkas	22/4/92	Abu Korkas El Balad VCW MMC for Water and Equipment Road Section
	Minya Governorate	19/4/92	GMMC
	Minya	3/5/92	Nazlit Hosain VCW MMC for equipment
	Bani Mazar	4/5/92	El Kais VCW MMC for Water MMC for Equipment
	Mallawi	5/5/92	Maasarit Malawo VCW MMC for Water MMC for Equipment
	Dair Mowas	6/5/92	Delga VCW MMC for Water MMC for Equipment

Table 2 (continued)
Maintenance Facilities Visited in Minya and Gharbiya Governorates (by name)

Gharbiya	Kafr El Ziat	13/4/92	Ibiar VCW MMC for Water MMC for Equipment
	Road Department	12/4/92	Equipment MMC Road Maintenance Section
	El Mehalla	14/4/92	El Hayatem VCW MMC for Water MMC for Equipment Road Section
	El Santa	15/4/92	El Qorashia VCW MMC for Water MMC for Equipment Road Section
	Samanoud	3/5/92	El Rahibean VCW MMC for Water MMC for Equipment Road Section
	Qotour	5/5/92	Damatt VCW MMC for Water MMC for Equipment Road Section
	Tanta	6/5/92	Ekhnaway VCW MMC for Water MMC for Equipment Road Section

SECTION THREE
Findings

OPERATIONALIZATION OF MAINTENANCE FACILITIES

The status of facilities in both governorates before the program started was as follows:

- Shortage of technical staff, mainly mechanics, electricians and welders.
- Wages (government salaries) paid to O&M workers were very low.
- No transportation (motor cycle or vehicle) for the maintenance staff.
- No training for most of the maintenance staff (engineers, technicians and operators).
- Poor building layout of some VCWs.
- Poor equipment location and storage at MMCs.
- VCWs were missing some important tools.
- Lack of spare parts (particularly imported) resulting in long repair periods. The funds for spare parts were typically used to purchase fuels and electricity.
- MMCs for both water and equipment had insufficient tools and machine tools.
- The governorates did not have an efficient inventory system.
- Poor building design and layout of Minya GMMC, Tanta MMC for equipment, and Gharbiya road department MC for equipment.

The status of the maintenance facilities after implementation of the pilot program in both governorates is as follows:

- Shortage in the technical staff was reduced by shifting personnel from other sections and hiring outside technicians, in some cases. At the assessed sites, staffs were

increased by 75 percent in Minya and 63 percent in Gharbiya. (See Table 6.)

- Wages were increased in ten Minya VCWs, Maghagha MMC for equipment, Minya GMMC and 25 VCWs in Gharbiya. This resulted from the establishment of these facilities as investment/service projects which allowed for the distribution of a percentage of the profits among the workers. The percentage increase in salaries was 85 percent in Minya and 55 percent in Gharbiya.

- Transportation problems were solved by purchasing 25 motorcycles for VCWs and 15 pick-up trucks for MMC; funds were allocated from the BVS 10 percent maintenance fund and/or from LD II-P funds.

- In both governorates, O&M training courses were provided to 575 persons through an LD II training block grant. Also, several training courses on specific types of equipment were designed and implemented through local DSF equipment dealers at their training centers (55 persons were trained in both governorates). OJT was also provided to MMC technicians through the implementation of service contracts for DSF equipment by the dealers as shown in Table 3.

Table 3
Implementation Schedule for Inspection and Service Contracts with DSF Equipment Dealers

Governorate	Dealer	Equipment
Minya	Mantrac	4 Bulldozers
Minya	Icon	Loader & Roller
Minya	Pico	4 Medium fire trucks
Minya	GMMC	4 Medium fire trucks
Gharbiya	Mantrac	Bulldozer
Gharbiya	Pico	3 lights & 3 medium fire trucks
Gharbiya	Icon	Grove, Loader, 4 Grader & 2 Roller

- The layouts and designs of 84 VCWs and MMCs in both governorates were modified and upgraded during the pilot program, using the LD II-P third-year funds.

- Facilities with poor locations were re-located including the MMCs for equipment in Kafr El Ziat, Mehalla, Tanta and El

Santa, all in Gharbiya. In Minya, facilities at El Edwa, Abu Korqas, Bani Mazar, Maasarit Mallawi and Der Mawas were relocated.

- Tools were purchased for 12 VCWs, using funds from the BVS 10 percent maintenance fund.

- Tools and machine tools for 19 MMCs were purchased with funds from the LD II-P third and fourth years.

- The layout and design of Minya GMMC and the Gharbiya road department MC were modified and upgraded before construction.

- Minya GMMC, Tanta MMC, and Gharbiya road department MC for equipment were constructed and outfitted; they are presently operating.

- LD II-P Bab II funds were used to procure spare parts which has shortened the time needed for repairs.

- Cardex and parts control systems, implemented by the Chemonics EQ section in both governorates, improved the integrated O&M system by shifting needed spare parts from one markaz to another, and establishing a spare parts tracking system.

IMPLEMENTATION OF O&M SYSTEM

Although the roles and responsibilities of each level were defined at the beginning of LD II-P[1] ,VCWs and MMCs typically performed repairs and overhauls, while neglecting regular preventive maintenance, before the pilot program. Also, MMCs did not provide any assistance to the VCWs. A prime focus of the pilot program was to reinstate the original preventive maintenance program as designed. The O&M pilot program successfully established the following roles and responsibilities for maintenance facilities.

Role and Responsibilities of VCW Workshop

The role and responsibilities of the VCWs in both governorates are the same:

- Implementation of weekly preventive maintenance (P_1).

[1] See O&M Planning and Budgeting Guidelines (ENG-M-18 [E&A]) Chemonics O&M section, August 1987.

- Implementation of monthly preventive maintenance (P_2).
- Implementation of minor repairs.

Adherence to these duties was substantiated by reviewing recording books and maintenance time schedules.

Role and Responsibilities of MMCs

Because of the presence of the GMMC in Minya Governorate, the role and responsibilities of governorate- and markaz-level facilities in Minya differ from that in Gharbiya. However, there are similarities.

In both Minya and Gharbiya, MMC responsibilities include implementation of the biannual preventive maintenance of water projects and light vehicles. In both governorates, all medium repairs are performed by MMCs.

In Gharbiya, biannual preventive maintenance for the heavy equipment (earth moving) and equipage vehicles (sewage, refuse, fire, etc.) is done by the local dealer, but not for all markaz. Capital repairs are performed by MMCs, with the help of private sector.

In Minya the GMMC performs capital repairs and biannual preventive maintenance for heavy equipment and equipage vehicles.

IMPACT OF O&M PILOT ACTIVITY ON SERVICE DELIVERY

Service delivery was one important indicator used to verify the success of the O&M pilot program. Level of success was determined by comparing service delivery before and after the implementation of the pilot activity. The service delivery of both potable water and equipment were examined in the final assessment.

Potable Water Service

Table 4 shows a comparison of service levels before and after the pilot program in Minya and Gharbiya for the inspected sites.

Table 4
Comparison of Pump Set Service Delivery Levels Before and After the Pilot Program

Indicators	Minya		Gharbiya	
	1989	1992	1989	1992
Pump set breakdowns per year	1036	387	1330	551
Average number of breakdowns per pump set per year	5.2	1.2	4.34	1.45
Percent of pump sets utilization	66	88	55	90
Average quantity of water /pump station/year (1000 m^3)	141	190	121	202
Average availability of pumps sets (percentage)	85	98.5	71	95.5

As displayed in the above table, the number of pump set breakdowns per year decreased by 63 percent in Minya and 59 percent in Gharbiya. Utilization of pump sets increased by 22 percent in Minya and 44 percent in Gharbiya, and the average quantity of water per pump set per year increased by 34 percent in Minya and 66 percent in Gharbiya. The availability percentage of pump sets increased by 13.5 percent and 24.5 percent in Minya and Gharbiya respectively.

Equipment Service

The determination of the level of equipment service delivery is based on two main indicators, availability and utilization. The positive impact of O&M pilot program in these areas is shown in Table 5. Although most of the equipment had been in operation since 1983, the availability percentage increased by 23 percent in Minya and by 29.3 percent in Gharbiya. The average utilization percentage increased by 16.9 percent in Minya and by 36 percent in Gharbiya.

Table 5
Availability and Utilization of Equipment
Percentages

Indicators	Minya				Gharbiya			
	1989		1992		1989		1992	
	A*	U*	A	U	A	U	A	U
Wastewater equipment	69	56	86	63.4	62	38	80	80.3
Solid Waste equipment	65	64	88	78	60	33	87	76
Road equipment	55	43	84	72	46	27	89.5	50
Average	63	54.4	86	71.3	56	32.7	85.5	68.7

* Availability
** Utilization

MANAGEMENT AND ORGANIZATION

The managerial problems which were faced before the pilot program included:

- Lack of maintenance awareness among governorate decision makers.
- Poor supervision at all levels.
- Very slow decision making process, which delayed the implementation of O&M programs, e.g. the transfer of funds for maintenance center rehabilitation.

These topics were discussed during the pilot program seminars and VCW/MMC O&M staff workshops. As mentioned earlier, governors of Minya and Gharbiya issued decrees providing for governorate-level committees headed by the secretary general. Each committee includes the maintenance coordinator, village development director, water maintenance engineer, road maintenance engineer, HQ garage engineer, and governorate computer division chief. The committees meet at least monthly; their responsibilities are:

- Supervising O&M plan implementation at all levels.
- Reviewing and approving O&M QPRs.
- Overcoming problems facing O&M plan implementation in all sectors.

- Drawing up an incentive systems (based on actual performance) for O&M personnel at all levels.

- Supervising training plan implementation.

- Supervising replication of the program in other marakez in the governorate.

- Reviewing utilization and availability rates.

Also implemented in both governorates, were monthly meetings held at markaz level headed by markaz chief and attended by VCW chairmen and O&M officials at the markaz and VCW levels. The function of the meetings was to follow-up the implementation of O&M system and facilitate problem solving as the need arose. Minutes of these meetings were sent to the governorate O&M committees from all marakez.

Impact of O&M Committee on the Implementation and Sustainability of the O&M System

At the monthly governorate O&M committee meetings, issues and problems are introduced through field visit reports by the village development director or governorate maintenance coordinator. Throughout the pilot program, problems encountered by the O&M committee were solved to a satisfactory degree. Adherence to the O&M plans was seen as the most effective way to sustain the O&M system, and the maintenance of infrastructure projects and equipment was identified as an essential element to project success.

Impact of O&M Coordinator Position on the Organizational Structure

In most governorates the O&M coordinator position is not a permanent job, nor is it a full-time position, within the organizational structure. This has typically lead to the perception that the O&M coordinator is, in fact, not part of the organization which has affected his/her effectiveness in that position.

Gharbiya solved this problem by appointing an experienced engineer from the village development department to the position of maintenance coordinator. It is a permanent position which is supervised by the village development director.

Minya designated the road department director as maintenance coordinator. Because this was not a full-time position, a village development department engineer was assigned to work with him on a full-time, permanent basis.

Both approaches proved that the O&M coordinator position problem could be solved within existing governorate organizational structures. In assessing the two approaches, it is clear that the Gharbiya approach is more successful than that of Minya, for the following reasons:

- The Gharbiya maintenance coordinator works full-time under the direct supervision of the governorate village development department (GVDD) director, as one of his employees.
- The GVDD director is supervised by the secretary general and is responsible for the follow up of all subprojects at the village level.
- Maintenance coordinator, as an employee in GVDD, is eligible for promotion within the organizational structure.
- Maintenance coordinator can use all GVDD facilities.

Impact of Availability of Staff on Operationalization

At the beginning of the pilot program there was a significant shortage of technical staff, particularly in Minya Governorate. Shortages were addressed by training some road laborers in the operation of water pump sets, and shifting operators to VCWs after training them in the needed areas. In addition, some Minya GMMC staff was shifted from the road and housing departments and the HQ garage to locations needing technicians. OJT provided by equipment dealers greatly augmented training efforts.

Gharbiya reassigned staff inter-departmentally to resolve the shortages. Table 6 shows the number of technical personnel before and after the program.

Table 6
Availability of Staff Before and After the Pilot Program*

Type of Site	Minya			Gharbiya		
	Visited Sites	Number of Personnel		Visited Sites	Number of Personnel	
		1989	1992		1989	1992
VCWs	7	35	60	6	73	105
MMCs for water	5	113	140	6	139	204
MMCs for equipment	6	85	138	6	95	175
Road Equipment MC	-	-	-	1	12	37
GMMC	1	-	69	-	-	-

*Excluding the drivers, labours and operators.

Impact of On-Site Organizational Charts on the Quality of Maintenance and Repairs

Organizational charts with job descriptions for staff were designed with assistance from Chemonics O&M advisors and implemented by governorate and markaz officials. They were then distributed to facilities of all levels of the O&M system. Organizational charts provided information on the following:

- Organizational structure of the maintenance facility including staff names and corresponding position.
- Roles and responsibilities of VCWs and MMCs.
- O&M plan time schedule according to the role and type of project.
- Activities of each type of preventive maintenance.
- Diagnoses, cause and repair procedure for each type of equipment problem.
- Maps of the water pipeline network for each pumping station, including pipe diameters and valve locations.
- Road maps for each VCW, including surface-type (dirt, gravel, asphalt).

The ready availability of the charts helped to focus staff activities, and alleviated the need to search for maintenance and repair activity information in manuals or guidelines the facility may not have had on-site.

Impact of the Establishment of Maintenance Facilities as Investment Projects on the Sustainability of the O&M System

Operating maintenance facilities as investment projects can provide a means of cost recovery and funds for worker incentives. Technical staff working at Minya investment project sites stated that their wages increased an average of 85 percent; Gharbiya technicians reported a 55 percent increase. In Gharbiya, investment project facilities perform maintenance tasks (plumbing, battery charging, tire repair, etc.) according to the availability of staff; Minya investment project maintenance facilities perform all types of maintenance services.

The investment regulation has allowed facilities to offer technical staff salaries which are competetive with those of the private sector. In addition, a portion of the net profits, according to the investment regulations, is allocated to the sustainability of the O&M system i.e.,

spare parts, materials, tools, etc. Table 7 shows the number of investment projects among the investigated sample.

Table 7
Investment Project Maintenance Facilities

Type of Facility	Minya		Gharbiya	
	Sample	Invest-ment	Sample	Invest-ment
VCW workshops	7	2	6	6
MMC for water	5	0	6	1
MMC for equipment	6	1	6	0
Road MC for equipment	-	-	1	0
GMMC	1	1	-	-

LD II-P BAB II FUNDS

The distribution of LD II-P Bab II funds by the ministry of finance (MOF) is usually postponed until several months after the start of the governorate fiscal year. (Funds for 91/92 were distributed to all governorates in October 1991.) However, the funds for 92/93 will be distributed to all governorates in July 1992 because they have already been received by MLA Amana and will be distributed as soon as the governorates complete their O&M plans and budgets.

Impact of O&M System on the Utilization of LD II Funds

The annual fund allocated through LD II-P, in agreement with the Bab II of the MLA Amana budget, is distributed among the 26 governorates as follows. The allocation shown for each fiscal year is for all governorates combined; the figure represents millions of LE.

1986/1987	LE 14.70 m
1987/1988	LE 14.70 m
1988/1989	LE 14.70 m
1989/1990	LE 41.81 m
1990/1991	LE 50.18 m
1991/1992	LE 59.84 m
1992/1993	LE 71.99 m

In FY 86/87, O&M plans and budgets were not developed before receiving funds, so all governorates spent the allocations according to their own criteria.

FY 87/88 is the first year that governorates developed an O&M plan and budget (prior to funding), using O&M guidelines distributed to

all governorates. Since then, the submission of an updated O&M plan and budget has been a precondition for annual funding from the LD II-P block grant.
Intensive TA with O&M plan and budget preparation has been given to Minya and Gharbiya during the pilot program. The results are shown in Table 8.

Table 8
Percentage of Total Bab II Fund Expenditures (by item)
Before and After The Pilot Program

Item	Minya		Gharbiya	
	87/88 %	90/91 %	87/88 %	90/91 %
Consumable materials	16	10.2	16.7	14.6
Oils and fuels	11	29.8	18.0	32.3
Oils and fuels for transp.	19	5.2	9.6	7.5
Spare parts	36	44	29.7	35.6
Water and electricity	14	-	25.8	-
Small tools and equipment	4	-	-	-
Service Contract/outside services	-	10.8		10.0
Total	100	100	100	100

As the table shows, the percentage of the budget for transportation oils/fuels and consumable materials (alum, chlorine, etc.) decreased, while the relative amount spent on spare parts and service contracts increased. This suggests that maintenance facilities were allocating more funds for maintenance and repair of subprojects and equipment.

Impact of LD II-P Bab II on the Sustainability of O&M System

The typical yearly MOF allocation to each governorate is less than LE 100,000 for all maintenance and repair of all equipment at all levels. In FY 90/91 the LD II-P Bab II fund allocation was LE 2,075,240 for Minya and LE 2,142,740 for Gharbiya (allocation data for FY 91/92 are not yet available). That year, Minya spent 99.8 percent of its allocation and Gharbiya, 99.9 percent. Needless to say, if there had been no LD II-P Bab II funds, it would have been impossible to conduct the level of maintenance and repair activities seen last year. Because the original Bab II funds were inadequate, LD II-P Bab II had a great effect on the sustainability of O&M system.

EQUIPMENT NEEDS ASSESSMENT STUDY IN GHARBIYA GOVERNORATE

Equipment need assessment guidelines were developed and finalized for use by markaz engineers. The engineers then assessed the performance of O&M facilities, and the demand for and supplies of equipment. Facility needs were identified and action plans were recommended by the engineers. This activity allowed markaz engineers to become aware of the status of their equipment in terms of availability and utilization percentages, and to develop a needs assessment based on that information. They learned to collect the information needed to determine the service level of their facilities and were given the opportunity to make recommendations on actions to improve those levels.

The results and recommendations of the various markaz engineers were discussed during a field visit attended by the Gharbiya maintenance coordinator. The recommendations of the markaz engineers were discussed and finalized.

The Gharbiya maintenance coordinator then presented the recommendations to the high officials and decision makers in the governorate (including the markaz chairman and the governorate secretary general). Their role was to review the results and recommendations of the case study and develop actions to increase the level of service provision.

This entire process allowed governorate O&M officials at all levels to be part of the assessment process, affording them the opportunity to further develop their skills in needs assessment. Using the lessons learned in Gharbiya, this needs assessment study is being replicated in other governorates.

Results of Study

The needs assessment study implemented in Gharbiya governorate included all marakez and districts, and concentrated on services related to solid waste, wastewater collection, and road maintenance. Tables 9 and 10 show the needs of each markaz or district to meet the demand as stated in the needs assessment study. The needs were considered in action plans, developed by marakez officials, which were reviewed and approved by the decision makers at governorate level.

In the area of road maintenance, the results indicated that no new equipment is required. The study also identified the need to repair six water spray trucks and six tractors (total estimated cost, LE 20600) and one grader (estimated cost, LE 12,000). It was recommended

that the operating hours for all graders be increased by one hour per day to meet road maintenance demands.

A critical element of the study was the identity of operation and maintenance needs. Table 11 notes markaz staffing requirements and the funds needed for building maintenance, tools, spare parts and materials, and training. As shown in Table 11, 60 drivers are needed (for all marakez); this is the main factor affecting the equipment utilization percentage. The utilization percentage can also be increased by better organization i.e., reducing trip times, increasing operating hours, working more than one shift in one day, and reducing downtimes caused by repairs.

Gharbiya Governorate developed an action plan to address the identified problems. Included was an official request to the organization and administration department to review technical staffs at all levels and, if possible, relocate staff where needed. The governorate action plan also requested the use of 92/93 LD II-P Bab II funds to cover the costs of other items.

Table 9
Solid Waste Service Needs of Gharbiya Governorate

Location Needs	Tanta 1st District	Tanta 2nd District	Qotour	Kafr El Ziat	Sam-ma-noud	Mehalla	Zefta	Basyoun	El Santa	Total
Cost of repairs for equipment (1000 LE)	15.0	24.1	11	9.0	30.0	60.35	5.0	-	-	154,45
Increase in the utilization (hr/day)	3.0	3.5	-	3.5	-	3.5	3.0	3.0	3.0	-
Resulting increase in service delivery (M^3)	27	75.0	-	175	-	44.0		16.0		
Purchase new equipment	2D -	2D 4T	- -	- 2T	-	5D -	- -	2D -	- -	11D 6T

D = Dump Truck
T = Tractor

Table 10
Wastewater Service Needs of Gharbiya Governorate

Location / Needs	Tanta 1st District	Tanta 2nd District	Qotour	Kafr El Ziat	Sam-ma-noud	Mehalla	Zefta	Basyoun	El Santa	Total
Cost of repairs for equipment (1000 LE)	48.0	18.5	-	-	28.0	1.45	13.0	51.45	-	160.4
Increase in the utilization (hr/day)	3	3.5	4	1	4	-	5	4	4	-
Resulting increase in service delivery (M^3)	65	-	54	-	20	-	180	-	82	
Purchase new equipment	- 8T	- -	- 3T	- -	- 1T	- -	2TR -	- -	- 2T	2TR 14T

TR = Truck
T = Tractor

Table 11
Operation and Maintenance Needs of Gharbiya Governorate

Locations / Needs	Road Dept	Tanta 1st District	Tanta 2nd District	Qo-tour	Kafr El Ziat	Sam-ma-noud	Mehalla	Zef ta	Bas-youn	El Santa	Total
No. of technical staff											
Driver	-	12	13	4	-	1	-	19	2	-	60
Mechanic	-	5	-	3	-	3	-	4	2	-	17
Electrician	-	-	-	-	1	1	-	-	-	-	2
Others	-	2	-	2	2	6	-	4	2	3	21
Building (LE)	-	-	-	16000	42000	33000	-	80000	5000	-	176000
Tools (LE)	20000	-	-	7600	12000	14900	77000	4150	-	6250	141900
Training(LE)	29550	12000	16550	9100	8000	11100	20700	14600	11200	19100	132800
Spare parts & materials (LE)	192600	131000	111600	37000	40400	17930	127800	43000	116450	48500	866280

MINYA GMMC O&M COMPUTERIZED SYSTEM

During LD II-P, the Minya main maintenance center was constructed and a technical staff was hired; tools and machine tools were also procured from available LD II-P funds. Spare parts and DSF equipment were stored in the GMMC. The responsibilities of the center include:

- Bi-annual maintenance for the equipage vehicles and for earth moving equipment.
- Medium repairs which are beyond the scope of the MMCs.
- Capital repairs for all types of equipment.

The GMMC operates as an investment/service project; incentives are distributed to the technical staff. A computerized system was designed to facilitate the work of the GMMC. A PC computer was purchased and a data analyst from Minya was trained by the Chemonics equipment section on system operations. The system has the following computerized constituents.

- Preparation of O&M plans and budgets: This computer program develops a time schedule of various maintenance needs for all types of equipment. It determines the spare parts needs for each type of equipment and their costs.
- O&M plan follow-up: This program includes a sub routine used for monitoring and following up the implementation of the O&M plan for equipment. It requires monthly data entry in order to verify the implementation of scheduled preventive maintenance. A monthly report is given to the maintenance coordinator for corrective actions.
- Spare parts management system: Developed as a part of the O&M computerized system for equipment O&M, this system reduces inventory investment because only those items that have a reasonable level of "movement" will be stocked. The system results in a smaller space requirement for spare parts storage, increases spare parts availability, and decreases the delivery time of spare parts (which, in turn, increases equipment availability).
- Maintenance center accounting system: This program includes a subroutine with the capability to create a bill for each equipment repair and generate the GMMC budget for each FY. This saves an enormous amount of time and increases accuracy.

Tables 12 and 13 show the budget of Minya GMMC for FYs 1989/1990 and 1990/1991 respectively. The increased net profit shown in these tables allowed the GMMC to distribute incentives to workers based on their performance.

Table 12
Minya GMMC Balance Sheet for FY 89/90

Assets				Items	Items	Liabilities			
Total		Partial				Partial		Total	
LE	ML*	LE	ML			LE	ML	LE	ML
				Fixed Assets:	Fixed Liabilities:				
		919850		Lands	Capital	1845026	300		
		705620		Buildings				1845026	300
		6188	980	Furniture					
		24950		Cars					
		189354	500	Tools & MC Tools					
		1015	200	Typewriters & Calculators					
		690		Safe					
1847668	680								
				Circulating Assets:	Circulating Liabilities:				
		78454	030	Current Bank	Grant (LD II-P)	1973942	570		
		1929877	990	Stocks (Spare parts)	Taxes	5	680		
		44079	580	Debtors (suppliers)	Creditors	600			
		500	250	Debt Accounts	O&M Funds	8663	540		
		600	-	Guarantee	Creditors	20099	190		
					Depreciation	12879	270		
					Net Profit	39963	530		
2053511	850							2056154	230
3901180	530							3901180	530

* Egyptian Mallime

Table 13
Minya GMMC Balance Sheet for FY 90/91

Assets				Items	Items	Liabilities			
Total		Partial				Partial		Total	
LE	ML*	LE	ML			LE	ML	LE	ML
				Fixed Assets:	Fixed Liabilities:				
		919850	-	Lands	Capital	1933836	300		
		705620	-	Buildings				1933836	300
		7296	980	Furniture					
		24950	-	Cars					
		1035	500	Coolers					
		189354		Tools & MC Tools					
		1015	200	Typewriters & Calculators					
		845	450	Safe					
		7855	-	Copying MC					
		59000	-	Fork Lift					
		59960	-	Other Equipment					
1976790	670								
				Circulating Assets:	Circulating Liabilities:				
		77666	780	Current Bank	LD II-P Funds	2051161	357		
		41432	110	Customers	Creditors	30995	650		
		9	551	Taxes	Previous Profits	39963	530		
		31977	330	Debtors (suppliers)	Depreciation	55393	850		
		51780	280	Cheque	Net Profit	98984	401		
		2370	750	Debtors					
		2019374	177	Stocks (spare parts)				2276498	788
		6394	495	Stocks (others)					
		1938	945	Stationary					
		600	-	Others					
2233544	418								
4210335	088							4210335	088

* Egyptian Mallime

SECTION FOUR

Conclusions and Recommendations

CONCLUSIONS

Through the O&M pilot program, the sustainability of the O&M system was improved at all levels. This was achieved through TA and OJT given by the O&M coordinator during replication of the system in other marakez. To build an institutional capacity for O&M training activities, a training center was constructed at the Minya GMMC. El Santa Markaz in Gharbiya Governorate, added a classroom for water equipment training; staff designed and implemented several training courses on O&M electrical switch panels, water meters, and plumbing. In both governorates, libraries with the appropriate manuals, spare parts catalogues, and Chemonics O&M deliverables were established in the Minya GMMC and Gharbiya information center.

The main conclusion drawn from the assessment of the O&M pilot program implemented in Minya and Gharbiya is that management of the O&M system is the area which needs most to be improved if the goals of an integrated O&M system are to be reached.

The alternative systems used in each governorate to install an O&M coordinator proved that the problems associated with this position could be at least partially solved within existing governorate organizational structures. Better results were achieved in Gharbiya for the following reasons:

- The Gharbiya maintenance coordinator works full-time under the direct supervision of the governorate village development department (GVDD) director, as one of his employees.

- The GVDD director is supervised by the secretary general and is responsible for the follow up of all subprojects at the village level.

- Maintenance coordinator, as an employee in GVDD, is eligible for promotion within the organizational structure.

- Maintenance coordinator can use all GVDD facilities.

Among the several performance indicators which verify that the pilot O&M system in both governorates had a positive impact is the

fact that all VCWs, MMCs and GMMCs are now operating with effective management (110 VCWs, 31 MMCs and two GMMCs).

Integrated O&M systems are established in both governorates, in which VCWs are responsible for first level of preventive maintenance (PM) up to monthly PM, MMCs assist VCWs in implementing semi-annual PM, and GMMCs assist MMCs with overhaul repairs and maintenance activities beyond their capabilities.

Based on the PM implementation findings, subproject and equipment service delivery was improved. The following conclusions are drawn from an analysis of tables 4 and 5:

- The average availability of water pump sets increased by 13.5 percent in Minya and 24.5 percent in Gharbiya, during the implementation of O&M system. (The increase was more pronounced in Gharbiya than Minya because the utilization of water pump sets at the beginning of the program was 55 percent in Gharbiya and 66 percent in Minya.)

- The average quantity of water produced per pump set per year increased by 35 percent in Minya and 37 percent in Gharbiya.

- The availability of equipment increased from 63 to 86 percent in Minya and 56 to 85.3 percent in Gharbiya.

- Because Minya Governorate did not have a wastewater problem, the wastewater equipment utilization increased by only 7.5 percent; in Gharbiya utilization increased by 42.3 percent.

- Utilization of solid waste equipment increased only 14 percent in Minya, because most of marakez have private sector collectors. In Gharbiya it increased by 45 percent because they depend completely on governorate equipment.

- Road equipment utilization increased by 29.4 percent in Minya and 23 percent in Gharbiya. Road equipment in Minya is distributed among all marakez; in Gharbiya the equipment is centralized in the road department.

Monitoring and recording systems have been implemented at all levels. These include register books, O&M quarterly progress reports (including equipment utilization and availability), maintenance coordinator field visits, and a reporting system which

goes from the village level, through the O&M committee, and ends with a summary report to the governor.

The expenditure of LD II-P Bab II funds for spare parts increased by 18 percent in Minya and by 5.8 percent in Gharbiya; electricity for water pump sets was reduced from 14 percent in Minya and 25.8 percent in Gharbiya to zero percent in both. Both governorates transferred the fund allocated for electricity to other O&M items such as oils and fuels (which increased 71 percent in Minya and 79 percent in Gharbiya). This shift in allocations, along with the implementation of regular preventive maintenance, accounts for the high availability and utilization percentages and demonstrates an efficient use of funds.

The Gharbiya equipment needs assessment study had a very positive effect on the O&M system. It resulted in the ability of O&M and utility engineers to conduct a similar study and served to make them aware of the needs of their own facilities. The process of decision making, on the part of markaz and governorate officials, was enhanced and there was noticeable improvement in the level of equipment utilization.

Gharbiya Governorate needs to purchase 11 new dump trucks and six tractors in order to meet the solid waste demand. The study highlighted the need to place first priority on the use of O&M funds for the repair of out-of-order equipment (total cost of LE 154,450) and to increase the utilization of available equipment by an average of three hours/day.

Two trucks and 14 tractors are needed to meet wastewater service demands and LE 160,400 is required for the repair of out-of-order equipment. An average of four hours/day increase in equipment utilization is also required to meet the demand.

The first priority for road maintenance service is the LE 32,600 needed to repair out-of-order equipment; no new equipment is required.

Regarding O&M staff needs (see Table 11), an action plan was developed to overcome the shortage of technical staff, and to use 92/93 LD II Bab II funds to cover the needs of other items. As a result of this needs assessment study, governorate officials can direct future funds to different areas on the basis of need.

The O&M computerized system in Minya Governorate will facilitate the following:

- O&M plan and budget.

- Follow up reports of the O&M plans.
- Accounting reports.
- Better management of the GMMC.

RECOMMENDATIONS

USAID, through Amana and the Central Agency for Organization and Administration (CAOA), should assist in the establishment of governorate-level O&M departments to be integrated into the organization structure of each governorate.

Until O&M departments can be established, that approach used in Gharbiya Governorate in which a qualified engineer assumes the O&M coordinator position full-time, is recommended. This acting O&M coordinator is supervised by the GVDD and assisted by three technical engineers from the roads, housing and equipment departments.

USAID should assume a leadership role by supporting an MLA Amana request to all governors to establish an O&M group to function as a subcommittee of GLDC. This sub-committee should be headed by the governorates' secretaries general; the members should include the road department director, housing department director or water company chairman, governorate village development department director, governorate maintenance coordinator, headquarters garage director and others appointed by the governor. The sub-committee will have the following responsibilities:

- Supervise the preparation and implementation of O&M plans and budgets at all levels.
- Address problems encountered during implementation, via monthly committee meetings.
- Review and assess quarterly O&M reports.
- Assess training needs at all levels and monitor training implementation.
- Develop a schedule for the governorate maintenance coordinator's field visits and resolve any identified implementation problems. A monthly report on implementation will be submitted by the governorate maintenance coordinator.

O&M coordinators should emphasize the operationalization of LD II-funded maintenance workshops and centers in other governorates. Identified unoperational facilities should initially receive TA to meet basic requirements, followed by training for all O&M officials.

Those governorates without O&M private sector firms (e.g. desert governorates) should establish governorate maintenance centers using the Minya model. Conversely, governorates with private sector firms, should implement the Gharbiya approach using an integrated O&M system for the village and markaz levels only.

The continuity of the annual O&M budgets should be ensured, using a 4-5 year transition period for the cost recovery scheme to be fully implemented. This can be arranged through cooperation among MLA, MOF, MIC and USAID. It should be noted that without the LD II-P/Bab II fund, improvement in O&M system is not possible.

Technical assistance on the analysis of quarterly equipment utilization and availability reports should be provided on a continuing basis, focusing on those governorate-level departments which have low percentages of equipment utilization and/or availability.

Develop standard investment project regulations through Amana and MOF, and encourage all governorates to use workshops and maintenance centers as investment projects. The resulting availability of incentives and bonuses will facilitate the hiring of qualified O&M staff and the retention of current staff members. In addition, operating VCWs and MMCs as investment projects will reduce reliance of these facilities on state budget funds (Bab I and Bab II).

Needs assessment studies, similar to that of Gharbiya, should be conducted in all governorates. Evaluation of equipment and O&M needs will be used to compare existing and future equipment and maintenance facility demands with available and projected supplies.

Encourage all governorates to use local dealers and private firms for equipment overhaul. This will allow local maintenance centers to focus on preventive maintenance and light to medium repairs.

Establish a small library in each governorate in GMMC, if available, or the governorate-level parts control section. It should be headed by the maintenance coordinator and provided with equipment O&M spare parts manuals and catalogues, and all Chemonics O&M deliverables.

APPENDIX A

ANNEX A

O&M PILOT PROGRAM SCOPE OF WORK

I. Purpose

A. Assist markaz and village O&M personnel in the function of maintenance centers and workshops. An intensive training program will be initiated for O&M personnel at all levels.

B. Upgrade governorate personnel capabilities with regard to O&M system for road, water and rolling stock through intensive on-site TA. Demonstrate that managers and technicians can successfully repair and maintain an infrastructure project and equipment according to the responsibilities identified in each level in the O&M plan.

II. Expected Output

A. Identification of major constraints to effective maintenance in the rural areas.

B. Strengthening of the markaz role in O&M system implementation (PM^3 and up to medium repair).

C. Strengthening of the preventive maintenance concept at the VC and markaz levels.

D. Upgrading of O&M staff technical skills through specific training programs.

E. Identification of markaz, governorate and dealer roles in maintenance and repair of DSF equipment.

F. Assessment report including plan of action that can be used by governorate personnel to implement the maintenance program.

G. Specific strategy for O&M systems to be replicated in other marakez and in other governorates.

III. Strategy

Because this task includes TA and training programs, and because of limits in time and staff, the O&M section is concentrating their TA efforts in two selected governorates according to specific criteria.

After the selection of these two governorates, Chemonics O&M team will select one markaz in each governorate to implement specific tasks with all its VCs. Upon completion of the tasks, an assessment report will be prepared stressing

the lessons learned. This is estimated to be a 9-month effort for infrastructure project implementation addressing maintenance needs for heavy equipment and rolling stock since no such provisions for this equipment were made when it was originally supplied.

IV. Implementation Steps

A. Select two governorates

1. Preparation of an initial list of priority governorates according to the following criteria.

   a. expressed desire on the part of governorate officials to participate.

   b. establishment on an O&M committee at the governorate level to be responsible for follow up implementation of the O&M system at all levels.

   c. assured assignment of a full-time maintenance coordinator.

   d. geographic distribution including upper and lower Egypt.

2. Visits to governorates to verify criteria and agreement to participate.

3. Final selection and informing selected governorates.

B. Site visit to the selected governorates to discuss the establishment of the O&M Committee and outlining of responsibilities. The proposed members of this committee are:

- secretary general as the head of the committee
- governorate maintenance coordinator
- housing, roads and village development department directors
- headquarters garage director
- other members to assist the committee

This committee will meet at least once per month and is responsible for:

- supervising O&M plan implementation at all levels
- reviewing and approving O&M QPR
- overcoming problems facing O&M plan implementation in all sectors
- drawing up an intensive system for O&M personnel at all levels according to actual performance
- supervising implementation of the training plan
- supervising replication of the program in other marakez in the governorate

C. Visit the selected governorates and carry out site visits to a number of the marakez in order to select one markaz per governorate to provide on-site TA in the O&M system.

D. Carry out monthly site visits to all VCs in the selected markaz and MMCs (water, city garage and road sections), providing on-site TA in preventive maintenance and functions of the maintenance workshop, the markaz role, the monitoring and recording system, and the implementation of the maintenance plan.

E. Assist markaz personnel in the assessment of the local private sector and dealer roles in order to identify their capabilities, involvement in an O&M system, and procedures to carry out O&M activities which are beyond markaz capabilities.

F. If a maintenance center is still under construction at the governorate level, TA will be provided in the field of construction supervision, engineering, modification of design to meet O&M system requirements, outfitting of the maintenance center, project commissioning, and the modification of existing maintenance facilities (old buildings), if needed.

G. Implementation Workshop

A one-day workshop will be organized by Chemonics-markaz officials, in coordination with USAID and ORDEV/Cairo, to be held at the markaz level each month. It will be attended by the governorate maintenance coordinator, governorate village development director, markaz chief, markaz maintenance coordinator, water MMC director, road section director, city garage director, all VC chairman, and all VC workshop supervisors

An effort will be made to assure participation and input of the attendees in discussions of the daily work of maintenance personnel in the field. The output will be detailed solutions for technical, financial, and administrative problems. Action needed and level of responsibilities will be identified.

A meeting will be held with the O&M Committee at the governorate level to present the results and recommendations of the markaz workshop in order to assist in solving problems and determining action steps.

H. To bring all DSF equipment back into operating condition, Chemonics O&M team will assist governorate and markaz personnel in establishing an inspection and service contract for equipment available at all levels throughout the governorate with the dealers in order to identify all spare parts and required budget. This will be done through direct contact between the governorate and dealers under the supervision of Chemonics in order to facilitate the coordination and cooperation between both.

I. Training Programs

In order to upgrade the O&M staff capabilities at all levels and to create an awareness of the preventive maintenance concept, the following training courses are suggested:

1. O&M of water projects for operators
2. O&M of water projects for technicians
3. O&M of water network for plumbers
4. repair and calibration of water meters
5. maintenance of road projects for technicians
6. operation and daily maintenance of equipment for operators
7. periodic preventive maintenance of equipment for technicians
8. maintenance and repair of tires and batteries for technicians

All of the above training courses will be carried out by a local training institute under Chemonics' supervision, except the training courses for DSF equipment (numbers 6 and 7) which will be carried out through a training contract with the dealers.

J. Replication Effort in Other Marakez

1. TA Stage

A one day meeting will be held with all markaz chiefs in the third month of the TA stage. The meeting will be led by the type two team from the LD II-P project and the O&M committee; the secretary general will attend. The purpose of the meeting will be to explain the O&M program and to encourage markaz chiefs in the non-targeted marakez to take steps to begin the maintenance program in their markaz. Specific topics will include posting of PM charts at each water pumping station, preparation of an inventory of equipment, maintenance records, PM schedules for markaz staff, and management of MMCs and VCWs. The O&M team at LD II-P will prepare briefing materials related to the establishment of effective maintenance programs. After this meeting the Chemonics O&M team will invite O&M officials in other marakez to join them during their visits to the target markaz (officials from one markaz will be selected to join Chemonics team on each site visit).

2. Intensive TA Stage

A second one-day workshop will be held with all markaz chiefs to enable them to report back on their efforts and to ask any questions they may have. The markaz chief of the targeted markaz will make a presentation concerning the efforts made in his markaz. LD II advisors will report back to the group concerning the heavy equipment maintenance program. Chemonics O&M team will visit at least two villages in each of other marakez to provide intensive

TA to these villages and assist the markaz O&M officials. The advisors will try to identify any markaz that is experiencing special problems in implementing the program.

3. Follow up Stage

O&M advisors will visit those marakez which were identified as having special problems. Training programs directed toward solving specific problems should be considered during this visit. The visits will take place during first month of this stage. The weak marakez along with a sample of the better marakez will be visited during the third or fourth month of this stage to assess progress. If problems persist, a meeting will be held with the O&M committee to advise them of steps they need to take to resolve the problems.

The targeted markaz should also be visited during this second follow-up visit to determine if the results achieved during intensive TA are being sustained. The type two team should carry out this second visit.

K. An assessment report will be prepared at the end of the 9-month period stressing the lessons learned, presenting input from governorate personnel and recommendations for the strategy needed to replicate this effort in other governorates.

APPENDIX B

ANNEX B

GOVERNORS DIRECTIVES ON O&M COMMITTEE

Gharbiya Governorate
Rural Development Department

A Memorandum for Presentation
to the Governor
(Infrastructure Project)

Please be kindly notified that a joint meeting was held at the Secretary General's office on 12/2/1989 as regards the operation and maintenance of the governorate's infrastructure projects and was attended by Chemonics consultants.

During the meeting the forming a subcommittee for O&M affairs at the governorate level, to be subordinated to the GLDC was discussed. It was agreed that it should be composed as follows:

First Under-Secretary and Secretary General as Chairman and membership of:

Engineer/Director General of the Roads Directorate
Engineer/Deputy of the Housing Directorate
Engineer/Director of Rural Development Department
Engineer/Maintenance General Coordinator

The following personnel will assist the committee in its work.

Governorate Water Maintenance Engineer - Housing Directorate
Governorate Roads Maintenance Engineer - Roads Directorate
Mechanical Drive Engineer at the Governorate
Governorate Computer Division Chief

The committee is entitled to seek the help of whom it needs to perform its tasks.

The committee and its assistants are competent in what follows:

1. Supervising the preparation of O&M annual plan and budget, and the related computer data entry.

2. Follow up implementation of O&M plans at all levels.

3. Preparation of O&M QPR's and its data analysis, and their presentation to GLDC on the specified dates.

4. Elimination of all obstacles obstructing plan implementation in all sectors.

5. Draw up criteria and basis of incentives and rewards distribution among O&M personnel at all levels according to actual performance rates. (standards)

6. Forming training plans and programs for O&M personnel and following up their implementation.

7. Successful O&M experiences implemented in one markaz to be passed onto the other governorate marakez.

8. All future entrusted responsibilities in the O&M field.

The committee will meet once every month and according to work requirements and conditions.

This is submitted to your excellency for approval on forming the above mentioned committee.

Please accept my best regards.

Department Director
Engineer/Hamed Amer
12/2/89

Approved by the Governor
14/2/89

General Department of
Legal Affairs

Decision o. 26 of 1989
Regarding Forming O&M Technical Office

Following being informed of Law No. 43 of 1979 regarding Local Administration System and its executive regulation amended by Law No. 145 of 1978 concerning the government civil personnel system and its executive regulation amended by law No. 115 of 1983. And what was raised during the joint meeting with Chemonics consultants dated 7/12/1989.

Decided

Article 1: To establish an operation and maintenance technical office headquartered in the governorate building and subordinated to the governorate Secretary General, with the membership of:

1. Engineer/Director General of Road and Transport Directorate and Maintenance General Coordinator at the Governorate.

2. Engineer/Deputy of Housing and Utilities Directorate at the governorate.

3. Engineer/Rural Development Department Director at the governorate.

Article 2: The following personnel will assist in performing the office's work:

1. Engineer/Ahmed Gama Toony, at the Road and Transport Directorate, to be responsible on full time basis for Road projects and Heavy Equipment Maintenance.

2. Engineer/Mohamed Fayez Taha Othman, Chief of Maintenance Division at the Housing Directorate, to be responsible for Water Projects Maintenance.

3. Engineer/Saad Makhlouf, Chief of Governorate Main Maintenance Center.

4. Engineer/Abdel Hady Mohamed Hassan, Governorate Vehicles Department Director, to be responsible for equipment maintenance at the governorate headquarters and marakez garages.

5. Engineer/Ragaie Mohamed Khalil, Chief of Village Development Department Computer Division at the governorate.

The office and assistants will be competent in the following:

1. Supervising the preparation O&M annual plan and budget and the related computer data entry.

2. Follow up O&M plan implementation at all levels.

3. Preparation of O&M QPR: and its data analysis and their presentation to the GLDC on the specified dates.

4. Overcoming all obstacles obstructing plan implementation in all sectors.

5. Draw up incentives and rewards distribution criteria and basis among O&M personnel at all levels according to actual performance rates (standards).

6. Laying down training plans and programs for O&M personnel and following up their implementation.

7. Successful O&M experiences implemented in one markaz to be passed onto the other governorate marakez.

8. All future entrusted responsibilities in O&M field.

Article 3: The office should meet in full membership at least once monthly.

Article 4: All concerned authorities should implement this decision as soon as it is issued and perform its tasks accordingly.

Governor of Minya
General/Abdel Tawab Rashwan

APPENDIX C

APPENDIX C
CHECKLIST OF THE PILOT O&M PROGRAM EVALUATION

Governorate: _____ Markaz: _____ Village: _____

Reporter: _____

Number and Type of Equipment:

Type								Total
No.								

Manpower:

Type								
	Before	After	Before	After	Before	After	Before	After
No.								

Type					Engineer		Total	
	Before	After	Before	After	Before	After	Before	After
No.								

Implemented Maintenance and Repair:

Type of Project	Before Pilot Program during 1988							After Pilot Program during 1991						
	No.	Maintenance			Repair			No.	Maintenance			Repair		
		P1	P2	P3	C	M	K		P1	P2	P3	C	M	K
Total														

What is the annual average of equipment break down, before and after the program?

Before _____ After _____

What is the average repair time for each breakdown?

Before _____ day After _____ day

Operationalization:

No. of VCWs served by MMC ☐

Operational Level (No. of Each)

Ex. ☐ Good ☐ Fair ☐ Poor ☐ Not Used ☐

Operational Not Operational

Percentage ☐ ☐

The impact of O&M Pilot Program on service delivery by area:

		Service Delivery		Availability	
		B	A	B	A
1	Water				
2	Roads Equipment				
3	Equipment:				
	Garbage Collection				
	Sewage				

Training:

- Were any training programs implemented to upgrade manpower capabilities ?

Yes ☐ No ☐

- If Yes, describe the training programs and the number of trainees in each.

  o By Chemonics: No. _____ Trade: _____
  _____ _____
  _____ _____

  o By Dealers: No. _____ Trade: _____
  _____ _____
  _____ _____

  o By Governorate: No. _____ Trade: _____
  _____ _____
  _____ _____

Organization and Management:

- Was there an organization chart for the centre before the pilot program?

  Yes ☐ No ☐

- If No, do you have an organization chart now?

  Yes ☐ No ☐

- Which materials have been received:

	Used	Not Used
1.	( )	( )
2.	( )	( )
3.	( )	( )
4.	( )	( )
5.	( )	( )

- Was there a maintenance committee at the governorate and markaz levels before the program?

  Yes ☐ No ☐

- If No, does it exist now?

  Yes ☐ No ☐

- If Yes, list its members.

- Under what regulations did the centre operate before the program?

  Government ☐ Services Investment ☐

- What regulation does the centre use now ?

  Governmental ☐ Services Investment ☐

Finance:

The expenditure of Bab II during the last 4 years

88 - 89		89 - 90		90 - 91		91 - 92	
Allocation	Expenditure	A.	E.	A.	E.	A.	E

Recording and Monitoring System:

Are the records and monitoring materials completed?

Yes ☐ No ☐

Recording Start: / /
Last Record: / /

- Do you prepare the QPR on time?

  Yes ☐ No ☐

Implementation of Maintenance System:

- Did you follow the O&M plan which you developed at the beginning of the year?

  Yes ☐ No ☐

- Did you register the utilization of all equipment day by day in the log books?

  Yes ☐ No ☐

State the availability of Equipment:

$\frac{\text{No. Operational}}{\text{Total No. of Equipment}}$ = _____ = %

- Do you take action for disposing the unused, inoperable and junk property during the last year?

  Yes ☐ No ☐

- If Yes, give type and No.:

Capability of Private Sector:

How many repairs during the last year were done by the private sector?

Current ☐ Medium ☐ Capital ☐

Sustainability of Service Delivery:

Approximately, what was the percentage of utilization and availability of the equipment before and after the program.

Utilization:

Before _____ % After _____ %

Availability:

Before _____ % After _____ %