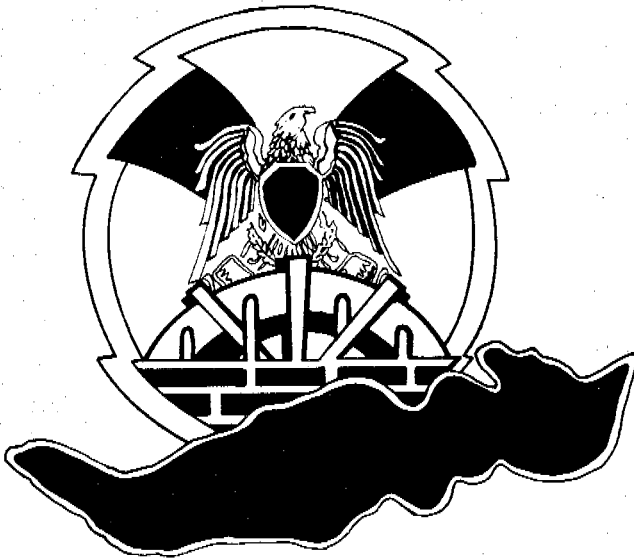70.00012

Government of Egypt
Governorate of Fayoum

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

FAYOUM DRINKING WATER AND SANITATION PROJECT

REVENUE IMPROVEMENT ACTION PLAN

Update December 1993

EL AZAB

December 1993

EL AZAB WATER WORKS, FAYOUM in cooperation with

IWACO

Consultants for Water & Environment
Rotterdam
The Netherlands

DHV

DHV Consulting Engineers
Amersfoort
The Netherlands

ECG

Engineering Consultants Group S.A.
Cairo
Egypt

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ABBREVIATIONS AND ACRONYMS

BWC	Beheira Water Company
DWC	Damietta Water Company
EWR	Energy and Water Supply Rijnland
FaDWS	Fayoum Drinking Water and Sanitation
KWC	Kafr El Sheikh Water Company
MIS	Management Information System
MOF	Ministry of Finance
RIAP	Revenue Improvement Action Plan
RIT	Revenue Improvement Task force

CONVERSIONS

Rate of Egyptian pound (LE) to US dollar (US$) is 3.37 in December 1993.

PREFACE

A Revenue Improvement Action Plan (RIAP) is a concept that aims at achieving cost recovery. It is usually applied in governmental organizations, especially in developing countries, were the institutional basis for revenue collection and enhancement is weak. A RIAP focuses on financial policies, administrative organization and accounting procedures. Its main interest is creating a stronger institutional fundament on which sound financial policies and administrative procedures can be built.

A RIAP starts with an overall analysis of the financial performance in terms of cost recovery indicators, procedures and the organization of financial tasks and tasks that are related. Based on that several fields for improvement are identified. For each of these fields an in-depth analysis is made. Subsequently, recommendations for improvement are given in each of the fields. Recommendations concentrate on all levels of the organization, ranging from financial policies at the management level, to administrative procedures at the operational level. Finally the recommendations are integrated and balanced into an action plan, which can be used as a guideline for implementation.

This report is an update of the first RIAP report, dated July 1992. The 1992 report forms the basis for the actions to improve revenue collection at El Azab. The current report evaluates the progress up to December 1993 and modifies the action plan.

This report was written by Lex Hemelaar, Resource Analysis, Delft, The Netherlands as a consultant to DHV, during a three weeks mission to Egypt from November 26 up to December 16, 1993. The first RIAP report was made by the same author in close co-operation with Mahmoud Soliman, consultant to ECG, during a three week mission to Egypt in June-July 1992.

The author wishes to express that a substantial contribution of the composition of this report was largely due to the involvement of the El Azab staff and the FaDWS technical assistance staff.

Lex Hemelaar,
Fayoum,
December 15, 1993.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This report is an update of the first Revenue Improvement Action Plan (RIAP) report, made in July 1992 [FaDWS, July 1992]. In the previous report an action plan was made, based on a number of recommendations, to be executed by a Revenue Improvement Task force (RIT).

In the course of 1993 a RIT was established. However, it is concluded that the RIT in its current form is not a task force unit, but a steering group. Adequate institutional arrangements still have to be made, mainly with respect to the management of the RIT. A full-time El Azab RIT manager and a number of chiefs need to be appointed. From the side of the technical assistance a full-time input is also required.

In spite of these shortcomings, much has been achieved since 1992. However, it is concluded that the tuning of the actions should be improved. Therefore this report recommends an integrated approach towards revenue improvement. In this concept the several fields of revenue improvement are integrated into a package that should be applied throughout the whole pilot area. It is envisaged that towards the end of phase II (1996), the total pilot area of Senoures district, currently about one fifth of the total service area, is covered by the new system of revenue collection. It is recommended to aim for a collection efficiency target of 80-85% by that time. Highlights on the several components of the integrated approach are discussed below.

Water meter management

Many activities concerning water meters have taken place in the pilot area, based on the results of a survey. Among others a replacement programme of broken meters is introduced, combined with a revolving fund and a payment in instalments scheme. Also a twinning agreement with Energy and Water Supply Rijnland (EWR), Leiden, The Netherlands has been signed, which includes an upgrading of the water meter workshop.

Recommendations are made to develop a water meter management plan which should be the basis for all activities concerning water meters. Further on it is recommended to change the legal status of the water meter, which is currently owned by the customer. This hinders a number of replacement, repair and maintenance activities, as El Azab has no free disposal of the meter in case of break down.

Customer data base

The condition of the customer data is currently the main problem in the whole revenue improvement approach. A survey and an in-depth research in the pilot area showed that the data in the existing ledgers are imperfect. It is recommended to have field visits in every village and hamlet to update the data. This should be combined with the introduction of a customer card, attached to the water meter itself or close to it, as an object for identification.

Computerized billing system

The preparations for an automated billing system in the pilot area are underway. Hardware configuration is present and the software is implemented, but still needs modification. It is expected that ~~within~~ soon an El Azab system manager can be appointed. It is recommended to make a plan of operations in order to structure future implementation activities.

It is concluded that it will definitely take a number of additional months before actual billing can start, as the customer data need to be updated first. Also the assessment of arrears, inherited from the 'old system', is a troublesome job. Recommendations are made to apply a straightforward and fast assessment procedure for arrears and to introduce an instalment scheme for settlement.

Meter reading and revenue collection system

The reading and collection staff has expanded substantially since the Governor transferred this task from El Azab to the local unit. As a result the revenue collected increased by 70%. However, for an adequate revenue management it is absolutely necessary that this staff comes under the control of El Azab.

Recommendations are made to introduce payment-points in the pilot area. Further on, it is recommended to develop a human development plan to upgrade the performance of the readers and collectors.

Finally some remarks concerning a Management Information System (MIS) have been made. It is recommended that a framework for such a system, based on automated processes, should be developed in phase II.

1. INTRODUCTION

The Fayoum Drinking Water and Sanitation (FaDWS) project aims at improving the drinking water and sanitation conditions in the Fayoum governorate to such an extent that it has a long lasting impact on the public health and the well being of the population of the governorate [FaDWS, October 1993]. Technical, financial and institutional assistance is given to El Azab, the drinking water organization in the project area.

The main objective of the financial component is to achieve cost recovery. One of the activities in this field is the development of a billing and collection system, to be introduced on a pilot scale.

In July 1992 a Revenue Improvement Action Plan (RIAP) was made which formed the basis of starting up the activities of the pilot project, to be managed by a Revenue Improvement Task force (RIT). The RIAP recommended a list of 29 actions for revenue improvement.

Several activities have taken place in the past one and a half years. The current report reviews these activities, modifies the recommendations made and identifies new issues. This report contains a list of, again, 29 recommendations. Most of them are new, a couple are modified, existing and a few are unchanged, existing recommendations.

Recommended actions in this report are numbered and printed in italics.

2. WATER METER MANAGEMENT

Current status (December 1993)
Several activities in the field of water meter management have taken place since the first
RIAP report was issued [FaDWS, July 1992]. They are listed below and the main results
are discussed.

A.   A survey held in the pilot area of Senoures among 1884 customers investigated the
condition of water meters [FaDWS, June 1993]. The survey was combined with the survey
on customer data and covered 11% of the pilot area and about 2% of the whole service
area of El Azab. Among others, the following findings can be derived from the survey
results:

- nearly 30% of the meters were broken;
- almost all of the broken local meters cannot be repaired;
- between *30 and 40%* of the meters are of the so-called 'old black' MAASARA type.
  Almost all of the broken local meters are of this type. They cannot be repaired,
  because of a poor quality and because there are no spare parts available;
- almost *40%* of the meters are imported, of which more than 90% are in good
  condition. However there are no spare parts available so replacement of these meters
  is required in due time;
- the remaining *20 to 30%* of the meters, consisting of the local brands KAHA and
  MAASARA (new type), are working well and the availability of spare parts is not a
  problem.

B.   A study in the pilot area concerning water meter installation, repair & maintenance
and replacement [van Zundert, October 1993], gives detailed information about the
procedures and time flows. The conclusions of this study are that it takes 67 days before
a reported broken, repairable meter is re-installed, and 95 days before a reported broken,
non-repairable meter is replaced. In both cases the administrative procedures consume more
than 90% of the total time. The administrative procedures mainly stem from the fact that
the water meter is owned by the customer.

C.   Based on the survey and study results and the recommendations made in the RIAP of
July 1992, the following **actions** have been started in the pilot area.

- all 'old black' MAASARA meters are being replaced, against a price of LE 105,
  charged to the customer;
- the KAHA meter is used as the standard for replacing the 'old black' meters;
- the project financed the purchase of a stock of 500 KAHA meters;
- the payment of a new meter that replaces a broken one can be done in ten
  instalments, the first one of LE 15 and nine monthly instalments of LE 10;
- a revolving fund has been created, fed by the instalment payments, with the purpose
  of an ongoing financing of the replacement operation. The fund is incorporated in the
  El Azab financial structure;
- a water meter workshop has been established in the maintenance centre of Senoures;
- all working meters older than 10 years in the villages of Tersa and Matartares will
  be revised, partially paid by the project.

This section continues with a discussion on some aspects of water meter management and finally a number of recommendations are made for further development.

Organization of re-installation and replacement
Effective organization of the handling of meters that are out of order is still hindered by the fact that the customer owns the meter and that El Azab has no free disposal of it. As indicated above, time consuming administrative procedures are required to register the flow of a broken meter. Re-installing of the same meter after reparation and replacing not-repairable meters by new ones requires a second, or even more visits to the customer's residence. For the 'old black' a procedure of direct replacement is arranged.

Workshop
The workshop established in the maintenance centre of Senoures is in good condition. There are substantial stocks of spare parts and adequate tools are available. There are two technicians assigned to repair and maintenance, one person is handling administrative procedures, one person looks after collection and re-installing, accompanied by one assistant. The position of head is filled temporarily by the head of the maintenance workshop of Senoures. However, presently not much activity is taking place, because almost all of the broken meters in the pilot area cannot be repaired, due to a lack of spare parts or non-repairable damage. Also, recovering spare parts from non-repairable meters is not possible, because these meters have to be returned to the customers as it is their property. In order to create a workload for the workshop, a meter revision scheme is about to start for working meters, older than ten years. Experiences have learned that meters of and above that age are not functioning well. It is envisaged that customers may oppose to the fact that they should hand over their working meter temporarily.

The twinning agreement with EWR Leiden, The Netherlands contains a component to upgrade the water meter repair workshop at the central facilities of El Azab, scheduled to start in September 1994. A detailed plan of operations, however, is not yet available.

Recommendations

1   **Meter standardization**
     Standardization of water meters, newly installed as well as replacements, is required to facilitate repairs and reduce the investments in spare parts. To diversify the risks attached to hidden defects and dependency on the supplier , it is proposed to use two brands instead of one as a standard for (re-) installation, viz. the KAHA and MAASARA (new) type.

2   **New connections**
     It is recommended that El Azab keeps all activities related to the installation of new connections under its own authority. Therefore all the materials needed as well as the water meter should be provided by El Azab from its own supplies. The digging of slots and other preparations should be done by the applicant. Only in this way El Azab can follow up on standardization of materials and water meters.

Fayoum Drinking Water
and Sanitation Project

3   Revolving fund for revision

It is recommended to continue with the revolving fund that has been installed in the pilot area for the aim to catch up with the backlog in replacement of broken meters by new ones. After completion of this task, this fund should be used for the same purpose, but in another area.

4   Regular Revolving fund

A second and different revolving fund should be created to recoup the costs of repair, maintenance and replacement, caused by the regular breakdown of meters. This fund should be fed by surcharges on water consumption bill and be an integrated part of the financial system of El Azab and thus as such be recognized by the Ministry of Finance (MOF). Presently a surcharge for maintenance is added to the bill amount. However, the monies are not flowing into a revolving fund, but are directly transferred to the MOF. The size of the fund should be large enough to cover the costs of the workshop, including the costs of spare parts and of newly purchased meters required to replace non-repairable meters. A reliable estimate of the size of the fund and the surcharge of the bill can be made after the upgrading of the workshop has been finalized. Note that this fund does not apply to water meters for new connections. New customers have to pay the water meter in a lump sum.

5   Ownership meter

It is recommended to modify the legal status of the water meter so that it becomes at El Azab's disposal. This is a prerequisite to obtain the following three advantages:

- *a time and cost saving direct replacement of a meter that is out of order by a good working (new or repaired) meter;*
- *an efficient coverage of the costs of direct replacement by a surcharge on the bill, instead of individual billing of the costs of repair or replacement by a new meter, and*
- *a reduction in the costs of spare parts by recovering spare parts from non-repairable meters.*

There are several options to modify the legal status of the meter. Two of them are discussed here. As it is not financial feasible that El Azab supplies the meters on its own account, both options allow the customer pay the purchase price of the meter. The first option is to move the ownership of the meter from the customer to El Azab without further consideration.
The second one is for the customer to retain ownership of the meter, but to give El Azab the disposal of it in case of meter failure. In this concept ownership does not refer to one specific meter, but to a water meter in general. The property is represented by a meter installed at the customer's residence at a certain time, but can it be taken over by any other adequate meter in case of failure. In this option the money paid by the customer for the purchase of the water meter should be considered as a loan, free of interest, given by the customer to El Azab. The meter serves as the customer's security for this loan. If the customer wants to end the connection, El Azab has to pay

back the initial value of the loan and take the meter back.

In both options El Azab should guarantee the customer the supply of a good working meter at any time. The feasibility of both alternatives should be investigated.

6   Workshop

In order to have the best results of the upgrading of the water meter workshop at the Al Azab premises by the twinning partner EWR, it is recommended to work out the plans laid down in the funding proposal under heading 2.2 Water meter repair and calibration, into more detail. Among others, such a plan of operations should contain detailed descriptions and a time table for the construction of the supporting facilities, viz. electricity and water connections and air compression. It is envisaged that the development of the plan is a joint effort of El Azab and EWR and will be effected during the stay of the head of the El Azab water meter workshop in The Netherlands in March 1994.

It is recommended that the twinning relationship will give an input to an overall water meter management plan, which contains, among others, working procedures, performance standards and guidelines for the installation, location and protection of meters. The development of this plan is the responsibility of the FaDWS project. It is envisaged that a concept of the water meter management plan will be ready for discussion during the stay of the Dutch counterpart in Egypt in September 1994.

The position of head of the workshop, which is still vacant, should be filled not later than January 1994, i.e. one month before the visit to The Netherlands is planned.

7   Revision of meters

The revision of all meters that are out of order is an essential part of the integrated approach towards revenue improvement, discussed later in chapter 7, Revenue Improvement Task Force. It is recommended to make sufficient staff available for this operation and to facilitate the administrative procedures. See appendix 2, heading 1, Water meters for more details.

3.   CUSTOMER DATA BASE

Current status (December 1993)
A.   The RIAP of July 1992 [FaDWS, July 1992] expressed the opinion that the customers data base is fairly complete. A **survey** was recommended to confirm this opinion. This survey was held, combined with the survey on water meters, in the pilot area of Senoures during the period from January to April 1993 [FaDWS, June 1993]. The sample included 1884 customers, *i.e.* about 11% of the pilot area and somewhat more than 2% of the total service area of El Azab. The following indications can be inferred from the survey, throwing more light on the status of the customer data.

● **The completeness**
Of all surveyed house connections, at least 7% was not registered in the customers files, mainly because they are illegal connections. For government connections the percentage of 'no show' was as high as 60.

● **The correctness**
In the survey area, about 15% of the household connections and 35% of the commercial connections were registered under a different name. Also the meter numbers were not registered well, although an indication to what extent is not mentioned. Further on, a very small percentage (less than one) is registered under a different consumer type (*e.g.* household instead of commercial). Entries in the ledgers were done correctly, apart from the date. Usually the date of receipts was recorded, instead of the date of entry.

● **The timeliness**
There was a backlog in recording receipts of collected revenue in the survey area, varying from more than two months (20%) to more than six months (10%). The survey report assumes that some of these receipts may never be recorded at all.

It is hard to say where the causes of the above mentioned deficiencies stem from. Mistakes can be made at almost any stage of the administrative procedure, starting from the initial supply of information by the customer and the recording of it by an El Azab employee, upto and including the final recording in the consumer ledgers.

This RIAP update report has found no substantial reasons why the survey results could not be representative for the whole service area of El Azab. Firstly, the customers surveyed in the Senoures district were chosen at random and the group is large enough to represent the whole district. Secondly, the customers in the Senoures district are a cross section of all customers in the service area. Thirdly, the administrative procedures followed for the other districts are the same as in the Senoures district and are executed by the same departments at El Azab.

B.   A second recommendation of the RIAP of July 1992 was the transfer of customer data from the consumer ledgers into a **computerized data base**. This was completed in August 1993 and all the customer data of the district of Senoures are now on computer files. An assessment of the computer software will be given in chapter 4, Computerized Billing System.

Impacts and Conclusions
In October 1993 the RIT team started the preparations for a computer based sample billing for the village of Tersa in Senoures. During these preparations the impacts of the shortcomings of the customer data became clearly visible. The core problem is that, in a number of cases,

> **using the data of a given customer in the consumer ledger, does not result in finding the correct customer in the field.**

A discussion on the causes of this problem needs an elaboration on the three items in the consumer ledger that can identify a customer, *viz.* the name (and address) of the customer, the connection number (also called consumer number) and the meter number. The cause of the core problem is that, in a number of cases, these three items do not refer to one unique customer. The following misfits explain this incongruity.

- **A misfit between the customer name and the connection number.**
  The reasons are twofold:
  - there are customers with the same name, an aspect that especially counts when not all the sub-names of the customer are recorded;
  - one customer owns more houses and therefore has more than one connection number;

- **A misfit between the customer name and the meter number.**
  There are four reasons for this misfit:
  - the absence of a meter number in the consumer ledger;
  - the meter has been replaced, but the meter number has not been updated;
  - the meter number was copied incorrectly to a form at the time of issuing the meter; and
  - the meter number was copied incorrectly from the issue form to the consumer ledger.

- **A misfit between the connection number and the meter number.**
  There are no additional reasons for this misfit then the ones already given in the two items mentioned above.

The result of the incongruity of customer data is that the meter readings that enter the accounting system are sometimes ascribed to wrong customers. As a result of this the water consumption calculated (current reading minus previous reading) can differ from the actual consumption and may be too high, too low or sometimes even negative.

This phenomenon is not new at El Azab, but recently becomes more pronounced for two reasons. The first reason is the renewal of the revenue collection staff, with staff from the local units since July 1992. The former collectors from El Azab were familiar with the status of the customer data. They had made their own, off the record, adjustments to incorrect or incomplete data, and thereby reduced the number of misfits. The current collectors lack this inside information. The second reason is that with a computerized

system, which is currently used in the pilot area, data are presented in a clear, structured and readily available way.

The magnitude of the core problem cannot be assessed on the basis of the surveys held. However, a sample held in the village of Tersa resulted in a percentage of 'suspicious' consumption amounts of more than 50. Appendix 1 gives more details on the results of this sample.

The conclusion is that the consumer files of El Azab do not always provide meter readers with correct information about the customers and, subsequently, provide revenue collectors with incorrect bill amounts. From the survey results it is not possible to assess the exact size of the misfits, but it is estimated to be somewhere between the 10 and 30%. This leads to a number of incorrect bill amounts which probably lies within the same range.

Improving the customer data

In order to improve the customer data, the question of how to organize the data base is a crucial one. Customer data should be organized around one *key datum*, *i.e.* a datum that, without mistakes, identifies the correct customer. A key is feasible to use when it satisfies the following requirements:

- **unique and unambiguous**, *i.e.* only one such a key must exist and a it must refer to only one customer;
- **logical**, *i.e.* issuing a key must be possible by using a simple, straightforward and quick routine;
- **recognizable**, *i.e.* it must be physical present at the customers residence so that a reader and a collector can verify it;
- **workable**, *i.e.* it should not be too long or complicated so that it is either time-consuming to verify or subject to misinterpretation; and
- **explanatory**, *i.e.* the key should give some information about the location and/or status of the customer.

The current consumer ledgers contain four customer particulars that might serve as a customer key, *viz.* the customer's name, the customer's address, the customer number and the water meter number. Below, each of these possible keys are evaluated against the five requirements listed above. Also the current status of the keys in the consumer ledgers is discussed.

Customer name

The uniqueness of the name of the customer depends on how many sub-names are used. Names in Egypt consist of three parts, the first name, the name of the father and the name of the grandfather. Many similar names exist, but usually more sub-names (of grand-grandfathers) are added to avoid confusion. But even if several sub-names are used the customer's name may not be unique and therefore ambiguous. Also long customer names are not beneficial for the workability in the field and in the accounting system. Concerning the requirements of recognizability and reasoning, the use of the customer name is indisputable. However, it gives no additional information than the name and therefore the explanatory value is low.

Currently the El Azab meter readers and revenue collectors use the customer name as the key to identify the customer. However, as the results of the survey have shown, a substantial part of the customer names registered in the consumer ledger is incorrect.

Customer address

Many data bases in western countries use the address as the customer key, because it satisfies all the five requirements more or less completely. However, a complete registration of all streets and houses is a prerequisite for this. The local units in the El Azab service area have not reached that stage yet. Streets often do not have an official name and houses are not numbered. So instead of a physical presence there is a physical absence of the address.

Due to this the addresses recorded in the consumer ledgers of El Azab only give the name of the village or hamlet.

Customer number

Also the customer number is often used as a key. The reason for this is that the number is created by the provider of the service itself. So there is a large degree of freedom in choosing the number, and therefore the requirements of being unique and unambiguous, logical, workable and explanatory can be satisfied to an optimal extent. However, the number is not automatically recognizable at the customer's residence. Usually the customer is informed about his number by a special mailing, customer card or bill receipt. Using the customer number as a key requires that the customer should have his number readily available when readers or collectors visit his residence.

At El Azab the customer number is represented by the connection number. It is used in the accounting system only, but not as a key by meter readers and revenue collectors in the field. The number is written on bill receipts as well. That means that currently only a limited number of customers are able to readily provide a meter reader and revenue collector with their customer number, *viz.* those that have been visited by a revenue collector and have paid the bill and have kept the receipt and can quickly find and show it.

Water meter number

A meter number is issued by the manufacturer and placed on the cover or the body of the meter. So it is physical present and thus recognizable at the customer's residence. It is unique in itself, although theoretically there is a possibility that identical numbers do exist, since meters from various manufacturers are used. However, the chance that this occurs is likely to be very small and that it appears in the same local unit even smaller. Regarding logicalness no problems are envisaged in the use of a meter number. However, it requires accurate recording of newly issued and replaced meters. With respect to workability there is one difficulty which appears when recording the number. The problem lies in the fact that some manufacturers issue the numbers in Arabic figures, while in Egypt the Sanskrit figures are commonly used. So a translation of Arabic into Sanskrit has to be made by El Azab employees.

Experiences from samples taken in the village of Tersa have learned that this conversion is prone to mistakes. Especially, because some Arabic figures have almost the same appearance as Sanskrit figures, but represent a different figure. Also the aspect of physical presence faces problems in the El Azab environment. Firstly because a lot of meter numbers disappeared because the cover with the number on it is missing. Secondly because corrosion or damage has made the number illegible.

The recommendation which datum to use as a key and how to update the customer data base is given in the following section. To conclude this section it is explicitly stated that the choice for one of the four customer data as the key datum, does not mean that the other three data become redundant. All the four data should be recorded to their full extent. The three data that are not key data, serve as an information to be used for further administration and in cases that additional verification and checks are necessary.

Recommendations

8   Key datum

It is recommended to use the customer number as the key datum for organizing the customer data base and identifying customers. It is envisaged that the customer number consists of 10 digits and contains the following information:
- *name of the district, digit 1;*
- *name of the local unit, digit 2 and 3;*
- *name of the village or hamlet, digit 4 and 5;*
- *sequence customer number, digit 6, 7, 8, 9 and 10.*

It is recommended that the 'code C', currently used in the computer programme, will serve as the key datum, because it incorporates all the information required. The only modification that has to be made is that 'code C' uses two digits for the district, while one is sufficient. Further on it is envisaged that 'code C' may be expanded later on for internal accounting purposes. However, these possible additions will not be required for identification of the customer.

9   Customer card

The recommendation for the customer number made above cannot be made without the introduction of a customer card. The card should make the customer number recognizable at the customer's residence. It should contain the following customer particulars:
- *customer code ('code C'); and optional*
- *customer's name and address.*

The card should be proof against alterations and corrosion, have a small and handy format and be readily presentable. Among others, possibilities are a card sealed with a hard plastic cover or a small metal plate. A sealed card should preferable be attached to the water meter at several points, with strong connections and possibly sealed. A metal plate could be fixed to the wall near

the water meter. The feasibility of both suggestions, and others that may come up later, should be examined.

Recommendation number 17 made in the previous RIAP report [FaDWS, July 1992], included the possibility that the customer card could be used for making entries by the meter reader, to be confirmed by his signature. This recommendation is cancelled now, because it requires a different type of card.

10 Updating the customer data base

It is recommended to update the customer data base by visiting all the customer residences and recording all the relevant customer data. The data obtained from these visits are to be used to update the existing customer data. This updating procedure is part and parcel of an integrated approach towards revenue improvement, which is recommended in chapter 7, Revenue Improvement Task Force. In appendix 2, full details on the updating procedure are given under heading 2, Customer Data.

11 Illegal connections

It is recommended to have a campaign to trace illegal connections in each local unit. This should be combined with and be part of the programme of updating the customer data, discussed above, as during this programme El Azab staff is already intensively present in the local units. Illegal connections recovered, should be charged the normal connection fee and an amount for consumption during the illegal period, based on the minimum use. The period of illegal consumption is to be assessed by El Azab for each case separately, with a minimum period of say one year.

It is recommended to create an opportunity for illegal customers to register their connection voluntary, before the start of the campaign. To stimulate the response to this possibility, a decree could be issued, preferably by the Governor, stating that customers with an illegal connections that is detected after the period of voluntary registration has ended, will face an high penalty.

4.   COMPUTERIZED BILLING SYSTEM

Introduction
The first RIAP report [FaDWS, July 1992] recommended a small scale, step-wise approach towards the automation of billing. This was based on the resources available at El Azab and on the experiences of visits to the water companies of Kafr El Sheikh (KWC) and Beheira (BWC).

Follow up on this recommendation was made by starting computerization in the pilot project in the Senoures district, split into two phases. The first phase of five months covers the development, installation and trial run of a computerized administrative system for water billing. The second phase of three months contains supervised operation, monitoring and evaluation. The initial try-out of the system will be in the village of Tersa (1100 customers), later to be expanded to the whole pilot area. After completion of the pilot project, an expansion to the whole service area is envisaged.

Two local consultants were contracted for the first phase, from May until the end of September 1993. Both experts have experience in this field, among others at the water company of Damietta (DWC). In the water billing working plan, the first phase has been subdivided into seven items, *viz.*

A.   Project start up.
B.   Data collection.
C.   Hardware installation.
D.   Software installation.
E.   Water bills.
F.   Systems assessment.
G.   Training.

Current status of automation (December 1993)
The working plan as outlined above includes all the major steps to be taken in the first phase. However, the time schedule set is clearly too optimistic, as the items B, D, E, F and G are not yet completed. Below, each of these items are discussed in turn.

B.   Data collection.
The problems concerning customer data are extensively discussed in chapter 3 Customer Data Base. In short, the problem is that data that were copied from the manual system into computer files cannot be successfully integrated with data recorded in the field, due to reasons that are outside the computerized system.

D.   Software programme.
The software is written in dBase III plus. Currently there are a number of bugs in the programme as well as some requirements that are not yet satisfied. Among others, an authorization for access to the programme, saving and back-up procedures are lacking. Modification of the software is still going on. A user manual in the Arabic language is produced, but will need amendments after modification of the software. A technical manual in English is about to be finalized. In addition to the requirements outlined in the contract,

the consultants have written two separate programmes, *viz.* to handle the backlog in arrears and a water meter programme.

E.   Water bills.
The stages of producing bills, recording payments and producing reports have not yet started. The layout of the billing form is still under revision.

F.   System assessment
This stage is an evaluation of the total system and is due when the items discussed above are completed.

G.   Training.
Up to now two training courses have been given to the six employees of El Azab, who do the data-entry, and to the head of the administrative department. The courses comprised a general introduction to computer systems and DOS and the basics of the dBase plus. Also on-the-job training is provided for a part of the software programme. Further on-the-job training will be required for the stages mentioned under item E above.

The backlog in the execution of the working plan amounts to several months. This is because the time required has been underestimated. For comparison, note that the implementation of an automated billing system at KWC took almost a year. However, it is concluded that the external support needs to be intensified.

Hardware configuration
The experts advised on the appropriate hardware configuration, which consists of the following parts:

●   two IBM 386, 33 MHz computers, each with a 125Mb hard disk and 1Mb extended memory;
●   one IBM 486, 67 MHz computer, with a 207Mb hard disk and 3.3Mb extended memory;
●   three Seikhosha SL-270 matrix printers with a printing speed in the 10 CPI-mode of 274 CPS (draft) or 91 CPS (letter quality); and
●   one tape-streamer with a 250Mb tape drive.

The configuration was based on a minimum requirement for data-entry of 2 times three operators. It was envisaged that one main computer handles the production of bills and reports. The concept is based on experiences at the DWC. However, it is concluded that several issues have not got the attention deserved. One of these is the linking of the computers. Currently the three computers operate as stand alone PC's. However, linking may result in a more efficient operation, because of data sharing. Another item is the time estimates for data-entry, processing and printing. In particular the fact that computers, when printing, cannot be used for data-entry should be kept in mind. Also the requirements of the hardware when it comes to expansion to the whole service area have not yet been investigated.

Management by El Azab and the FaDWS consultants

It is concluded that the introduction of the new system is not running smoothly. Both El Azab and the project staff have to intensify the management of the computerization process. Full-time management by an El Azab employee, assisted by a project consultant, is required to guide and monitor the process, manage the El Azab staff and look after the coordination and integration with other revenue improvement activities. However, for the persons concerned, the computerization process was a task, second to their main concerns, and responsibilities were not clearly set.

Apart from this issue concerning the general management, the position of computer system manager is still vacant. One candidate is selected, currently working in the governmental service, but not yet released from her job.

It is emphasized that, in spite of the limited availability of staff and skills, substantial progress has been made. However, care should be taken that the system will not adequately be embedded in the El Azab organization.

Billing form

In the beginning of the computerized billing system, two kind of billing forms will be used, viz. one for the 'old system' arrears and one for the regular billing. The billing form that has been designed for the regular billing still has the following shortcomings:

- the name of El Azab is only printed in the watermark and may become illegible after printing the bill;
- the date of issue is not on the bill;
- the water meter number is lacking;
- only the billing period and not the reading period is on the bill; and
- the consumption refers to a four months period, while the charge has to be for two months.

Arrears

The survey on the customer administration held in the pilot area of Senoures (FaDWS, June 1993) showed results that point in the direction of large arrear amounts. The survey concluded that almost 65% of the customers in the pilot area are behind in paying for more than one year, including 19% that has never paid at all.

In general the arrears are caused by three things, viz.
● the unwillingness of customers to pay;
● the shortage of El Azab meter readers and revenue collectors up to July 1992;
● the absence of effective legal means.

The unwillingness to pay is on its turn caused by several reasons, such as the dissatisfaction about the quality and timeliness of the service supplied and the financial position and preferences of the customer. Also the shortage of El Azab field staff and the absence of legal means have a detrimental impact on the willingness to pay. The shortage of readers and collectors led to high bill amounts of which settlement in one time is difficult. Concerning legal means the only measure El Azab can take is to disconnect the customer.

The threat with this measure indeed induces some customers to settle their bill. However, disconnection is not always effected and, if applied, can easily come round by making an illegal connection afterwards.

According to the El Azab accounts, the total arrears amount to LE 5 million in July 1993. However, this amount can be doubted for several reasons, of which the two most important are:

- the mistakes made in the ascription of meter readings to customers, a misfit already discussed in chapter 3, Customer Data Base; and
- water quantities, consumed in previous years, are charged against current tariffs which after substantially higher than the previous rates.

The second reason needs more clarification. Up to July 1992 the meter reader staff of El Azab was limited and insufficient. Therefore a large backlog of correct readings existed, because customers were either not visited and not recorded, or not visited but recorded by using an estimate. In July 1992 the meter reading labour force has been expanded with local unit staff and since then the backlog is shrinking. So for a group of customers this results in a large consumption, calculated by subtracting the current reading from the previous reading. Then, mistakenly, this consumption is charged against the current tariff. This is not correct as the consumption was built up during several previous years, including years in which the tariffs were lower than they are at present. Thus, the arrear amount is set too high.

Currently, calculations for the village of Tersa, Senoures district, are being made, in order to estimate the correct value of the arrears. Based on these results a better estimate of the total arrear amount can be made.

Summarizing, the meter readings are regarded as a basis, too weak to assess the arrears upon. The main reason is that the ascription of the readings to the correct customer is not straightforward at the moment. Therefore too many arrear amounts will be false, even if the previous consumption is charged against previous tariffs. Without doubt it will be a laborious, cumbersome and time consuming effort to achieve 100% correctness, if it can be achieved at all. Apart from that, the meter readings cannot serve as a basis for the large number of broken meters.

Recommendations

12   Update Billing Working plan
     It is recommended to ask the experts to make an update of the phase one working plan and invite them to make a proposal for the second phase. It is stressed that billing should not take place before the update of the customer data has been finalized. Billing plays a crucial role in the integrated approach towards revenue improvement, which is described in chapter 7, Revenue Improvement Task Force.

The consequence of this recommendation is that it will take several months from now, before billing of the village of Tersa can take place. This should, however, not mean that testing the automated billing system should be postponed. That has to continue without delay in order to have the system ready for implementation when the customer data of Tersa are sorted out.

13   System manager

It is recommended that El Azab does whatever is within its competence to speed up the appointment of a system manager. Also it is recommended to create the position of a system manager assistant. In this way the vulnerability of the system to absence of the system manager can be reduced. In order to have the maximum benefit of the training given by the contracted experts, it is essential that the appointment of a system manager assistant will be effected within one or two months from now.

14   Plan of Operation

It is strongly recommended to make a detailed plan of operation for the automated system. Among others, this plan should contain the following items:

- *a justification for the current hardware configuration and its optimal set up for handling the pilot area;*
- *the modifications required for covering the whole service area, including cost estimates of additional hardware;*
- *time schedules, based on detailed time calculations for data-entry, processing and printing of bills, lists and reports;*
- *staff requirements, in numbers and skills;*
- *planning of training courses, including the kind of courses required, for which staff and when; and*
- *procedures for authorization and back-up of data.*

The plan should be made by the RIT, with assistance of the two experts who are contracted for the first phase.

15   Billing forms

Careful design of regular billing and 'old system' arrear billing forms is required. It is recommended to have good procedures for approving the layout and to limit the quantity of billing forms ordered. It is envisaged that experiences of using the billing form in the pilot area may result in modifications of the layout of the form.

16   Billing frequency

The recommendation made in the first RIAP [FaDWS, July 1992] is repeated here. Billing should take place every two months, i.e. six times a year. Currently it is three times per year. As meter reading takes place every four months, the amount due based on two subsequent readings should be equally spread over two bills. It is noted that this is not yet incorporated in the software programme.

17   Assessing ' old system' arrears

It is recommended that an assessment of the 'old' arrear amounts of each and every customer will be made, before the system of a new computerized billing is introduced.

For this purpose a straightforward method of computing the arrear amounts is recommended. This method uses the minimum annual consumption for each of the previous years. The minimum quantity should be differentiated by type of customer and, if feasible, by area. This annual amount of m^3 is multiplied by the appropriate tariffs of the previous years. The result is a minimum annual charge for each of the previous years.

Subsequently, the total amount due for a customer is computed by summing up the minimum annual charges for each year that the customer had a connection. The year of installation of the connection, recorded in the consumer files, determines this amount. Next, the total payments made by the customer to El Azab is subtracted from the minimum annual charges. If the outcome is positive, that positive amount is considered as the arrear amount, to be charged to the customer. If the outcome is zero or negative, the customer is considered not to have arrears. Customers in this group have already paid the minimum amount or more. Note that it is recommended not to return the negative amounts to the customer. The possibility of adding an interest amount to the arrears may be considered. However, the basis for this is weak as El Azab itself has failed to visit customers in time.

It is recommended to apply this method to all residential and all commercial customers, irrespective of whether the water meter was broken or not. *Governmental connections are better traceable in the accounting system and are also bigger users. Both characteristics justify a separate, detailed assessment of their arrears.*

The advantages of using the recommended method are numerous. It is fast, transparent, and easy applicable because only two data are needed, viz. the year of connection and the total payments made in the past. Also the chances are high, that it will be accepted by the customer with arrears. This is evident, for it is the most favourable way of calculation for the customer. The advantage of this acceptance should not be underestimated. Up to now, El Azab has no legal means to force customers to pay arrears. So El Azab is very much dependent on the willingness of the customer to pay, which, on its turn, depends on whether the customer finds the way of calculation acceptable or not. For this reason, the collection efficiency of the arrears, calculated in the recommended way, is expected to be high. And that may very well result in a collected amount, which is higher than what could be collected if the arrear assessment is done in another way, that (pretends) to be more accurate.

The arrear amount in the recommended method depends heavily on the quantity of water used in the calculation. The use of a minimum quantity is preferred above an average quantity. Applying an average would be unjust, because in that case the customers that have used below average quantities are charged too much. In fact, the strange consequence is that these customers will be charged with an arrear amount, even if they had payed all their bills in time! Apart from the injustice, charging an average quantity will diminish the level of acceptance and, consequently, the willingness to pay.

Note that the recommended method is an introduction, with retroactive effect, of a mixed system of flat rates and differential tariffs. Flat rates are applied to customers with arrears. Differential tariffs have been applied to customers that paid on time. Clearly there is an element of injustice in treating the same type of customers in a different way. From the point of view of El Azab, it should be kept in mind that El Azab itself is partly to be blamed, because of a shortage of staff, an imperfect administration and the ineffective legal means at its disposal. From the customer's point of view, those that have paid their debts in time may consider it unfair when they become aware of the results of the applied method. It is difficult to estimate to what extent this awareness may arise. However, it is not recommended to give these customers any financial compensation to offset this uncomfortable feeling.

18   Settlement of arrears

It is recommended to apply a two step approach towards settling the arrear bill. In the first step direct payment of a bill with the total value of the arrear should be applied. A discount may be considered if direct payment is effected. The second steps concerns customers that do not choose direct payment. For this group a scheme of **payment in instalments** *for settling the 'old system' arrears should be applied. The scheme should be based on a fixed instalment amount, to be set somewhere between the LE 10 and 20. Subsequently, the number of instalments is determined by the total arrear amount (e.g. a total arrear amount of LE 75 and a fixed instalment amount of LE 15, gives five instalment periods). There may be a legal problem with instalment periods that cross the financial year. However, there are several ways cope with this and still leave the scheme unimpaired.*

It is strongly recommended to apply this standardized scheme for all customers with arrears, instead of making individual, time consuming arrangements and contracts with each and every debtor.

19   Billing of 'old system' arrears

It is emphasized that the billing of arrears should not take place before the customer data have been updated. Only then a reliable arrear bill can be presented. In appendix 2 full details of activities concerning arrear billing are given under heading 4, Arrears Billing.

5. METER READING AND REVENUE COLLECTION SYSTEM

Current status (December 1993)

The most important change since July 1992 is the appointment of readers and collectors from the local units by a Decree from the Governor. Through this the reading and collection staff expanded from 28 persons (16 readers and 12 collectors) to about 120 persons (60 readers and 60 collectors). The organizational set up of this change is, in general, in accordance with the recommendations made in chapter 8 of the first RIAP report [FaDWS, July 1992]. However, the staff is still employed by the local unit and El Azab cannot exert authority of them. For a full description of the current organization see section 4.2 of the survey report [FaDWS, June 1993].

Meter reading performance and optimal size of the reading staff

Both the survey report [FaDWS, June 1993] and the experiences from the pilot project in the village of Tersa (see appendix 1) learned that meter reading is not done accurately. This can only partially be caused by bad accessibility, as the survey report concluded that only 2.6% is difficult to reach. Another reason may be the fact that meters are located in dark places although the survey report does not mention this. Still, numbers of water meters are copied incorrectly and readings are sometimes so way out of line with previous readings, that the readers are at least suspected of being either incompetent or careless.

The optimal size of the reading staff must be determined by using specific data of the local units, time standards for reading and transportation and the reading frequency. Appendix 9 of the first RIAP provides a framework for making these calculations [FaDWS, July 1992].

Revenue collection performance and optimal size of the collection staff

The expected increase in collected revenue has not stayed away. The financial year 1992/93 closed with an amount of collected revenue of LE 1.9 million, about 70% more than the LE 1.1 million collected in the previous year. A substantial part of this increase is caused by the collection of arrears. The annual collected revenue per collector dropped from about LE 90,000 to LE 30,000, indicating a decreasing marginal return. This does not automatically imply that the size of the current collection staff is too large. The collection of arrears is a less rewarding activity.

The economic optimal size of the collection staff will be reached at the point where the incremental *(not the average!)* amount collected by one additional collector is equal to the variable costs of the collector. For the additional 48 collectors taken as a whole, the incremental revenue was LE 16,000 per head. The variable costs of a collector is around LE 1,500, which is still far below the incremental revenue.

It is difficult to decide on the optimal size of the collection staff from these aggregated figures. However, from a financial monitoring point of view it is a useful exercise. The size of the staff initially has to be determined and monitored by using specific local unit data, time standards for collection and transportation and the frequency of collection. Appendix 9 of the first RIAP provides a framework for making these calculations [FaDWS, July 1992].

Recommendations

20   Reading frequency

As earlier recommended in the first RIAP [FaDWS, July 1992] the frequency of reading should be changed into once every four months, i.e. three times per year. Currently it is four times per year. As the billing frequency is recommended to be once in every two months, every reading will serve two bills.

21   Payment-point and Door-to-door systems

Depending on the size of a village or hamlet, a payment-point or door-to-door collection system is recommended. Full details of this recommendation are included in the first RIAP [FaDWS, July 1992], pages 23 and 24.

22   Collection frequency

The collection frequency should be equal to the billing frequency and is therefore recommended to be changed into once in every two months, i.e. six times per year. Currently it is four times per year.

23   Human development plan

It is recommended to upgrade the performance of the readers and collectors and their supervisors by developing their skills to a higher level. Especially the readers should be aware of the fact that they play a crucial role in the revenue assessment. A human development plan should be designed and implemented, containing:

● *task descriptions;*
● *building awareness of their role in the company, which may be supported by introducing identification cards and uniforms;*
● *training of tasks and entertaining customer relations;*
● *target performances and incentive schemes;*
● *better arrangements for transportation allowances;*

24   Authority over readers and collectors

It is recommended that El Azab continues its efforts to get the readers and collectors transferred to the authority of El Azab in order to conduct efficient and effective control and management.

6. MANAGEMENT INFORMATION SYSTEM

Introduction

A MIS is a system that provides data or information to people within an organization, so that they can perform or manage their tasks in a better way. As it is a system, it organizes the flow of information among departments and inside departments, according to certain rules, regulations, standards, etc. Data recording and processing, reporting and decision support and computer systems are main components of a MIS.

MIS at El Azab

The institutional capacity building programmes of the FaDWS project aim at cost recovery, organizational development and human resources development [FaDWS, October 1993]. The success of these programmes depend, among others, on the quality of information processes in the El Azab organization. Therefore the existing information system at El Azab needs improvement.

The first steps towards automated processes have been made with the implementation of a computerized billing system. Gradually this should be expanded to other sub-systems within El Azab. To structure this process, a framework is required that defines the information requirements at all levels in the organization and organizes the automation process.

Twinning relationship

In November 1992 El Azab signed an agreement with the Energy and Water Supply Rijnland (EWR), Leiden, The Netherlands to entertain a twinning relationship [EWR, 1993]. The objective is to establish a long term cooperation aimed at the exchange of relevant knowledge and experiences. Both parties consider it very important to have close links between the twinning activities and the FaDWS project.

The terms of reference identifies the fields of management and organizational issues at the executive level, upgrading of maintenance centre(s) and the upgrading of the meter repair workshop. In addition to that, the funding proposal contains an administrative organization component, in particular to "advise on methods of revenue collection and administration".

However, these subjects have had extensive attention at El Azab, in the framework of the FaDWS project. Moreover, after deliberate considerations and consultations, decisive steps in the field of customer data base, billing and collection have already been made by El Azab or will be taken in the near future. Therefore, to reconsider these subjects is not regarded as an effective contribution to the twinning relation.

Recommendations

25 Management information system
> *It is recommended to incorporate a MIS component in phase II of the FaDWS project. This MIS should offer a framework for further implementation of automation processes, based on an analysis of the information requirements at El Azab.*

26 Twinning with EWR

It is recommended to focus the financial administrative component mainly on management information systems. Knowledge and experiences in this field are still limited at El Azab. Besides that it has not got much attention yet in the FaDWS project.

7.   REVENUE IMPROVEMENT TASK FORCE (RIT)

Introduction
The RIAP of last year [FaDWS, July 1992] recommended the establishment of a Revenue Improvement Task force (RIT). Its main task is to manage the implementation process in the pilot area with respect to the recommendations made in the fields of:
- water meter management;
- customer data base;
- automated billing system;
- meter reading; and
- revenue collection.

Its was recommended that the RIT would be a separate unit, led by an El Azab manager on a full time basis, and supported by El Azab staff and the consultants. An organization chart was provided and task descriptions were formulated.

Current status (December 1993)
It is concluded that the RIT, in it is recommended form, still does not exist. The RIT in its current form is not a task force, but a steering group formed by El Azab and the technical assistance staff. El Azab is represented by the general manager, the financial manager, the head of the revenue department and the head of the maintenance centre Senoures. From the side of the consultants, the team leader and two technical assistants are members. The steering group has had four meetings in which the progress of RIT activities were discussed and decisions were made on implementation.

The RIT activities are managed by the El Azab financial manager on a part time, *ad hoc* basis. Further on the head of the maintenance centre Senoures managed the implementation of water meter activities. The technical assistance staff provided part time, *ad hoc* assistance. Further on El Azab staff was assigned to a number of operational tasks in addition to their routine work.

In spite of the limited time spent on the RIT activities and the lack of an adequate institutional arrangement, much has been achieved since July 1992. Especially in the fields of water meter management and automation. Credits should be given to all the parties concerned, because of an enthusiastic participation in RIT activities and the awareness of the relevance of revenue improvement.

However, what is missing is an integrated approach towards RIT activities. Presently, the stage has been reached at which integration becomes badly needed, because the produce of the bill is coming within sight. The success of the billing process depends very much on the performance and the tuning of the activities concerning water meters, customer data, automation and meter reading.

Recommendations

27   Integrated Approach

It is recommended to follow an integrated approach towards revenue improvement. An outline for this is given in figure 1 on the next page. The figure shows the components of revenue improvement and their sequence in an integrated approach. The first concern in an integrated approach is to upgrade the condition of all water meters, the basis for billing on actual consumption. Next, the customers data have to be updated in order to identify the consumers. Then the four monthly sequence of reading can start and, at the same time, the billing of arrears, inherited from the 'old system', can take place. When the four monthly reading has taken place the first billing with the new system is due. Next the collection of the bill amounts can take place, as well as the collection of the 'old' arrear amounts. Details on the activities, staffing, time schedules and supporting policies are formulated in appendix 2.

It is recommended that the activities listed in appendix 2 are taken as a package, that is applied in sequence to each of the villages and hamlets in the pilot area. The first two items concerning water meters and customer data, have to be done only once. For the whole pilot area of Senoures, the total time required for these two items is estimated at 1.5 years.

28   Revenue Improvement Task force (RIT)

It is recommended to establish the RIT as a separate unit in the form as recommended in the first RIAP [FaDWS, July 1992]. The current report provides an updated list of task descriptions of the RIT staff as well as the required technical assistance in appendix 3. The RIT should adopt the integrated approach, as outlined above, as a guideline for implementation of revenue improvement activities in the pilot area.

29   Target Phase II (1994- 1996)

It is envisaged that towards the end of phase II the integrated approach is implemented in the whole pilot area. It is recommended to strive for a collection efficiency of 80-85% as a target to be reached at the end of phase II. The expansion of the new system to the whole service area should be effected in phase III.

Figure 1. Integrated Approach of Revenue Improvement

```
                        ┌─────────────────────┐
                        │ 1.                  │
                        │     Water Meters    │
                        │ Goal                │
                        │ Upgrade the condition of │
                        │ all water meters    │
                        └─────────┬───────────┘
                                  │
                                  ▼
                        ┌─────────────────────┐
                        │ 2.                  │
                        │    Customer Data    │
                        │ Goal                │
                        │ Update and Computerize │
                        │ all Customer Data   │
                        └──────┬───────┬──────┘
                               │       │
              ┌────────────────┘       └────────────────┐
              ▼                                          ▼
   ┌─────────────────────┐                   ┌─────────────────────┐
   │ 3.                  │                   │ 4.                  │
   │   Meter Reading     │                   │   Arrears Billing   │
   │ Goal                │                   │ Goal                │
   │ Organize and manage │                   │ Assess & issue computer │
   │ new reading system  │                   │ bills of 'old' arrears │
   └─────────┬───────────┘                   └─────────┬───────────┘
             │                                         │
             ▼                                         │
   ┌─────────────────────┐                             │
   │ 5.                  │                             │
   │      Billing        │                             │
   │ Goal                │                             │
   │ Issue new computer bills │                        │
   │ and produce reports │                             │
   └─────────┬───────────┘                             │
             │                                         ▼
             ▼                               ┌─────────────────────┐
   ┌─────────────────────┐                   │ 7.                  │
   │ 6.                  │                   │   Arrear Collection │
   │  Revenue Collection │                   │ Goal                │
   │ Goal                │                   │ Organize and manage the │
   │ Organize and manage the │               │ collection of 'old' arrears │
   │ new collection system │                 └─────────────────────┘
   └─────────────────────┘
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*Fayoum Drinking Water
and Sanitation Project*

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APPENDIX 1

RESULTS OF ANALYSIS OF CUSTOMER DATA
TERSA VILLAGE, SENOURES.

Starting in July, customer data were copied from the consumer ledger on data-entry forms. Next, the data were copied from the data-entry forms into computer files. Among others, the following data were entered in the computer:

- name of the customer;
- consumer number, also called connection number;
- water meter number;
- last reading registered in the consumer ledger, the so called 'June 1993' reading.

In August 1993, El Azab readers visited the local units of Tersa and Matatares in order to update and assess the status of the computer data. The same data were registered as mentioned above, on the understanding that in this case the readings were the actual August data. The readers could not be influenced by existing data, because no customer data were provided to them.

Using the data for the village of Tersa, the water meter number was updated and the August readings were entered. The customer name was used as an identification key used for data-entry. Subsequently, the water consumption was calculated by subtracting the 'June' reading from the August reading. This were the results:

- 18% of the records showed a negative consumption;
- 35% of the records showed an abnormal high consumption (> 100 m3);
- 13% of the records showed a normal consumption.
- in 34% of the cases no consumption could be calculated, because the meter was broken or not readable or the customer's residence was not accessible.

These results show that at least 53% of the data are in a bad shape. A second data collection visit was held in Tersa in November 1993 in order to verify the August data and get reliable consumption data over the period August to November 1993. Again, El Azab staff went, without any customer data, into Tersa village to register the customer's name, meter number and reading. The data were entered in the computer files using the customer name as a key. The calculation of the water consumption for the three months period between August 1993 and November 1993 showed the following results:

- 7% of the records showed a negative consumption;
- 15% of the records showed an abnormal high consumption (> 100 m3);
- 35% of the records showed a normal consumption.
- in 43% of the cases no consumption could be calculated, because the meter was broken or not readable or the customer's residence was not accessible.

Although the results are somewhat better, still at least one third of the data is unacceptable. Below follows a list of reasons that, to a great or lesser extent, may have caused this imperfection:

- the name of a customer is not unique, so readings of different customers with the same name can be interchanged;
- meters readings were not copied correctly either by the reader or by the data input assistant; e.g. a check of water meter numbers recorded in August and in November learned that the meter numbers of many customers were recorded (slightly) different.
- the water meters were replaced by a new ones or repaired and set to zero without giving notice to the customer administration.

APPENDIX 2

**DETAILS ON THE COMPONENTS OF AN
INTEGRATED APPROACH OF REVENUE IMPROVEMENT**

1. Water Meters

Goal:
Upgrade the condition of all water meters

Activities:
1.1 'Old black' MAASARA meters: replace all (broken and working).
1.2 All other brands: 1.2.1 replace broken, non-repairable meters.
                                  1.2.2 repair broken, repairable meters.
                                  1.2.3 revise (maintain and calibrate) all meters older than 10 years.

Staffing and Duration:
1,000 connections: 2 persons for a period of 2 months.
Senoures district: 4 persons for a period of 1.5 years.

Supporting policies:
Standardize water meters *(see recommendation 1)*
Take authority over the installation of new connections *(see recommendation 2)*
Revolving fund for revision *(see recommendation 3)*
Revolving fund for regular repair and maintenance *(see recommendation 4)*
Change legal status of the water meter *(see recommendation 5)*
Upgrade the performance of the water meter workshop *(see recommendation 6)*

2. Customer Data

Goal
Update and computerize all customer data

Activities
2.1 Visit all customers (with or without blank forms) and carefully record the following data:
- full customer's name;
- customer's address (if existing);
- water meter number (if existing);
- consumer/connection number from an old receipt (if available);
- water meter reading; and
- status of the meter.

Leave behind a temporary copy of the data at the customer's residence (e.g. on a sticker, pasted to the water meter glass) and inform the customer.
2.2 Transfer the same customer data as mentioned above (activity 2.1) from the consumer ledger to the computer.
2.3 Update the computer data of activity 2.2 by using the field data of activity 2.1.
2.4 Issue the customer code ('code C') in the computer files.
2.5 Make the customer cards containing the following data:
- customer code ('code C');
- full customer name;
- customer's address.
2.6 Visit all customers and

- remove the temporary copy (see activity 2.1);
- fix the customer card to or close to the water meter;
- record the meter reading.
- inform the customer about the new system (orally and on paper)

2.7 Enter the meter reading of activity 2.6 in the computer (the 'zero' reading).

Staffing and Duration

1,000 connections:	5 field visitors and 2 computer operators for a period of 1.5 month.
Senoures district:	10 field visitors and 2 computer operators for a period of 1.5 years.

Supporting policies

Issue a policy for illegal connections *(see recommendation 11)*

3   Meter Reading

Goal

Organize and manage the new reading system

Activities

3.1 Change the reading frequency into once in four months; the first reading to start four months after the 'zero' reading of activity 2.6.
3.2 Make task descriptions, target performances, incentive schemes and arrangements for transportation allowances.
3.3 Train, instruct and guide the readers with respect to the new system.

Supporting policies

Make a human development plan *(see recommendation 23)*
Bring readers under the authority of El Azab *(see recommendation 24)*

4   Arrears Billing

Goal

Assess and issue computer bills of 'old system' arrears

Activities

4.1 Assess the value of arrears of each customer.
4.2 Design a separate billing form for arrears.
4.3 Issue arrear bills for the total value.
4.4 Issue bills for payment in instalments if the customer prefers to spread the payment of the total value (activity 4.3) is not paid.

Supporting policies

Design a policy for assessing arrears *(see recommendation 17)*
Design a policy for settling arrears by instalments *(see recommendation 18)*

5. Billing

Goal

Issue new computer bills and produce reports

Activities

5.1 Change the billing frequency into once in two months; the first billing to start one month after the first reading (activity 3.1).
5.2 Design a billing form.
5.3 Enter the reading.
5.3 Assess the consumption for the billing period, i.e. the difference between the last reading (activity 3.1) and the 'zero' reading (activity 2.6), divided by two.
5.4 Produce bills and reports for collection.

Supporting policies

Update the billing working plan *(see recommendation 12)*
Appoint a system manager and a assistant system manager *(see recommendation 13)*
Make a plan of operation for computerization *(see recommendation 14)*

6. Revenue Collection

Goal

Organize and manage the new collection system

Activities

6.1 Change the collection frequency into once in two months, the first collection to start direct after the first billing (activity 5.1) has ended.
6.2 Design a payment-point system and determine the requirements for a successful introduction (among others the size of the area, to distribute bills to customers or to present bills at the payment-point, the actions in case of 'no show').
6.3 Introduce the payment-point system in areas where it is feasible, *i.e.* establish the payment-point, fix time-schedules, inform customers, etc..
6.4 Make task descriptions, target performances, incentive schemes and arrangements for transportation allowances.
6.5 Train, instruct and guide the collectors with respect to the new system.

Supporting policies
> Make a human development plan *(see recommendation 23)*
> Bring revenue collectors under the authority of El Azab *(see recommendation 24)*

7.   Arrear Collection

Goal
> Organize and manage the collection of 'old system' arrears

Activities
7.1   Present arrear bill with the total value (activity 4.3) to customers in a door-to-door collection system.
7.2   If the customer does not pay the total value of the arrear bill (activity 7.1), apply door-to-door collection with the standardized instalment bills (activity 4.4).
7.3   Make task descriptions, target performances, incentive schemes and arrangements for transportation allowances.
7.4   Train, instruct and guide the readers with respect to the arrear collection system.

Supporting policies
> Design a payment in instalment scheme *(see recommendation 18)*
> Human development plan *(see recommendation 23)*
> Bring arrear collectors under the authority of El Azab *(see recommendation 24)*

APPENDIX 3

TASK DESCRIPTIONS FOR
REVENUE IMPROVEMENT TASK FORCE (RIT)

Introduction
A Revenue Improvement Task force (RIT) unit should be established to take up the activities of the pilot project, formulated in the integrated approach (see figure 1 and appendix 2). This task force will have its office at the El Azab headquarters at the Alazab premises. The task force will be led by the RIT manager, who is accountable to the head of the administration department. The RIT consists of five units, each led by a chief. Positions have to be filled by El Azab employees who are appointed by the general manager. The selection needs careful attention and the El Azab employees have to be freed from part of their routine work to be available for the task force.

The total management staff requirement is 6, *viz.* one the manager and five chiefs. Further on additional staff is required for assisting the management and the execution of operational tasks. The tasks of the RIT staff are in the field of planning, organizing, training and guidance. Below the tasks of the manager and each of the unit chiefs are summarized and the requirements for technical assistance are identified.

Recommended Tasks Revenue Improvement Task force Manager

General
1. Manage and control the task force and the implementation of the integrated approach.
2. Advise and assist the El Azab management on matters concerning the pilot project.
3. Report and be accountable to the head of the administration department.
4. Make efforts to modify the Governor's decision on readers and collectors.
5. Organize and monitor activities in the fields of water meter management, customer data base and automation of billing.
6. Organize the operation of the reading and collection departments in the pilot area.
7. Make working schedules for the operation of the new reading and collection system.
8. Design a proposal for an incentive structure for staff, depending on the revenue collected.
9. Identify training needs for the RIT staff.
10. Entertain contacts with customers and provide adequate information regarding the implementation of changes.

Recommended Tasks Meter Management chief

General
1. Assist and advise the management in establishing a meter management policy and plan.

Replacement and Revision programme
2. Organize the dismantling, repair and re-installing or replacement of all the broken meters in the pilot area.
3. Achieving standardization of water meters and materials.
4. Design criteria for the installation, location and protection of meters.
5. Design operational and administrative procedures for meter re-installing.
6. Make proposals for changing the legal status of the water meter.

Workshop
7.   Design working procedures, standards and schedules for optimal performance.
8.   Identify requirements for and numbers of additional technical staff and advise and assist the RIT manager in recruitment.
9.   Identify requirements for additional equipment and advise and assist the RIT manager in purchase.
10.   Assess optimal composition and levels of meters and spare parts in stock.

Revolving fund
11.   Assist and advise the RIT manager in getting approval from the Ministry of Finance for the implementation of a regular revolving fund for financing the costs of replacement, repair and maintenance of meters.
12.   Make detailed calculations for assessing the amount of surcharge on the bill.

Recommended Tasks for the Customers Data chief

General
1.   Assist and advise the management in establishing a customer data management policy and plan.

Data collection
2.   Organize the updating of data through the collection of field data.
3.   Prepare a policy with respect to illegal connections.

Customer card
4.   Design and implement a customer card.

Automation
5.   Design data input sheets to be used for inputting customer data into the computer.
6.   Organize transfer of customer data of the pilot area from the consumers sub-ledger to the data input sheets.

Recommended Tasks for the Billing System chief (System manager)

General
1.   Assist and advise the management in establishing policies and a plan of operations.
2.   Manage the automated billing system in the position as system manager.
3.   Maintain contacts with the experts that assist in implementation of the billing programme.

Software programme
4.   Identify modifications of software programme.

Hardware configuration
5.   Assist and advise the RIT manager in the purchase of additional hardware configuration.
6.   Identify accommodation and office requirements for housing the Billing Unit.

Billing
7.   Design, implement and evaluate the regular and the arrear billing form.
8.   Organize the billing cycle with a frequency of every two months.
9.   Organize the arrear billing programme.

Selection and Recruitment
10. Identify the requirements for an assistant system manager.
11. Assist and advise the RIT manager in recruiting an assistant system manager.
12. Identify the requirements for additional computer operators.
13. Identify needs for training of computer operators.

Recommended Tasks for the Meter Reading chief

General
1.   Assist and advise the management in establishing a meter reading policy and plan.
2.   Assist the RIT manager in the efforts to modify the Governor's decision on readers.
3.   Develop a human development plan for readers.

Reading frequency
4.   Organize the introduction of a reading frequency of three times per year instead of four times.

Meter readers
5.   Identify requirements for the meter readers.
6.   Assist the Local Units in selecting the new readers.
7.   Organize and coordinate the extension of meter readers in the local unit.

<u>Recommended Tasks for the Revenue Collection manager</u>

General
1. Assist and advise the management in establishing a collection policy and plan.
2. Assist the RIT manager in the efforts to modify the Governor's decision on collectors.
3. Develop a human development plan for collectors.

Collection systems
4. Organize the implementation of the recommended payment-point and door-to-door warning note system for villages.
5. Organize the implementation of the recommended door-to-door system for hamlets
6. Design regulations for follow up on bad debtors.

Collectors
7. Identify requirements for collectors.
8. Assist the Local Units in selecting the new collectors.
9. Organize and coordinate the extension of collectors in the local unit.

<u>Recommended Consultancy Assistance</u>

Consultancy

The RIT manager and the five units should be assisted by local and foreign consultants as follows:

1. The team leader of the Fayoum Drinking Water and Sanitation Project should provide regularly backstopping to the pilot project.
2. One local financial consultant for the meter management for a period of one month.
3. One foreign technical consultant for the meter management unit for a period of one month.
4. Two local computer system experts for the remainder of phase one and for phase two of the billing programme.
5. One local financial consultant for the whole length of the pilot project.
6. One local senior financial consultant for a period of eight months.
7. One foreign financial consultant for the period of six weeks, divided over two times three weeks in the course of the pilot project.
8. Training needs for the execution of the operational tasks are already identified in the previous chapters. Training and guidance of the RIT staff is to be given by the consultants and depends on the quality of the El Azab employees selected.