LOCAL DEVELOPMENT II — PROVINCIAL

مشروع التنمية المحلية

LD II-P

FINANCED BY U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

GUIDELINES:

Methodology and Terms of Reference to Conduct Rural WS/WW Needs Assessments and Strategic Planning

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

Revised January 1992
LDII – EE5-07(E)

Chemonics / 8 El Fawakrh Street / Mohandiseen, Cairo / Tel.: 3602645, 3482247 / Fax: 3608472 / Telex: 93037
٨ شارع الفواكه / مهندسين . القاهرة / تليفون : ٣٤٨٢٢٤٧ . ٣٦٠٢٥٥ / فاكس : ٣٦٠٨٤٧٢ / تلكس : ٩٣٠٣٧
2000 M St., N.W. / Washington, D.C. 20036 / Tel.: (202) 466-6340 / Fax: (202) 331-8202 / Telex: 1440361 CHNC UT

GUIDELINES:

Methodology and Terms of Reference to Conduct Rural WS/WW Needs Assessments and Strategic Planning

Revised January 1992
EE5-07(E)

Table of Contents

List of Tables and Figures

Introduction

A major objective of the Government of Egypt (GOE) over the last decade has been to upgrade the technical and administrative capacity of local government units to plan, implement, operate, and maintain adequately financed water supply and wastewater systems. Upgraded capacity and greater access to essential services should improve environmental and public health conditions while fostering development of villages.

Improving the environmental conditions of rural Egypt is, however, a formidable task. An estimated 40 percent of the rural population is directly served with water supply (1986 Census); less than five percent of the rural population is served by formal wastewater systems (Chemonics Report ENV-R-4). Further, the demand for these services is enormous, as witnessed by the popularity of programs designed to implement these services, and by the prominence of such programs in the GOE's five-year development plans.

THE NEED FOR COMPREHENSIVE SECTOR PLANNING

To cope with this great demand and the limited resources available to meet it, strategies for the rural water supply (WS) and wastewater (WW) sectors must be developed. Such strategies should take into account competition and pressure from other rural development sectors, as well as the rapid economic and political changes occurring in Egypt. Comprehensive planning for the water supply and wastewater sectors at the governorate level provides a logical and convenient starting point for long-term sector planning at the national level.

Planning at the governorate level will also bolster the GOE's long-term program regarding decentralization of responsibilities. Governorate sector plans prepared within a consistent framework, under similar guidelines, can be combined to allow central government planners to define national-level sector needs with minimal effort.

The methodology used to formulate comprehensive sector plans must ensure that all forces and variables affecting the sector are considered. For Egypt, these factors include delineating the specific long-term responsibilities of the governorate, markaz, and village governmental entities for

project financing, construction, sustainability, and monitoring and enforcement. Planning process methodology should also assure that plans reflect the current sociopolitical demands and realities that will affect WS and WW service provision.

The sector planning process should emphasize a full participatory approach. Inputs should be sought from all government institutions involved, and local government staff should be directly responsible for the work effort. In the Egyptian rural context, central government, governorate, markaz, and village inputs to the plan would be solicited and the actual effort required to produce the plans would be performed by employees at the governorate level or below.

As a first step toward comprehensive planning, sector needs assessments may be performed. The purpose of such assessments is to provide governorates with basic sector information that will allow for the prioritization of sector requirements. Once determined, these prioritized needs can be updated easily, and at any point in time the basic sector data can be utilized in a more comprehensive strategic planning approach.

This document provides the terms of reference necessary to undertake such a needs assessment.

PURPOSE AND CONTENT OF THESE TERMS OF REFERENCE

These terms of reference (TOR) are intended for use by rural governorates in Egypt to obtain the consulting services necessary to prepare sector needs assessment studies for their WS and WW sectors. The TOR do not define a rigid program for governorates to follow. As a first step in a comprehensive planning process, they are best interpreted as a guideline that provides a firm foundation for governorate programs over the next several years, and a framework for long-term planning.

Section 1 of these TOR provides an overview of the project components and requirements. This section is meant to introduce consultants to the requirements of the TOR and to provide a general framework for understanding the assessment study.

A detailed discussion of the major work elements required under these TOR is presented in *Section 2*. All consultants wishing to bid on a governorate assessment study must thoroughly understand the work program outlined in this

section and the details provided in the referenced appendices before preparing their proposals. This section is also meant to direct the consultant in carrying out the assessment once the contract has been awarded by the governorate.

Section 3 provides consultants with specific guidelines for preparing and submitting proposals, including the information needed concerning costs, schedules, personnel, and background of the consulting firm. It also explains how the governorates will perform the selection process. Submissions that do not follow the requirements outlined in this section may be rejected without consideration.

Section 4 lists some of the common items that are covered in the contract between the governorate and the selected consultant.

Appendix A provides information pertinent to the review and possible updating of governorate master plans in those governorates that possess such plans. Questionnaires for collecting field data, and an excerpt from the Planning Manual on how to rank villages form *Appendix B*. *Appendix C* includes technical data pertinent to project ranking, prioritization, formulation, and cost estimation, while *Appendix D* contains information concerning the desired background of key personnel for the study.

Consulting firms proposing on this sector needs assessment study should have a clear understanding of the requirements set forth in these TOR, including the four appendices, and should ensure that their proposals reflect this understanding.

Section 1

Overview of the Sector Needs Assessment

The sector needs assessment required under these terms of reference (TOR) will provide the governorates with a "snapshot" of the prioritized physical needs of the water supply and wastewater sectors. Rough cost estimates of these needs will also be provided.

This information will provide the basis for comprehensive, long-term water supply (WS) and wastewater (WW) sector plans at the governorate level. The assessment process outlined in these TOR also provides a planning methodology suitable for establishing needs at the markaz level, and can be utilized almost immediately to determine the characteristics and priorities of an individual village's water supply and wastewater requirements.

This section of the TOR reviews the assessment program outputs and and the work required to achieve these outputs. Sources of information that can be used by the consultant selected for the assessment, including existing master plans and their applicability to this work effort, are also provided. Detailed requirements for the selected consultant's work program under these TOR are presented in *Section 2*.

OUTPUT FROM THE ASSESSMENT

The output from the work efforts required under these TOR includes the following:

- A detailed ***sector assessment***, which includes the needs of all villages and ezab (of greater than 1,000 persons) in the governorate
- A ranking and prioritization ***framework*** for villages and projects that can be revised to be applicable for future conditions
- A computer-mounted (personal computer), comprehensive ***database*** that describes the WS and WW sector conditions. This database should be designed for easy updating of analyses and computations.

- A project identification document for the governorate that provides a ***prioritized WS and WW project list*** with approximate capital costs[1]
- The identification of ***top priority projects*** that require immediate implementation to mitigate or remove potential threats from environmentally dangerous situations and/or severe deficiencies in public water supply

These outputs, which are described in detail in *Section 2* of these TOR, will allow the governorate to:

- Devise an immediate action plan (using the top priority projects).
- Frame a long-range investment program to meet WS and WW sector needs (using the prioritized list of projects and their associated costs).
- Plan for WS and WW needs at the markaz level.
- Estimate the approximate schedule for each project's implementation.

SUMMARY OF WORK PROGRAM

These TOR have been prepared under the assumption that the selected consultant will adhere to the following general work sequence:

- Mobilize the project team, meet with governorate and markaz personnel, and aid the governorate in establishing a steering committee.
- Collect essential data via field surveys and/or updates of existing master plans. These data will be used to formulate the database model.
- Use the database model, as explained in *Appendix C.3* of these TOR, to rank villages by their characteristics.

---

[1]The governorate-wide prioritized project list should take into account the following: any WS or WW projects in the governorate already in the planning stage or under construction; the effect of providing regionalized WS/WW service by extending existing WS or WW facilities (and thus the service areas) in any of the cities in the governorate; and the effect of clustering or regionalizing proposed WS/WW facilities (that is combining individual village systems with others).

- Identify villages with projects scheduled for inclusion in other programs.
- Prioritize the remaining villages.
- Formulate projects and prepare preliminary cost estimates.
- Prepare a ***cluster*** analysis to indicate which projects could be combined.
- Prioritize the clustered projects and prepare final cost estimates.
- Identify top priority projects and prepare the sector assessment report.

SOURCES OF DATA FOR THE SECTOR ASSESSMENT

These TOR have been prepared on the premise that consultants will obtain data through the following means:

- Governorate master plans (currently available for 12 governorates)
- Field surveys performed at the village level
- Reports and file data from NOPWASD and other GOE institutions.
- Publications and file data of the USAID-sponsored LD II program.
- Other sources of data as identified and/or obtained by the consultants proposing for this work

Table 1.1 lists the 12 governorates that have completed master plans, and shows the date of publication and the engineering group responsible for the work. ***Under these TOR, consultants submitting proposals in any of these 12 governorates must provide reports that review the governorate master plan.***

Appendix A.1 explains how the review reports should be prepared and submitted as part of each bidding consultants' proposal. These review reports—referred to as master plan discussion papers—are further discussed in *Section 2.*

The review report of the consultant with the winning proposal shall be presented to a governorate steering committee. This committee shall decide if the master plan will be a valuable addition to the effort required under these TOR, and may direct the selected consultant ***to perform a***

master plan update and use the updated information in the Sector Assessment. Even in instances where the master plan is not to be updated, the consultant will be able to utilize the general data it contains.

More information about updating master plans for use in this sector assessment is provided in *Section 2* and *Appendix A.2.*

Consultants must recognize that a limited number of copies of each governorate master plan are available for review, and that these plans are currently in English.. The governorate will provide each consultant with a master plan copy to review. However, the review may have to be made within a given time period to accommodate the several consultants who must be scheduled. Thus, for consultants to comply with the proposal submission deadline required under these TOR, scheduling of a master plan review period may be critical.

Table 1.1:
Governorates with Water Supply/Wastewater Master Plans

Governorate	Local Consultant	Expatriate Consultant	Year of Final Report
Asswan/Qena	Upper Egypt Consultants	Kruger & Associates (Denmark)	1987
Beheira	Engineering Consultant Technical Office	Sogreah (France)	1986
Daqahliya	Engineering Consultant Technical Office	Sogreah (France)	1986
Damietta	Engineering Consultant Technical Office	Sogreah (France)	1986
Fayoum	Engineering Consultant Group	IWACO & DHV (Netherlands)	1991
Giza	Engineering Consultant Group	Associated Engineering International (Canada)	1988
Ismailia	Middle East Consultant	Metcalf & Eddy, Inc. (USA)	1979
Kafr el Sheikh		Kescon (Germany)	1987
Menufiya *	Sabour Associates	K Konsult (Sweden)	1991
Matrouh	A.A. Warith	CH2M-Hill International United Consultants	1988
Sharqiya		Nihon Suido (Japan)	1984
Sohag		Inter Sigma (Yugoslavia)	1985

*Report title: *Concise Feasibility Study—Interim Report*

CONSULTANT RELATIONSHIPS WITH VILLAGES AND GOVERNORATES

These TOR assume that the consultant chosen for the work shall maintain close relationships with the village councils and their staffs, and the markaz and governorate staffs. The consultants, as part of their proposals, must outline how they will carry out this close coordination and liaison. *(See Section 2, Work Element 1* and *2).*

Another premise of these TOR is that village staff members, under the selected consultant's supervision, shall perform the major part of the field work. The selected consultant is expected to instruct and train staff on how the field survey work should be accomplished. This effort represents a key portion of the TOR and must be discussed in the consultant's proposal. (See *Section 2, Work Elements 1,* 2, and *3).*

Section 2

Work Program for the Sector Needs Assessment

This section describes the detailed work program for the sector assessment effort. Consultants proposing to carry out the work under these TOR should prepare proposals with the understanding that little deviation from the methodology described in this section, and in the appendices referred to in this section, will be allowed.

SECTOR ASSESSMENT WORK ELEMENTS

Figure 2.1 provides an overview of the sector assessment work flow. Each work element shown in this diagram is described below.

Work Element 1: Mobilize

The mobilization work element consists of the following tasks:

Establish Lines of Communication

The consultant shall contact the governorate to discuss how the work described in these TOR will be accomplished. This initial meeting will be used to introduce the project manager and other senior members of the consultant's project team to the governorate staff assigned to administer this study. The lines of communication and method of liaison between the consultant's staff and their governorate counterparts should be established.

Establish a Steering Committee

The consultant engaged under these TOR is expected to aid governorate staff in establishing a formal steering committee to oversee this work. This committee shall be chaired by the secretary general of the governorate or some other senior official named by the governorate. Other members shall include markaz and village officials, and community leaders.

The consultant shall submit, as part of its proposal, suggestions regarding the membership and organization of the steering committee. The actual membership selection will be made by the governorate, however, and should

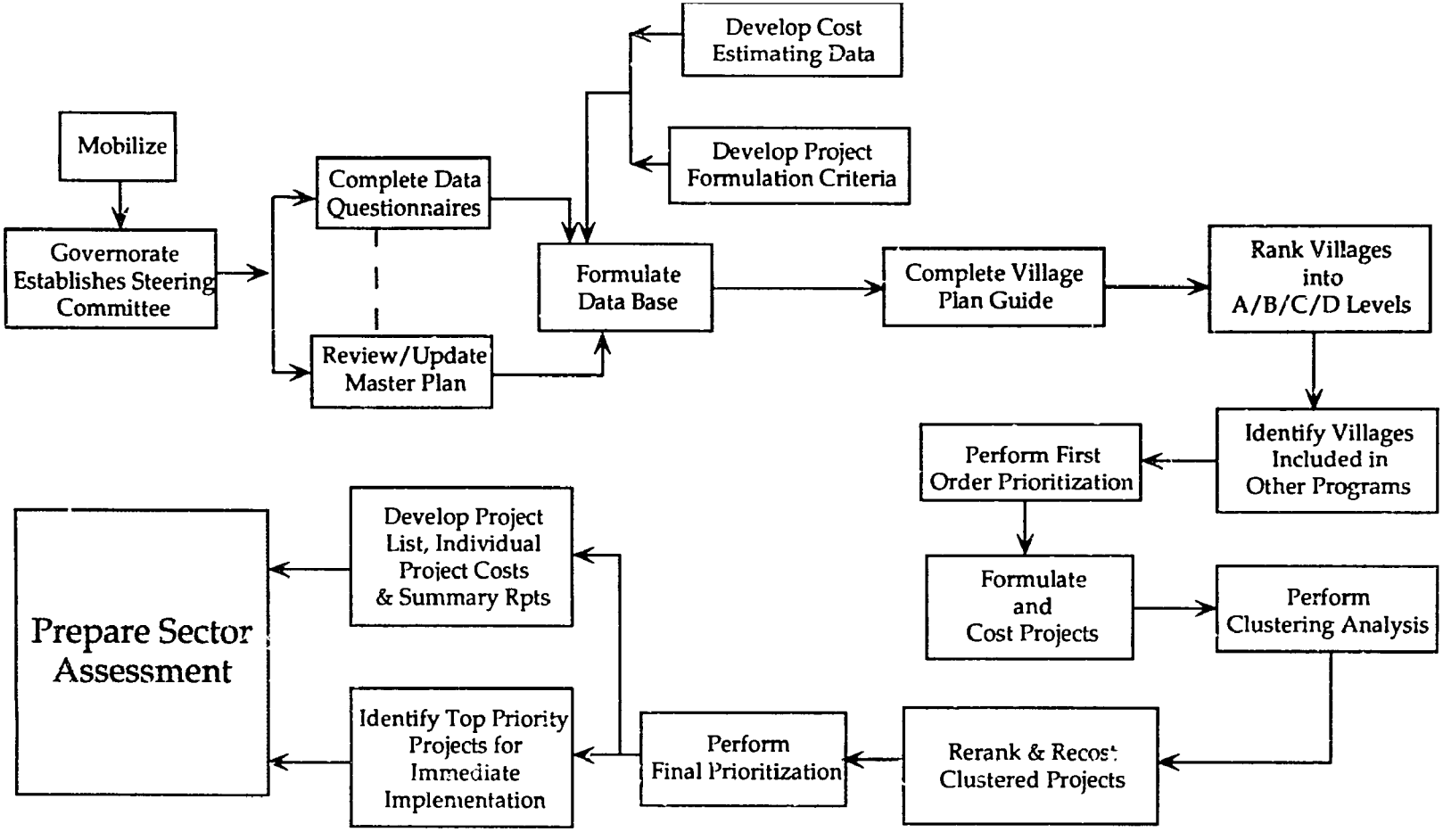

Figure 2.1
Sector Assessment Work Plan Flow Diagram

represent all sections of the populace (both technical and non-technical people).

The steering committee shall be responsible for overseeing the consultant's efforts and facilitating the progress of the work. In this regard, the steering committee should provide guidance and input as required, and make necessary decisions on issues and questions raised by the consultant.

The consultant shall present an oral report to the steering committee on a monthly basis, and a written report every second month. The written report should review the general status of the project, including the work accomplished in the past two months, any existing or anticipated problems, major efforts planned for the next two months, milestones reached, and any gains or slippages in the overall project schedule. The format of the monthly meetings and the bimonthly written progress reports should be decided at the first steering committee meeting.

Determine Available Staff

The initial meeting with the governorate shall include a discussion of the governorate (or markaz) staff available to work on this task. The consultant should be ready to discuss the methodology to be used for:

- Initiating contacts with the markaz and village council chiefs
- Determining the number of markaz and village council staff required for the survey work, and the consultant's plan to train the village council personnel to successfully carry out the work

Field survey work shall involve, to the greatest degree possible, members of the village council staffs. Village council chiefs shall be contacted through the marakez, and shall in return contact the village council chairmen to arrange for survey personnel.

Work Element 2: Collect Data

A significant effort in the sector assessment involves obtaining the data needed to classify the WS, WW, and general environmental conditions of each village and ezba. The data questionnaires used for these surveys are provided in *Appendix B.1*, and shall be considered part of these TOR.

Classification of villages and ezab according to the data required will allow for the ranking of these entities using the methodology presented in the document entitled ***Planning Manual For Village Wastewater and Environmental Protection Projects*** (EE5-09, published in December 1991, and referred to hereafter as the Planning Manual). The introduction and first section of the Planning Manual are provided in *Appendix B.2*, which should be considered a specific component of these TOR. The planning manual methodology shall be performed with data obtained through field surveys.

Consultants should examine and fully understand the data questionnaires and the Planning Manual prior to preparing proposals, as these TOR components provide the foundation for the entire effort.

Data may also be obtained from master plans in those governorates with existing master plans (see Table 1.1 on page 7). All data obtained shall be stored in the sector assessment database described under the heading *Formulate the Database* on page 14 of this section.

Perform Field Surveys

Consultants proposing for the work under these TOR shall provide a description of how they plan to train and utilize the village council personnel and control the field survey work required to complete the data questionnaires.

In preparing this description the consultant must recognize that these TOR intend for the markaz staffs to arrange for the use of village council personnel from all villages within their particular markaz. Selected village council staff shall be provided with training for the field survey work.

The field survey descriptions provided by consultants shall also provide estimates of the number of personnel required and the schedule for this effort. In preparing these estimates, consultants should recognize that:

- These TOR assume that the major portion of the data questionnaires will be completed by village council personnel, supplemented as required through interviews with the village council chief, members of his staff, and markaz staff. Much information is expected to be available for the consultant's examination at the village council's headquarters. Some of the data questionnaire requirements, however, will require observation and measurements.

- The number of villages/ezab in the governorate will vary: Some governorates may contain several hundreds of these settlements, and even if much of the data pertinent to satellites, villages, and ezab are available from the village council, some component of field work and associated observations and measurements will be required.
- Data will be available from master plan updates in the governorates that have this requirement (see *Review & Update Master Plans*, below).

Consultants shall also describe in their proposals how they plan to provide quality assurance for the field efforts.

Although the survey work should be accomplished primarily by village council personnel trained and supervised by the consultant, responsibility for the timeliness and the accuracy of the data collected will be solely that of the consultant. As a result, the consulting firm conducting the work should expect to control the schedule for surveying villages and ezab, and should plan for its own personnel to continually spot-check or monitor the ongoing survey work.

Further, to ensure the quality of the data, final copies of the questionnaires shall be completed by the consultant, after the rough field copies have been collected. Collections should be made on a weekly basis, and resolution of any inconsistencies should be made no later than the following week.

Finally, the consultant must plan for its ***own personnel to re-survey a minimum of 15 to 20 percent of the villages to ensure the accuracy of the data*** collected in the initial surveys. Large inconsistencies shall require a third survey by representatives of both the consultant and village council.

As an alternative to resurveying 15 to 20 percent of the villages, the consultant can elect to include one of its personnel as a full-time member of every village council's survey team ***for all villages and ezab to be surveyed.*** However, such assignment by a consultant of its own personnel ***will not relieve the consultant of preparing and implementing a training and a quality assurance program for the field efforts.***

Review & Update Master Plans

The selected consultant shall update the master plan for any governorate in which this is deemed beneficial. The decision to perform a master plan update shall be made by the steering committee using the Master Plan Discussion Paper, which

must be submitted as part of the consultants' proposals for any of the 12 governorates listed in Table 1.1 (see page 7). Specific requirements and guidelines for the master plan discussion papers are discussed in *Appendix A.1*

Updated master plans may thus be an additional data source for completing the questionnaires and performing the Planning Manual analyses described in *Appendix B.2*. In this situation, the overall effort required for the field surveys may be decreased. Updated master plan data should be utilized as much as possible to complete the data questionnaires; however, all information presented in the questionnaires shall require verification through field surveys.

Manpower and other costs required to prepare these updates shall be part of the commercial bid submitted to the governorate.

Information and guidelines about updating master plans as part of this sector assessment are provided in *Appendix A.2*.

Formulate the Database

To comply with these TOR, the selected consultant shall formulate a computerized database management system. This ***database*** should be developed from commercially available software similar to dBase IV or FoxPro Systems developed by Ashton-Tate Corporation. The selected system should run in both Arabic and English.

The database is meant to be used by the governorate in future planning efforts for its WS and WW sectors. Thus, the consultant shall be required to transfer data files to the governorate and to provide the governorate with appropriate documentation, including a user manual, and training. See Figure 2.2 for details about transfer requirements.

The database shall be suitable for use with a personal (desktop computer), and shall allow for easy storage, retrieval, and updating of data collected as part of the sector assessment. Other pertinent data relating to the governorate's WS and WW systems, and environmental, physical, and social conditions shall also be stored in this database.

1. Consultants shall carefully document the variables, or data items, by supplying the following:

variable type	**variable length**
variable position	**variable file location**
variable relationships	**indices**
composite measures	**calculated variables**

2. Consultants shall supply data files on MSDOS diskettes, using dBase and ASCII formats.

3. Consultants shall include and document all related programs used to manipulate the database, including:

- **programmed report formats**
- **data entry routines**
- **programs for performing calculations, index construction, projections, etc.**

4. Consultants shall train members of the governorate staff in the complete operation of the database. Approximately 36 hours of training shall be provided to up to four staff members selected by the governorate. The schedule for this training will be developed as work progresses.

Figure 2.2: Requirements for Transfer of Database Management System to Governorates

The database, in conjunction with accompanying software programs, shall be capable of *producing* the completed data questionnaires shown in *Appendix B.1*, and shall produce other summary tables of governorate-wide data as described later in this section. Further, the database shall be able to perform the indexing calculations introduced in the Planning Manual, so that rankings can be computer-generated. The sub-routine for these calculations should be flexible to allow the governorate to vary the classification criteria in its future planning efforts.

These TOR also require that the database has the ability to:

- Create summary tables for all or parts of the governorate, illustrating different sets of data
- Perform calculations, using stored unit cost values, so it can rapidly produce cost estimate reports
- Utilize stored indices and constants to update costs, project populations, or other analyses described in these TOR.
- Perform other database requirements as described throughout these TOR.

In their proposals, consultants must include a detailed description of the database they would formulate for this project. This description should include the hardware and software requirements, and any experience they have had with this type of system on previous projects.

Further, in their proposals consultants should discuss the advantages of using their particular database for the sector assessment, and should detail the type of training they intend to provide to the governorate staff.

Work Element 3: Rank the Villages

The village ranking analysis described in the Planning Manual (*Appendix B.2*) shall form the basis for the prioritization analysis. The ranking methodology to be used under these TOR identifies villages with similar characteristics. Once these villages are grouped into great categories, they can be prioritized using additional criteria.

Village ranking was developed so that a single village could be classified in terms of its needs for wastewater facilities by analyzing some easily discernable village characteristics. This concept can be expanded to apply to all villages in a governorate, thus providing a convenient method for classifying hundreds of villages into defined categories by grouping them according to similar characteristics. ***The key point to remember in this analysis is that a high rank indicates a great need for facilities.***

In this analysis, ezab are not ranked. However, data for all settlements over 1,000 persons shall be collected and stored in the database for later analysis.

The database shall use data collected through field surveys and/or master plan updates to classify the villages as shown by the methodologies presented in *Appendices B.2* and *C.1*. An index, which acts as surrogate measurements for village characteristics, shall be computed for each village. This index is expressed as both a numerical score and a percentage, and will be used to define a village's rank from the top level of A to the lowest level of D. Detailed description of methodologies and typical sets of WW and WS rankings are provided in *Appendices B.2* and *C.1*.

As a guide to the consultant, *Appendix C.1* indicates how the ranking methodology can be adapted to classify villages with overlapping indices.

The database output resulting from the ranking analysis should be in several formats that show the villages by rank, point scores, and percentage scores for each index. *Appendix C.1* provides further discussion on the formats required for the results of the ranking analysis.

Proposals should comment on the ranking analysis, the manner in which the database would be used in this analysis, and the format and/or table headings the consultant intends to provide to summarize the results of the analysis.

Work Element 4: Identify Villages Included in Other Programs

In the final assessment report to be prepared for this project, the consultant shall discuss any villages already included for WS and/or WW service projects under existing programs. This requires consultation with the governorate. It may also entail discussions with other GOE institutions such as the National Organization for Potable Water and Sanitary Drainage (NOPWASD) and the GOE Ministry of Planning; and United Nations Organizations such as the World Bank, the World Health Organization (WHO) and the United Nations Development Fund (UNDP).

The villages included in these programs shall not be prioritized (see *Work Element 5*, below). However, these villages and their associated data shall still be included as part of the database.

The selected consultant's final report should discuss these programs briefly, indicating the villages covered, the type and characteristics of the program, and the date that facilities are expected to be on-line. The tabulation for presenting these villages might have headings as shown below:

Village	Markaz	Rank	Index Value	1991 Population	Target % Served		Program Name	Estimated		
					WS	WW		Sponsor	On-line Date	Investment Cost

(Note: This tabulation is similar to those shown in Appendix C.2 for the village ranking output.)

Work Element 5: Analyze Priorities

An integral component of this sector assessment concerns the prioritization of projects. Prioritizing sector needs will allow the governorates, central government planners, and villages to recognize the capital investments required for the sector.

In effect, the prioritization analysis is the second step in what may be termed a "hierarchy of needs" analysis. The first step—village ranking—will provide a rough indication of the where sector needs are greatest; the second step—prioritization—indicates ***the sequence of implementing projects for villages within the same ranking.***

Project prioritization under these TOR shall be carried out at two points during the sector assessment. First, the ranked villages (excluding those having projects in other programs) shall be prioritized. Then after projects are formulated and clustered as described under *Work Element 9*, the prioritization analysis shall be rerun (see *Work Element 10*).

The consultant engaged under these TOR shall perform the first prioritization analysis as described in *Appendix C.2.*

Point scores for various priority factors shall be assigned as presented in *Appendix C.2.* A village's "first order" priority level shall be the value resulting from summing all the factor scores.

Each village's WS and WW projects shall be prioritized ***within the ranges of the village ranking analysis described above.*** That is, all villages in the same rank shall be prioritized compared to others in that rank.

Proposals should comment on the prioritization methodology and the manner in which consultants would conduct this analysis, including how the database capabilities would be used.

Consultants submitting proposals under these TOR may propose an alternative procedure or alternative factors for this analysis. These should be described in detail in their proposals.

Work Element 6: Formulate Projects

To this point in the analysis, villages have been the focus, and have been ranked and prioritized according to their need

for projects. The analysis could stop here and the prioritized list could be utilized by the governorates to determine project sequencing. Then, as funding became available, projects would be formulated and constructed, according to this sequence.

Such an analysis would provide an incomplete sector assessment, however, as there would be no consideration of costs or specific project type. To provide a complete assessment, a methodology for identifying project characteristics, which incorporates the ability to prepare cost estimates for the village and ezba needs, must be prepared.

Ordinarily in sector planning, a policy document would guide planners as to the type of project and the particular characteristics suitable for various villages. Criteria and standards to guide the preliminary design would also be available. These policy standards would allow sector planners to formulate a preliminary set of generic projects for the villages.

Formulation of such policy and standards for Egypt's rural WS and WW sectors is in the early stages, and such guidelines are unavailable for use with these TOR. Thus criteria and general policy have been developed as part of the TOR for use by the consultant selected for the sector assessment. These criteria are presented in *Appendix C.3*.

The consultant engaged under these TOR shall review these guidelines with the governorate and steering committee to assure that they agree with the governorate's mandate. When criteria are expressed as a range of values, the steering committee will decide which values to use. Adjustments should be made as required, and thence the consultant shall utilize the criteria and data as the basis for project formulations for the villages.

The consultants shall incorporate the project formulation standards and criteria, and various cost data into the database. The database (and its associated programs) shall then be used to formulate projects and produce cost estimates for these projects.

The database ***must*** have the flexibility to incorporate policy criteria and standards to allow for the rapid preparation of cost estimates for projects. As policy criteria and standards are refined, revised values should be entered into the database, replacing the values used in this analysis. This

capability will ensure that the database remains valuable to the governorate in its ongoing planning work.

Proposals should comment on the consultants' planned approaches to project formulation as described above and in *Appendix C.3-1*. If consultants wish to utilize an alternative procedure yielding similar results, they should describe the proposed alternative method, in detail, in their proposals.

Work Element 7: Estimate Costs

Cost estimating parameters for use in this study are presented in *Appendix C.3-2*. These cost data were derived from WS and WW projects constructed in Egypt over the past several years under USAID's Local Development (Provincial) Projects, and from other work done in the WS and WW Sector. The figures were then converted to 1990 levels by applying the pertinent cost indices.

The consultant engaged under these TOR shall incorporate the cost estimating parameters into the database so that rapid cost estimates can be prepared. *Appendix C.3-3* provides an example of how the cost estimates are calculated.

Proposals should comment on the cost estimating methodology of *Appendix C.3-2*. Consultants may utilize alternative procedures or alternative unit costs; these should be described in detail in their proposals.

Consultants should review *Appendix C.3-2*, recognizing that the cost estimating methodology presented was developed especially to obtain costs for project formulation as described in *Work Element 6* and *Appendix C.3-1*. This simplified approach can be used instead of a more detailed, rigorous approach that would require consultants to perform design calculations for hundreds of projects.

Work Element 8: Cluster Villages and Ezab

The selected consultant shall analyze the prioritized villages, together with the ezab, to determine their potential for inclusion in regionalized or clustered groupings. Under these TOR, the consultant shall utilize existing maps only.

The following guidelines shall be utilized in the clustering analysis:

- The clustered or regional system ***should be logical*** on a geographic basis. It should also be logical on a political basis; that is, the village council, governorate, and markaz officials should agree that it is politically feasible to combine the various villages and/or ezab into a clustered group. Such agreement can be determined by discussing the proposed clustering with the public officials involved.
- The maximum cluster population (1991 level) is 300,000 (no limit on minimum). At least one mother village with an existing village council must be included.
- The total clustered area should not exceed 400 km^2, and no two adjacent village boundaries should be separated by more than 5 km.
- Clustered villages should have at least one all-weather roadway, in good condition, connecting their centers; routes for large WS pipelines and sewers should be apparent; and sites for water and wastewater treatment plants, as required, should be apparent.
- Regionalized systems recommended in governorate master plans should automatically be considered valid for this analysis.
- Governorate water company plans for regional service at the village level should be incorporated.

Proposals should describe the methodology to be used for performing the clustering analysis. Descriptions should include the techniques to be employed, the maps to be used (the scale of maps, their source, and their general availability), and the manner in which the clustered projects will be illustrated in the sector assessment report.

Work Element 9: Rank Clustered Projects

The first-level prioritization analysis was applied within the ranked ranges of individual villages without regard to project formulations or estimated costs (see *Work Element 5*). The inference was that each village would have a specific project. To maintain consistency, the second-level prioritization analysis (that is, the analysis on the clustered projects) ***must also be applied to ranked*** projects. Thus, the consultant shall re-rank all projects after clustering, considering the clustered projects as single entities.

Ranking the clustered projects can take several forms. The least complex case is one in which the original rankings of all

villages in the cluster were the same or were very close. The "clustered project" ranking would thus be the same as the original ranking.

Complications may arise if the villages included in clustered projects have varied rankings. The greater the variance the greater the difficulty in determining the ranking of the clustered project.

For purposes of the analysis, the clustered project rankings shall be defined as the weighted average of the rankings of the individual villages included in the cluster. This weighted average is computed by summing the products of each village's average index (percentage) and population, and dividing the sum by the total population (see *Appendix C.4*).

In this ranking analysis, ezab may be included in the clustered projects. Since the ezab are not ranked originally under the process described in *Work Element 3*, they will not add or subtract to the rank level of the clustered projects. An example of ranking for a clustered project that includes an ezba is shown in *Appendix C.4*.

The database shall allow the cluster ranking calculations to be performed rapidly, and shall provide summary reports indicating the rankings of the clustered projects. These summary reports of the rankings of the clustered projects should be in the formats illustrated in the sample table shown in *Appendix C.4*.

The newly ranked clustered projects will be prioritized as described below.

Work Element 10: Prioritize Clustered Projects

After re-ranking projects subsequent to clustering, the consultant engaged under these TOR shall use the following parameters to adjust priorities as needed:

- Cost per newly served person for a given project[2]
- Regionalization—the potential for an area to receive service from a newly clustered project or from an existing regional system

[2] A "newly-served" person is a person added to the WS or WW system between the current date (1991) and the projected date (2001).

These added prioritization factors are further discussed in Appendix C.5.

A key point in the re-prioritization analysis is that projects that can be made part of regional systems shall be given higher priority.

Because clustered projects may cause benefits of scale, thus reducing the cost per person served, the consultant should prepare cost estimates for projects reformulated after clustering, or for projects in which benefits of scale are apparent.

As in previous sections, any alternatives a consultant wishes to propose regarding the prioritization analysis for clustered projects (and the possible need to re-formulate the projects due to clustering) should be discussed in the proposal.

Work Element 11: Identify Top Priority Projects

The consultant engaged under these TOR shall prepare a list of "Top Priority Projects" (TPP). This TPP list is intended for use by the governorate as a guideline for scheduling required sector investments. The consultant shall ensure that the list includes the immediate investments required to mitigate or remove any potential threats from environmentally dangerous situations or from severe deficiencies in public water supplies.

For most governorates, the first prioritization analysis (before clustering) will ordinarily produce this TPP list, with the most severe WS and WW situations at the top of the list. However, further examination by the consultant may be necessary to assure the inclusion of projects covering the most critical needs.

The identification of the critical needs should not be difficult, as these should be well known at the village, markaz, and governorate levels, as well as by other GOE institutions involved in the sector. Data pertaining to such situations should be collected during general data collection. The consultant shall be required to check the preliminary TPP list, with various officials of the governorate, markaz, villages, and other GOE institutions involved.

The finalized list, for both WS and WW projects, shall be presented by the consultant in the Sector Assessment Report. The format for the list, shall be as follows:

- Absolute immediate needs shall be listed first

- Other priority projects recommended for inclusion in a governorate-wide program shall be listed below absolute immediate needs, and shall be sorted by the size of the needed investment, from smallest to largest.

Work Element 12: Prepare the Sector Assessment Report

The Sector Assessment Report for this project shall summarize all work elements and analysis conducted for this study and provide recommendations concerning top priority projects. As a second volume, the consultant shall also submit a compendium of project summaries generated by the database, for each village and ezba in the governorate.

Under these TOR the ***consultant's report is intended to be a relatively brief summary with most of the detail provided as appendices.*** The general formats for the report and the compendium are described below.

Summary Report

The body of the summary report shall consist of four basic sections:

- *Methodology*—a brief review of how the consultant conducted the study; the methods used for analysis; and the manner in which village, markaz, and governorate personnel (including the steering committee) were trained and utilized.
- *Description of the database*—including its capability, hardware and software requirements, and the training provided to governorate personnel to enable them to use this database for future governorate WS and WW sector planning.
- *Existing situation*—a general description of the existing conditions in the governorate's WS and WW sectors. This description should detail the level of service, the general location of villages by markaz, and the general characteristics of existing facilities.
- *Recommendations*—these should stem from the consultant's work efforts and should provide details of the projects.

Appendices

The appendices to the summary report shall provide supporting detail to the body of the report. The number of

appendices and their presentation format will, in general, be up to the consultant. However, appendices that provide the following are required:

- ***Chronology of the major milestones*** of the consultant's work effort, including the dates for mobilization, the initial meeting at the governorate, the organization of the steering committee, the meetings and major decisions of the steering committee, all training sessions, the completion of field efforts, and the completion of the major components of the analysis.
- ***Detailed description of the database design,*** and a detailed users' manual for governorate staff. The manual should provide explanations of all facets of the database sufficient to allow an individual with a low level of experience, and no more than a cursory background in the use of personal computers, to operate the database by using the manual after only five to six hours of instruction.
- ***Complete description of the data analysis*** and the results of the ranking and prioritization analysis as set forth in these TOR. (See *Appendix C.2* for suggested output reports from the ranking analysis.)
- ***Summary of program recommendations and project characteristics.***

Several of the appendices may consist solely of tabular presentations that summarize the results of the analyses. These should include the following:

- A summary table of projects for the entire governorate showing all villages or clusters, and providing the following information: markaz, villages included in the project, project type (WS or WW), 1991 population and percent of population served, projected populations and percent of population to be served by the formulated project, total project costs, and costs for each component of the project
- Summary tables, as described above, with data sorted to illustrate the villages in order of decreasing priority, population size or percent served, and/or investment costs
- Summary tables, as described above, for each markaz in the governorate

Compendium

Under these TOR the consultant shall prepare, in addition to the summary report and appendices, a single-volume compendium consisting of summary sheets for every village and/or ezba in the governorate.

These summaries, to be produced by the database, shall present for each village/ezba:

- General location
- Existing WS and WW conditions
- Service levels and infrastructure characteristics
- Recommended project rank and priority
- Detailed description of the characteristics of the recommended project, including the level of service to be provided, the population to be served, the facilities required, and the estimated cost.

Consultants should, as part of their proposals:

- Present a sample outline for the summary report and appendix portion of the Sector Assessment Report in the form of a detailed table of contents.
- Provide samples of the format for the various computer-generated summary reports.
- Present a sample format for the compendium summary sheets, indicating the information to be provided.

Section 3

General Conditions for Preparing Proposals

This section is devoted primarily to providing guidelines for consulting firms regarding the information they must submit as part of their proposals. Firms should be aware that non-compliance with these guidelines may result in the rejection of their proposals without consideration.

These TOR require a "two-envelope" proposal—a double submission from the consultants. One envelope should provide technical requirements and a description of experience and personnel, while the other should provide the commercial bid for the project.

The technical envelope shall contain all information the consultant believes necessary to justify selection on a purely technical basis, as well as information about the consulting firm's organization, experience, and overall personnel profile. The project organization specific to this study and profiles of key personnel involved should also be included.

The commercial bid envelope shall include data relating to the commercial bid for the project.

RANKING OF PROPOSALS

These TOR require that the consultants' proposals be ranked by technical merit (that is, by examining only the contents of the technical envelope). Once the technical preference is determined, the governorate will attempt to negotiate with the selected consultant based upon the commercial bid in the second envelope.

If an agreement cannot be reached between the preferred consultant and the governorate, the firm with the second-best technical proposal will be contacted for negotiation. This process of negotiation will continue until a settlement is reached or until the governorate cancels the process.

During the technical ranking process governorates may request additional information from any or all consultants submitting proposals. Governorates may also request that

some or all consultants submit to formal interviews. The format and other requirements relating to such interviews shall be provided to the consultants, by the governorates, at least 10 working days before the interview schedule.

Technical selection shall be based upon the following weighted parameters:

Parameter	Weighted Percent of Total
Overall experience of consulting firm	20%
Proposed project manager	20%
Proposed full-time members of project team	20%
Responsiveness of proposal to TOR	10%
Uniqueness of consultant's approach and general understanding of TOR requirements	15%
Database capability and consultant's capacity to train governorate staff	15%

SCHEDULE FOR PROPOSAL SUBMISSION

Ten copies of both the technical and commercial proposals shall be submitted to the office of the secretary general in the governorate.

For governorates which require a master plan discussion paper[3] proposals must be submitted within 60 days of the issuance date of these TOR (that is, proposals are due on the issuance date plus 60 days).

For all other governorates, proposals must be submitted within 45 days of the issuance of these TOR (that is, the issuance date plus 45 days).

In both cases, proposals shall be due by noon on the last day.

Each submission—the technical proposal and the commercial bid—should be in its own wrapping, addressed to the secretary general, with the consulting firm's name and the proposal title (as shown on the front page of the TOR).

---

[3]These 12 governorates, which have existing master plans, are listed in Table 1.1 on page 7 of this document.

TECHNICAL PROPOSAL REQUIREMENTS

The bulk of the technical proposal shall address the items described in Section 2 of these TOR. The following format shall be used:

- Section I: Introduction
- Section II: Work Plan
- Section III: Personnel Organization for the Study
- Section IV: Schedule and Project Management
- Section V: Firm Profile

The content of each of these sections is described below.

Introduction

This section should include the name and address of the consultant, the name of the governorate requesting proposals, and a brief summary of the proposal format.

Work Plan

The Work Plan should present the plan for accomplishing the sector assessment by indicating the consultant's approach to the study, and the manner in which each of the work elements described in *Section 2* of these TOR would be accomplished. Specific questions, descriptions, and other general requirements outlined in these TOR should be addressed in detail in this section of the proposal. References to the TOR work items should be included.

This section of the proposal must be prepared in detail to fully describe how the consultant plans to execute the work. Additionally, it should fully describe how the required analyses will be performed.

A specific portion of the technical proposal will relate to updating the master plan. This should be kept separate from the other work elements.

Personnel Organization

This section should indicate the specific groups or teams the consultant proposes to organize to conduct the work, and should explain how these groups relate to one another in terms of lines of responsibility. The relationship of the

consultant's project manager to the teams should also be shown.

Brief resumes (of one to two paragraphs) should be provided for the project manager, the deputy project manager, the database manager, and all other team leaders or senior employees assigned to this project. These resumes should indicate the individual's position on this project, his number of years with the firm, his years of total experience, and his experience on other relevant projects.[4]

Schedule and Project Management

In the fourth section a bar chart showing the key elements of the work shall be presented. This bar chart should present the schedules for all individual items of work (such as field surveys and database development) and should clearly indicate the overall schedule for the project, and the scheduled time for any proposed interim submissions or key review meetings.

A second bar chart shall also be prepared for the project staff, to illustrate the time that they will spend on the project. This should be similar to the bar chart presented by major work element, and should include all personnel assigned to the project.

The personnel assignment shall also be shown in a tabular form that illustrates the approximate time each person will spend on each key work element. Personnel will be listed down the left side of the matrix, and major elements of the work plan across the top, as shown below:

Name	Work Element 1	Work Element 2	Work Element 3 ...
Employee 1 Employee 2			

The number of person months, person days, or hours the consultant expects the employee to work will be provided for

[4]Consultants should recognize that, if selected for the work, they are expected to furnish the key staff members described in their proposal. More complete resumes of all members assigned to the project, should be presented in the *Firm Profile* portion of the proposal.

each work item. This matrix presentation will allow the project manpower requirements to be viewed in terms of major work elements.

In this section the consultant will provide a separate component that indicates the personnel and level of effort required to update the master plans (see *Appendix A.1*).

Firm Profile

The final section of the technical proposal should present general data about the firm and its senior members. The average gross annual billing for the firm over the last five years should be stated.

This section should include project descriptions of six to twelve projects, if possible, that illustrate why the firm would be an appropriate choice for the sector assessment. The project descriptions should be accompanied by a summary table showing each project as a single line, indicating the project name, the client or owner, the type of project, the year of completion, the total fee, and the role played in the past projects by any personnel proposed for inclusion on this sector assessment study.

Complete resumes for all personnel assigned to the project should be included in this section.[5] Resumes for senior managers and/or owners of the firm may be presented at the discretion of the consultant. A suggested format for the "long form" resumes is shown in Figure 3.1.

COMMERCIAL PROPOSAL REQUIREMENTS

The consultant's commercial proposal shall be submitted separately from the technical proposal. The commercial proposal shall consist of two sections, one for labor or personnel requirements, and the other for all other costs, including commodities, vehicles, and special equipment that the consultant estimates is required for the work. These two sections are described below.

Personnel Costs

Personnel costs shall be displayed by indicating the staff members, the number of work months each staff member

[5]Desired qualifications of the Project Manager, Deputy Project Manager and Data Base Manager are presented in Appendix D.

Name: _____

Profession: _____

Years with Firm: _____

Proposed Position on Team: _____

Key Qualifications:

Outline the staff member's experience and training most pertinent to assigned work on proposed team. Describe the ***degree of responsibility held*** by staff member on previous relevant assignments and give dates and locations. Use up to a half page.

Education:

Summarize college/university and other specialized education of staff member, giving names of schools, dates attended, and degrees obtained. Use up to a quarter page.

Experience Record:

List all positions held by staff member since graduation, giving dates, names of employing organization, title of positions held, and location of assignments. For experience in last ten years, give types of activities performed and, where appropriate, references. Use up to three-quarters of a page.

Languages:

Indicate proficiency in speaking, reading and writing of each language by "excellent,", "good," "fair", or "poor".

_____ Date:_____

Signature of Staff member

Figure 3.1: Suggested Format of Curriculum Vitae for Members of Consulting Team

will be employed on the project, and the total expected payment for the services of each staff member.

The basis for each of these calculations shall be the model form shown in Figure 3.2. Using this form, the consultant "certifies" the various components of its manpower costs for each staff member proposed for this project. (The percentages utilized for social charges, overheads, and other payments should be the values ordinarily used by the consultant. The consultant may be required to furnish documentation to justify these values.)

For example, three engineers with base monthly salaries of LE 1,500, LE 1,000 and LE 800, and incentive equal to 20 percent of the base salaries, are proposed for use on the project for six, six, and three months respectively.

Using social charges and overheads equal to 40 percent and 90 percent of base salaries respectively, and an overall fee of 15 percent, cost figures for these engineers would be:

Base Salaries LE/Month	Social Costs (at 40%)	Overheads (at 90%)	Subtotal (LE/Month)	Fee at 15% (LE/Month)	Incentive Payments (LE/Month)	Monthly Rate (LE/)
1500	600	1350	3,450	518	300	4,268
1000	400	900	2,300	345	200	2,845
800	320	720	1,840	276	160	2,276

To illustrate total salary cost, all proposed personnel, the time each is expected to spend on the project, and the monthly rate as calculated above can be used to produce a total for each person assigned to the project as shown below:

Person	Work months	Monthly Rate (LE)	LE Total Per Person
A	6	4,268	25,608
B	6	2,845	17,070
C	3	2,276	6,828

Cost for Master Plan Updating

The cost presentation portion of the consultants' proposals shall include a separate section specific to the work required to update the master plan (if applicable for the governorate

We hereby confirm that we have agreed to pay to the staff members listed, who will be involved in this assignment, the basic salaries and other payments (if applicable) indicated below:

Name	1. Basic Salary per Work Month/Day/Hour	2. Social Costs (_% of 1)	3. Overhead (__% of 1)	4. Subtotal	5. Fee (% of 4)	6. Incentive or other payments	7. Rate Per Working Month/Day/Hour	8. Multiplier Fixed Rate (% of 1)

Signature Date:

Name:
Title:

Notes: All costs in LE
For columns (2) and (3), the value of percent (of column 1) should be shown in the table heading (see under *Personnel Costs* p. 34)
Column (4) = Col (1) + Col (2) + Col (3)
For Col (5), the value of fee percent should be shown in the table heading (see under *Personnel Costs* p. 34)
If other payments are shown in column 6, consultant should explain the purpose of the payment
Col (7) = Col (4) + Col (5) + Col (6)
Col (8) = Col (7) + Col (1)

Figure 3.2
Model Form for Breakdown of Agreed Fixed Rates in Consultant's Contract

covered by the proposal). Figure 3.2 illustrates how this information could be presented in the commercial bid.

Other Direct Costs

The consultant should itemize all other direct costs expected on the project such as the following.[6]

- Room, meals and incidental expenses for field survey personnel.
- Vehicle rental (number, unit cost per month, and number of months)
- Special equipment
- Commodities
- Other costs (these should be enumerated by the consultant)
- Miscellaneous

Each of these costs should be broken down into as much detail as possible. Lump sums will not be acceptable ordinarily (except when they may be logical, for example under miscellaneous).

Total Proposed Bid

The consultant should sum the totals of the cost breakdowns discussed above to obtain the total proposed bid price. The portion of the total bid price for updating the master plan (see *Appendix A.1*) shall be clearly illustrated.

[6] These costs are not included in the overhead rate factor.

Section 4

Overview of Standard Consulting Services Agreement Contract

The consultant selected to perform the work required for this sector assessment project must sign a standard services agreement with the governorate. This section provides a cursory discussion of the contract terms; it is assumed that consultants submitting proposals under these TOR are already aware of the terms of such contracts.

Depending on the governorate, the agreement between the consultant and governorate may include the following:

- Starting date
- Methods of preparing and timing for the submission of invoices and payments
- Services that will be contracted (the consultant's proposal and/or a negotiated scope of services is usually included as an appendix)
- Methods for financial record-keeping
- Ownership of file data
- Ownership of files and reports
- Insurance coverage
- Responsibilities of the governorate
- Financial disposition of equipment purchased with project funds
- Settlement of disputes
- Conditions under which the governorate may terminate the agreement with the consultant

Contracts may vary; not all governorates will cover all these topics in their contracts. However, these topics can serve as an example for consultants, to indicate the potential complexity of the contracts and contract negotiations.

Appendix A: Reviewing and Updating Master Plans

Appendix A.1

Master Plan Discussion Papers

PURPOSE OF THE DISCUSSION PAPER

A Master Plan Discussion Paper (MPDP) is required as part of the proposal submission in the 12 governorates with completed master plans (see Figure 1.1 on page 7 of this document). The discussion paper shall be prepared to determine if any portions of the existing master plan would provide a supplementary source of data for use by the governorates in the development of their water supply and wastewater sector assessments. If parts of the existing master plan are deemed useful for the assessment, these parts should be earmarked for updating.

Recommendations as to what portions of the master plan should be updated, and the extent and detail of the updates, shall be made prior to negotiations with the consultant awarded the work. Thus, the consultants proposing for this work must have a complete understanding of the TOR.

A consultant proposing on this task may conclude, based on the work undertaken to prepare the MPDP, that the master plan will provide little significant data pertinent to village level planning, ***even if updated***. This conclusion must be documented in the MPDP.

On the other hand, the consultant may conclude that updating of the master plan will benefit the sector assessment effort. In any case, ***the commercial portion of the proposal must include cost estimates for the work involved in updating the master plans.***

An award of LE 5,000 for the MPDP shall be provided ***only to the consultant selected for the assessment work***. This level of payment does not infer that the level of effort required to prepare the MPDP is equal to this amount. The intent of these TOR is to avoid elaborate presentations or formats; the discussion papers should convey the required information in as concise and readable format as possible.

CONTENT AND PRESENTATION

Under these TOR, the foundation for all material presented in the MPDP—except for Section II: Status of Master Plans

and any topics for which 1986 census data is required—should be available from the master plan itself. Section II of the MPDP will require that the consultants contact various government agencies and the involved governorate. It might also require using the GOE 1986 census report.

If the consultants desire to include data in the MPDP from sources other than the master plan, these data should be documented by source, and presented in a summary manner, indicating specific information that will be valuable in the Sector Assessment Task.

The following MPDP outline presents the general contents expected in the paper's executive summary and seven report sections. ***Under these TOR, the MPDP should cover the topics shown in no more than 30 pages, including figures and tables. The outline summarizes the contents of each section as a series of instructions under major headings with Roman numerals. These outline headings should be used as the MPDP's major headings.***

OUTLINE FOR THE MASTER PLAN DISCUSSION PAPER

Executive Summary

In this section, the consulting firm should indicate its conclusion concerning the value and applicability of the (updated) master plan components to the sector assessment requirements. The consultant should indicate which components are applicable to the sector assessment, which are not applicable, and which would be applicable with minor revisions. The reasoning behind these judgments should be explained.

The rest of the executive summary should summarize the topics covered in the discussion paper.

I. Introduction

The introduction should provide:

- Location of governorate
- Number and names of marakez
- Year the master plan (final report) was submitted
- GOE ministry(ies) involved

- Name of the consultant or consortium that prepared the report, with names of consortium members involved
- Name of the organization sponsoring the study
- External aid received from individual governments towards the master plan preparation
- GOE and/or other local contributions to the master plan study

Any of this information not available from the master plan should be indicated, together with a brief description of the consultant's estimate of efforts needed to collect the data for the sector assessment.

The introduction should also provide:

- A general description of the characteristics of the governorate, including the 1986 census population values (urban and rural)
- Projected value(s) used in the master plan for the above characteristics
- A tabulation of the mother villages, their satellite villages and their ezab, with an indication as to where in the master plan such data is available.

If the master plan does not contain such data, the introduction should indicate the sources where they can be obtained.

II. Status of Master Plan Recommendations

This section should discuss the governorate's policy with regard to the master plan, and the consultant should indicate whether:

- The master plan is accepted as the "blueprint" or "guideline" for the provision of water supply and wastewater facilities in governorate. If the governorate believes the master plan should be followed, the consultant should indicate the reasons for this belief, and any plans for its implementation. If the master plan has not been accepted by the governorate as a valid sector guideline, the reasons for non-acceptance should be stated.

- Any master plan recommendations have been implemented, or facilities completed since the master plan's submission
- Any projects related to the master plan recommendations are under construction and/or in the planning stage

Any projects or facilities that fall into one of the last two categories should be tabulated by type, size, location, expected on-line date, source of funding, and the number of people to receive service from the project. (For rehabilitation projects, the number of people benefitting should be listed.)

III. Base Data

This section should:

- Discuss the manner in which the master plan ***classifies the communities***[1] —whether by size, general characteristics, or some other means (such as the ranking of villages into class A, B, C, or D as per the Planning Manual methodology).
- Discuss the ***master plan methodology used for population projections*** for individual villages. If projections were not made to the village level, discuss the level (governorate, markaz, region) to which they were made and describe the methodology used.
- Discuss the master plan's ***presentation of the existing water supply and wastewater facilities above the single village level.*** Present the facilities in a table that indicates type, size, location, purpose, and general condition. Indicate whether the master plan presents a clear and complete description of existing conditions.
- ***Tabulate existing facilities at the single village level*** and indicate the number of villages for which data are available. "Village facilities" are defined as treatment plants, pump stations, total km of water supply transmission and distribution system pipelines, total km of trunk and collection sewers, outfalls, total number of water supply sources by type and capacity, and number and total capacity of water supply storage tanks.
- Comment on the information presented in the master plan regarding ***specific service area delineation, and***

[1] As tabulated in the Introduction of the MPDP

type and extent of the existing WS and WW service provided. Tabulate data on the existing number of connections; persons, households, and/or buildings served; and non-domestic connections, industrial, and large water users. Review the presentation of the general conditions of the WS and/or WW service supplied (good/bad) and the reasons for the service condition. Any information not provided in the master plan should be so indicated.

- ***Summarize the master plan data pertinent to the role of various institutions in the governorate's WS/WW sectors.*** Examples of such information include facility ownership and operational responsibilities; the extent of involvement of the governorates, markaz, or village government entities; and the extent of involvement of GOE ministries in the sector. List the institutions referenced in the master plan.

IV. Levels of Service

In this section the consultant should indicate the data presented in the master plan regarding future levels of service and standards (if none are presented this should be indicated). Items to be commented upon include:

- *Water Supply*—the conditions and capacity of the source of supply, the volume of water provided or consumed per capita, the hours of service provided, the residual pressure, the water quality levels, and the targets for future percentages of population to be served.
- *Wastewater*—the volume per capita, the type of system (sewers or on-site), the treatment levels and effluent quality levels for wastewater treatment plants, the infiltration allowances, and the targets for future percentages of the population to be served.

V. Costs

This section should:

- Review the cost-estimating methodology and unit costs utilized by the master plan for various components of facilities.
- Tabulate estimates of cost or investment levels by system, down to the village level, for any recommended facilities. These tabulations should be as presented in the master plan, but should be shown only until the year 2010.

VI. Recommendations/Prioritization

Here, the consultant should ***summarize the recommendations*** in the master plan. This summary should be provided in terms of service areas (regional, city, or village) and recommended facilities for both water supply and wastewater, and of cost (by system and by total for WS and WW). Data regarding the master plan's construction schedule and investment levels for recommended facilities, the number of households served, any increases to service area boundaries, and sources of funds should also be summarized for the recommended individual village facilities.

Also, the consultant should ***review the prioritization procedure*** used in the master plan for the recommended facilities and/or investment levels, with specific reference to the prioritization for the village-level facilities. Conclusions should be presented as to the applicability of the prioritization system given in the master plan as compared to the prioritization system required in these TOR.

If the master plan has not presented a prioritization system, and especially if one has not been proposed for village facilities, the consultant should indicate this and should describe the methodology used in the master plan for choosing village facilities or services.

VII Conclusions

The consultant should provide conclusions regarding:

- The applicability of the updated master plan features to the sector assessment requirements of these TOR, and how this updated data could be utilized in the assessment.
- Other sources of data that would be useful for the sector assessment effort.

Appendix A.2

Guidelines for Updating Master Plans for Use Under These TOR

The outline for the master plan discussion papers, presented in Appendix A.1, provides a description of the factors that should be reviewed to enable the steering committee to logically determine if an existing master plan is worth updating as part of the sector assessment effort (see *Sections 1* and *2* of these TOR). This appendix is meant to provide consultants with information about how a master plan update can actually be performed, if such an effort is warranted.

Consultants should estimate the costs for performing a master plan update and include them as part of the commercial portion of the proposal.

The key parameter for consultants is to understand how the updated master plan data would be used in the sector assessment to be performed under these TOR. This understanding will enable the consultants to decide which master plan data should be updated, because ***only the data useful for the sector assessment effort should be updated.*** Further, these data should be updated only to the limits required for the sector assessment, and the updated material should be presented in a format that can be directly utilized in the the sector assessment database.

The components of the existing master plan that should be considered for updating include:

- All ***baseline information,*** especially that referring to service area boundaries and population served, facilities in use and their current condition, purpose and condition of facilities (or extensions to service) provided subsequent to the master plan completion, and any significant system users added after the master plan completion
- ***Investments in the WS and WW sectors*** (including those under the LD II program or other programs)

- ***Village characteristics*** such as socioeconomic data or other characteristics of the service that will be utilized in project formulation or prioritization
- Recommendations or ***information regarding the possible clustering*** of villages (that is, the provision of regionalized service), including the villages and ezab in the clusters, the pipeline routes, and the recommended facility locations
- ***Features of the governorate,*** including topography, geology, economic factors, and laws or ordinances affecting water supply and wastewater service

The master plan material must be updated in a format that can be directly utilized in this sector assessment. *Section 2* of these TOR provides specific output requirements that might serve as guidelines as to the type of master plan data to be updated and the extent of detail required.

The consultant must further recognize that the updated master plan data will be utilized to complete the Essential Data Questionnaires provided in *Appendix B.1.*[2] Thus, the data collection requirements of the questionnaires provide further guidelines to consultants concerning the extent and level of detail required for updating the master plans.

[2]These data should be verified by field surveys.

Appendix B: Collecting and Analyzing Data

FIELD SURVEY QUESTIONNAIRE - VILLAGE DATA	1

VILLAGE NAME: _____ Form No. _____

MOTHER VILLAGE NAME: _____

ZEMAM: _____

MARKAZ: _____

GOVERNORATE: _____

NAME OF DATA COLLECTORS: _____ Revisions: _____

_____

DATE OF DATA COLLECTION: _____

POTABLE WATER SYSTEM DATA

1.a What is the population given by 1986 CENSUS ? _____

1.b Does the village have piped water service? _____ (If no, move to question number 13)

2. What year was the water system first installed? _____

3. How many buildings exist in the village? _____

4. How many water service connections exist? _____

5. Is water available to all consumers 24 hours per day every day? (If no, answer questions 6 & 7) _____

6. How may days per week is water available? _____

7. How many hours per day is water available? _____

8. What floor is the water system pressure able to deliver water to during the summer?

   a.) 1st floor _____ (street level)
   b.) 2nd floor _____
   c.) 3rd floor _____

d.) 4th floor _____

9. What floor is the water system pressure able to deliver water to during the winter?

a.) 1st floor _____
(street level)
b.) 2nd floor _____

c.) 3rd floor _____

d.) 4th floor _____

10. How would you rate the water system pressure throughout the village during the summer?

a.) extremely low _____

b.) low _____

c.) medium _____

d.) high _____

11. How would you rate the water system pressure throughout the village during the winter?

a.) extremely low _____

b.) low _____

c.) medium _____

d.) high _____

12. How many times a year does a major pipe failure occur within the village pipe system? _____

13. Which complaints about the water service are the most common amongst the villagers?

a.) low pressure _____

b.) too expensive _____

c.) tastes bad _____

d.) causes frequent illness _____

e.) poor availability _____

f.) other (specify) _____

14. How many working public taps are there? _____

PIPED WASTEWATER SYSTEM DATA

15. Does the village have a piped wastewater service? _____ (If no, move to question number 18)

16. What year was the system installed? _____

17. How many wastewater connections are there? _____

17.a Is treatment provided? Y ___ N ___

.b Year installed ____

.c Type of treatment ____

.d Capacity (cubic meter per day) ____

.e No. of pump station ____

.f General physical condition of treatment plant & pump station

Very Good ___
Average ___
Poor ___

.g Approximate volume of wastewater influent which is normally by passed.

ENVIRONMENTAL POLLUTION DATA

18. Is there a solid waste collection service within the village? _____

19. If yes, is this solid waste collection service:

a.) public _____

b.) private _____

20. If there is a solid waste collection service, how many houses are served by this service? _____

21. Where is the wastewater discharged which has been evacuated from household vaults?

a.) Wastewater Treatment Plant or Pump Station (if applicable) _____

b.) Drains and Canals _____

c.) Nile River _____

d.) other (specify) _____

22. If groundwater is a problem, identify to what degree:

a.) Serious problem _____

b.) Problem _____

c.) Little problem _____

d.) No problem _____

23. How does the problem manifest itself?

a.) Complaints from villagers because of damaged foundations _____

b.) Flooded areas _____

c.) Wet streets _____

d.) Other (specify) _____

PHYSICAL DEVELOPMENT DATA

24. What is the population of the village? _____

25. What is the distance to the markaz city (km)? _____

26. What is the distance to the mother village (km)? _____

27. What is the number of buildings in the village? _____

28. What percentage of buildings are of adobe construction? ____

29. What percentage of buildings have electric service? _____

30. List the number of each school within the village: _____

a.) Preschool _____

b.) Primary _____

c.) Prepatory _____

d.) Secondary _____

e.) Commercial Secondary _____

f.) Technical Secondary _____

g.) Agricultural Secondary _____

h.) Religious Secondary _____

31. List the number of the following facilities available within the village?

a.) Village Hospital _____

b.) Health Clinic _____

c.) Private Clinic _____

d.) Pharmacies _____

32. How many telephone lines are available in village? _____

33. Specify which type of telephone service is available:

a.) Automatic _____

b.) Manual _____

c.) Ahliya _____

d.) None _____

SOCIOECONOMIC DATA

34. What is the average monthly water bill per household? _____

35. What is the average monthly electricity bill per household?_____

36. If applicable, what is the average monthly wastewater service bill? _____

37. What is the cost per household for vault evacuation? _____

38. How many newspapers are sold per day?

a.) Al Harm _____

b.) El Wafd _____

c.) EL Akbar _____

39. List the number of cultural and youth centers available:

a.) Small Stadium _____

b.) Cultural Center _____

c.) Cinema _____

d.) Video Club _____

e.) Youth Center _____

40. Indicate the number of facilities available with in the village:

a.) Privately owned bakeries _____

b.) Lawyer Offices _____

c.) Boutiques _____

d.) Workshops for refrigerator repair _____

e.) Workshops for television and radio repair ____

f.) Jeweller shops _____

g.) Gas stations _____

h.) Car repair shops _____

i.) Banks _____

41. Is there a weekly market within the village? _____

FIELD OBSERVATIONS

42. Rate the degree to which solid waste is discharged in the waterways?

a.) Serious problen _____

b.) Problem _____

c.) Little problem _____

d.) No problem _____

43. Rate the degree to which solid waste is discharged throughout the village?

a.) Serious problem _____

b.) Problem _____

c.) Little problem _____

d.) No problem _____

44. Rate the degree to which sullage disposed in the streets?

a.) Serious problem _____

b.) Problem _____

c.) Little problem _____

d.) No problem _____

45. Rate the presence of feces (human or animal) visible in the streets:

a.) Serious problem _____

b.) Problem _____

c.) Little problem _____

d.) No problem _____.

46. Rate the groundwater problem throughout the village?

a.) Serious problem _____

b.) Problem _____

c.) Little problem _____

d.) No problem _____

47. Number of pools with sewage and/or solid waste _____

48. Indicate below the problems and needs of the water service supply system within the village as indicated by the village council and as perceived by the data collection team perceives them:

a) Added capacity of supply form new source ___
b) New wells ___
c) Extensions/additions to distribution piping network ___
d) Extensions of conveyance (ie large diameter) piping ___
e) New pump sets ___
f) New elevated storage ___
g) More public taps ___ How many ? ___
h) Rehabilitation to existing system (if yes - which part ?)

_____

i) Other ___

49. Indicate below the problems and needs of the wastewater service within the village as indicated by the village council and as perceived by the data collection team perceives them:

a) New sewer system, or extensions/addition to existing system ___
b) Program for household disposal - (more vault cleaner - vault construction) ___
c) New sewer system with treatment plan - (or treatment plant only) ___
d) More tanker trucks (ie owned by village)
e) Others

50. Are there records at the village council which provide data concerning bacterial or chemical characteristics of the wells or surface waters used as the village's water source(s) Y ___ N ___

51. If question 50 = yes, what is(are) date(s) of sample(s)? what is the quality of water?

Excellent ___
Average ___
Poor ___
Very bad ___

(Consultant should complete this question by interpreting the data. Comments on poor or very bad quality levels should also be presented.)

52. If question 50 = no,
Does the village council or consultant have knowledge of such tests being conducted ? (Consultant should attempt to obtain and describe results.)

MAPPING

Together with the Water Company Zone Engineers and a Village Council Technician plot the following data on each 1:1000 scale base map:

- Water distribution pipe location, diameter, material, and (if possible) length. Differentiate between Water Co. trunk main and Village distribution main. Note location of working public taps.
- If existing:Wastewater pipeline location, diameter, material, and (if possible) length.
- New building development which does not appear on the base map.
- Roadways within the village. Differentiate between paved roadways and non paved roadways. Indicate areas on the map which have streets less than 2 m in width.

Complete the following questions based on the mapping data, and/or through measurements in the field

53. What is the length of paved roads (km)?

_____ km

54. What are diameters, lengths, materials of the <u>water</u> piping system:
(see note after question 52)

Dia. (mm)	Length (m)	Material	Year Constructed	Water Co. or Vil. pipe

55. What are diameters, lengths, materials of the wastewater piping system:

(see note below)

Dia. (mm)	Length (m)	Material	Year Constructed	Collector or Lateral

Note : For question 53 and 54, the consultant must recognize that the most important measurement required is total length of pipeline or sewer. If all information as indicated in questions 51 and 52 are not ready available, the total length of pipeline should be obtained via field measurements.

ESSENTIAL EZBAH DATA FORM	2

VILLAGE NAME: _____ Form No. _____

MOTHER VILLAGE NAME: _____

ZEMAM: _____

MARKAZ: _____

GOVERNORATE: _____

NAME OF DATA COLLECTORS: _____ Revisions: _____

_____

DATE OF DATA COLLECTION: _____

EZBAH DATA

1. Together with the Village Council Chief prepare a schematic map on the attached blank page showing the name and location of all villages and ezbahs within the Village Council and the distances (km) between them. Use extra sheets if necessary.

2. Together with the Village Council Chief complete the attached EZBAH DATA FORM for each ezbah within the jurisdiction of the Village Council.

Prepare Village and Ezab Schematic below. This should be a block diagram, noting the locations of various villages and ezab. The general locations of major water supply and wastewater facilities (ie wells, storage tanks, pumping stations, treatment plants) and the major roads connecting the villages and ezab should also be shown.

FIELD SURVEY QUESTIONNAIRE - VILLAGE COUNCIL NEEDS	3

MOTHER VILLAGE NAME: _____ FORM: _____

MARKAZ: _____ DATE: _____

GOVERNORATE: _____

GEOCODE: _____ REVISIONS: _____

NOTE : Field survey workers should complete this questionnaire via interviews with village council chairmen, members and village council staff members.

1. Identify the problems and needs of the potable water service as the village council perceive them in the villages and ezbahs within the village council. Use extra sheets if necessary.

   Examples of Problems: low system pressure, frequent pipe breaks, interrupted service, poor quality, poor taste, expensive water bills, high cost of connection, etc.

   Examples of Needs: additional pipe, rehabilitation or replacement of old pipe, pump station, household meters, etc.

Village or Ezbah	Major Problems in System	Major System Needs

2. Identify the problems and needs of the wastewater service as the village council perceives them in the villages and ezbahs within the village council. Use extra sheets if necessary.

   Examples of Problems: no piped service, high cost of piped service, high cost of vault evacuation, frequent flooding of sewers, frequent vault evacuation, etc.

   Examples of Needs: Implementation wastewater project, procurement of evacuation trucks, pipe replacement, etc.

Village or Ezbah	Major Problems with Wastewater	Major Needs

3. Provide a breakdown of the village council workforce involved in water, wastewater, and solid waste, and the salary cost of each position (including allowances).

Name	Qualifications	Job Description and salary per month total

4. What is the role of the village workshop in maintaining water and wastewater systems in the village:

5. What was the Bab II budget (1990 and 1991) for wastewater facilities O&M. ?

	1990	1991
WW		
WS		

6. Identify the village's problems and needs in the area of Operation and Maintenance of the water, wastewater, and solid waste systems in the village:

7. Explain below your problems with the workforce dedicated for the water, wastewater, and solid waste service. (Examples: lack of supervision, lack of training, short in staff, excess in staff over the job requirements, dissatisfied employees due to wages, work hours, or other reason (specify), etc.

8. For each village and ezbah list in order of priority the top ten infrastructure needs including: water service, wastewater service, solid waste collection, schools, health facilities, roads, buildings, etc.:

FIELD SURVEY QUESTIONNAIRE - VILLAGE WATER SYSTEM	4

Village Name: _____ Form No.: _____

Mother Village Name: _____

Markaz: _____

Governorate: _____ Revisions: _____

Village Geocode: _____

Date: _____

1. Water Company Service Zone:

Water Company Service Zone	

2. System Installation:

Year Piped Water System First Installed	

3. Water Source:

a) Type Source (wells or treatment plant) How many ?	
b) Name of Water Treatment Plant	
c) Name of Pump Station	
d) Distance of Source to Village (ie length of supply pipeline)	

4. Storage

a) How many elevated storage tanks serve village	
b) Volume of each	
c) How many ground storage reservoirs serve village	

d) volume of each	

5. Water Meter Data:

a) Number of Working Domestic Meters	
b) Number of Faulty Domestic Meters	
c) Number of Working Non- Domestic Meters	
d) Number of Faulty Non-Domestic Meters	

6. Public Tap Data:

a) Number of Working Public Taps	
b) Number of Not work Public Taps	
b) How Many working taps have more than one faucet	

7. Water Service Data:

a) Hours of Service per Day	
b) Ave. Number of Days per Week without Water	

8. Water Supply Data:

a) Est'd Ave. Daily Domestic Water Supply (m^3/day)	
b) Est'd Ave. Daily Non-Domestic Water Supply (m^3/day)	
c) Total Est'd Average Daily Water Supply (m^3/day)	

9. Connection Data:

a) Are there any buildings with more than one connection	
b) Number of Domestic Connections	
c) Number of Non-Domestic Connections	
d) Total Number of Connections	

10. Water Account Data:

a) Number of Domestic Accounts	
b) Number of Non-Domestic Accounts	
c) Total Number of Accounts	
d) Are Number of Connections to Water System Greater or Equal Number of Accounts	
e) Explain (d) If Answer is Greater	

11. Water Billing Data:

a) Total Village Revenues Collected in 1990	
b) Revenue per account 1990	

12. Is data available on the percentage of losses in the village water system? Yes ___ No ___

13. If #12 = yes, what is the percentage value, and source of data? % ___ Source of Data _____

14. Does the consultant performing the survey have knowledge of such data from his experience or from material he has reviewed for this study ? Yes ___ No ___

15. If #14 = yes, what is percentage value and source of data? % ___ Source of Data _____

Appendix B.2

Introduction

PURPOSE AND SCOPE

For development to proceed in a logical fashion within a particular sector, some kind of planning must be implemented. In its simplest form planning can take the shape of a needs assessment. The purpose of this manual is to allow planners and decision makers to conduct a simple needs assessment survey for the water and wastewater sectors of rural Egypt.

This manual is not intended to produce a definitive model of the sectors problems but to introduce the types and extent of the problems that a village may be experiencing. For example, by undertaking the assessment it may become obvious that a village's predominant problem is solid waste accumulation, or that although a village is well-developed physically and socioeconomically, it lacks a constant water supply in certain areas.

While the manual is not a panacea in relation to detailed planning, it is a useful tool that can be used to help prioritize needs within a village, and to determine those that are immediate and urgent. The manual has also been designed to complement and be used as part of the detailed *Terms of Reference for Governorate-Wide Sector Assessment: Water Supply and Wastewater* prepared to help governorates select consultants to conduct sector wide needs assessment and strategic planning.

ANALYZING THE STATUS OF THE SECTOR

Planners of village infrastructure projects can analyze the current status of water and wastewater and environmental pollution problems by answering three questions.

- *What is the magnitude of the problem?*
- *What type of solutions have already been implemented?*
- *What are the physical resources or current projects that will contribute to solving the problem?*

To determine the magnitude of the problem, planners should compare the village with others in the same governorate, or with past conditions in the village itself.

Then, in *quantitative* terms, they should try to express the severity of the problem and its negative impacts on village infrastructure and residents.

Next, existing solutions are identified and evaluated on the basis of their effectiveness or shortcomings.

Finally, to prevent village wastewater problems in the future, new projects must be designed to complement and integrate with current ones. Planners should identify currently available resources, regardless of their origin, to determine what funds will be required in the future.

This manual is meant to help planners answer these three questions quantitatively.

Section 1

A Methodology for Determining the Magnitude of the Problem

INTRODUCTION

Analyzing water and wastewater problems at the village level is a complex issue. Village water and wastewater problems can be attributed to several different factors relating to the physical, economic, and social development of the village, as well as its current environmental conditions. An analysis of the magnitude of water and wastewater problems in a village must take these factors into account. To make the analysis useful nationwide, the factors should be measured on a uniform scale.

To help keep the analysis simple, four data collection forms have been designed specifically for this task. Using these data forms, four indices can be calculated:

- A physical development index
- A water service index
- A social development index
- An environmental pollution index

Together, these indices cover the main factors related to water and wastewater problems in Egyptian villages.

Physical Development Index

This index measures the extent of village development with respect to construction and population, service delivery problems, and the degree to which the village resembles a town or a small city. It is perhaps the most important index, as it correlates closely with all the other indices. For example, the extent of village development is often related both to the water supply and the degree of environmental pollution. Similarly, a well-developed village will usually have a much larger number of community facilities.

Water Service Index

To establish a water service index, one must determine the extent and availability of water supply (buildings served, hours available, and type of sources utilized) related to the

volume of wastewater discharged. This is a positive indicator that reflects the type of water and wastewater service required by the community.

Social Development Index

This index measures the extent of village development in terms of amenities provided to the community by the private sector. It also gauges how much the community is paying towards support services. Both of these factors indicate the ability of communities to pay for new utility services. They do not, however, indicate the willingness of the community to do so.

Environmental Pollution Index

Visible signs of pollution in a village are an excellent indicator of the need for some form of wastewater or other environmental projects. Simple measures of the degree of pollution can be provided by noting polluted ponds of water, sullage or sewage, and accumulations of solid waste.

Figure 1 shows the scale used for each of four indices; each scale is graduated from 0 to 100 and divided into four intervals: range A (75-100), range B (50-75), range C (25-50), and range D (0-25).

The first three scales are positive in that moving from 0 to 100 indicates improvement. The fourth scale, environmental pollution, is negative in that as you move from 0 to 100 the environmental situation is deteriorating.

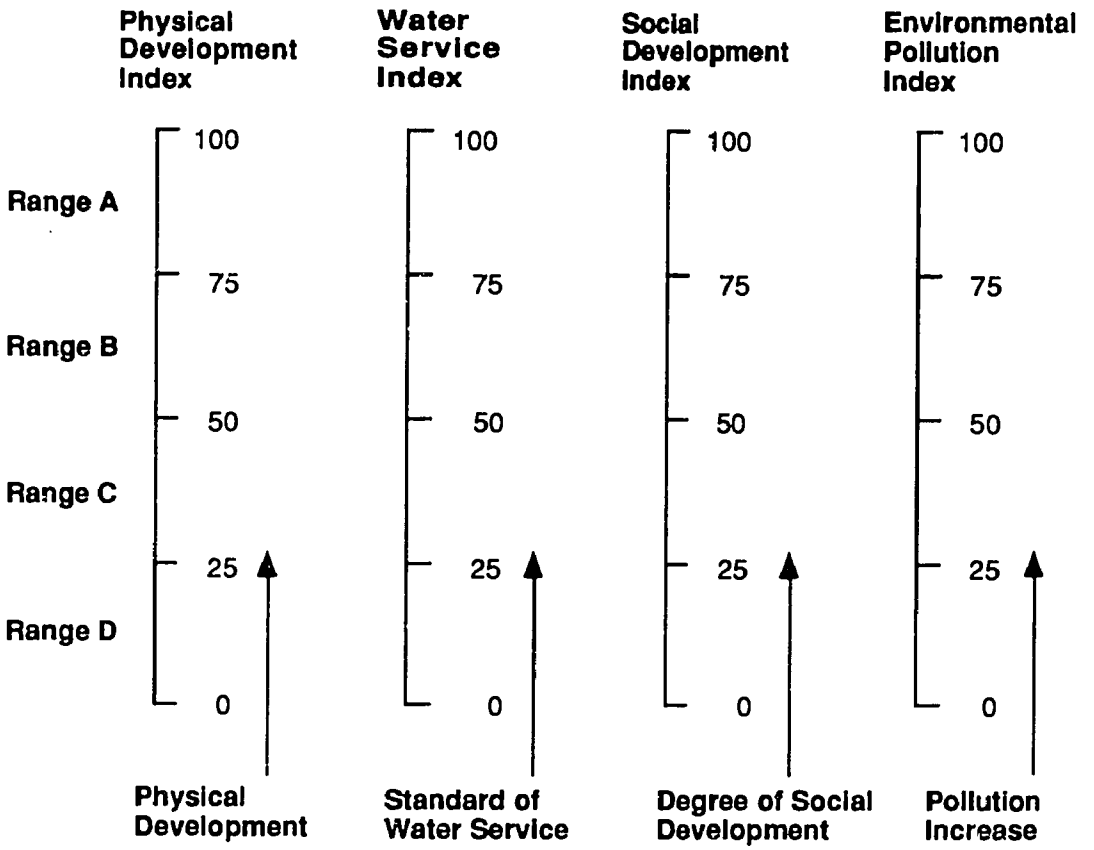

FIGURE 1 : The Four Indices

Using the data forms that have been developed, the current state of each village can be described in terms of these indices. Some examples of how these indices work are provided in the following discussion.

VILLAGE PROFILES: FOUR EXAMPLES

Village I

Village 1 has all four indices within range A. From this, we know the village is well-developed with many amenities, and has features similar to a small city. It enjoys good potable water service, but also has serious environmental pollution from liquid and solid waste.

Some of these problems may be attributed to the side effects of a high rate of per capita water consumption and to a water network that serves most of the village houses.

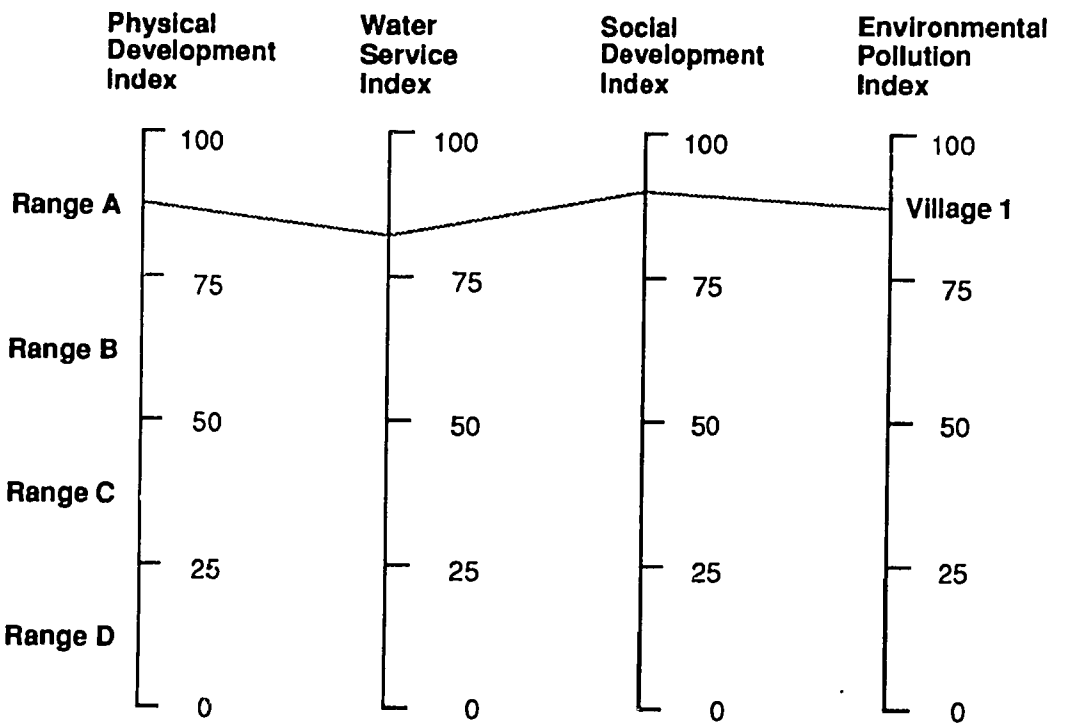

Figure 2: Village 1 as Described by the Four Indices

Village 2

Village 2 has index values as follows:

- Physical development index: A
- Water service index: C
- Social development index: A
- Environmental pollution index: B

Village 2 is fairly well-developed physically, with a significant number of social amenities. However, the village lacks adequate water service, and the water sector should be examined in detail. This village also suffers from intermediate environmental pollution problems, particularly high-level groundwater. This means that the cause of the problem is related to another water source, such as canal water, or to the fact that the ground level of the populated area is below that of the planted area nearby.

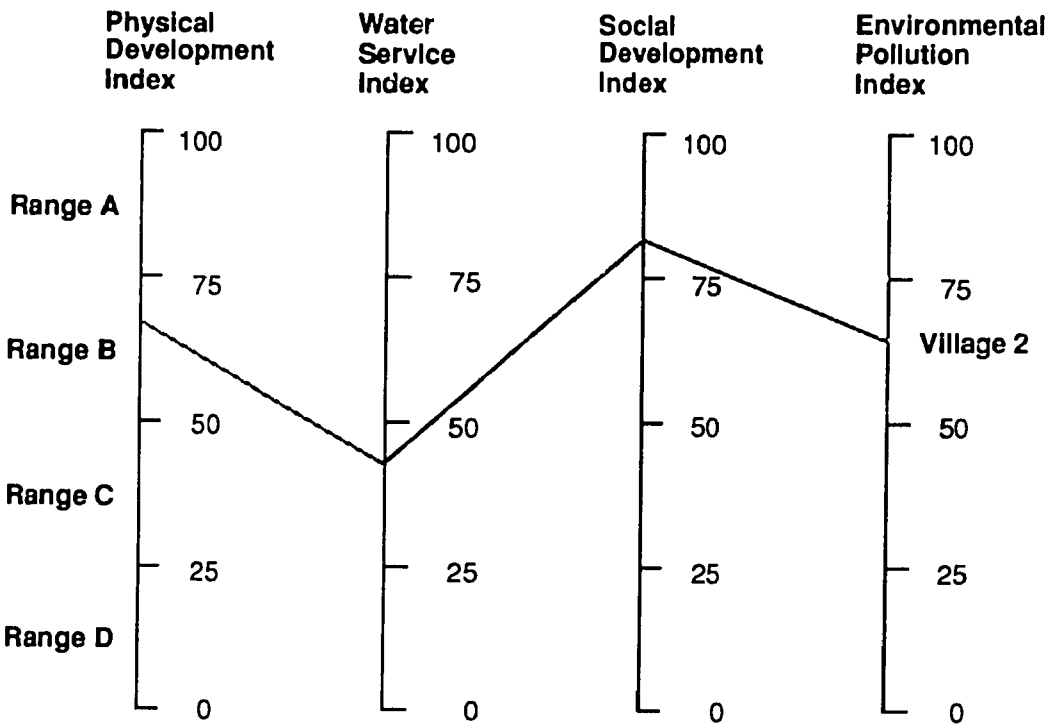

Figure 3: Village 2 as Described by the Four Indices

Village 3

Village 3 has the following index values:

- Physical development index: C
- Water service index: B
- Social development index: C
- Environmental pollution index: C

This village has intermediate physical and social development, with good potable water service, and no serious environmental pollution problems.

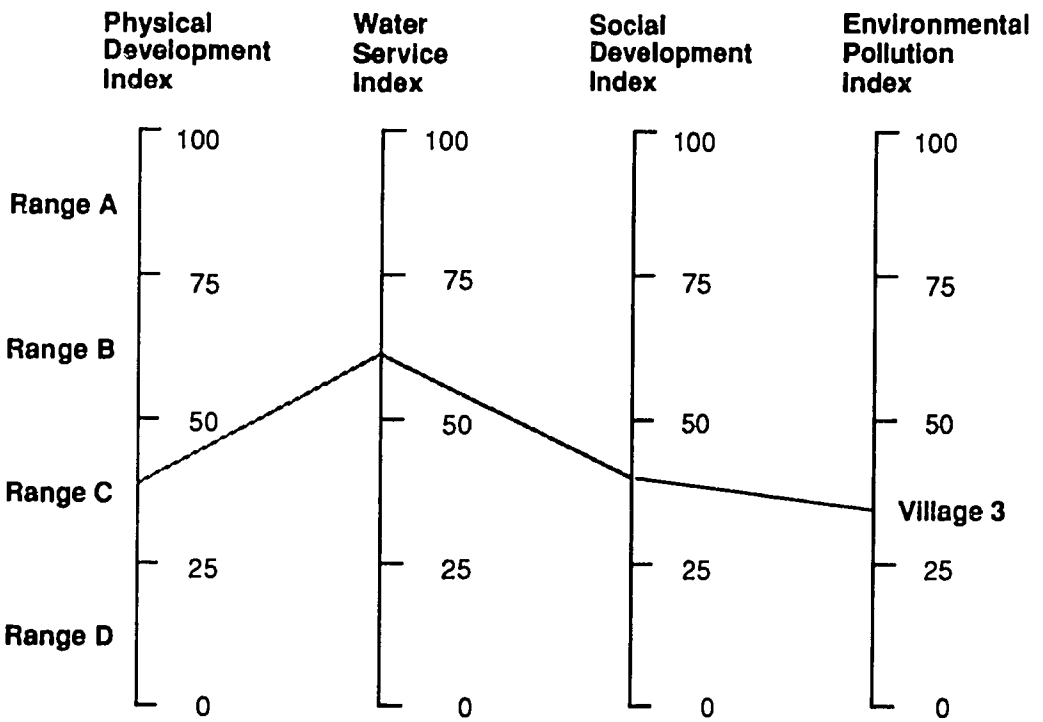

Figure 4: Village 3 as Described by the Four Indices

Village 4

Village 4 has all four indices within the D range.

Physically, this village is underdeveloped, although social amenities are slightly better. It suffers from a potable water shortage, yet it does not face any serious water or environmental pollution problems.

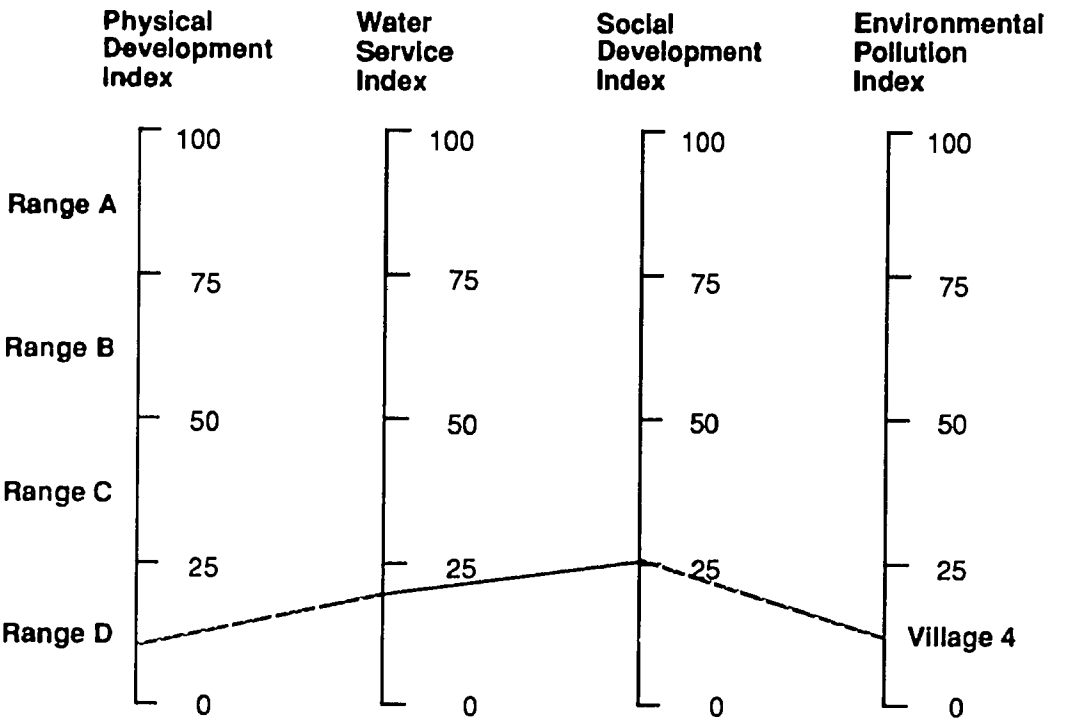

Figure 5: Village 4 as Described by the Four Indices

These examples show the usefulness of the four indices for describing the status of a village. They provide a simple means of quantifying problems and conditions and allow the decision makers to develop a simple needs assessment in relation to strategy planning. But how are these indices derived? The following discussion provides the key—easy-to-use data forms.

CALCULATING THE INDICES

Determining the Physical Development Index

This index incorporates a great number of factors, including various aspects of construction, service delivery, and production. Ten factors have been selected as most indicative of the extent to which a village is physically developed:

- Village size (population)
- Distance of the village from the city (physical/geographic dimension)
- Building water service connection rate
- Percentage of adobes
- Percentage of houses with electricity service connections
- Percentage of houses without cistern-type toilets
- Availability of educational services
- Availability of health services
- Availability of telephone services
- Availability of internal roads

A numeric value of one to four is assigned for each of the ten factors, and the values are added for a total index value. Table 1 shows the questionnaire that is used to assign values for the ten factors.

TABLE 1: Physical Development Index Value Questionnaire

Factor	Data Source	Development Criteria	Points
1—Village size in 1990	1986 census with 2.7% increase/year added	> 30,000 ☐ 15,000 - 30,000 ☐ 5,000 - 15,000 ☐ < 5,000 ☐	4 3 2 1
2—Distance from nearest city	Village index or markaz map	≤ 5 km ☐ 6 - 10 km ☐ 11 - 15 km ☐ > 15 km ☐	4 3 2 1
3—Building water service connection rate	Village council subscriber unit or water bill collection authority	>70% ☐ 45 - 70% ☐ 40 - 45% ☐ < 40% ☐	4 3 2 1
4—Percentage of adobes	Local council or field survey	≤10% (rare) ☐ 11 - 25% (low rate) ☐ 26 - 50% (medium rate) ☐ > 50% (high) ☐	4 3 2 1
5—Houses with electricity service connections	Local council	≥ 80% (almost all) ☐ 50 - 79% (high) ☐ 20 - 49% (med) ☐ <20% (low) ☐	4 3 2 1
6—Houses without cistern toilets	Local council	≤ 5% ☐ 6 - 10% ☐ 11 - 20% ☐ > 20% ☐	4 3 2 1
7—Educational services	Local council	All phases: nursery, primary, prep & secondary; commerce, industry, agriculture; & Azhar ☐ Primary, prep & secondary ☐ Primary and prep. ☐ Primary only or none ☐	4 3 2 1
8—Health services	Local council	Village hospital /health unit, pharmacies, private clinics ☐ Health unit & pharmacies ☐ Health unit only ☐ None ☐	4 3 2 1
9—Telephone service	Local council	Automatic exchange ☐ Manual exchange ☐ Private exchange ☐ No exchange ☐	4 3 2 1
10—Internal paved roads	Local council	> 2000 m ☐ 1000 - 2000 m ☐ 200 - 1000 m ☐ < 200 m ☐	4 3 2 1
TOTAL PHYSICAL DEVELOPMENT INDEX POINTS			

The planner ticks the appropriate box and arrives at a total point value by adding the points for the ten different factors. Table 2 can then be used to obtain a description of the physical development of the village.

TABLE 2: PHYSICAL DEVELOPMENT INDEX RANGES

Description	Physical Development Index Range	Numeric Value
Highly developed village	A	37-40
Village with medium development	B	28-36
Developing village	C	17-27
Underdeveloped village	D	< 17

Determining the Water Service Index

This index is based on the following six factors:

- Percentage of buildings 100 m or less from the water network
- Percentage of buildings with service connections
- Percentage of buildings with multi-tap outlets (sink, bath, toilet, shower)
- Diversity of the village potable water source
- Service continuity throughout the day
- Network pressure, determined by identifying the number of stories receiving water without using motors or pumps

Table 3 is used to assign a value of one to four points for each of these six factors.

TABLE 3. Water Service Index Value Calculation Table

Factor	Data Source	Development Criteria	Points
1—Buildings ≤ 100 m from water network	Local council	> 90% ☐ 70-90% ☐ 50-70% ☐ <50% ☐	4 3 2 1
2—Buildings with service connections	Local council subscriber department or water bill collection authority	> 70% ☐ 45-70% ☐ 20-45% ☐ <20% ☐	4 3 2 1
3—Buildings with multi-taps	Local council	> 70% ☐ 40-70% ☐ 20-40% ☐ <20% ☐	4 3 2 1
4—Service continuity	Average supply time per day	24 hours ☐ 16-24 hours ☐ 8-16 hours ☐ < 8 hours ☐	4 3 2 1
5—Water system pressure	Storeys receiving supply without using motors (in most houses)	4th floor and up ☐ 3rd floor ☐ 2nd floor ☐ 1st floor only ☐	4 3 2 1
6—Water sources	Water source identification	Special system with outside source from network or manual pumps ☐ Special system without outside source or manual pumps ☐ Village connected to outside system or to nearby city network with no local storage ☐ Weak connection with outside source, no piped water system ☐	4 3 2 1
TOTAL POTABLE WATER SERVICE INDEX POINTS			

The planner uses Table 3 to assign a point value to each factor and adds all the values to arrive at a total index rating. These total ratings are shown in Table 4, which defines four categories of village by the total point value. The index is positive, in that a high score indicates good potable water service.

TABLE 4: Potable Water Service Index Ranges

Description	Potable Water Service Index Range	Numeric Value
Village with excellent potable water service, including service connections, per capita supply, and water pressure	A	20-24
Good potable water service	B	14-19
Satisfactory potable water service, but could be improved by increasing supply and pressure, or by extending service connections to unserved regions	C	7-13
Village needs potable water service support, either from the source or network	D	< 7

Determining the Social Development Index

This index is dependent on seven factors:

- Monthly water bill
- Monthly electrical bill
- Cost of household vault evacuation
- Number of newspapers sold daily
- Number of cultural centers
- Number of private facilities available
- Presence of a local market

Table 5 shows how the magnitude of each factor can be identified and a score of one to four points assigned. When totaled, these points yield the social development index.

TABLE 5. Social Development Index Value Calculation Table

Factor	Data Source	Development Criteria	Points
1—Average monthly water bill	Field Survey	Cost per family/month > LE 4 ☐ > LE 2≤4 ☐ LE 1-2 ☐ <LE 1 ☐	4 3 2 1
2—Average monthly electrical bill	Field Survey	Cost per family/month > LE 6 ☐ > LE 4≤6 ☐ LE 2-4 ☐ <LE 2 ☐	4 3 2 1
3—Cost per household for vault evacuation	Field Survey	Cost per family/month > LE 3 ☐ > LE 2≤3 ☐ > LE 1-2 ☐ <LE 1 ☐	4 3 2 1
4—Number of newspapers sold daily (Al Ahram)	Field Survey	> 50% of households buy 1 ☐ 35 - 50% of households ☐ 10 - 35 % of households ☐ < 10% of households ☐	4 3 2 1
5—Number of cultural & youth centers • small stadium ___ • cultural centers ___ • cinema ___ • video club ___ • youth center ___	Local Council	> 4 ☐ 3 - 4 ☐ 2 ☐ 0 - 1 ☐	4 3 2 1
7—Number of private facilities: • private bakeries ___ • lawyer's offices ___ • boutiques ___ • workshop for refrig. ___ • workshop for TV ___ • jewelry shop ___ • gas station ___ • car repair ___ • banks ___	Local Council	>4 ☐ 3 - 4 ☐ 2 ☐ 0 - 1 ☐	4 3 2 1
8—Is there a weekly market in the village?		Yes ☐ No ☐	1 0
TOTAL SOCIAL DEVELOPMENT INDEX POINTS			

The planner assigns a point value for each factor by ticking the appropriate box on the questionnaire, then adding all the points to produce a total value for the index.

Table 6 shows four categories of villages; the highest point value is assigned to villages with the greatest groundwater and soil saturation problem.

TABLE 6: Social Development Index Ranges

Description	Social Development Index	
	Range	Numeric Value
Highly developed village	A	20 - 25
Village with medium development	B	15 - 19
Developing village	C	7 - 14
Underdeveloped village	D	≤ 6

Determining the Environmental Pollution Index

This index is dependent on seven factors:

- Extent to which high groundwater causes areas of stagnant water throughout the village on a year-round basis
- Percentage of stagnant pools that are polluted with sewage or solid waste
- Number of house vaults directly connected to waterways in or around the populated area
- Severity of solid waste accrual in waterways in and around the populated area
- Extent of discharge of solid waste in the streets
- Extent of disposal of sullage in the streets
- Occurrence of human and animal waste in village streets

Table 7 shows how the magnitude of each factor can be identified and a score of one to four points assigned. These points, when totaled, yield the environmental pollution index.

TABLE 7. Environmental Pollution Index Value Calculation Table

Factor	Data Source	Development Criteria	Points
1—Severity of the groundwater problem throughout the village as reflected in year-round stagnant pools	Field survey	Common ☐ Moderate ☐ Low ☐ None ☐	4 3 2 1
2—Percentage of stagnant pools polluted with sewage &/or solid waste	Field survey	> 70% ☐ 30-70% ☐ 5-30% ☐ <5 % ☐	4 3 2 1
3—Discharge of vault liquid waste into waterways	Field survey	> 70% of houses ☐ 30-70% of houses ☐ 5-30% of houses ☐ <5% of houses ☐	4 3 2 1
4—Discharge of solid waste into waterways	Field survey	Common ☐ Moderate ☐ Low ☐ None ☐	4 3 2 1
5—Solid waste accumulation in the streets	Field survey	Common ☐ Moderate ☐ Low ☐ None ☐	4 3 2 1
6—Sullage disposal in the streets	Field survey	Common ☐ Moderate ☐ Low ☐ None ☐	4 3 2 1
7—Presence of human and/or animal feces in the streets	Field survey	Common ☐ Moderate ☐ Low ☐ None ☐	4 3 2 1
TOTAL ENVIRONMENTAL POLLUTION INDEX POINTS			

The planner assigns a point value to each factor by ticking the appropriate box, and then adds the points to obtain the total index.

Table 8 shows four categories of villages, with the highest point values assigned to villages having the greatest environmental pollution problems.

TABLE 8: Environmental Pollution Index Ranges

Description	Environmental Pollution Index Range	Numeric Value
Obvious general pollution, needing urgent and radical solution	A	25-28
Visible pollution but not yet at a drastic level	B	19-24
Limited pollution	C	13-18
Very little pollution, no problem yet	D	< 13

WHAT IS THE MAGNITUDE OF THE PROBLEM?

To arrive at a quantitative answer to this question, two simple processes are required.

- Converting each measured scale to a percentage, using Table 9.
- Plotting the values of the four indices, using Figure 6.

TABLE 9. Conversion of Points to Percentage

Index	Points Calculated from Questionnaire	Conversion of Points to a Percentage	Percentage
Physical development index	( )	$\frac{\text{points} \times 100}{36} =$	
Water service index	( )	$\frac{\text{points} \times 100}{24} =$	
Social development index	( )	$\frac{\text{points} \times 100}{25} =$	
Environmental pollution index	( )	$\frac{\text{points} \times 100}{28} =$	

The resulting percentages are then plotted on the scales shown in Figure 6. Results can be compared with the examples on pages 4 to 8.

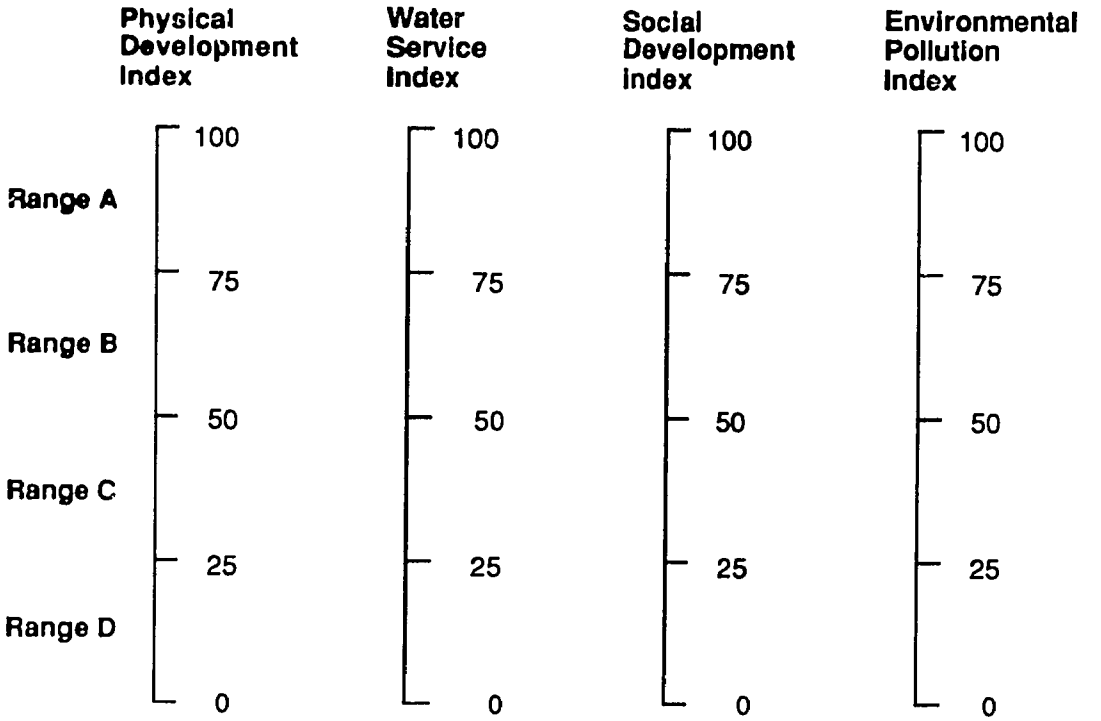

Figure 6: Plotting Percentages on the Scales

Summary of Procedures for Developing Indices:

1. Fill out questionnaires for each of the four indices (See Tables 1, 3, 5, & 7).
2. Convert the total index values to percent, using table 9.
3. Plot the percentages using the scales in Figure 6.

Appendix C: Technical Data for Project Ranking, Prioritization, Formulation and Cost Estimation

Appendix C.1

Analysis Requirements for Village Ranking Methodology

The Planning Manual excerpt provided in *Appendix B.2* details the methodology for ranking villages regarding wastewater projects. The key point of that analysis is that the higher the village is ranked, the greater its need is for a wastewater project.

High village wastewater rankings occur when ***environmental conditions are poor*** and:

- Social and developmental factors indicate that the village is at an institutional level at which a formal wastewater project is applicable.
- The water supply system generally provides adequate volumes of water, through direct connections to a large percent of the village population.[1]

Thus, the village ranking methodology for wastewater projects recognizes that need for a formal wastewater project can be driven by factors other than environmental conditions. Also, the wastewater ranking system indicates the project's location (that is, the village) but not the project's characteristics.

The situation for water supply service, however, is quite different. Formal water supply systems exist in nearly all villages and ezab.

These projects range from systems in which service is provided completely through public standposts, to systems in which service is available on a wide scale via direct house connections. The common element for these water supply systems is that the system is publicly owned—that is, the system's physical components are owned by some government entity. Generally, these owners are the villages themselves, or a governorate water company.

Because water supply service is widely available, the ranking of villages in terms of water supply can depend totally on

[1]This indicates the potential for large volumes of wastewater discharge.

water supply factors. Social and development factors such as those considered for wastewater rankings need not be considered.

The details pertinent to the analysis requirements for wastewater and water supply projects are discussed below.

ANALYSIS REQUIREMENTS FOR VILLAGE WASTEWATER PROJECTS

The Planning Manual excerpt provided in *Appendix B.2*, explicitly describes how the village rankings for wastewater projects should be computed. Under these TOR the database model should be capable of computing and storing the point score value and index for each of the four wastewater ranking indices using information obtained from the questionnaires provided in Appendix B.1. The database should be capable of computing the index values both as percentages and numeric scores, of designating their rank (A, B, C, or D), and of displaying these ranks graphically on scales as shown in the Planning Manual.

Village wastewater rankings can be represented numerically by using the average of the four individual indices and/or by plotting each of the indices as shown in the Planning Manual. Both methods yield the same result, provided that the values of all indices are within the same range.

Wastewater rankings can be more difficult to determine when the value of individual indices are not all within the same range. One method of adapting the analysis for these situations is to produce gradations or sub-ranks within the ranking ranges. Table C1, prepared as a guide for consultants, indicates how these gradations might be established. Additional criteria could be used to provide mid-level gradations in addition to the "Hi-Lo" designations shown in Table C1.

Table C2: Example of Adapting Ranking Criteria to Produce Gradations within Categories

Ranking Category	Rank Gradation	Wastewater Ranking (See Appendix B.2)
A	High	All 4 indices have values > 75%
	Low	Environmental pollution and water service indices > 75%; others > 65%
B	High	Environmental pollution index > 75%; others > 60%
	Low	Environmental pollution and water service indices > 50%; others > 45%
C	High	Environmental pollution index over 50%; others > 40%
	Low	Environmental pollution and water service indices > 25%; others over 20%
D	(no gradation)	All indices < 25%

Note: This table is for illustration only; it is meant to serve as an example for the consultant of how ranking can be adapted to provide a logical set of gradations within each category. Depending on the specific situation, the consultant engaged under these TOR may have to formulate a set of limits similar to those shown in the table.

ANALYSIS REQUIREMENTS FOR VILLAGE WATER SUPPLY PROJECTS

Computation of Index and Rankings

Village water supply rankings should be determined utilizing the Water Service Index (WSI) point score value presented in the Planning Manual (*Appendix B.2*), adjusted as described below.

The WSI point score in the Planning Manual is designed so that a high score (and thus a high index) identifies a high-service water system. This is because the planning manual is concerned with identifying villages with wastewater service needs, and villages with high-quality water systems are candidates for wastewater service. To indicate water supply service ***needs***, however, the WSI point score must be adjusted so that a high point score (and thus a high index) will identify villages with ***poor water supply systems.***

This adjustment should be performed in two steps. First, the WSI index point score is subtracted from 30 to obtain the Water Supply Deficiency Score (WSDS). Thus,

WSDS = 30 - WSI Score (as calculated in Planning Manual)

Second, two "condition" factors are added to the newly defined WSDS to produce the Water Supply Deficiency Index (WSDI). which will be the scale in the analysis for ranking village water supply needs. The first of these condition factors, C1, indicates the general physical condition of a village water supply infrastructure. The second, C2, represents the water supply system's quality level in terms of user perception of the service. C1 and C2 are defined using questions 12, 13, and 48 from the village data field survey questionnaire (that is, questionnaire No. 1 in *Appendix B.1*) as follows:

Condition Factor C1

C1 = 8 if answers to question No.12 ≥ 6, and if question No. 48 indicates that more source capacity or rehabilitation is required together with one other improvement.

C1 = 6 if the answer to question 12 is < 6 and if question 48 indicates that more source capacity or rehabilitation is needed

C1 = 3 if the answer to question 12 is < 6 and if question 48 indicates that improvements other than more source or rehabilitation are needed.

C1 = 1 for all other combinations of answers to questions 12 and 48.

Condition Factor C2

C2 = 6 if 5 or more complaints are cited in question 13

C2 = 4 if 3 or more complaints are cited in question 13.

C2 = 0 if no complaints are cited in question 13.

Using the appropriate C1 and C2 values, the WSDI can be calculated as follows:

WSDI = WSDS + C1 + C2

Since, using the Planning Manual methodology, the minimum WSI for any village is six, it follows that the maximum possible score for the WSDS is 24 (that is, 30 - 6).

Also, since the maximum values of C1 and C2 are 8 and 4, respectively, the maximum value of the WSDI is 36 (24 + 12).

Using the concepts for indices and ranking ranges developed in the Planning Manual, the Water Supply Deficiency Index (WSDI) can be expressed as a percentage through the following calculation:

$$\text{WSDI (as a percent)} = \frac{\text{WSDS} + \text{C1} + \text{C2}}{36} \times 100$$

This WSDI percent can be converted to rankings as follows:

- If ≥ 75%, Rank = A
- If ≥ 50%, but < 75%, Rank = B
- If ≥ 25%,< 50%, Rank = C
- If < 25%, Rank = D

Table C2 illustrates this analysis for six hypothetical villages.

Table C2: Water Supply Deficiency Index for Six Villages

Village	WSI Point Score	WSDS Value	C1	C2	WSDI Point Score	WSDI %	WSDI Rank
1	22	8	1	0	9	25	D
2	18	12	3	2	17	48	C
3	16	14	6	4	24	67	B
4	14	16	6	4	25	69	B
5	7	23	8	6	35	97	A
6	9	21	8	6	33	92	A

In this table, the WSI point score is computed as described in the Planning Manual; the WSDS is computed as (30-WSI); C1 and C2 are obtained from the analysis of questions 12, 13, and 48 of the field survey questionnaires; the WSDI point score is the sum of the WSDS, C1, and C2; the WSDI percent is the WSDI score divided by 36, and multiplied by 100; and the WSDI rank is obtained by noting the where the WSDI percent falls in the ranking array of percentages, as shown in the Planning Manual.

The rankings presented in Table C2 indicate that the villages with lower WSI values (but higher WSDI scores) are more in need of water supply projects.

Analysis of water supply projects

The database provided by the selected consultant shall be capable of computing and storing the point score and the WSDI index values. Since only a single index will be used for the water supply project rankings, there is no need for a graphical presentation. However, the database should be capable of displaying the WSDI as a numerical score, a percentage, or a letter that designates rank (A, B, C, or D).

PRESENTATION OF RESULTS

These TOR require that output of the ranking analysis be summarized in tables. Such tables should include some base data from the questionnaires, so that the conditions in each village can be better understood. Table C3 illustrates the type of data and formats that should be included in the consultant's report as part of the ranking analysis.

TABLE C.3

Samples for Column Headings and Table Formats to Illustrate Results of Village Ranking Analysis

Sample 1. Villages Illustrated by Rank and Index Level

Village	Markaz	WS or WW		1991 Population	% Served	
		Rank	Index Value		WS	WW

Villages should be listed by rank and descending index value. The index value used here should be the average value of all indices. Thus, all "A" ranked villages would be listed in order of descending index value, then all "B" ranked villages, etc. For cases in which the total index values are equal, population levels—from largest to smallest—or partial WS or WW index scores could be used as a third means of sorting the list.

Sample 2. Villages Illustrated by Markaz

This report would have the same column headings as above, but villages would first be sorted by markaz, then by rank and index. Thus all "A" ranked villages in a markaz would be listed, then all "B" ranked, etc.

Sample 3. Villages Illustrated by Population

Again, the same table heads would be used, but villages would be listed first by population, in a descending fashion, without regard to markaz or level.

Sample 4. Villages Illustrated by Population and Markaz

As above, except that the villages would be listed by descending order of population within each markaz (sorted first by markaz, then by population).

Appendix C.2

Prioritization Factors and Analyses

Three prioritization factors have been developed for both WS and WW projects. A village's first order prioritization will be the score (total point value) that results from summing the three individual factor scores. This appendix provides the prioritization factors and shows how they are computed.

FIRST ORDER PRIORITY FACTORS FOR WS PROJECTS

WS1: Location Priority—Markaz Population Served

This factor is calculated by the database as follows:

If the village is located in a markaz whose 1991 population served by direct water supply connections is

≤ 40%	WS1 point value = 5
> 40 but ≤ 55%	" " " " = 3
> 55 but ≤ 70%	" " " " = 2
> 70	" " " " = 1

WS2: Population Served by Existing WS System via Direct Connections

The WS2 factor is determined by the database as follows:

For a village with a 1991 or existing population of :	And a percent of population served of:			
	> 70%	>55 ≤ 70%	>40 ≤ 55%	≤ 40%
Over 30,000	2	6	9	12
15,000 to 30,000	1	3	6	9
5,000 to 15,000	1	2	4	6
under 5,000	0	1	2	3

WS3: Adequacy of Source and Reliability of System

If Factors C1 + C2, as defined in *Appendix C.1*, are:

≥ 12	WS3 point score = 6
≥ 8, but < 12	" " " " = 3
> 6, but < 8	" " " " = 2
< 6	" " " " = 1

FIRST ORDER PRIORITY FACTORS FOR WASTEWATER PROJECTS

WW1: Population Served with Direct WS Connections in Existing System

WW1 factor is determined by the database as shown in the table below.

For a village with a 1991 or existing population of:	And a percent of population served of:			
	> 70%	>55 ≤ 70%	>40 ≤ 55%	≤ 40%
Over 30,000	12	10	8	6
15,000 to 30,000	10	8	6	4
5,000 to 15,000	7	5	3	2
under 5,000	4	3	1	0

WW2: Environmental Conditions

This factor can be determined after the ranking analysis is complete, as follows:

If Environmental Index > 20 WW2 point score = 10
" " " ≥ 15 but ≤ 20 " " " " = 7
" " " ≥ 10 but < 15 " " " " = 3
" " " < 10 " " " " = 0

WW3: Water Supply Service Levels

If the village WS Rank, as determined from the ranking analysis is A or B, and the WSI point score is:

> 18 WW3 point score = 8
> 14 but ≤ 18 " " " " = 5
> 11 but ≤ 14 " " " " = 2
< 12 " " " " = 0

If WS Rank is not A or B, WW3 point score = 0

ANALYSIS REQUIREMENTS FOR BOTH WS AND WW PRIORITIZATION

Villages shall be prioritized within the rankings developed as described in *Appendices B.2* and *C.1*. A village's priority rating shall be the sum of the point scores for each factor (WS1 + WS2 + WS3 for water supply; WW1 + WW2 + WW3 for wastewater). ***The higher the score, the higher the priority.***

The consultant engaged under these TOR is expected to perform the calculations involved in the priority analysis using the database model; the model should also have the capability of including the first order priority scores in the tabular presentations shown in Table C3 and in other tabular formats.

Appendix C.3-1

Project Formulation

METHODOLOGY FOR DETERMINING THE CHARACTERISTICS OF PROJECTS OR REQUIRED IMPROVEMENTS

As a guideline for consultants submitting proposals under these TOR, this appendix illustrates, qualitatively, the computations required to determine the components and characteristics of the formulated projects.

Once the project components are determined, the unit cost information presented in *Appendix C.3-2* can be applied to determine the project cost for each village or ezba in the study. *Appendix C.3-3* provides a sample problem that illustrates, quantitatively, how project components are defined and costed.

The methodology presented in this appendix relies on the data available from the field survey questionnaires presented in *Appendix B.1*. These data should be stored in the database model, and used as the criteria, standards, and project characteristics needed for this methodology.

Under these TOR, the database model should be capable of:

- Projecting total populations for the year 2001
- Applying criteria to determine the components of water supply and wastewater projects

PROJECT FORMULATION CRITERIA

Population for Base Year = 2001

Individual village and ezba populations shall be projected to the year 2001 by increasing the 1986 census population by 2.7 percent for 15 years. Simplified, this means the 1986 population can be multiplied by 1.49 to obtain the projected 2001 population.

To determine 1991 populations, the 1986 population should be multiplied by 1.14. If the actual 1991 population is known, this value can be multiplied by 1.305 to determine the projected 2001 population.

Criteria for Water Supply Projects in Base Year 2001

For village or cluster populations > 40,000 persons:

Water service should be provided to 90 percent of total population by direct house connections.

The volume per capita = 120 to 150 liters per day.

For village or cluster populations > 20,000 but < 40,000 persons:

Water service should be provided to 80 percent of total population by direct house connections.

The volume per capita = 120 to 150 liters per day.

For village or cluster populations >15,000 but ≤ 20,000 persons:

Water service should be provided to 70 percent of total population by direct house connections.

The volume per capita = 100 to 120 liters per day.

For village or cluster populations > 7,500 but ≤ 15,000 persons:

Water service should be provided to 60 percent of total population by direct house connections.

The volume per capita = 80 to 100 liters per day.

For the purposes of this analysis, it is assumed that all persons not directly served via house connections, including all population centers < 7,500, are to be served through public taps.

One tap shall be available for every 200 persons, at a volume of 30 liters per day per capita.

Note: The actual values to be utilized in this analysis, within the ranges indicated above, will be selected by the steering committee (see *Section* 2, p. 19).

Criteria for Wastewater Systems in Base Year 2001

For village or cluster populations > 40,000 persons:

Wastewater service shall be provided to 80 percent of the population with water supply connections.

For village or cluster populations > 15,000 but ≤ 40,000 persons:

Wastewater service shall be provided to 70 percent of the population with water supply connections.

For village or cluster populations >7,500 but ≤ 15,000 persons:

Wastewater service shall be provided to 60 percent of the population with water supply connections.

For the purposes of this analysis, it is assumed that village or cluster populations less than 7,500, or other households not receiving formal wastewater service, shall be served by on-site sanitation units.

Methodology for Determining Components of Water Supply Projects

Determine Existing Population

This information is available by using the 1986 census information as described above, or through an actual field survey.

Determine Existing Population Served

Using data questionnaire No. 1 in Appendix B.1, determine the number of buildings and the number of water service connections. With these data plus the existing population figures, calculate the average number of persons per building, connections per building, persons per connection, and persons with direct house connections.

Determine the percent of the existing population served by connections by dividing the number of persons connected by the total population and multiplying the result by 100. Thus,

$$\% \text{ Pop Served} = \left(\frac{\text{No. persons connected}}{\text{total pop}}\right) \times 100$$

Determine the 2001 population to be served

Compute the 2001 population to be served, and the percent of the 2001 population to be served, using the criteria described under *Criteria for Water Supply Projects in Base Year 2001* on the previous page, and the method described above for the existing population.

Determine the new population to be served

Calculate the new population to be served by direct connections between 1991 and 2001 by multiplying the 2001 population by the 2001 percentage of population served, and subtracting the existing population served by direct connections. Thus,

New pop. = 2001 pop. x (% of 2001 pop. served x .01) - 1991 pop. served

Determine the water supply project components

Based on the size of the future population served, the following water supply project components can be computed:

Number of new water supply connections equals the number of new persons served divided by the existing number of persons per connection.

Number of new well sources equals new persons served divided by 10,000, that is one well source per every 10,000 new persons served.[1]

Length of supply pipeline (from new well to village) equals the existing conveyance pipeline length. If this is not applicable, assume:

- 2,000 meters for projects serving less than 20,000 persons
- 6,000 meters for projects serving over 60,000 persons
- 4,000 meters for projects serving 20,000 to 60,000 persons

The ***amount of elevated storage*** required equals the average daily water demand (population multiplied by average per capita use) divided by 4 and rounded up to the nearest 100 cubic meters.[2] Storage tanks have capacities ranging from 100 to 500 cubic meters in increments of 100 cubic meters; thus, a required storage volume of 2,100 cubic meters would

---

[1]A well source is defined as the well, pumpset, electrical controls, building, and diesel generator.

[2]This will provide enough storage for six hours.

translate to four 500 cubic meter tanks and one 100 cubic meter tank, or some similar combination.

Length of new water distribution pipeline may be calculated by one of the following methods, as deemed appropriate by the consultant:

- Multiply the value of existing water supply pipe length per connection by the number of new connections.[3]
- Use the data questionnaires to compute the existing length of street access per connection, and multiply this factor by the number of new connections.[4]
- Multiply the number of new connections by a constant length of pipeline (such as 10 meters). This method is most appropriate for areas with few or no existing house connections.[5]

If field survey results clearly indicate that all or part of the ***existing system requires rehabilitation,*** the consultant shall note this. The cost for rehabilitation will be estimated as shown in *Appendix C.3-2.*

Methodology for Determining Wastewater Project Components

The values for existing population, existing population served, future population served, and the "new" population served are determined as shown above for water supply projects. Persons not served by a sewer system should be served by individual household vaults.

Based on the size of the future population served, the wastewater project components can be computed as follows:

- *Wastewater pumping stations*—one per every 10,000 new persons served $\left(\frac{\text{new persons served}}{10000}\right)$

---

[3]The existing system's length should be available from the data questionnaires and includes all piping, regardless of diameter size.

[4]Street access is defined as the total length of all streets (paved and unpaved), alleys, and pathways with a width of 2 meters or more.

[5]The value of 10 meters is given only as an example; a method for computing the appropriate constant is to use the average value of pipeline per connection for villages with an existing formal water supply system in the same markaz. If no formal systems exist in the markaz, a governorate-wide average could be used.

- ***Length of new sewers*** will be estimated as follows:

$$\left(\text{Length of WS pipeline} \times \frac{\%\text{ of pop. with WS}}{\%\text{ of pop. with WW}}\right) - \text{Length of existing sewers}$$

- ***Force main length*** will be estimated at 2,000 meters of pipeline per pumping station.
- ***Wastewater treatment plants*** will be assumed at the rate of one per wastewater project. For delta governorates the use of activated sludge secondary treatment plants will be assumed. The use of oxidation ditches will be assumed for all other plants, except for non-delta governorates with adequate land area, which will be assumed to be served by stabilization ponds. The consultant will choose the WW plant technology in the non-delta governorates based on land availability.
- ***Evacuation pumper trucks*** for households not served by sewer systems will be assumed at the rate of one pumper truck for each 300 households not connected to the sewer system.
- ***Rehabilitation*** will be estimated in the same manner as for water supply.

Appendix C.3-2

Data for Estimating Costs for Formulated Projects

This section presents unit cost data for use in estimating the capital costs of formulated water supply and wastewater projects. In accordance with the TOR, these data should be stored as part of the database and utilized with the standards and criteria presented in *Appendix C.3-1* to produce the required cost estimates.

The database shall also store computed values required to:

- Perform the analyses presented in *Appendices C.4* and *C.5*
- Produce summary sheets similar to those in the sample calculation shown in *Appendix C.3-3*

As stated in the main body of these TOR, consultants may substitute their own unit cost estimates for use in the sector assessment. In any case, the consultant must adjust the unit costs in this appendix as required if construction costs differ because of the governorate's location.

DATA FOR ESTIMATING WATER SUPPLY PROJECT CAPITAL COSTS (1990 PRICES)

The following costs were derived primarily from LD II water supply projects, supplemented by data from other projects. The costs have been updated to 1990 prices.

Wells

Components include casing, drilling, pump, screen, switch gear, and power drives.

Total cost for all components = LE 130,000 per well

Water Supply Distribution Pipelines

This is a total composite cost for small diameter ($\varnothing \leq 200$ mm), medium diameter (200 mm $< \varnothing \leq 300$ mm), and large diameter ($\varnothing > 300$ mm) pipelines. For a typical project, small diameter pipe is used for 75 percent of the total project line length, while medium and large diameter pipe are used for

15 percent and 10 percent, respectively, of the total line length.[1]

Cost = LE 110 per meter

Conveyance Pipelines

This is a total composite cost computed as described for water supply distribution pipelines. The percentage breakdown for conveyance pipelines by diameter size is 35, 50, and 15 percent of the total pipeline length, respectively, for small, medium, and large diameter pipelines.

Cost = LE 130 per meter

Elevated Storage Tanks

By volume, assuming equal tank height:

Cost for 100 cubic meter tank =	**LE 140,000**
Cost for 200 cubic meter tank =	**200,000**
Cost for 300 cubic meter tank =	**250,000**
Cost for 400 cubic meter tank =	**280,000**
Cost for 500 cubic meter tank =	**330,000**

For volumes greater than 500 cubic meters, the total cost is estimated by combining costs for representative portions. For example, if the tank volume required is 900 cubic meters, calculate the total cost by adding the cost for a 500 cubic meter tank and a 400 cubic meter tank (LE 330,000 + LE 280,000 = LE 610,000).

Water Treatment Plants (Package type)

Water treatment plants are needed only in specific areas of Fayoum and some delta governorates. Costs are based on the size of the plant at the volume per capita rates described in *Appendix C.3-1*.

For up to 15,000 persons	**= LE 20/person**
Between 15,000 and 30,000 persons	**= LE 18/person**
Between 30,000 and 45,000 persons	**= LE 16/person**
For over 45,000 persons	**= LE 15/person**

[1]Based on the statistical values of typical LD II water supply projects.

Public Taps

Taps are estimated at the rate of one per 200 persons.

Double faucet taps = LE 2,700

House Connection with Water Meter

Cost per new connection = LE 200

Rehabilitation Costs

If rehabilitation of existing system components is required, the consultant will estimate the percentages of each system component requiring rehabilitation, and estimate costs for these components using the above unit costs.

DATA FOR ESTIMATING WASTEWATER PROJECT CAPITAL COSTS (1990 PRICES)

Wastewater Pumping Stations

Pumping station capacity costs are shown below by the size of the population served; costs for populations that fall between those shown should be obtained by interpolation.

The cost per person for new population served:

5,000 persons	=	LE 90
10,000 persons	=	60
15,000 porsons	=	45
20,000 persons	=	40
30,000 persons	=	35
40,000 persons	=	30
Over 50,000 persons	=	25

Wastewater Force Mains

As for water supply distribution pipelines, this is a total composite cost that includes small, medium, and large diameter pipe.

Cost = LE 100 per meter

Sewers (trunks plus laterals)

This is a total composite cost for small, medium, and large diameter PVC sewers (see discussion of water supply distribution pipelines for the diameter ranges for each designation). Typically, small, medium, and large sewer diameter lines compose 60, 30, and 10 percent of a sewer system, respectively.[2]

Cost = LE 90 per meter

Wastewater Treatment Plants

As for wastewater pumping stations, the cost per person is shown for the additional population to be served; costs for systems serving a population size between those listed should be obtained by interpolation. Costs are shown for delta and other governorates.

Cost per person for new population served:

		Delta	Non-Delta	
			Oxid. Ditches	Stab. Ponds
5,000 persons	=	LE 300	LE 200	LE 50
10,000 persons	=	220	160	35
15,000 persons	=	165	125	30
20,000 persons	=	150	105	25
30,000 persons	=	120	90	20
40,000 persons	=	110	85	18
Over 50,000 persons	=	100	80	17

House Connections

Cost per new connection = LE 120

House Vaults

LE 300 each

Evacuation Trucks

LE 50,000 each

Rehabilitation

Estimate costs as for water supply.

---

[2]Percentages reflect statistical values of typical LD II wastewater projects.

Extra page for possible additions.

Appendix C.3-3

Sample Project Formulation Problem

This appendix provides a sample problem to illustrate how the survey data criteria and standards are applied to project formulation and how costs are estimated for formulated projects. It also illustrates the required capability of the database.

The problem is not meant to limit the consulting firm in its design of the database, but to provide a "long-hand" version of the output required from the database regarding project characteristics and components. The consultant is free to devise other methods of project formulation, so long as they combine sound engineering judgement and database capabilities.

BASE DATA

Data Collected through Field Surveys

This problem is for a project located in a delta governorate with the following base data (as collected through field surveys):

1991 village or cluster population	48,000
Total number of buildings	6,000
Number of water supply connections	4,000
Number of wastewater connections	1,000
Length of existing water supply line from wells	2,900 meters
Length of existing WS pipeline network	42,000 meters
Existing WWTP	none
Length of existing sewer system	8,000 meters
Length of roads, streets, paths, and alleys	66 kilometers
Condition of existing system	Good (no rehab needed)

Data Calculated with Database

Using this data, the database can compute the following:

Persons per building $= \frac{48000}{6000} = 8$

No. of persons connected to WS system $= 8 \times 4{,}000 = 32{,}000$

No. of persons connected to WW system $= 8 \times 1{,}000 = 8{,}000$

Percent pop. served by WS system $= \frac{32000}{48000} \times 100 = 67\%$

Percent pop. served by WW system $= \frac{8000}{48000} \times 100 = 16\%$

Percent pop. with WS who also have WW $= \frac{1000}{4000} \times 100 = 25\%$

Projected pop. for 2001 $= 48{,}000 \times 1.305 = 62{,}600$

Projected no. of buildings in 2001 $= \frac{62600}{8} = 7{,}825$

No. to be served by WS in 2001 $= 0.9 \times 62{,}600 = 56{,}300$

No. to be served by WW in 2001 $= 0.8 \times 56{,}300 = 45{,}000$

No. of new persons for WS $= 56{,}300 - 32{,}000 = 24{,}300$

No. of new persons for WW $= 45{,}000 - 8{,}000 = 37{,}000$

No. of added WS connections $= \frac{24300}{8} = 3{,}040$

No. of added WW connections $= \frac{37000}{8} = 4{,}600$

DETERMINING PROJECT COMPONENTS

New WS System Facilities Required

Use the above base data, and the criteria and methodology in *Appendix C.3-1*, to determine the following WS components:

Length of new conveyance lines $= 2{,}000$ m

New water mains $= \frac{42000}{4000} \times 3{,}040 = 32$ km

New storage tanks:

Avg. daily demand $= \frac{120}{1000} \times 56{,}340 = 6{,}800\ m^3$

Req. storage $= \frac{6800}{4} = 1{,}700\ m^3$

No. of storage tanks = three $500\ m^3$ and one $200\ m^3$

Wells and pump sets $= \frac{24300}{10000} = 3$[1]

No. of public taps $= \frac{62600 - 56300}{200} = 32$

[1] At the rate of one per 10,000 persons.

New WW System Facilities

Using the base data shown above, with the criteria and methodology presented in *Appendix C.3-1*, the following components for wastewater projects can be determined.

New sewers = $\left[(32000 + 42000) \times \frac{0.8}{0.9}\right] - 8{,}000 = 58{,}000$

New pump stations = $\frac{37000}{20000} = 1$ [2]

Length of new force main = 2 x 2,000 m = 4,000 m^3

New treatment plants = 1 act. sludge plant serving 45,000 people
= capacity of approximately 5,400 m^3 per day

No. of household vaults = **no. of buildings with sewer connections**
= 7,825 - (1,600 + 4,600) = 2,225

No. of evacuation trucks = $\frac{2225}{300} = 7$ [4]

COST ESTIMATES

With the project formulation data described above, the database should be capable of producing a cost estimate summary sheet for each project (WS and WW) by using the cost information provided in Appendix C.3-2. Although the following sample combines WS and WW projects on one sheet, similar sheets could be prepared for WS or WW projects alone.

Note: Other cost summaries may be required as determined by the steering committee (see Section 2). Any such additional summaries should be easy to produce with a properly designed database.

---

[2]At the rate of one per 20,000 persons

[3]At the rate of 2,000 meters for every pump station

[4]At the rate of one truck per every 300 households not sewered

SAMPLE CALCULATIONS FOR WS AND WW COSTS

Governorate:_____

Markaz:_____

Village:_____
Is this a Mother Village? Yes ☐ No ☐

Cluster:_____

(List all villages/ezab if the sheet is for a clustered project)
1991 Population = 48,000
1991 Pop. served by WS = 32,000
1991 Pop. served by WW = 4,000

2001 Projected Population = 62,600
2001 WS Pop = 56,300
For Year 2001, No. new persons served by WS = 24,300
For Year 2001, No. new WS connections = 3, 040

2001 WW Pop = 45,000
For Year 2001, No. new WW connections = 4,600
For Year 2001, No. new persons served by WW = 37,000

Capital Cost Estimates for Water Supply Project, Year 2001[5]

Well installations: 3 @ LE 130,000 each =	LE 390,000
Conveyance Mains : 2,000 m @ LE 130/m =	260,000
Elevated Storage Tanks: three 500 m^3 @ LE 330,000 =	990,000
one 200 m^3 @ LE 200,000 =	200,000
Water Distribution Piping: 32,000 m @ LE 110/m =	3,520,000
House Connections: 3,040 @ LE 200 =	608,000
Public taps: 32 @ 2,700 each =	864,000
Subtotal	**LE 6,832,000**
Contingency (@ 25 percent)	1,708,000
TOTAL WS PROJECT CAPITAL COST	**LE 8,540,000**

Cost per person added, including public taps = LE 351
Cost per new connection, including public taps = LE 2,840

[5]All costs rounded to nearest LE 1,000.

Capital Cost Estimates for WW Project, Year 2001

Wastewater Pumping Stations =	
New persons served	= 37,000
Number of new pumping stations	= 2
Persons per pumping station = $\frac{37000}{2}$	= 18,500
Unit cost per person served	= LE 41.5/person
Total ps cost = LE 41.5 x 37,000	= LE 1,536,000
Force Main to WWTP: 4,000 m @ LE 100/m =	400,000
Sewers: 58,000 m @ LE 90/m =	5,220,000
WWTP: 37,000 new persons @ 113/person	4,181,000
House Connections:	
4,600 new connections @ 120/connection =	552,000
Raw Cost	**LE 11,889,000**
Contingency (@ 25 percent)	2,972,000
SUBTOTAL FOR DIRECT CONNECTIONS	**LE 14,861,000**

Cost per person added = LE 402
Cost per new connection = LE 3,231

Additional Comprehensive WW System costs:

House vaults for 2,225 buildings w/o sewers:	
@ LE 300 each =	LE 668,000
Evacuation trucks	
(1 per 2,000 persons not directly connected)	
8 trucks @ LE 50,000	400,000
Raw cost for unsewered areas	**LE 1,068,000**
25% contingency	267,000
SUBTOTAL FOR UNSEWERED AREAS	**LE 1,335,000**
TOTAL WW PROJECT CAPITAL COST	**LE 16,196,000**

Appendix C.4

Cluster Ranking Analysis

Clustered wastewater projects shall be ranked using the weighted average of the rankings of the individual projects.

Table C4 illustrates a wastewater project for a cluster of villages and shows how ranking of the clustered villages would be prepared by "long hand." For this sector analysis, the ranking of clustered villages shall be performed by the database designed by the consultant.

Re-ranking of clustered water supply projects shall be computed similarly. The same calculations are involved, but only the single water supply ranking scale—as presented in *Appendix C.1*—will be utilized in computing the weighted rank for the water supply project cluster.

TABLE C4
Sample Calculations Illustrating the Computation of Weighted Cluster Rankings for Wastewater Projects

Village in Cluster	1991 Population	Ranking of WW Project	Percentage Level of Index				Average of Index Levels*
			PDI	WSI	SDI	EPI	
V1	33,000	Hi A	90	80	85	85	85
V2	17,000	Mid B	60	65	60	70	64
V3	3,000	Hi C	45	35	45	65	48
V4	11,000	Hi B	64	74	60	80	70
V5	17,000	Lo A	78	80	77	77	78
V6**	1,000	-	-	-	-	-	-
V7	4,000	Mid C	42	33	25	67	43
TOTAL	85,000						

*This is an average of the four index levels (PDI, WSI, SDI, and EPI) explained in the Planning Manual excerpt in Appendix B.2

**Village V6 represents an ezba; ezba populations are not ranked and their populations are not included in the weighted average.

The data in the unshaded columns is stored in the database; both the ranking shown in the first shaded column and the

average shown in the last shaded column are computed using stored values.

The weighted ranking is computed by dividing the total population (except for ezab) into the sum of the products of the average ranking level for each village multiplied by its (the village) population.

Using Table C4, the sum of the products of each village's population and average rank is:

$$(33 \times 85) + (17 \times 64) + (3 \times 48) + (11 \times 70) + (17 \times 78) + (4 \times 43) =$$

$$2805 + 1088 + 144 + 770 + 1326 + 172 = 6305$$

This sum, divided by the total population is:

$$\frac{6305}{85} = 74$$

Thus, the clustered wastewater project has a high B ranking (according to the scale provided in the Planning Manual).

Appendix C.5

Prioritization of Clustered Projects

The consultant engaged under these TOR shall re-prioritize the projects subsequent to the clustering and re-ranking analyses described in *Section* 2. Two additional prioritization factors will be included in the re-prioritization:

- Cost per newly served person served for a given project, whether the project covers a single village or a clustered group of villages.
- Regionalization—the potential for an area to receive service from an existing regional system or a combination of new systems (that is a clustered system).

This appendix illustrates how these additional factors will be incorporated into the analysis.

ADDITIONAL PRIORITIZATION FACTORS

In addition to the factors used for the first prioritization (see *Appendix C.2*), two added factors, WS4/WW4 and WS5/WW5, should be determined after the ranking of clustered projects (as described in *Appendix C.4*).

WS4/WW4: Cost Per Person Served

If the village or cluster system cost per newly served person is:

In lowest quartile[1] WS4/WW4 pt value = 10

[1]Quartile values of unit costs should be determined by the consultant, who will examine the total array of unit costs. If, for instance, the cost of 100 projects was analyzed and arrayed by unit costs from lowest to highest, the lowest quartile would be all those projects with costs equal to or lower than the 25th project, the second quartile would be the 26th through the 49th project, and the fourth quartile would be projects 76 through 100.

In second quartile	"	"	"	=	7
In third quartile	"	"	"	=	4
In fourth quartile	"	"	"	=	1

WS5/WW5 - Regionalization Factor

The value of this factor is determined as follows:

- If the clustered system can be served by extending existing systems that serve cities or if service can be provided from existing regional systems

  WS5/WW5 point value = 12

- If the clustered system can be served in part as described above, but also, in part, by existing village systems

  point value = 8

- If the clustered system will be served completely by new facilities, and the total estimated cost is under LE 3,000,000 for WS, or LE 3,500,000 for WW

  point value = 5

- If as above, except that total estimated cost exceeds LE 3,000,000 for WS or LE 3,500,000 for WW

  point value = 3

- If project does not include any regionalized system

  point value = 2

PRIORITY LEVELS OF CLUSTERED PROJECTS

After determining WS4/WW4 and WS5/WW5 as described above, projects are re-prioritized as follows:

- For non-clustered projects, the new prioritized score is the sum of the first level priority score (see *Appendix C.2*) plus WS4/WW4 and WS5/WW5.

  For example, for a village with a 1991 population of 20,000, and prioritization factors of:

WS1	=	2		
WS2	=	6		
WS3	=	2, Subtotal	=	10
WS4	=	7		
WS5	=	2, Subtotal	=	9
Total Final Prioritization Score			=	19

(The total Wastewater Prioritization Score would be computed similarly.)

- For clustered projects, the new prioritized score is computed as the weighted average of the original prioritization scores plus the individual scores for factors WS4/WW4 and WS5/WW5, as shown in Table C5 below.

TABLE C5
Sample Calculations for Final Prioritization Scores of Clustered WS Projects

Village in Cluster	1991 Population	First Order Prioritization Factors			
		WS1	WS2	WS3	Total
V1	8,000	5	6	3	14
V2	11,000	3	6	3	12
V3	31,000	3	9	3	15
TOTAL	50,000				

The weighted prioritization of the clustered WS project is calculated by multiplying, for each village, the population and the total of WS factors, then dividing by the total population for the cluster.

Thus,

$((8 \times 14) + (11 \times 12) + (31 \times 15)) \div 50 = 709 \div 50 = 14.18$

By adding on the final re-prioritization factors,

WS4 = 7
WS5 = 6

we obtain a final re-prioritization factor of 27.18

As in the original prioritization process, those ***projects with the highest score receive the highest priority.***

SORTING PROJECTS WITH THE SAME FINAL PRIORITY LEVELS

After the re-prioritization analysis is run some projects within rankings may have the same priority level. If so, these projects shall be sorted (that is, listed sequentially) first by descending population size. If necessary, a second sort criteria can be the percent of the population served by direct WS connections, in ascending order.

Appendix D

Appendix D

Desired Qualifications of Key Project Personnel

This appendix presents qualifications for the assessment project's key personnel—the Project Manager, the Deputy Project Manager, and the Database Manager. Consultants should note that:

- These are ***desired*** qualifications, but the consultant will not be prohibited from proposing individuals for key positions who do not possess all of the qualifications.
- The importance of the proposed project manager and permanent members of the project team must be taken seriously with regard to the criteria listed in *Section 3*.

PROPOSED PROJECT MANAGER

The consultant's proposed Project Manager (PM) is the senior representative for this project, entrusted by the consultant to guarantee the quality of work and to be responsible for the overall technical, administrative, and liaison requirements. The proposed PM should possess a Master's Degree in engineering, planning, or other closely related field, and should have at least 15 years of experience including at least five with the consultant proposing for the assessment study.

The PM's background should include experience as the director of at least one (or as major contributor to several) large engineering planning project involving water supply and wastewater infrastructure. At least one of these projects should have been in Egypt. The PM should also have experience in projects that required determining alternative sets of policy variables and their use in program design.

The PM should be experienced working with the institutions in Egypt's Water Supply and Wastewater Sector and should possess at least a working knowledge of personal computers and their application to engineering planning studies.

DEPUTY PROJECT MANAGER

The consultant's proposed Deputy Project Manager (DPM)—the first assistant to the PM—shall be responsible, under the PM's direction, for the daily activities of the project. The DPM will report directly to the PM and will act as the PM's representative when so designated.

The DPM should have a Master's Degree in engineering and ten years of related experience, the last two of which should be with the consultant proposing for this assessment study. The DPM's background should include directing or being a major contributor to at least one water supply and/or wastewater planning study in Egypt; other experience should be indicative of an ability to organize, perform and/or direct the field work and other analyses described in *Section 2*.

The DPM should also have hands-on experience in the use of personal computers and various software applications for engineering planning and engineering analyses.

DATABASE MANAGER

The consultant's proposed Database Manager (DBM)—the individual responsible for the direction and management of all efforts required to design and operate the database as described in *Section 2* of these TOR—should possess a Bachelor's Degree in engineering, computer science, or a closely aligned field and should have seven to ten years of experience. Five years of this experience should be in computer operations related to database design and overall data management activities including data storage, updating, retrieval, and report generation. The DBM should have hands-on experience in the use of personal computers, and should be experienced with several software programming systems, including at least two database management systems capable of being linked with other software to provide the analytical capabilities described in Section 2.

A key element of the DBM's experience will be the ability to design a database using technical and socioeconomic data and information in various analysis to support program design.

The DBM should have a working knowledge of the elements required for water supply and wastewater projects, and should possess at least four years of experience with an Egyptian engineering consulting firm, including a minimum of one year with the firm proposing the DBM.