

Government of Egypt
Governorate of Fayoum

Government of the Netherlands
Ministry of Foreign Affairs
Directorate General for
International Cooperation

FAYOUM DRINKING WATER AND SANITATION PROJECT



INCEPTION REPORT VOLUME I

PLAN OF OPERATIONS

Revised version January, 1992

EL AZAB WATER WORKS, FAYOUM in cooperation with

IWACO

Consultants for Water & Environment
Rotterdam
The Netherlands

IDHV

DHV Consulting Engineers
Amersfoort
The Netherlands

ECG

Engineering Consultants Group S.A.
Cairo
Egypt

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INTERNATIONAL REFERENCE CENTRE
FOR COMMUNITY WATER SUPPLY AND
SANITATION (IRC)

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INTRODUCTORY NOTE CONCERNING THE REVISED VERSION

Based on discussions in Fayoum and subsequent correspondence with the Netherlands Embassy in Cairo, a number of modifications have been made to the July 1991 version of the plan of operations.

With respect to the earlier version the modifications can be found on the following pages:

- page 7
 - line 6: El Azab's *and NOPWASD* responsibilities
 - 3rd par. of section 2.3: *El Azab is Executive Authority for water supply and responsible for the water supply activities*
 - bottom par. of page: GOF will be *supervized technically* by NOPWASD.
- page 14
 - third par. of section 3.2.4: coordinator from El Azab *and the party responsible for sanitation*
- page 17
 - revised figure 3.1
- page 18
 - bottom line: *It is expected that a Sanitation Authority will be established in the Governorate*
- page 19
 - new paragraph: *Concerning implementation etc.*
- page 20
 - table 3.1: add *NOPWASD* to GOE (third column)
- page 26
 - par. at top of page: *the project will evolve an education programme in household hygiene*
- page 40-42
 - *reformulated chapter 6, including table 6.1*

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LIST OF ABBREVIATIONS AND CONVERSION FACTORS

AA	Administrative Arrangement
AW	El Azab Water Works of Fayoum Governorate
BAD	Bilateral Associate Expert
DGIS	Directorate General for International Cooperation
DHV	Consulting Engineers, Amersfoort, the Netherlands
ECG	Engineering Consultants Group (Cairo)
GOE	Government of Egypt
GOF	Government of Fayoum ICA Institute of Cultural Affairs
GON	Government of the Netherlands
IWACO	Consultants for Water and Environment, the Netherlands
NOPWASD	National Organization for Potable Water and Sanitary Drainage
PO	Plan of Operations
TOR	Terms of Reference
UASB	Upflow Anaerobic Sludge Blanket
USAID	United States Agency for International Development

CONVERSION FACTORS

DFL	Dutch Guilder (1 Dfl - LE 1.86)
LE	Egyptian Pound

EXECUTIVE SUMMARY

GENERAL

The Fayoum Drinking Water and Sanitation Project is a cooperation between the Government of the Netherlands (GON) and the Governorate of Fayoum (GOF) in Egypt. The project has as a longterm objective to improve water supply and sanitation conditions in the Governorate.

The duration of the project is five years (1990-1995), divided into two stages. Stage 1 covers the first three years; one preliminary year for inception and project start-up (90/91) and two years for master planning, feasibility studies, preliminary designs, rehabilitation and pilot projects. Stage 2 will initially be limited to two years and concentrate on detailed design, tendering and execution of works.

The project focusses on two main subjects (sub-projects), i.e. water supply and sanitation (waste water and solid waste).

In the sub-project watersupply, assistance is provided to an established organization, El Azab Waterworks of Fayoum, a Water Authority with 750 personnel, 1500 litres/sec. production capacity and serving over one million people in Fayoum with drinking water. The sub-project sanitation on the other hand starts nearly from zero especially where waste water is concerned. Neither facilities nor managing agencies are available.

The Inception Report consists of two volumes. Volume I presents the Plan of Operations for phase I (years 2 and 3) and Volume II provides a comprehensive review of the existing situation with respect to water supply and sanitation in Fayoum.

EXISTING SITUATION

Water supply

El Azab Water Works is responsible for water supply in all Fayoum, excluding Fayoum city. Water production is mainly concentrated in El Azab station (1200 l/s) and is supported by compact treatment plants in the regions outskirts, presently amounting to 17 units at 25 l/s production each (16 hours/day).

Water is supplied to nearly 80,000 house connections and 1000 public taps through a regional network. It is estimated that water supply coverage reaches 90%; 30-40% from house connections, 50-60% from public taps.

Part of the plant and the network is 50 years old and is in need of replacement. Exact leakage figures however cannot yet be presented, due to the absence of measurement data. Substantial leakage is expected in reticulation systems.

House connections are metered, but over 60 % of the meters are out of order. Moreover meter reading takes place only once a year or less. Billing is done on the basis of consumption estimates. Public taps serve the major part of the population especially in small villages and hamlets, but their condition is frequently poor.

The percentage of Unaccounted for Water (UFW) is estimated at 70%, of which only part is leakage. Substantial quantities of UFW are used at public taps (free water) and through Government connections (partly paid for).

Plant and distribution network are run in a simple and ad hoc manner, due to the limited means in terms of information (network drawings, pressure- and flow data), skilled manpower, means of transportation, tools and equipment and budget. In contrast to the generally simple technical operations, the organization is highly complicated and bureaucratized due to over-centralization, lack of delegation and complete dependance on Government regulations.

Sanitation

Central facilities for waste water disposal are not available in Fayoum. Individual households are using cess pits or dispose of waste water in nearby drains or on the street. In many villages problems with high groundwater occur because of critical drainage conditions.

A few waste water projects are presently ongoing in Fayoum, but not yet operational.

Solid waste collection and disposal facilities are available in all Markaz towns, but not in villages.

PROJECT APPROACH

Four groups of project activities in both sub-projects (water supply and sanitation) have been identified as priority areas:

- a) Planning and design activities.

These are aimed at master planning and making the preliminary designs and cost estimates for the works to be executed in phase 2.

b) Supporting studies.

Feasibility studies are required for urban sewerage, for UASB and for sanitary landfilling. In addition an Environmental impact study will be executed. The studies are relevant for both the master planning as well as for the preliminary designs.

c) Implementation.

Implementation in phase 1 will be focussed on rehabilitation works on the network, reticulation system and service connections and treatment plant. A programme in selected pilot villages for the improvement of water supply and sanitation in conjunction with improved maintenance, billing and client relations will be developed and executed.

d) Organizational strengthening.

These activities are aimed at strengthening the various departments in El Azab, notably the distribution department, the maintenance centres and the billing and financial department.

The project will follow a "Technical Assistance approach", focussed on the institutional development of El Azab. The project team works from within El Azab together with "Task forces" in the various departments of El Azab in order to focus the project support.

PROJECT OUTPUT

The expected project result of phase 1 can be summarized as follows:

Planning and design

- master plans for water supply and waste water for Fayoum Governorate (excluding Fayoum city);
- preliminary designs and cost estimates for physical works in the fields of water supply, waste water collection and treatment, and solid waste disposal in selected geographical areas in Fayoum;
- an indicative implementation plan for the proposed physical works.

Supporting studies

- feasibility study for the application of sewerage in selected towns in Fayoum;
- feasibility study for application of UASB in Fayoum;
- feasibility study for sanitary landfilling of solid waste;
- environmental impact study of improved water supply, waste water disposal

and solid waste disposal in Fayoum Governorate.

Implementation

- rehabilitated distribution bottlenecks (the number depending on available procurement funds);
- rehabilitated reticulation systems and service connections in selected pilot villages;
- rehabilitated components of production installations;
- demonstration on-site sanitation facilities in selected villages.

Organizational strengthening

- complete set of network drawings;
- computerized distribution network simulation model;
- utilization of instruments and equipment for leak detection and detection of blockages in pipelines;
- facilities for systematic measurement of flows and pressures;
- tested hydraulic evaluation methods for solving distribution problems;
- increased distribution design capacity;
- computerized billing system (pilot scale);
- client database (pilot scale);
- tested methods for improved billing efficiency and cost recovery;
- tested simple financial analysis methods;
- improved network maintenance procedures and working methods;
- tested client relations model;
- section for waste water management in El Azab.

PROJECT INPUTS (PHASE I)

The project inputs in phase I can be summarized as follows.

1. Consultancy

Expatriate consultancy: 63 manmonths (48 long mission, 15 short mission);
Egyptian consultancy: 78.5 manmonths (55 long mission, 23.5 short mission).

Expatriate and Egyptian experts will be employed in the fields of water supply, waste water, solid waste, institutional development, finance, socio-economic aspects and computer.

Total value of consultants services (costs of personnel) in phase I amounts to Dfl 2.8 million. Project operational costs amount to Dfl 175,000 including O&M costs of equipment and vehicles.

2. Equipment, procurement and training

The following amounts are available:

- equipment	Dfl 775,000
- procurement	Dfl 500,000 plus LE 200,000 (GOE)
- training	Dfl 285,000

Equipment includes instrumentation for leak detection, measurements, computer hard- and software, project office equipment and furniture, vehicles.

Procurement funds are available for supplies of pipes and fittings, execution of works (rehabilitation) and other subcontracted work.

Training funds shall be used for various forms of training either in Egypt or overseas (fellowships).

Local administration, supervision and guidance from the Governorate shall be provided and supported by a fund of total Dfl 200,000 (starting from year 2).

1. INTRODUCTION AND BACKGROUND

The Fayoum Drinking Water and Sanitation Project, hereinafter called "the project", is a cooperation between the Government of the Netherlands (GON) and the Governorate of Fayoum (GOF) in Egypt. The project has as a longterm objective to improve water supply and sanitation conditions in the Governorate.

The Directorate General for International Cooperation of the Dutch Ministry of Foreign Affairs have granted IWACO, Consultants for Water and Environment, a contract for executing the consultancy services for the said project. IWACO has formed a consortium with DHV Consulting Engineers (The Netherlands) and ECG, Engineering Consultants Group (Egypt).

The consultants team started the work in the field in October 1990 and a draft Inception Report was finalized in February 1991. The discussions that followed and the comments obtained provided essential inputs and guidelines for the formulation of the Plan of Operations (PO), which is presented in this Volume.

An extensive description of the existing situation with respect to the project context in general and water supply and sanitation conditions in Fayoum in particular is provided in Volume II of this report. Also the overall scope for water supply and sanitation improvements in Fayoum Governorate is indicated in Volume II.

This Plan of Operations covers the two year period from September 1, 1991 to August 31, 1993 and describes project activities, project organization, project finance, time schedule and manpower planning.

Originally the inception phase (3 months) was planned to be part of the projects first phase of two years, but it turned out that nearly a year was required to settle the project status (Administrative Arrangement), to rethink the project approach and to arrive at a consensus between all involved parties about the actual scope of work to be undertaken. A short review of the developments during the past year is presented below (see also quarterly reports January, April and July 1991).

Consequently phase 1 of the project is extended to three years; a preparatory year and two years for execution. The scope of work in subsequent project phases will depend on evaluation and appraisal of the results of phase 1, so no detailed plan for phase 2 will be presented yet.

Short review of previous developments

GON started to implement the project in August 1990. Between that date and the submission of this Plan of Operations a year has passed with the following phasing of activities:

- a) Mobilization of consultants team: 2 months (August/September 1991)
- b) Inception phase: 5 months (October 1990 to February 1991)

The consultants team that started its work in the field in October 1990 required five months to complete the draft Inception Report, instead of the three months planned for it. The absence of an Administrative Arrangement for the project caused delays in data collection because the project did not have a formal status. On the other hand, the project took the opportunity to integrate with its main counterpart, El Azab Water Works, and started in an early stage to involve El Azab engineers in preparing plans for rehabilitation and introduce them to basic skills such as hydraulic evaluation of distribution networks.

- c) Interim Period: 3 months (March to May 1991)

Discussions on the draft Inception Report and delays in achieving an agreement between GON and GOF about the project caused DGIS to decide for an Interim Period. During this period no short missions were executed and the project worked low-profile within El Azab. The Administrative Arrangement was signed on May 15, 1991. Preparation and approval of the Plan of Operations was expected to take another three months so the Interim Period was extended till August 1991.

- d) Extended Interim Period: 3 months (June to August 1991).

During this period a modest start of activities concerning surveys for master planning and preparation of pipeline rehabilitation was made. During this period, the PO was formulated in close cooperation with the Embassy and the main counterpart El Azab (the result of which is at hand).

The data and information collected during the Inception stage, the comments on the draft Inception Report, the results of discussions between Embassy and GOF with respect to the Administrative Arrangement for the Project and finally the preparation of an "Environmental Profile" for Fayoum Governorate, are all developments which contributed to the necessary review of the original project concept. The resulting concept and approach as well as the description of the activities are presented in the following chapters.

2. SCOPE OF WORK

2.1 OBJECTIVES

The main objective of the project was formulated in the Terms of Reference (TOR) as follows:

To improve the drinking water supply and sanitation in Fayoum Governorate to such an extent that it has a long lasting impact on public health and the well being of the rural population in Fayoum Governorate.

The following specific objectives are mentioned in the Administrative Arrangement:

- 1) Assisting El Azab Water Works (AW) of Fayoum technically and financially to upgrade its performance.
- 2) Drawing up, with the assistance of El Azab, a master plan for the future water supply of rural Fayoum, accommodating the water supply requirements till the year 2020.
- 3) Drawing up a master plan for waste water elimination in the whole of the Governorate (excluding Fayoum city).
- 4) Executing feasibility studies for sewerage/sanitation projects for one district town of about 40,000 inhabitants and a number of smaller villages totalling about 40,000 inhabitants.
- 5) Transferring know-how in the field of anaerobic waste water treatment.
- 6) Assisting and financing local programmes on solid waste disposal.
- 7) Carrying out an environmental impact study.
- 8) Elaborating methods and implementing a programme to inform and educate the population in the functioning of drinking water and sanitary systems.
- 9) Assisting El Azab and other organizations concerned in developing sustainable organizational structures for drinking water supply and sanitation.

2.2 OVERALL SCOPE OF WORK AND APPROACH

Based on the abovementioned objectives and based upon the discussions that took place with respect to the draft Inception Report, the scope of work can be described according to the following aspects:

- a. project fields of operation;
- b. project area;
- c. project phasing;
- d. project approach.

2.2.1 Fields of operation (sub-projects)

A division between two sub-projects was made to clearly distinguish between the two major fields of operation:

- I. The sub-project 'Drinking Water Supply', including master planning, rehabilitation and extension of the present network and institutional strengthening.
- II. The sub-project 'Sanitation', i.e. waste water disposal (and treatment) and solid waste disposal, including master planning, implementation of works and institutional strengthening. The sub-project also includes a pilot project on the application of the Upflow Anaerobic Sludge Blanket (UASB) system for domestic sewage treatment (see Vol.II, chapter 6).

Additional activities bearing a relationship with both sub-projects include:

- an 'Environmental Impact Study' of the project as a whole, and
- community information and involvement activities which are aimed at increasing the awareness of the population with respect to the proper utilization of water, waste water and solid waste facilities (in selected pilot villages).

Project activities will focus on:

- a. technical systems, i.e. drinking water, waste water and solid waste;
- b. Operation & Maintenance organizations;
- c. consumers/users of the technical facilities.

Technical systems for drinking water supply include the distribution network and the service connections, but also the treatment installations. The latter is an addition to the original scope of work, which excluded the production side.

Waste water technical systems include both on-site and off-site systems, while solid waste systems include collection and disposal of solid waste.

The main O&M organization included in the project is El Azab Water Works, especially since El Azab has been entrusted with the responsibility for waste water. As far as the users are concerned, individual households or their representatives will be addressed.

2.2.2 Project area

The project area is confined to Fayoum Governorate, excluding Fayoum city. Fayoum city is part of the USAID sponsored "Provincial Cities Development Project" in which master planning for water and waste water as well as implementation of works are included and presently still ongoing. However, where necessary, reference will be made to the city.

In order to focus the projects' field activities a selection of priority areas will be made early in the project. Master plans will cover the whole area, but execution of project activities in the field will be limited to selected areas. Criteria for the selection of those areas will be developed together with the counterpart agencies.

Rehabilitation during phase 1 will be concentrated on the obvious bottlenecks in the water supply distribution network. Other implementation in phase 1 will be limited to a few selected pilot villages.

2.2.3 Project phasing

The project is divided into two phases. Phase 1 covers three years; one preliminary year for inception and preparation (the past year) and two years for master planning, area selection, feasibility studies and preliminary design. During years 2 and 3 of phase 1 a parallel stream of rehabilitation activities and pilot projects in the field will be executed.

Phase 2 concentrates on detailed design, tendering and implementation of works, while both phase 1 and 2 are supported by institutional strengthening activities.

Before the end of phase 1 an Evaluation and Appraisal mission should take place to determine the scope of work, duration and financing of phase 2.

In figure 2.1 the general project concept and project phasing are schematically represented.

2.2.4 Approach

The approach which has been adopted for phase 1 of the project is a "Technical Assistance approach", focussed on the institutional development of El Azab. This in contrast to the engineering or target oriented approach. The approach is meant to be realized as follows:

- the consultants team works from within El Azab and not from an outside consultants office;
- project activities are planned and if possible executed together with El Azab personnel; experience, skills and equipment available in El Azab will be used optimally;

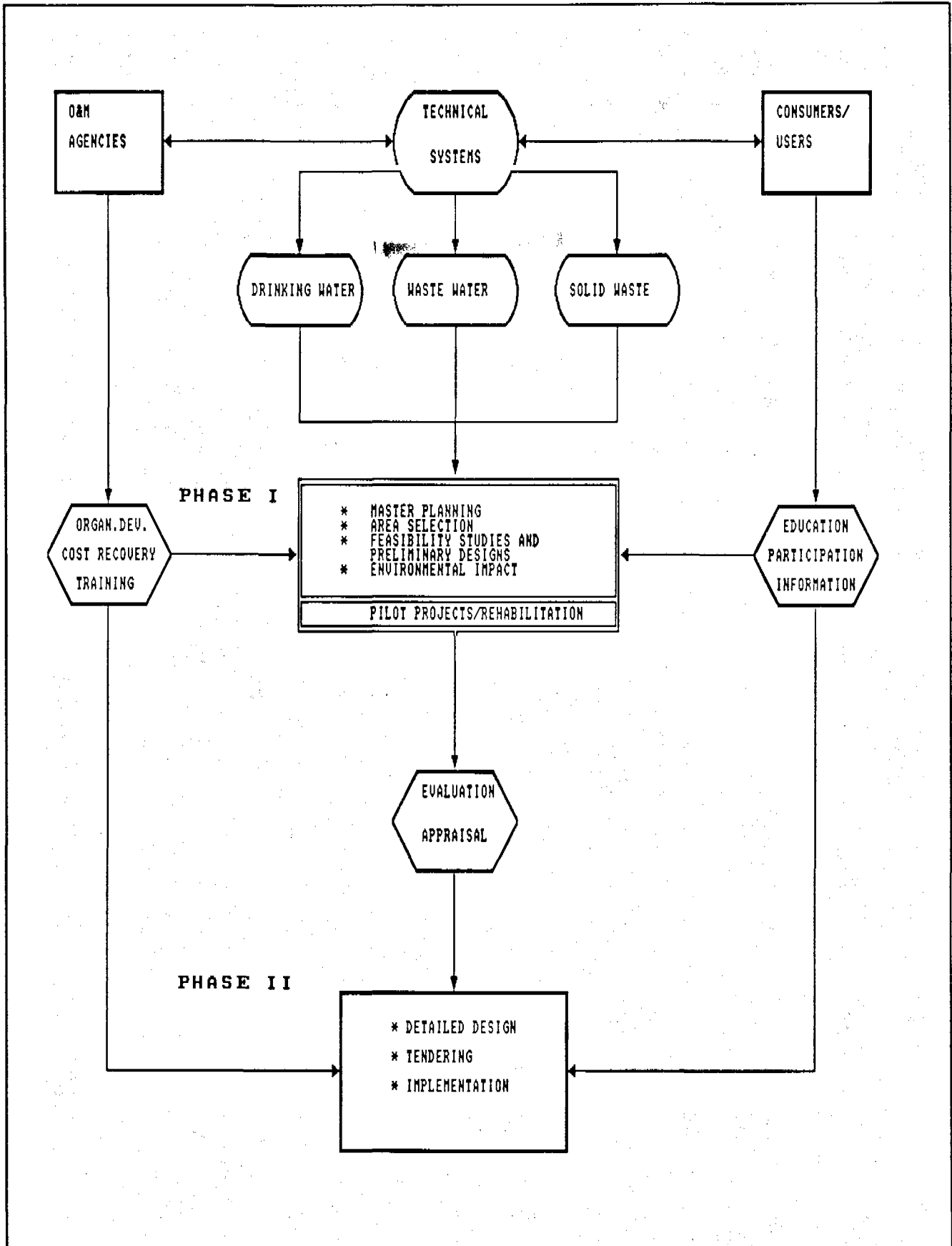


Figure 2.1. Project concept

- to focus the support in the El Azab organization Project Task Forces will be established in the relevant departments of El Azab. Also the Maintenance Centres in the Districts will receive support because of their important function with respect to the functioning of the network and the service connections, and the relationship with clients;
- activities which are not considered part of El Azab's and NOPWASD responsibilities shall be either carried out by the consultants' team or be sub-contracted to local consultants or specialized agencies;
- the timing and scheduling of those project activities which belong to the (future) core responsibilities of El Azab shall be adjusted to the absorption capacity of the organization.

A pre-condition for the feasibility of the approach is that El Azab makes sufficient manpower available to the project (staffing of Task Forces). It is realized however that the organization is understaffed in some essential fields (see chapter 4 of Volume II). Training of young engineers and managers should therefore become an important activity.

A consequence of the approach is that the progress in the work of the task forces depends to a large extent on the cooperation obtained from El Azab. Experiences in the first project year show that frequent rescheduling of those project activities will be necessary.

2.3 INSTITUTIONAL FRAMEWORK

The project is the first one which is to be executed under a direct agreement between GON and GOF. Previous projects were all under the direct authority of a National Ministry. Responsibilities for the present project are all at Governorate level, but technical supervision from the national level will still be provided.

The general institutional and legal framework of the water supply and sanitation sector can be found in chapter 3 of Volume II. Responsibilities for the present project are as follows.

The Governor of Fayoum has nominated El Azab Water Works (AW) as the Egyptian Executive Authority for water supply, being responsible for the water supply activities in the project.

The Governorate of Fayoum will be supervised technically by the National Organization for Potable Water and Sanitary Drainage (NOPWASD). Furthermore an Advisory Committee will be established which will be responsible for the approval of project execution plans, follow-up of implementation, and authorization of expenditures of the local contribution of the project.

The institutional framework for the project is shown in figure 2.2. Besides the relevant departments in the Governorate, the Executive Authorities, the Advisory Committee, NOPWASD and the consultants, the Markaz and village levels are also shown.

Twinning of El Azab with a Dutch Water supply company, as mentioned in the TOR, has been given attention in the Inception Phase. Further arrangements and appointments have to be made during the following project years.

3. PROJECT ACTIVITIES AND METHODOLOGY

In this chapter a general description of activities and the methodology is provided. A detailed description is provided in chapter 4.

3.1 GROUPS OF ACTIVITIES AND TARGETS

3.1.1 General

Project activities in both sub-projects (water supply and sanitation) are divided into four groups:

a) Planning and design activities.

These are aimed at master planning and making the preliminary designs and cost estimates for the works to be executed in phase 2.

b) Supporting studies.

Feasibility studies are required for urban sewerage, for UASB and for sanitary landfilling. In addition an Environmental impact study will be executed. The studies are relevant for both the master planning as well as for the preliminary designs.

c) Implementation.

Implementation in phase 1 will be focussed on rehabilitation works on the network, reticulation system and service connections and treatment plant. A programme in selected pilot villages for the improvement of water supply and sanitation in conjunction with improved maintenance, billing and client relations will be developed and executed.

d) Organizational strengthening.

These activities are aimed at strengthening the various departments in El Azab, notably the distribution department, the maintenance centres and the billing and financial department.

3.1.2 Expected results

The expected project result of phase 1 can be summarized as follows:

Planning and design

- master plans for water supply and waste water for Fayoum Governorate (excluding Fayoum city);
- preliminary designs and cost estimates for physical works in the fields of water supply, waste water collection and treatment, and solid waste disposal in selected geographical areas in Fayoum;
- an indicative implementation plan for the proposed physical works.

Supporting studies

- feasibility study for the application of sewerage in selected towns in Fayoum;
- feasibility study for application of UASB in Fayoum;
- feasibility study for sanitary landfilling of solid waste;
- environmental impact study of improved water supply, waste water disposal and solid waste disposal in Fayoum Governorate.

Implementation

- rehabilitated distribution bottlenecks (the number depending on available procurement funds);
- rehabilitated reticulation systems and service connections in selected pilot villages;
- rehabilitated components of production installations;
- demonstration on-site sanitation facilities in selected villages.

Organizational strengthening

- complete set of network drawings;
- computerized distribution network simulation model;
- utilization of instruments and equipment for leak detection and detection of blockages in pipelines;
- facilities for systematic measurement of flows and pressures;
- tested hydraulic evaluation methods for solving distribution problems;
- increased distribution design capacity;
- computerized billing system (pilot scale);
- client database (pilot scale);
- tested methods for improved billing efficiency and cost recovery;
- tested simple financial analysis methods;
- improved network maintenance procedures and working methods;
- tested client relations model;
- section for waste water management in El Azab.

3.2 METHODOLOGY

In this section the methodology for the different categories of activities is described. It concludes with a general time schedule of activities (barchart).

3.2.1 Planning and design activities

Master planning

Planning for water supply is presently done on a more or less ad hoc basis. There is no master plan and as a corollary El Azab does not have well defined medium- and longterm development plans or strategies.

A master plan is required to formulate efficient rehabilitation and extension programmes. Water supply policies and strategies will be determined, as well as the financial consequences and feasibility thereof, before the technical master planning is established.

Master planning for sanitation starts from a different situation, since there is hardly any sanitation infrastructure available (in contrast to water supply). This planning will therefore be much more oriented on starting points, preconditions and constraints. The plan shall indicate which type of facilities are suitable for the situation in Fayoum, depending a.o. on soil condition, groundwater table, available space, costs of the provisions, existing population density and future developments as well as possibilities for participation of the population in construction of the facilities (financial, labour, operation and maintenance).

Master plans shall be prepared in three phases:

- 1) preliminary master plan, which can be commented upon by all responsible agencies;
- 2) draft master plan, which will be submitted for comments and approval;
- 3) final master plan.

Before a draft master plan for sanitation is presented consultants propose to check on the feasibility of city sewerage systems (off-site) and proposed on-site sanitation facilities.

The time horizon of the master plans is 30 years, up to the year 2020, while for the first ten years more specific and concrete projects shall be identified. Planning tools will be developed to provide for future updating of the planning.

For urgently needed improvements a short term plan will be made for the coming five years, and operationally for the coming two years. These short term plans should fit into the longterm master plan.

It will not be the objective of the project to produce extensive and sophisticated master plans. Experience learns that master plans are rarely fully implemented and soon become obsolete especially when they cover such a long period of time (three decades) and such an extended area (nearly a whole Governorate). It is considered equally important to develop planning tools and increase the planning capacity of the concerned agencies (institutional development).

Area selection

Based on the master plans, the Governorate, NOPWASD and GON have to decide about the areas to be selected for further project implementation.

Preliminary designs and cost estimates

For the part selected and to be undertaken by GON in phase 2, preliminary designs and cost estimates will be prepared. This will be executed for all project implementation aspects i.e., water supply, waste water collection and treatment (including UASB) and solid waste disposal.

3.2.2 Supporting studies

The feasibility studies mentioned in section 3.1.2 above are evident. The study for UASB shall be carried out early in the project so that a decision can be made about whether or not a preliminary research phase is necessary (to be included in phase 1), or that a pilot plant can be directly erected in Fayoum, without previous research.

The environmental impact study was given considerable emphasis in the project proposal (5 manmonths in the first project year were proposed). However, recently studies for a so-called 'Environmental Profile' for Fayoum Governorate have started. This profile will, according to the present planning, become available by end 1991. The profile will indicate priority areas for environmental improvement and conservation.

One of the likely priority areas will be waste water evacuation and treatment, a major activity of the present project. Extensive study of the environmental impact of this sub-project seems therefore somewhat overdone. Hence, it is proposed to reduce the scope of the environmental impact study significantly, as compared to the original project proposal.

3.2.3 Implementation

The second category of activities are implementation activities. These include the following:

Water supply

- a. Rehabilitation of distribution piping, reticulation piping and service connections. This will apply especially to obvious bottlenecks in the present network. Work will be carried out according to the short term planning (see 3.2.1), and will possibly be limited to the chosen priority areas.
- b. Pilot project improved water supply at village level. This pilot project will include all the aspects of improved maintenance, administration, billing and payment as well as customer relations. It will be executed in the selected pilot villages. The involved El Azab district Maintenance Centre will get an important function in the day-to-day monitoring of the pilot villages.

Sanitation

Implementation activities for sanitation will be limited to the following:

- a. field testing of on-site waste water disposal systems in selected pilot villages;
- b. if feasible solid waste collection will be introduced to the pilot villages.

3.2.4 Organizational strengthening; development of task forces

Because of the size of the El Azab organization it is not possible to provide assistance for institutional development in a general way only; the assistance must be focussed towards smaller groups in the relevant sectors of the organization. This can be achieved through a task force approach; small groups who carry out non-routine specific development activities, closely coached by the consultants.

The task forces will receive the necessary training, facilities and budget to carry out their assignments.

Every task force will have a coordinator from El Azab and the party responsible for sanitation, and will have a number of members as is required for the activities to be carried out. They are assisted by a member of the consultants team. The El Azab members of the task forces will have to be partly vacated for their development work, but partly they will still carry out their normal work routine. Excess hours worked shall be compensated by the project and incentives shall be provided.

The composition of the task forces may change according to the developments and the arising needs.

Four task forces are proposed:

1. Distribution
3. Finance and Billing
3. Customer Relations

4. Waste Water

At a later stage a fifth task force may be added for water production (treatment). A description of each task force is as described below. The first task force which has already been established is the "Distribution" task force. Establishment of the other task forces will follow in due time.

Distribution Task force

Tasks:

- water supply master planning;
- planning and supervising the execution of projects with respect to the network and service connections (rehabilitation, extension);
- development of an improved distribution management system;
- development of network mapping;
- leak detection, hydraulic evaluation;
- development of a design unit for pipeline rehabilitations and extensions;

Finance and Billing Task force

Tasks:

- development of an improved billing system;
- development of an improved customer administration system;
- development of an improved accounting system;
- development of an improved method for financial analysis.

Customer Relations Task force

Tasks:

- development of customer relations activities in El Azab and/or the maintenance centres;
- development of information and promotion material for existing and new clients;
- execute promotion campaigns for house connections;
- inventorize customer complaints and try to remedy them (through appropriate El Azab department);

Waste Water Task force

Tasks:

- establishment of a waste water department in El Azab;
- master planning for waste water evacuation and treatment;
- advising local units with respect to waste water problems;

- prepare and supervise the execution of waste water projects (on-site and off-site).

3.2.5 Evaluation and Appraisal

Towards the end of phase 1 an Evaluation and Appraisal should be carried out. Elements of evaluation are:

- the effectiveness of the followed institutional development approach with respect to the performance of El Azab (network management, customer administration, cost recovery and reduction of Unaccounted for Water, client relations, etc.);
- the sustainability of the project results sofar.

Aspects for appraisal include:

- the proposed areas for implementing GON funded infrastructure;
- the preliminary designs and cost estimates;
- the scope of work and approach for phase 2;
- institutional arrangements for phase 2;
- financial arrangements for phase 2.

3.2.6 Time schedule of activities

The time schedule for phase 1, years 2 and 3, is shown in the barchart of figure 3.1. Activities are planned as follows:

First half year

- execution of surveys and inventory of existing water supply;
- selection of pilot villages and preparation of the programme;
- start of distribution rehabilitation;
- preliminary master planning;
- start of client database and client relations model;
- UASB feasibility study.

Second half year

- ongoing pilot villages programme;
- ongoing rehabilitation programme for distribution lines and reticulation;
- client database and billing system and client relations model for testing in pilot villages;
- preparation for draft master planning and preliminary designs.

Third half year

- ongoing pilot villages programme;
- ongoing rehabilitation programme;
- draft master planning and area selection;
- environmental impact study;
- solid waste feasibility study;
- preliminary designs and cost estimates for implementation in phase 2 of water supply, waste water, solid waste and UASB systems;
- evaluation and appraisal mission.

Fourth half year

- finalization of pilot villages programme;
- ongoing rehabilitation;
- finalization of master plans ;
- plan of operations for phase 2 (based on evaluation and appraisal report).

During the whole project, organizational support and training will be provided. Towards the end of year 3 the project results shall be evaluated and an appraisal shall be made for the work in phase 2.

In chapter 4, project activities are described in more detail for the sub-projects water supply and sanitation.

3.3 DIVISION OF TASKS AND RESPONSIBILITIES

The roles of the involved parties and agencies (the actors) in the project can be indicated by mentioning for each proposed project activity the relevant task or responsibility.

The involved actors in the project are:

- GON (DGIS and Embassy);
- GOE (NOPWASD);
- GOF (Governor and Advisory Committee);
- El Azab Water Works;
- Consultants (expatriate and Egyptian);
- Contractors/suppliers;
- Village local units and Markaz chiefs;
- The users or consumers.

It is expected that in the near future a Sanitation Authority will be established in the Governorate.

The contributions, tasks and responsibilities of the mentioned actors include the following:

- providing data or information;
- planning, preparation and budgeting;
- approval of plans and budgets;
- financing;
- execution;
- supervision, guidance;
- monitoring and evaluation;
- operation and maintenance;
- follow-up.

The matrix of responsibilities is shown in table 3.1. For each involved party, the responsibility is indicated as per category of project activities. Since the Sanitation Authority is not available yet, it is not mentioned in table 3.1.

Concerning implementation of water supply improvements (rehabilitation, extension of pipelines) the responsible organization for tendering will be El Azab (technical) and the Governorate (financial). The tender evaluation board will consist of El Azab, the consultant, the Governorate and NOPWASD. Supervision of the execution of works is El Azab's responsibility.

Further details with respect to the tendering procedure will be established by the Netherlands Embassy and the Governorate.

Table 3.1 Division of tasks and responsibilities with respect to project activities

PROJECT ACTIVITIES	INVOLVED PARTIES							
	GOM	GOE/ NOPWASD	GOF	EL AZAB	CONSULTANT	CONTRACTOR SUPPLIER	MARKAZ VILLAGE	USERS
General responsibilities	TOR Financing Monitoring Evaluation Appraisal	TOR Co-finance Monitoring Evaluation	TOR Co-finance Monitoring Evaluation	Ex.Authority Execution Participation Supervision O&M	Advising Execution Training	Execution Mat.supply	Solid waste Waste water Participation Supervision O&M	Participation Pay for service
Master planning	Evaluation Follow-up	Approval Follow-up	TOR Data Approval Follow-up	Data Execution Follow-up	Surveys Projections Formulation		Data	Data
Area selection	Appraisal Follow-up	Coordination Approval	Criteria Decisions	Criteria	Advise			
Prel.designs & cost estimates	Appraisal	Approval Follow-up	Approval Follow-up	Execution	Execute			
Implementation planning	Appraisal Approval	Approval	Approval	Drafting	Drafting			
Supporting studies	Evaluation	Acknowledge	Acknowledge Follow-up	Data	Execute		Data	Data
Rehabilitation works	Financing Evaluation	Supervision Monitoring	Co-finance Supervision	Plan/prepare Specifications Tendering Supervision O&M	Plan/prepare Design Supervision	Execute Supply	Plan/prepare Supervision	Participate Respond
Pilot villages programme	Evaluation	Monitoring	Approval Monitoring	Plan/prepare Specifications Tendering Supervision O&M	Plan/prepare Design Supervision Monitor	Execute Supply	Plan/prepare Supervision Participation Monitor	Participate Respond
Organizational strengthening	Evaluation	Monitoring	Evaluation Monitoring Cooperation	Participation Follow-up	Planning Guidance Training		Participation Follow-up	Participate Respond

4. DESCRIPTION OF ACTIVITIES

In this chapter a more detailed description is provided of the activities to be undertaken in the subprojects water supply and sanitation. General activities, which are relevant for both sub-projects are described first.

4.1 GENERAL ACTIVITIES

4.1.1 Development scenario's

Population forecasting

Population data will be collected and analyzed. Consultants will produce population forecasts based on the trends found, and on existing forecasts. Various regions and/or settlement types will be distinguished, if needed and justified.

Regional development

Consultants will screen regional development plans for aspects which may be of importance for raw water sources, water demand, sanitation requirements, water quality of effluent receiving surface waters and infrastructure.

4.1.2 Survey of Local Units (municipalities)

Several local units in Fayoum have been briefly surveyed during the inception phase of the project. The resulting experience will be used to update the survey programme and to complete it for all 42 local units.

The purpose of the survey is to have a general view of Fayoum with regard to water supply and sanitation aspects. Regional differences as well as differences between various types and sizes of settlements should be detected.

Hamlets will be checked for connection to the El Azab supply system.

Social and physical environment will be investigated for suitability of various on-site sanitation techniques.

4.2 SUB-PROJECT WATER SUPPLY

4.2.1 Inventory of the existing water supply

Preparation of distribution drawings

Drawings will be made to scale 1:25,000, showing all piping between built-up areas, together with its connections.

Installation of monitoring points

Facilities will be made to connect Pitot flow meters and pressure gauges at several locations in the distribution network. Eventually, there will be some 25 flow monitoring points and some 100 pressure monitoring points.

Building and calibrating a distribution model

A first version of an ALEID computer simulation of the network hydraulics was made in the inception phase of the project. The model will be improved with more complete piping data. The model will be calibrated with the measurements obtained from the monitoring points.

Survey of public taps and house connections

A sample survey will be executed to know the condition of public taps and house connections, the way they are used and how much water is used and spilled at these taps.

The survey will also investigate the potential demand for various types of service connections. The interviews should provide the possibility for interviewed people to present preferences and suggestions for water and health related matters.

The survey will be done in combination with the sanitation sub-project.

4.2.2 Design of water delivery

Consultants will prepare a list of options for water delivery, including technical facilities, ways of paying for consumed water and operation and maintenance of the facilities. The list will be screened for national and governorate policies, for optimal service to clients and for technical and administrative feasibility. Non-feasible options will be eliminated.

A documented recommendation will be presented to El Azab for approval, and finalized after discussions.

4.2.3 Rehabilitation

Tentative planning and cost estimates

As soon as the main flaws in production and distribution become visible, consultants will draft a tentative planning for rehabilitation. Tentative planning only, as rehabilitation works tend to be unpredictable. The rough cost estimates shall remain within the budget limits.

Rehabilitation of distribution piping

Flaws in the distribution system will be detected while the ALEID model will be calibrated for the existing situation (see 4.2.1).

Certain pressure readings may only be explained by a disproportionately large water abstraction, which indicates extensive leakage or spillage.

Pressure losses which do not correspond with normal pipe friction indicate obstructions like forgotten (partially) closed valves, growth of tree roots within pipes, intentionally introduced obstructions inserted by the local inhabitants, etc.

Rehabilitation of reticulation piping and service connections

These rehabilitation activities should not start before a decision is taken on water delivery, see 4.2.2. They should preferably start in the pilot villages as mentioned in 4.2.4.

Consultants will present a proposal for reticulation drawings, to scale 1:500, which also show the connections to registered clients. Consultants propose to base these drawings on aerial photos; much work on measuring and mapping of houses and streets can thus be omitted. Approval to obtain these drawings should be requested as soon as possible, as aerial photos appear to be a sensitive matter.

Rehabilitation of production facilities

The nature of rehabilitation works on production facilities has yet to be determined, in cooperation with the El Azab production department.

4.2.4 Field testing of water delivery in pilot villages

A few villages and hamlets will be selected for field testing of water delivery in all its aspects. The field testing will be done together with testing for the sanitation sub-project.

The field testing should be combined with the rehabilitation of public taps and house connections, and preferably also of reticulation piping.

Testing should certainly include billing and payment discipline, while the overall objective would be to investigate satisfaction of clients and feasibility and efficiency for El Azab.

The pilot areas shall be thoroughly metered, even when a flat rate for house connections is applied and while public taps are free of charge: metering is needed to learn actual use.

4.2.5 Master plan water supply

Preliminary master plan

Consultants will prepare a very preliminary master plan in the beginning of the project, since the proposal for the main infrastructure for water production and transmission seems almost obvious. The responsible agencies may thus comment in an early stage, while El Azab might consider the preliminary plan while planning for extensions to its distribution system (as for the 1992-1997 planning).

Water demand forecast

Water demand forecasts will simply be based on population forecasts and estimated future water use. At this time of the project, reliable numbers for present actual demand will be available.

Investigation into decentralized production

Decentralized production at 3 to 5 locations would be a very efficient water supply for Fayoum Governorate. The savings on pipelines would more than pay for the costs of smaller scale of production.

Unfortunately, permanent raw water sources seem to be absent: hardly any ground water can be abstracted and irrigation canals are drained during the month of January for maintenance.

As decentralized production would be ideal, its possibilities will be investigated in more depth, through discussions with the irrigation department.

Relationship with Fayoum City water supply

In principle, Fayoum City will not be included in the master plan, but the future relationship between El Azab and Fayoum City is not clear. Both water supply companies may be united in the future, or Fayoum City may remain dependent on additional bulk water supply from El Azab. Both alternatives will have important consequences for the master plan. Consultants recommend discussions between the involved authorities to resolve the future relationship; consultants will be available for support upon request.

Draft master plan for production and distribution

Consultants will prepare a master plan for water supply for the year 2020. The plan will also indicate how the plan may be executed in phased extensions. The plan includes cost estimates for the various phases.

Environmental impact

The draft master plan will also include a chapter on the environmental aspects of the planned supply system, based on an environmental impact study to be carried out for the project as a whole (see section 3.2.2).

Area selection

The priority areas in general and the areas in which GON support will be concentrated should be selected during this phase of the master planning. Awaiting finalization of the master plan, work on preliminary designs and cost estimates can be started.

Finalization of the master plan

After discussions, review for financial consequences and reception of comments from the involved authorities, consultants will finalize the master plan.

4.2.6 Support on client administration

Data base

Consultants will prepare an outline plan for a client data base and the way it should be operated within El Azab. This plan, of course, shall be made in close cooperation with El Azab.

After agreement on the outline plan, consultants will prepare the data base programme and implement it within the El Azab administration. Its use shall be demonstrated and tested on the pilot areas as mentioned in 4.2.2.

Client relations

As a consequence of the decision on water delivery, as mentioned in 4.2.2 relations with the El Azab clients will need to be revised. The main item will probably be improved service (including information) towards clients, and improved payment discipline in return.

Consultants will support the establishment of client services (preferably decentralized in a district maintenance center), with the pilot villages as a testing ground for gaining experience with renewed client relations.

It is planned that, supplementary to the improvement of water supply and sanitation services, the project will evolve an education programme in household hygiene. Activities for such a programme are to be taken up in the first project phase, in close collaboration with the local health extension services.

4.2.7 Support on organizational development

General organization

The transformation of El Azab into a Public Sector Company and its additional responsibility for waste water will imply important organizational changes in the near future.

Consultants will provide support on the development of the general organization of the El Azab company and its relations with external parties, to the extent where this is appreciated by the El Azab management.

Finance and accounting

Consultants will provide support to El Azab on finance and accounting matters, to the extent where this is appreciated by the El Azab management.

The support may include financial analysis and the development of a strategy to achieve full cost recovery in the future.

Support may be provided for the development of an improved accounting system and a financial management information system.

Task forces

Consultants will provide on-the-job training while performing the various tasks as described above in this plan of operations. Consultants propose to do this through task forces, in which both El Azab personnel and consultants cooperate. The following task forces are proposed (see also section 3.2.4):

- Water distribution;
- Finance and billing;
- Water production and laboratory;
- Client relations.

Training

Training is required for all sectors and fields of El Azab. A training plan will be made when the training budget becomes available (see chapter 6) in consultation with the involved departments. As much as possible, use will be made of existing training material and courses.

4.2.8 Preliminary designs and cost estimates

Consultants will prepare the tentative scope for implementation of works in the second phase of the project, based on the master plan, the selected areas and on the available budget.

Preliminary designs will be prepared for those areas and works which are likely to be co-financed from GON. The preliminary designs will be used to obtain more reliable cost estimates. The implementation scope will be adjusted if the anticipated costs do not match the available budget.

A tentative implementation plan will be made for phase 2, based on the preliminary designs. The plan will be based on the preliminary designs and pay attention to detailed design, tendering and construction supervision in phase 2.

Detailed design work will include surveying, hydraulic and structural design and the preparation of construction drawings and tender documents. The exact scope of the design work cannot be known at this time, as the nature of the extensions is not yet determined.

Consultants will provide support to the tendering of works. It is assumed that tendering will be done by El Azab.

Consultants will provide support to the supervision of the construction works. In principle, supervision will be done by El Azab and the manufacturers of piping and equipment to be installed.

4.2.9 Evaluation and appraisal

Evaluation and appraisal shall be carried out by a GON/GOE mission. Based upon the results of the mission consultants will prepare a plan of operations for phase 2. A tentative planning for implementation will be attached to the preliminary designs (see 4.2.8).

4.3 SUB-PROJECT SANITATION

4.3.1 Inventory existing sanitation

A sample survey will be done on present sanitation practice: waste water and solid waste handling. This survey will be done in combination with a similar one on water supply (see 4.2.1). The survey will inventorize peoples preferences and priorities for addressing waste water and solid waste problems. An indication of the willingness to pay for such services should be obtained from the survey.

Existing plans on sanitation improvements will be studied and if necessary, be taken into account.

4.3.2 Selection of project town

Prefeasibility sewerage system

Consultants will briefly check on the technical feasibility of a sewer system with a treatment plant in two Markaz capital towns selected for sewerage by the Governorate.

Selection of on-site sanitation

Consultants will select feasible on-site sanitation techniques for Fayoum, based on the outcome of the survey of local units (see 4.1.2) and the sanitation survey.

Selection of project town and on-site project area

Consultants will present a selection of a Markaz capital town for the sewerage project, for approval by the relevant authorities. A selection will also be made for one or more rural areas, in which the selected on-site sanitation techniques will be tested.

The rural areas should preferably be located near the selected sewerage town, for logistic reasons. A larger number of rural areas is possibly required, as different techniques are feasible for different social and physical environments, viz. for different parts of Fayoum.

4.3.3 Preliminary design

Field testing on-site sanitation in pilot villages

A few villages and hamlets will be chosen for field testing of the selected sanitation techniques. The field testing will include the willingness of households to have a sanitary facility installed at (reduced) cost, after satisfactory functioning has been proven with a number of demonstration facilities.

Feasibility of town sewerage system

Consultants will draft technical sketches of the sewerage system and accompanying treatment plant, sufficiently in detail to form the basis for a reliable cost estimate. The estimate will include investment costs as well as recurrent costs. A proven technique will be chosen for treatment, at least cost.

The willingness and ability to pay for a sewer connection will be investigated and an estimate will be made of the additional funding (by the government), necessary for cost recovery.

Feasibility will probably depend on guaranteed cost recovery.

4.3.4 Master plan

Preliminary master plan

Consultants will prepare a very preliminary master plan for sanitation in an early stage of the project, but only after the results of the sanitation survey have been analyzed.

The purpose of this plan is to obtain early comments from the responsible agencies, which may result in more efficient planning of subsequent investigations.

Draft master plan

Consultants will prepare a draft master plan for approval, in case the studied sewered system and the selected sanitation techniques in smaller communities appear to be feasible. The master plan will include a cost estimate.

In case feasibility appears to be problematic or uncertain, consultants will present recommendations on further steps towards improved sanitation.

The master plan will include recommendations on collection, handling and disposal of solid waste, for various types of communities.

Environmental impact

In conjunction with the water supply subproject an environmental impact study will be made of the proposed improvements.

Area selection

Priority areas for sanitation improvements in general and those areas where Netherlands support will be oriented at shall be indicated in the draft master plan.

Final master plan

After discussions, review for financial consequences and reception of comments from the involved authorities, consultants will finalize the master plan.

4.3.5 Support on operation, maintenance and client relations

Consultants will present recommendations on the terms at which clients may be connected to the sewer system, to be discussed with the responsible authorities, updated and finalized.

In the same way, consultants will assist in designing an organizational structure for the operation and maintenance of the sewerage system. The elaboration and operationalization of this structure will take place in phase 2.

4.3.6 Support on organizational development

The Public Sector Company that El Azab will soon become will also become responsible for waste water. At this stage it is not clear how far these responsibilities will reach. In either case, consultants will be available for support with regard to the development of the new organization, to the extent where this is appreciated by the management.

In the short term it will be considered to establish a 'Waste Water Task force' within El Azab.

Consultants will provide training to the newly developed waste water organization. Detailed plans will be made at a later stage, in consultation with the organization.

4.3.7 UASB feasibility study

The nature of the collected sewage in the sewerage project and the operations and maintenance requirements will be evaluated to determine the feasibility of an UASB plant. Comparisons will be made with operating conditions in other countries (India). If the result is positive, consultants will prepare a preliminary design for a pilot UASB unit. Depending on the outcome of the feasibility study it may be desirable to include a preliminary laboratory research phase before the construction of a pilot plant.

The costs of the UASB pilot plant will be excluded from the feasibility considerations as mentioned under 4.3.3.

4.3.8 Solid waste feasibility study

This study will determine the feasibility for sanitary landfill as the method for solid waste disposal in a selected Markaz town or a number of villages. Secondly the desirability and feasibility of solid waste collection in villages will be investigated.

If feasible, preliminary designs and cost estimates will be prepared.

4.3.9 Preliminary designs and cost estimates

Consultants will prepare the scope for implementation in the second phase of the project, based on the master plan, the area selection and the available budget.

The preliminary designs will be used to obtain more reliable cost estimates. The implementation scope will be adjusted if the anticipated costs do not match the

available budget.

A tentative plan for implementation will be prepared.

4.3.10 Evaluation and appraisal

Evaluation and appraisal shall be carried out by a GON/GOE mission. Based upon the results of the mission consultants will prepare a plan of operations for phase 2 (see 4.2.10).

5. PROJECT STAFFING AND DIVISION OF TASKS

5.1 CONSULTANTS SERVICES

Consultants services to the project are provided by IWACO and DHV from The Netherlands, and by ECG (Engineering Consultants Group) from Cairo, Egypt.

Due to the change in project phasing, emphasis and type of activities the staff planning for the project as a whole has been reviewed. This is shown in table 5.1, where the staffing for the total five years as mentioned in the project proposal is compared with the Plan of Operations.

The most important change is the substitution of 20 manmonths of short missions for one long mission of also 20 manmonths in the second and third project year. It has appeared in the first project year that continuous longterm support is needed for the institutional development process in El Azab. Also because of the decrease in activities like hygiene education, environmental impact and solid waste in phase 1, less short missions are required.

For the coming two years the long term support and coordination is provided by four resident engineers:

- the Netherlands teamleader and institutional development expert (18 manmonths in year 2 and 3);
- the Netherlands water supply and sanitation expert (20 manmonths);
- the Egyptian sanitation expert and co-teamleader (20 manmonths);
- the Egyptian water supply expert (16 manmonths).

Short term services are provided by six expatriate experts and four Egyptian experts:

Expatriate:

- | | |
|------------------------------|--------|
| - senior water supply expert | 1.0 MM |
| - senior sanitation expert | 1.4 MM |
| - UASB expert | 1.0 MM |
| - Environmental expert | 1.0 MM |
| - Socio-economist | 2.0 MM |
| - Financial specialist | 2.2 MM |

Egyptian:

- | | |
|----------------------------|--------|
| - Computer specialist | 4.0 MM |
| - Social scientist | 6.0 MM |
| - Institutional specialist | 8.0 MM |
| - Solid waste expert | 1.5 MM |

TABLE 5.1 PROJECT STAFFING COMPARISON: PROPOSAL VERSUS PLAN OF OPERATIONS

EXPERT	NAME	FIRM	PROPOSAL					:Total	PLAN OF OPERATIONS					:Total
			Year						Year					
			1	2	3	4	5		1	2	3	4	5	
<u>Long mission</u>														
Coordinating consultant	A.Sannen	IWACO	10	10	8	8	4	40	10	10	8	6	4	38
Water supply and sanitation engineer	TBN	DHV					0	0	11	9	0	0	20	
<u>Short mission</u>														
Computer and leak detection specialist	C.de Jong	IWACO	3	2				5	1.7					1.7
Water supply specialist	A.P. Bot	IWACO	3					3	2	1				3
OMT specialist	TBN	EWR	1	2	2	1	1	7						0
Socio-economist	A.Hoogenboom	DHV	2	2	1	1		6	1	1	1			3
Environmental expert	J.W.v.Sluis	DHV	5					5	0.5		1			1.5
Sanitation specialist	A.Budde	DHV	4	2				6	0.7	0.7	0.7	0.7		2.8
UASB expert	A.Schellinkhout	DHV						0		1				1
Financial expert	S.Postma	DHV	2	2				4	0.5	1.5	0.7			2.7
TOTAL MM EXPATRIATE			30	20	11	10	5	76	16.4	26.2	20.4	6.7	4	73.7
MM Short mission								36						15.7
MM Long mission								40						58
MM IWACO/EWR								48						42.7
MM DHV								28						31
MM jaar 1-3								61						63
MM jaar 4-5								15						10.7
<u>Egyptian</u>														
Sanitation engineer	H. Elbanna	ECG	7	9	11	11	11	49	9	10	10	10	10	49
Water supply engineer	M. Elridi	ECG	7	10	8	3		28	10	8	8	10	5	41
Social Scientist	M. Elsafty	ECG	7	8	8	4	2	29	1.5	4	2	1		8.5
Computer specialist	K. Elbasiouny	ECG	2					2	0.5	2	2			4.5
Inst.dev.specialist	F. Elkady	ECG	2	1	1			4	1.5	4	4	1	1	11.5
Solid waste specialist	J.Kodsy	ECG	1			1		2	0.5	1	0.5	1		3
TOTAL MM EGYPTIAN			26	28	28	19	13	114	23	29	26.5	23	16	117.5
MM jaar 1-3								82						78.5
MM jaar 4-5								32						39

Totally 46.6 manmonths of expatriate and 55.5 manmonths of Egyptian consultancy services are planned for in the coming two years. The corresponding barchart of personnel is shown in figure 5.1.

It is proposed to include in the project a Netherlands Bilateral Associate expert (BAD) as a junior sanitary engineer. The BAD should work under the guidance of the teamleader, the expatriate watersupply and sanitation experts and contribute to both sub-projects.

5.2 DIVISION OF TASKS

To distinguish more clearly between executive tasks of:

- consultants (Egyptian and expatriate);
- El Azab task forces and
- sub-contractors,

a division of tasks has been made for the following four categories of activities:

- a. water supply activities;
- b. billing and administration activities;
- c. sanitation activities;
- d. community involvement and client relations activities.

The result of this is shown in table 5.2 (four pages), which is basically a job description for the involved executive parties. Table 5.2 should be understood in conjunction with table 3.1 (overall division of responsibilities), the barchart of activities (figure 3.1) and the barchart of personnel (figure 5.1).

Not mentioned in table 5.2 are the job descriptions of the coordinating consultant (team leader), who basically coordinates all project activities and especially concentrates on institutional development activities, of the Environmental expert, who carries out one mission to carry out the environmental impact study and of the Bilateral Associate Expert (BAD) who would provide general support to water supply and sanitation activities.

Figure 5.1
BARChart of PERSONNEL, YEAR 2 AND 3

PERSONNEL	YEAR 2 1991				1992				YEAR 3 1993				MAN MONTHS												
	S	O	N	D	J	F	M	A	M	J	J	A		S	O	N	D	J	F	M	A	M	J	J	A
EXPATRIATE																									
Project manager	[Bar chart showing presence from Sep 1991 to Aug 1993]																								18.0
Water supply/sanitation expert	[Bar chart showing presence from Oct 1991 to Aug 1993]																								20.0
Senior water supply expert	[Bar chart showing presence from Feb 1992 to Mar 1992]																								1.0
Sanitation expert	[Bar chart showing presence from Feb 1992 to Mar 1992]																								1.4
UASB expert	[Bar chart showing presence from Nov 1991 to Dec 1991]																								1.0
Environmental expert	[Bar chart showing presence from Oct 1991 to Nov 1991]																								1.0
Socio-economist	[Bar chart showing presence from Sep 1991 to Oct 1991]																								2.0
Financial specialist	[Bar chart showing presence from Jun 1992 to Jul 1992]																								2.2
Bilateral Associate expert	[Bar chart showing presence from Sep 1991 to Aug 1993]																								(18)
TOTAL MM EXPATRIATE consultant																									46.6
EGG																									
Water supply specialist	[Bar chart showing presence from Sep 1991 to Aug 1993]																								16.0
Sanitation specialist	[Bar chart showing presence from Sep 1991 to Aug 1993]																								20.0
Computer specialist	[Bar chart showing presence from Dec 1991 to Jan 1992]																								4.0
Social scientist	[Bar chart showing presence from Sep 1991 to Oct 1991]																								6.0
Institutional specialist	[Bar chart showing presence from Feb 1992 to Mar 1992]																								8.0
Solid waste expert	[Bar chart showing presence from Sep 1991 to Oct 1991]																								1.5
TOTAL MM EGYPTIAN																									54.0

TABLE 5.2 DIVISION OF TASKS IN PHASE 1

A. WATER SUPPLY ACTIVITIES

EL AZAB	CONSULTANTS TEAM	EXPATRIATE	EXTERNAL CONTRACTS
Distribution taskforce and Maintenance centres	Expatriate WS&SAN expert & ECG water supply expert	Senior WS expert (2 missions)	
- Complete pipeline drawings	- Investigate decentralized production (for master planning)	Mission 1 (Jan. '92) - finalize water delivery	- Preparation of missing longitudinal sections (survey & draughting) approx. 100km.
- Updating ALEID input file	- Investigate Fayoum city connections (masterpl.)	- Check flow & pressure measurements.	- Aerial photographs and drawings 1:500 of pilot area
- Measuring of flows and pressures in the network	- Investigate distribution bottlenecks	- Start ALEID calibration and instruct.	- Preliminary masterplan
- Calibration of ALEID	- Prepare rehabilitation plans and designs	- Check rehabilitation plans and designs	- Prepare rehabilitation plan for reticulation
- Investigate distribution bottlenecks	- Prepare pilot villages programme	- Make ALEID runs for draft masterplanning	Mission 2 (Oct. '92) - Evaluate pilot villages
- Tendering of rehabilitation works	- Prepare preliminary water demand based on pop. forecasts and supply level.(masterpl.)	- Verify ALEID runs for draft masterplanning	- Establish future water demand
- Survey of service connections	- Support and guide distribution taskforce	- Support rehabilitation	- Prepare draft master plan
- Select pilot villages	- Support pilot villages programme	- Final ALEID runs for masterplans	- Establish programme for rehabilitation of production
- Complete 1:500 maps for reticulation network and service connections in pilot villages	- Support programme	- Preliminary designs and cost estimates	- Execution of production rehabilitation El Azab station
- Rehabilitation of service connections (pilot vill.)	- Prepare programme for production rehab.		- Basic computer training for distribution taskforce
- Supervision of rehabilitation works			

Table 5.2 (continued)

B. BILLING AND ADMINISTRATION ACTIVITIES

EL AZAB	CONSULTANTS TEAM ECG	EXPATRIATE	EXTERNAL CONTRACTS
Finance and billing taskforce	Institutional & computer experts	Financial expert	
<ul style="list-style-type: none"> - Provide information on procedures, administration system - List advantages and disadvantages of present system - Participate in the design of cost recovery programme and of accounting system - Participate in trainings - Implement cost recovery programme - Apply new accounting system - Apply financial analysis method 	<ul style="list-style-type: none"> - Analyse present client administration - Analyse present accounting system and financial administration - Specify needs for improvements and (im)possibilities for reorganizations - Prepare implementation of cost recovery programme - Design improved accounting system Prepare required trainings for: <ul style="list-style-type: none"> - general administration - cost recovery methods - computerized billing - accounting system - financial analysis 	<p>Mission 1 (Jan.'92)</p> <ul style="list-style-type: none"> - Define operational requirements of client and billing dbase - Prepare specs for a first version of a computerized billing programme - Review El Azab financial analysis - Develop strategy and programme for improved cost recovery <p>Mission 2 (Aug.'92)</p> <ul style="list-style-type: none"> - Evaluate the prepared billing computer programme - Follow-up on cost recovery programme - Make outline of an improved accounting system - Develop a simple method for financial analysis - Prepare financial chapters for draft masterplans <p>Mission 3 (April'93)</p> <ul style="list-style-type: none"> - Follow-up on accounting system - Follow-up on financial analysis - Financial chapters of final masterplan Contribute to preliminary designs and cost estimates 	<ul style="list-style-type: none"> - Develop computerized billing programme and test it on pilot scale - Basic computer training for finance and billing taskforce

Table 5.2 (continued)

C. SANITATION ACTIVITIES

EL AZAB	CONSULTANTS	EXTERNAL CONTRACTS
Waste water taskforce	Expatriate WS&SAN expert and ECG sanitation and solid waste experts	Expatriate Sanitation expert UASB expert
- Orientation on waste water in Fayoum Governorate	- Survey of local units (villages)	Mission 1 (Feb.'92)
- Follow courses and trainings	- Contribute to household survey (sanitation aspects)	- Preliminary masterplan for sanitation
- Tendering for implementation of on-site sanitation in pilot villages	- Propose on-site sanitation technology	- Assess feasibility of town sewerage system
- Supervision and monitoring of pilot villages programme	- Carry out feasibility study in selected town	- Prepare solid waste disposal study
- Assist execution of town feasibility study	- Investigate nature of sewage from town/village	Mission 2 (Oct.'92)
- Contribute to sanitation masterplanning	- Detailed design of selected on-site system	- Contribute to solid waste disposal study
	- Supervize and guide execution of pilot villages programme	- Evaluate pilot villages programme
	- Sanitation masterplanning	- Draft masterplan sanitation
	- Execution of solid waste disposal study	UASB Mission (June'92)
	Preliminary designs and cost estimates waste water and solid waste and planning	- Execution of UASB feasibility study
	- Provide guidance and on-the-job training for newly established waste water taskforce in EL azab	

Table 5.2 (continued)

D. COMMUNITY INVOLVEMENT AND CLIENT RELATIONS ACTIVITIES

EL AZAB	CONSULTANTS ECG	EXPATRIATE
Client taskforce	Sociologist	Socio-economist
		Mission 1 (Oct. '91)
- Participate in survey	- Prepare questionnaire	- Review results of local unit survey
- Receive training	- Prepare system for data analysis and reporting	- Complete questionnaires for household survey
- Apply client relations model in pilot vilages	- Select and instruct surveyors	- Advise on pilot villages programme
	- Execute survey	- Contribute to design of water delivery
	- Analyse results and report	Mission 2 (June'92)
	- Contribute to programme for pilot villages	- Review results of household survey
	- Develop client relations model	- Evaluate pilot villages programme
	- Organize training for client relations	- Design client relations model
	- Monitor pilot villages programme	- Support training in client relations
	- Evaluate pilot villages programme	- Provide inputs for draft masterplan
		Mission 3 (Jan. '93)
		- Evaluate pilot village programme
		- Evaluate client relations model
		- Contribute to preliminary designs

6. PROJECT COSTS

6.1 BUDGET ALLOCATION

The following amounts have been allocated by GON and GOE:

GON : Dfl 6,500,000

GOE : LE 2,200,000

The amount allocated by GON is available mainly for expenditures in phase I of the project for the categories: consultancy, equipment, training, procurement and local administrative costs.

Of the GOE allocation LE 200,000 is available in the first two years and LE 2,000,000 after year 2, exclusively for procurement purposes.

A breakdown of the GON allocation is shown in the upper part of table 6.1. It should be noted that modifications have been made to previous breakdowns mentioned in earlier project documents. This modification was necessary due to the extension of phase I to three years instead of two years, and because of changes in the Plan of Operations.

The lower part of table 6.1 shows a preliminary breakdown of the GOE allocation.

6.2 EXPLANATION OF PROJECT COSTS

Personnel costs

These costs include all costs related to the employment of expatriate and local consultants. Furthermore it includes costs related to the employment of local project staff (secretary, drivers etc.), allowances for students and allowances for counterpart staff.

Procurement

The procurement budget in year 2 amounts to Dfl 500,000 and LE 200,000. This amount will be utilized for rehabilitation works on the El Azab distribution network. Budget details will be provided in a special design report.

It is recommended, that if rehabilitation proceeds in a satisfactory way in year 2, a budget of similar size be made available for the third project year.

Table 6.1 Specification of overall project budget

GON BUDGET (DFL)	Revised budget *)	EXPENDITURES PHASE I			PHASE II	
		Yr.1	Yr.2	Yr.3	Yr.4	Yr.5
I. CONSULTANTS CONTRACT						
Personnel cost	2,896,572	792,695	823,257	590,718	413,408	276,494
Operational cost	300,000	50,000	60,000	65,000	65,000	60,000
Equipment	775,000	250,000	250,000	275,000	0	0
Training	250,000	0	125,000	125,000	0	0
Sub-total	4,221,572	1,092,695	1,258,257	1,055,718	478,408	336,494
Inflation	253,369	0	50,330	86,147	59,736	57,156
Contingencies	223,059	54,305	65,413	57,135	26,856	19,350
Total	4,698,000	1,147,000	1,374,000	1,199,000	565,000	413,000
Second long exp.mission **)	570,000	0	250,000	320,000	0	0
Grand Total I	5,268,000	1,147,000	1,624,000	1,519,000	565,000	413,000
II. PROCUREMENT AND LOCAL COSTS						
Procurement	1,030,000	0	500,000	530,000	p.m	p.m
Local adm. costs	200,000	0	50,000	50,000	50,000	50,000
Grand Total II	1,230,000	0	550,000	580,000	50,000	50,000
GRAND TOTAL GON	6,498,000	1,147,000	2,174,000	2,099,000	615,000	463,000

Notes:

*) Budget approved by DGIS 4/11/91

**) As per separate budget

GON BUDGET (LE)	TOTAL	EXPENDITURES PHASE I			PHASE II	
		Yr.1	Yr.2	Yr.3	Yr.4	Yr.5
PROCUREMENT	2,200,000	0	200,000	225,000	1,000,000	775,000

Equipment and operational costs

Originally an amount of Dfl 1,000,000 was mentioned for purchase of project equipment and materials. This amount contains Dfl 775,000 for actual purchases and Dfl 225,000 for operation and maintenance costs. The amount mentioned in table 6.1 for operational costs of Dfl 300,000 contains these Dfl 225,000 as well as Dfl 75,000 project office costs. The Year Plans for 1992 and 1993 will provide details on proposed equipment expenditures.

Training

Training funds will be used for on-the-job training, training courses inside Egypt and fellowships overseas. Training will be mostly oriented on members of taskforces. Detailed training plans will be provided in each Year Plan (1992 and 1993).