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STAGE FOUR

Yemen Water Sector

Yemen Water Sector - Damage Assessment Report of the Urban Water Supply and Sanitation Situation in Yemen – Stage IV

Part 2: Situational Assessment Report

Annex 11 Technical Assessment Report for Al Sheher

Imprint

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Abbreviations

ABR	Anaerobic Baffled Reactor
BMZ	German Ministry of Economic Cooperation and Development
BoD	Board of Directors
BoQ	Bills of Quantities
CAC	Cooperative Agricultural Credit (Bank)
CBO	Community Based Organization
COCA	Central Organization for Control and Auditing
DAS	Damage Assessment Study
DCI	Ductile Cast Iron
DI	Ductile Iron
EM	Electro-mechanical
USD	US Dollar
FC	Financial Cooperation
GI	Galvanized Iron
GDP	Gross Domestic Product
GIZ	Gesellschaft für Internationale Zusammenarbeit GmbH
GoY	Government of Yemen
HR	Human Resources
HRDU	Human Resource Development Unit
INGO	International Non-Governmental Organisation
ICRC	International Committee of the Red Cross
IDP	Internally Displaced People
IT	Information Technology
JAR	Joint Annual Review
KfW	Kreditanstalt für Wiederaufbau
LAC	Local Advisory Committee
Utility	Local Corporations
MoCS	Ministry of Civil Service
MoF	Ministry of Finance
MoM	Minutes of Meeting
MWE	Ministry of Water and Environment
NRC	Norwegian Refugee Council
NRW	Non revenue water
NWRA	National Water Resource Authority
NWSA	National Water and Sanitation Authority
NWSSIP	National Water Sector Strategy and Investment Plan
OMS	Operation Management Support
O&M	Operation and Maintenance
PIIS	Performance Indicator Information System
PVC	Polyvinylchloride
QF	Questionnaire forms (DAS Stage III)
St, ST	Steel
TA	Technical Assistance
TFPM	Task Force on Population Movement
UN	United Nations
USD, U$	American Dollar
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WSP	Water Sector Programme in the Republic of Yemen

WSLC	Water and Sanitation Local Corporation
WU	Water Utilities
WWTP	Wastewater Treatment Plant
YER, YR	Yemen Rial

Units

LS	lump sum
m	meter
Mio	million
masl	meter above sea level
mg/l	Milligram per litre
m^3/d	Cubic meters per day
lpcd	litre per capita per day
no, nos	number (numerical figure)

Executive Summary

Al Shehr LC is responsible on the water and sanitation services in Al Shehr area. The LC has three main directorates: financial, water, and sanitation. As per the 2022 collected data the total population in area is around 139,256. The served population is around 95%.

There is sanitation system in place mainly collection network serving around 47% of Al Shehr city. There is no wastewater treatment plant, the collected wastewater is discharged to the sea.

A. Institutional Assessment and Recommended Technical Assistance Measures (TA Plan)

From the institutional part the LC has three main directorates: financial, water and sanitation. The total number of employees is in total 145 employees as per year 2022 figures. The LC governance and management challenges, actions and priority need to improve work efficiency are listed below.

Department/Section	Shortcoming	Recommendation	Implementation Priority
Governance / Management / Organisational structure / Resilience	Organisational structure needs update to reflect new sections for Women and Statistics	Update organizational structure as per the real situation	Moderate
	Some of the laws and regulations need update for LC benefits	Work with legislation bodies to modify old regulation to cope with LC needs	High
	No contingency plan for emergency	Prepare contingency and risk management plan including drought management plan	Moderate
	Lack of private sector involvement to carry out certain activities/services	Adjust regulations to allow for Private sector involvement	High
	No capacity building plans to LC staff according to directorates needs	Prepare capacity building plan to LC staff according to directorates needs	Moderate
	Low customers payment	Facilitate customers debit payment	High
	No advisory committee involved in decision making	Form advisory committee to participate in the decision-making process.	Moderate
Human resource and capacity building management	No Job description for staff	Prepare job description for staff	Moderate
	Low qualification or skills of some employees	Hire qualified staff and carry out regular training for staff as per directorates needs.	High
Finance management	Lack of standardized procedure and reporting	Prepare standards work and work flow procedures to minimize time	Moderate
	Lack of qualified accounting auditor and reviewer	Appoint accounting auditor	High
	Financial system for revenue collection is still manual	Install automated financial system	Moderate

Customer service and relation management	Considerable domestic customers without meters	Install more meters	High
	Lack office equipment, computers, printers, data network	Purchase of more computers, printers for customers services	High
	No workshop for meter maintenance	Construct workshop for maintenance of meters and other fittings	High
	Improve customers collection efficiency	Provide incentives to encourage customers to pay bills	Moderate
IT	Lack of computers, printers and servers	Purchase of computers and printers	Moderate
Gender	Low number of women employees.	Hire more women in suitable jobs like secretary, finance, and IT	Moderate

B. Infrastructure Assessment and Recommended Rehabilitation Measures (Investment Plan)

From the technical part the LC provides water and sanitation services to Al Shehr city and areas around it. The LC is serving 95% of the current population 139,256 people. The LC obtains the water from the currently 16 operating wells. The average per capita is around 80 litre per person per day. The total production capacity in year 20022 is 568,488,1 m^3. The length of water transfer lines is 6433 km while the length of water distribution network is around 183933 km. The water amount supplied by the water distribution network in year 2022 is 5,297 m3.

The water supply system includes 8 reservoirs two of which are for collection and the remaining are for distribution.

The water per capita in 2022 is around 80 litres per person per day which is good compared to WHO standard 150 litres per day. The sanitation services cover around 47% of Al Shehr city, all collected wastewater discharged to sea without treatment. The list of challenges, actions and priority are listed below.

Department	Shortcoming	Recommendation	Implementation Priority
Water Supply	Water per capita is still low < 80 litre per person per day	Drill more wells to increase water supply	High
	No spare pumps and no spare parts	Purchase stand by pumps and pumps spare parts	High
Water Distribution	Still 5 to 10 % of the population without water supply network	Expand water distribution network to cover all population	Moderate
	Frequent pipeline blockage due to high content of dissolved salt.	Water quality treatment is needed to reduce salinity concentration	High
Water quality monitoring and testing	No water lab, no water quality monitoring	Construct water lab and hire qualified staff for water testing and monitoring	High
Operation and maintenance	Operating the generator and pumps 24 hours per day in hot and humid climate; this decreases the life span of the generators by 3 to 5 years	Purchase of standby generators and spare parts	High
	The lack of maintenance equipment, electricity generators for the O&M of the pumps, and water network	Procurement of electricity generators and transformers for sustainable water supply	High
	No qualified staff for operation and maintenance	Carry out regular training for O&M staff	Moderate
	High water losses	Investment in network rehabilitation	High
Energy	Cost of diesel to run the electricity generators is high and not enough funds for it.	Work with government and NGOs to provide necessary funds	Moderate
	Low use of solar energy units	Install solar energy units to reduce the pressure on diesel generators	High
Wastewater	Sea contamination due to discharge of raw wastewater	Construct wastewater treatment plant	Moderate
	Ground water contamination from Raw wastewater	Carry out monitoring program for water sources	High

Based on the assessment results and LC needs the investment pan is categorized into three stages: Urgent, Short term and long term. The estimated cost for the technical needed measures is as follows.

Package	Measures	Urgent $	Short-term $	Long-term $	Total $
1	Civil works on buildings and structures		359,000		359,000
2	Well rehabilitation and new construction		200,000	50,000	250,000
3	Water pumping station (surface and submersible)			14550	14550
4	Collection and distribution reservoirs		730,000		730,000
5	Water network rehabilitation and extension, water meters and valves				Not available
6	O&M tools and equipment	57,000			57,000
7	Generators	27,000			27,000
8	Solar energy systems		200,000		200,000
10	Water laboratory			60,000	60,000
11	Wastewater laboratory		50,000		60,000
12	Wastewater treatment plant		3,500,000		3,500,000
13	Collection Network				Not available
14	Wastewater lifting station		10,000		10,000
Total investment		84,000	4,849,000	124,550	5,057,550

The total needed amount for the rehabilitation, restoration and extension of the water and sanitation system, provision of solar systems and supply of required operation and maintenance materials and equipment is estimated to be about $ 5,057,550.

distributed according to priority as follows.

- Urgent measures: $ 84,000
- Short-term measures: $ 4,498,000
- Long-term measure: $ 124,55

1. Background

Al Shehr city is part of Al Shehr district within Hadramout governorate shown in figure 1. Al Shehr district is located 62 km at the eastern side of Mukalla. The governorate has 28 districts.

Figure 1.1 Location Map.

The population growth through period from 2017 to 2022 in Al Shehr city the governorate districts is shown in Table 1.1.

Year	2022	2021	2020	2019	2018	2017
Population	139256	135200	131262	127439	123727	120124
Growth Rate	3%	3%	3%	3%	3%	3%
Immigrants	No data	No data	No data	No data	No data	No data

Table 1.1 Population Growth in Al Shehr City

Al Shehr LC is responsible on the water and sanitation services in Al Shehr and Al Hami cities. LC administratively belongs to the general water and sanitation corporation. The main objectives of the situational assessment report for LC in Ataq city are as follows.

- Assessment of the current water and sanitation services; this covers both technical (water and sanitation infrastructure) and institutional (offices, staffing and equipment) aspects.
- Prepare list of actions to improve the water and sanitation services with cost estimate.
- Prepare investment plan for GIZ and other donors.

For this purpose, two questionnaires were prepared based on DAS III list of required information: Questionnaire A for technical issues while questionnaire B for institutional issues. In addition, the field team prepared checklist for the problems and challenges faced the LC. Respective pictures were taken; some of them are presented in Appendix A-1

The questionnaires were prepared with close coordination with GIZ and the LC representatives through the carried-out workshops in Yemen. The questionnaires were distributed to LC's and LC for filling the requested data and the consultant field team is working with LC and LC representatives on filling gaps and getting the LC and LC certification for collected data.

Part A is covering all institutional subjects: management, governance, human resources, customer management, financial management, and IT management while Part B covers water supply, water and wastewater infrastructure, and managements. The questionnaires were distributed in March 2023. Interviews were conducted with the General Manager, Deputy General Manager for technical affairs, the Financial Manager, the Human Resource Manager, the Technical Manager, the Customer Manager and IT Manager. The field team verified and certified the questionnaires from LC and LC in August 2023.

In addition, the field team held several telephone conferences with the responsible members of the LC and LC respectively to ask for clarification of data. All provided data were analysed and respective results incorporated in this report. The final version of the filled questionnaire forms was translated into English and are listed in Appendices.

The sections below summarise the assessment outcomes of the water and sanitation services and LC and LC management capacity. The report sections are based on Hodeida report. The outcomes are summarised into an investment plan which include actions and measures to improve the services with cost estimate.

2. Assessment of Organization and Management

The LCs in Yemen were established based on Republican Decree no. (02) for the year 2001. The legal procedures and laws are still in operation during the conflict; the LC is following the financial and civil service laws, law for procurement and water law.

The LC provides the BoD with its plans and reports for discussion in the regular meetings. Obviously, the BoD was conducting its regular meetings on monthly basis before the crisis. Due to insecure condition, they stopped the recurrent meetings. The BoD should resume the meetings to insure regular monitoring and assessment of the LC performance. Decisions and instructions taken by the BoD are followed up through:

- Authorization of the LC General Manager to prepare the progress report of the agreed actions in the current

meeting and present it for discussion in the next meeting.
- Authorization of the Governor Deputy to follow up the LC management to implement certain agreed actions.
- Authorization of the competent BoD members to check, review and provide their feedback on the discussed LC performance reports and plans.

The LC emphasizes on the good interaction of the Ministry of Water and Environment, the Board of Director and the Local Council cooperation during the crisis.

2.1 Organization Structure and Governance

Al Shehr LC organizational structure is shown in Figure 2.1. The LC has an administrative procedure which was prepared for the water sector in year 2000. The LC has the following directorates and sections.

- Administrative directorate which includes HR and employee's affairs sections
- Financial directorate which includes accounting, funds, loans, assets sections
- Water directorate which includes water production, water distribution, water connections, operation and maintenance, quality, laboratory, wells and pumping stations sections.
- Sanitation Directorate which includes plants, collection network, connections, lifting stations, operation and

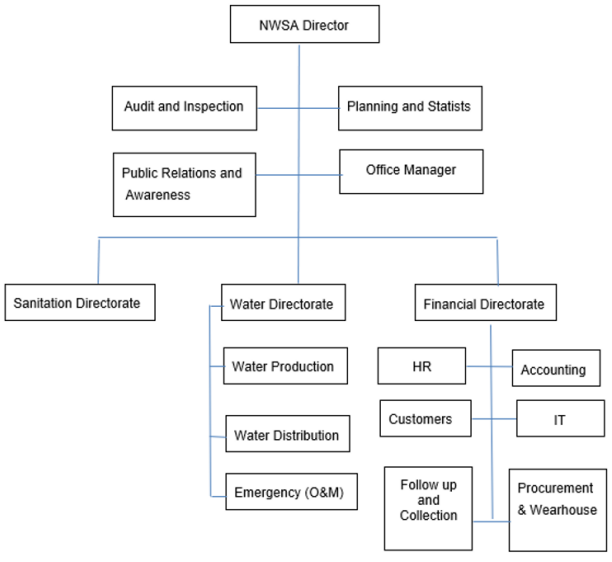

Figure 2.1 Organizational Structure

2.2 Governance and Management

In the governance side Al Shehr LC mange the water and sanitation services through the various directorates and higher management team (LC manager and his assistants). The directorate of technical affairs coordinate the water supply and sanitation services with the management team. There is no written procedures or standard procedures (SOP's) to be followed in each directorate including the operation and maintenance ones. However, the LC is implementing the international and national standards related to water and environment. The LC is cooperating with various governmental offices and with locals to resolve any related issue.

In order to improve the governance and management within Al Shehr LC the following issues need to be addressed.

- Work with the private sector to carry out certain activities/services.
- Update organizational structure where two sections been added (one for women and another one for safety).
- Form advisors committee to help in decision making process.
- Some of the laws and regulations need update for LC benefits.
- Develop short- and long-term strategies.
- Better communication with various stakeholders
- Update administrative and financial programs.
- Hire qualified staff for monitoring and inspection.
- Apply automated financial system for revenue collection.
- Development of capacity building plans to LC staff according to directorates needs.
- Development of job descriptions for staffing
- Lack of equipment, computers, printers, cameras and inspection tools.
- Lack of financial resources to improve water and sanitation services and for fuel.

Assessment of Staffing Needs

There are 145 staff members in Al Shehr LC in year 2022, 135 are male and 10 are female as shown in Table 2.1 There are no female staff members in the LC. The table below summarizes the staff according to gender, working condition. According to the LC all employees are currently working. Comprehensive details on the assessment of staffing situation of the LC are given in questionnaire A.

Staff situation	2017	2019	2022
Total no. of permanent staff	150	142	145
Total nos. of contracting staff	0	0	95
Total nos. of day workers (temporary worker)	0	0	18
Total no. of staff	150	142	145
Total nos. of staff male actual working	127	121	111
Total nos. of staff male not actual working	14	11	24
Total nos. of staff female actual working	9	10	10
Total nos. of staff female not actual working	0	0	0
% of female to total	6%	7%	7%

Table 2.1 Staff Situational Summary

There is no data on number of staff per each directorate. The qualification is considered as important indicator for

the employee performance. The staff qualifications as per year 2022 is as follows.

Qualification	Number	No of Females
Bsc	20	1
Diploma	3	2
High School	34	2
Vocational	9	2
Less than High School	60	2
Without	10	-

The number of staff distribution in the various directorates is as follows.

Position	Number	No of Females
Managers	10	No data
Administration	12	No data
Accountants	7	No data
Engineers	6	No data
IT	2	1
Technicians	12	No data
Drivers/Guards and Cleaning staff	8	No data
Workers	90	No data

The total number of staff responsible on water and sanitation services such as water production, distribution, operation and maintenance are 57. This number distributed as follows between various technical sections.

Department	Number	No of Females
Management	10	No data
Financial	12	No data
Customers Service	21	2
Planning and Statistics	2	No data
Women	1	1
IT	3	1
Internal Audit	5	No data
Legal Issues	1	No data
Drivers/Guards and Cleaning	8	No data
Sanitation	10	No data

2.4 Capacity Building Plan

The LC prepared a list of needed training for the staff in the various directorates as shown in the Table 2.2.

Training	Directorate	No Trainees	Training days
Governance, Risk Management, Communication	Management	11	7
English	Management	7	180
O&M for electricity generators	Technical Affairs	24	30
Surveillance	Support sections	18	7
Secretary and archiving	Administration	5	14
Strategic planning and project management	Management	22	30

Table 2.2 Training Needs

2.5 HR Procedures and Reporting

Al Shehr LC follows the general procedure of public civil law and national salary scheme for employment and salary payment. Nonetheless, there are no job descriptions available for the different positions, which indicate that the employees may not be always aware of their tasks and responsibilities. Furthermore, there is no cooperation with other water corporations in terms of HR support or exchange of staff.

The workflow procedures of human resource department are not documented in any way, but the annual vacation and attendance and payroll is reported monthly. The LC applies the shiftwork for the technicians in order to minimize the operation cost during the crisis such as overtime and overnight allowances.

3. Assessment of Financial Capacity

3.1 Financial Data, Procedures and Reporting

Al Shehr LC organizational structure shows the financial directorate as one of the key directorates. It includes several sections such as accounting, HR, Audit, IT, and projects. The financial directorate is responsible on all financial issues from staff salaries to projects funds and all related expenses.

The financial directorate prepare annual financial report. The report includes costs, expenses, balance, and assets. The report shared with several organization such as central water and sanitation corporation and the central audit bureau. The last financial audited report from the central audit bureau was published in year 2018. There are other semi-annual, quarterly, and monthly reports. In addition, there are monitoring report for accounting activities. The financial directorate has registration documents for LC assets, the last update was in year 2021.

It also uses accounting and financial software for financial reports. The collected financial data in questionnaire A covers the followings.

- Recurrent annual budget.
- Revenues, expenses and liabilities.
- Financial efficiency and support
- Financial subsides.
- Bank account data and cashflow
- Cashflow requirements
- Recurrent Budget

The annual total recurrent budget overview is used as monitoring tool to identify the LC performance in utilizing the allocated and received budget. In addition, the deviations of the expenses to the approved or received budget from the funding sources - recurrent or investment budget – are identified. Table 3.1 below provides an overview of the recurrent requested budget and received amounts from the government.

Recurrent budget (Yemen Riyal)	2017	2019	2021
Total recurrent budget requested	-	494,959,000	703,764,000
Total recurrent budget approved in YER	-	-	-
Total recurrent budget disbursed in YER	459,689,216	621,296,672	811,995,499

Table 3.1 Recurrent Budget in (Yemen Riyals)

3.3 Revenues, Expenses and Liabilities

The table below (Table 3.2) presents an overview of the annual amount of operation and maintenance cost for LC according to different categories for period from 2017 to 2022.

Revenues / Expenses (Yemen Riyal)	2017	2019	2021
Total revenue in YER	323,518,872	374,164,183	386,001,067
Total expenses in YER	459,689,216	621,296,672	811,995,499
% expenses versus revenue	1.4%	1.7%	2.1%
Salaries, allowances, incentives and others in YER	229,615,326	299,173,155	392,394,864
% Salaries, etc. of total revenue	71%	80%	100%
% Salaries, etc. of total expenses	50%	48.2%	48.3%
Fuel, oil in YER	39,063,436	53,738,292	36,453,663
% Fuel, oil, of total revenue	12%	14.4%	9.4%
% Fuel, oil, of total expenses	8.5%	8.6%	4.5%
Electricity in YER	56,353,686	59,836,234	185,816,371
% Electricity total revenue	17.4%	16%	4.8%
% Electricity of total expenses	12.2%	9.6%	2.2%
Maintenance, spare parts, other O&M expenses in YER	19,943,190	41,368,522	51,938,590
% Maintenance, other O&M of total revenue	6.2%	11%	13.4%
% Maintenance, other O&M of total expenses	4.3%	6.7%	6.4%
Other expenses in YER	20,175,111	65,062,388	34,155,861
% Other expenses of total revenue	6.2%	17.3%	8.8%
% Other expenses of total expenses	4.3%	10.5%	4.2%
Depreciation in YER	94,538,466	102,118,081	111,236,150
% Depreciation of total revenue	29.2%	27.2%	28.8%
% Depreciation of total expenses	20.5%	16.4%	13.7%

Table 3.2: Revenues, Recurrent Costs and Depreciation

Revenues:

Total annual revenue increased from year 2017 to 2021 by 1.2 times. This is considered small increase compared to increase in population and number of customers. The annual expenses are much higher than annual revenues. In year 2017 the ratio was 1.4% increased to 2.1 in year 2021.

Expenses:

The expenses increased from year 2017 to year 2021 by 1.7 times due to an increase of the salaries, fuel prices and operation and maintenance cost. The salaries form around 48% of the expenses but it consumed all the revenues in year 2021. The power (fuel and electricity) formed around 6.7% from the expenses in year 2021.The O&M cost formed around 6.4% of the expenses in year 2021.

Both power and O&M expenses has no source of funding due to salaries consumed 100% of revenues in year 2021. This put high pressure on the LC to find support from other sources such as donors or NGO's or government. The depreciation represents 13.7% in year 2021, this adds more pressure on the need to find more financial resources to cover this cost.

Revenues versus Expenses

The revenues compared to expenses indicated that Al Shehr NWAS faces high challenge in the financial capacity as the expenses still much higher than revenues (ratio 2.1%).

Liability

The financial liability of the LC is shown in Table 3.3 through the following indicators: The total liable amount accumulated to 648,755,122.81 Riyal in year 2021. The highest portion is for electricity and taxis which represents 60%.

Financial liability	2021 (YER)	% of total
Salaries and wages	3,812,312.38	0.6%
Other dues for employee	56,366,840.05	8.7%
Indebtedness of electricity	185,816,371	28.6%
Fuel and oil	36,453,663	5.6%
Insurance	65,934,981	10.2%
Taxes	208,730,943	32%

Local councils	49,149,591	7.6%
Other financial obligation	42,490,419	6.5%
Total	648,755,122.81	100%

Table 3.3 Financial liabilities in Year 2022

Looking at the huge figures of liabilities it is evident that the LC is not even able to cover the operation and maintenance cost, as there are still payable amounts to insurance organization, local council and for taxes.

3.4 Financial Efficiency and Support

The table below (Table 3.4) summarizes the financial overview of the LC in Year 2021.

Description	2021 (YER)
Total revenue	386,001,067
Total expenses	811,995,499
Depreciation	111,236,150
Total expenses plus depreciation	923,231,649
Deficit / savings with depreciation	-537,230,582
Deficit / savings without depreciation	-425,994,432

Table 3.4 Financial Overview for the last two years

It is clear that there is big deficit either with or without depreciation, this makes the LC unable to cover the operation and maintenance cost which affects the quality of water supply services.

3.5 Financial Subsidies

The deficits increased with time due to increased expenses and low revenues. The deficit requires financial support or subsides from the ministry and other organization. Table 3.5 below presents an overview of the received funding subsidies in the past three years.

Funding	Year 2017	Year 2019	Year 2021
Government			
Donors		9,342,004.0	29,033,290.0
Total		9,342,004.0	29,033,290.0
Deficit		-409,071,493.00	-425,994,432

Table 3.5 Financial subsidies

There are no figures on the government subsidy, the only available figures are for donor's subsidy with total amount of 29,033,290 Riyals in year 2021. The total support still small compared to the deficit in year 2021 with total amount of 425,994,432 Riyals. The donor's contribution was mainly used to provide fuel to electricity generators and for solar energy cells.

3.6 Bank Account Data and Cash Flow

The table below (Table 3.6) presents an overview of the accounts for 2017 to 2021. The connection account is the income the LC received for new connections. Respective amounts are utilized for investments. The income account represents the revenues from the water sale. The LC uses these revenues to cover the running cost (O&M). The depreciation account is for depositing the collected revenue for the required amount to cover the operation and maintenance cost and is utilized for replacing spares and materials of the water or sanitation facilities.

Account Type	Connections Account	Income Account	Expenditure Account	Depreciation Account	
2017	first period balance (YER)	386231	365230	250226	23400
	Total Deposits (YER)	7022143	6929841	9876751	
	Total withdrawals and transfers (YER)	6820421	2003000	10023571	
	end period balance (YER)	587952	5292072	103407	23400
2019	Total Deposits (YER)	15997750	311552340	303333000	8000000
	Total withdrawals and transfers (YER)	16209858	306803000	302046081	8003000
	end period balance (YER)	593388	4887629	1731084	20400
2022	Total Deposits (YER)	20295870	390866902	392378002	2000000
	Total withdrawals and transfers (YER)	19666963	390888902	390744862	2000000
	end period balance (YER)	822244	1272432	1846259	20400

Table 3.6 Bank Account Details

The total cash deposit or revenues from connections and income is around 386,001,067 Riyals in year 2021. The average monthly cashflow is around 67666292 Riyals. There is no depreciation amount in the bank due to the crisis. Subsequently, there is no budget for investment or major maintenance available.

3.7 Cash Flow Requirements

The LC did not provide data on the cash flow requirements. The financial support has been calculated according to the financial capacity of the utility. To cover the monthly recurrent minimum expenses for salary and fuel, and electricity the LC needs in total 614,664,898.

Riyals per year as per the year 2021 figures are needed for basic issues. The fuel cost may vary during the course of time in dependence on the exchange rate, price per litre of fuel and availability of electricity from public grid. Support in this regard can be provided for 12 months during conflict in terms of improving the intuitional and financial capacity and the interim assessment. The unexpected and unreasonable fluctuation of the economic situation and unpredictable end of crisis does not allow providing reliable cash flow figures for the post-conflict era. Once post-conflict condition applies, the actual situation (particular regarding physical damage) of the LC has to be reviewed and the cash flow requirements updated respectively. In addition, the financial support has to be controlled through the MoF and in accordance with their regulations.

3.8 Financial Actions

According to the collected information in questionnaire B, Al Shehr LC implemented the following actions to improve the financial management.

- Increased the use of solar energy in water production to reduce the production cost.
- Increased the promotions for staff working in the field.
- Facilitated customers debit payment.
- Reduced water losses from water networks
- Conduct financial and administrative training to improve staff working efficiency.
- Provide financial and administrative staff with needed computers and facilities to analysis financial data and prepare financial reports.

4. Assessment of Customer Management

4.1 Customer Management Procedures and Reporting

Al Shehr LC has customers management system which is used for updating the network and customers data. The customer service centre applies the following procedures in this regard.

- Customer application for new customer connection, added water meters, change of meter location and change of customer name.
- House connection and meter installation.
- Meter reading and bills distribution.
- Revenue collection.
- Inspection and follow up of connections.
- Customer Complains follow-up.

For the readings of the functional water meters, the LC uses GIS based reading routes. The bills are distributed manually. The customers pay either directly at the LC Customer service centre, or to the LC account at the post office or to the staff when they visit their houses.

The LC uses a Maintenance Management System application for the customer complaint procedure. Thus, any complaints from customers are reported and addressed and documented.

4.2 Customer and Connection Data

The table below (Table 4.1) summarizes the number of connections per customer category for the water system. The total number of water connections in 2017 is 3233 connections, increased to 4300 in year 2022 most of which are in the domestic sector (domestic formed 87% from total in year 2022).

Connections	2017	2019	2021
Domestic connections	13883	14642	15507
Government connections	147	156	166
Commercial connections	1312	1507	1646
Total connections	15343	16305	17319
% installed water meter to total connection	100%	100%	100%
No of functional water meters	15407	16373	17388
% of functional water meter to total	100%	100%	100%
No of nonfunctional with zero reading	1534	1727	1662
% of zero Reading water meter to total	20%	21.6%	19.5%
Domestic sanitation connections	6980	7325	7808
Government connections	80	84	86
Commercial connections	172	189	210
Other connections	177	225	237
Total connections	7409	7823	8340

Table 4.1 Water connections per customer category

The total number of installed water meters in year 2021 is 17319 meters all of which is functional. water meters are charged for either an estimated consumption or a fixed amount per month.

In year 2021 there is 1662 meters with zero reading water meters, representing 19.5% of the total meters. This percentage indicates that the respective customers are charged only for the minimum consumption of 5 m per month. This means the LC charges only 80.5% of the customers for the consumption from the actual water meter readings while the remained 19.5% pay the minimum charges. There are only 8340 sewerage connections in the city, the collected sewerage water is discharged to wadis without treatment or reuse.

4.3 Billing & Collection

Al Shehr LC takes monthly water readings and issue water bills every two months. The domestic sector is the largest sector in water consumption (in year 2021 domestic water formed 89.5% of the total connections). Table 4.2 shows the billing amounts and percentage from total for all sectors.

2022	2019	2017	
5,684,881	4,754,294	4,235,610	Total Produced Amount (m3)
3,420,215	3,033,561	2,510,921	Total Billed Amount (m3)
59%	64%	60 %	Percentage of Billed against Produced
3,061,939	2,768,782	2,302,433	Billed Domestic Amount (m3)
116,190	79,524	84,078	Billed Governmental Amount (m3)
242,086	185,255	124,410	Billed Commercial Amount (m3)

Table 4.2 Billing Amounts

The billed domestic water represents around 89.6% of the total amount billed in year 2022 while the government water represents 3.4% and commercial represents around 7%. The details for the billing and collection are shown in Table 4.3.

	2017	2019	2022
Total Water Revenues (Riyals)	338,896,666	400,721,603	528,013,211
Revenues Domestic (Riyals)	245,145,735	291,703,578	268,064,141
Percentage from Total	72%	72.8%	51%
Revenues Governmental (Riyals)	52,998,830	49,412,015	120,397,000
Percentage from Total	15.6%	12.3%	22.8%
Revenues Commercial (Riyals)	40,752,101	59,606,010	139,552,070
Percentage from Total	12%	14.8%	26.4%

Table 4.3: Revenues from Water Services

The sanitation services are limited to certain parts where the LC is responsible on collection only. There is no treatment pants or reuse schemes. The served customers with wastewater collection pay fees for this service. Table 4.4 shows the revenues collected from sanitation service for various sectors.

2022	2019	2017	
66,952,084	39,098,624	33,438,411	Billing Total Wastewater Revenues (Riyals)
36,906,892.00	27,926,349	23,194,084	Billing Revenues Domestic (Riyals)
21,265,500.00	5,792,700	7,043,100	Billing Revenues Governmental (Riyals)
8,779,692.00	3,655,460	2,567,011	Billing Revenues Commercial (Riyals)

Table 4.4: Revenues from Sanitation Services

The collection efficiency is extremely low in all sectors. For example, in year 2017 the number of collected bills was 56621 then this dropped to 52797 in year 2022. This reflected in high debit in all sectors. The highest collection efficiency is for the domestic sector. It was 34% in year 2017 then dropped to 27% in year 2022.

The total debit in year 2017 was 391,764,523 Riyals increased to 1,058,095,500 Riyals in year 2022 almost more than double. Table 4.5 lists the issued and collected bills and debit for years from 2017 to 2022. The LC needs to improve the collection efficiency to reduce debit through several measures. Some of the measures are listed in the financial management section.

	2017			2019			2022		
	Number of bills	Debit	coll. Eff.	Number of bills	Debit	coll. Eff.	Number of bills	Debit	coll. Eff.
	No	YER	%	No	YER	%	No	YER	%
No of Domestic issued bills	160015		34%	168616	25,447,699	32%	183713		27.3%
No of Domestic collected bills	55022			54018			50298		
Domestic debit		222,822,413			306,094,938			513,041,99	
No of Governmental issued bills	1633		8.5%	1713	935,573	4.8%	1900		1.4%
No of Governmental collected bills	138			82			27		
Governmental debit		116,460,742			155,350,270			429,791,823	
No of Commercial issued bills	11803	952,280	12.3%	13936	4,737,977	14.2%	16910		14.6%
No of Commercial collected bills	1461			1977			2472		
Commercial debit		52,481,369			64,579,491			115,261,678	
Total number of issued bills	173451		32.6%	184265		30.4%	202523		26%
Total number of collected bills	56621			56077			52797		
Total debit		391,764,523			526,024,699			1,058,095,500	

Table 4.5: Billing and collection amount per customer category

4.4 Tariff Structure

The tariff as shown in the table below (Table 4.6) was approved in 2010. This approval took into account the poor customers or rationalization of consumption in the tariff of the domestic sector and mosques. The sewerage tariff services are calculated as 80% of the water tariff and applies for customers connected to the sanitation system.

As shown in the table below the tariff is structured in different subcategories for each category of customer and presents the monthly fee per m3 water consumed.

Customer category	Amount of Consumption in m3/year	Water Tariff (YER/m3)	Sewerage Tariff (YER/m3)	Total Tariff YER
Domestic & Mosques	(0 -5)	50	40	90
	(6 - 10)	60	48	108
	(11 - 15)	85	68	153
	(16-20)	100	80	180
	(21- 30)	140	112	252
	(over 30)	180	144	324
	Total:			
Government, & Schools	(0 - 10)	300	240	540
	(Over 10)	300	240	540
	Total:			
Commercial & Other	(0 - 10)	265	212	477
	(Over 10)	265	212	477
	Total:			

Table 4.6 Approved tariff structure

Obviously, the current tariff is insufficient to cover the total operation cost as stated hereinafter. The water and sanitation sectors need governmental subsidy to improve service efficiency. The LC should aim to increase its revenues and therefore improve their financial capacity through:

- Gradual increase of tariff structure.
- Increase number of connections.
- Minimize the Non-revenue water.
- Increase the collection efficiency from all customers and collected bills of domestic customers.

4.5 Quality of Customers Services

The LC has customers care centre for complaints and service quality. The percentage of resolved complains is high with 30 days for example 100% for bills and other complains. Table 4.7 list the number of complains and resolved time for each.

	2017	2019	2022
No of received bills complains	80	100	40
No of resolved complains	70	100	40
Average Response time (days)	30	30	30
No of other complains	20	18	20
No of resolved complains	202	18	20
Average Response time (days)	10	10	10

Table 4.7 List of number of complains and response time.

5. Assessment of IT and Office Resources

The LC has an IT department/section under the financial directorate. The IT section is responsible on the following.

- Management of data/maps storage and transfer
- Installation, operation and management of networks, servers, computers, printers etc.

The data includes administrative, financial, HR, customers and technical. There is GIS unit within the IT section responsible on preparation of GIS maps for water and sanitation infrastructure. The billing system is under the IT section, and it forms significant part of the IT activities.

Currently, there is a local network in the main building connecting the IT with financial and LC office Manager. There is only one server, the server specifications are listed in the Annex of Questionnaire A. The server is in moderate condition and requires regular maintenance.

There are 6 desktops and 1 laptop in moderate condition serving various sections mainly used for billing and accounting. There are 1 printer connected to desktops through local network. The printers used mainly for printing bills. The international organizations provided support to IT section in terms of printers, laptops, desktops, projector and external hard desks.

The software applications are mainly windows applications and special programs for billing, accounting, inventory control, Performance Information Indicator system (PIIS) and payroll (salaries). The GIS application is used for mapping for water and sanitation infrastructure.

Regarding the data backup, the IT department makes and keeps two copies of backup data in two separate locations as manual backup once a day. Two staff members are in charge of the backup procedure.

During the crisis and due to lacking power supply form the public grid, the IT department is only 4 hours functional at normal working hours per day from the power station within LC area. Power saving devices such as UPS or voltage regulators are available.

The IT needs office needs, computers, network, electricity chargers, and various software are listed in Annex of questionnaire A. Table 5.1 lists the main computer needs.

IT Item	NO	Section
Main Server	-	IT section
Desktops	5	IT section, Customers office
Laptops	4	IT section
Printer for bills	1	IT section, Customers office
Desktop Printers	2	IT section, customers office
Cameras	2	IT section
UPS	2	IT section
Routers/Switch/Modem	4,2,4	IT section
Battery	8	IT section
Antivirus system	10	IT section
IT Training		

Table 5.1 Computer needs.

6. Assessment of Gender Cross Cutting Issues

The total population in Al Shehr in year 2022 is 135613. The women form around 41% of total population. There are few female employees working in the LC. There is special section for women work involvement.

Women's empowerment in both public and private sectors is fundamental to ensure human empowerment equality and sustainable development. In Yemen, the women involvement is low and in some cases like Ataq LC is nil. This requires significant efforts to open the door for females by expanding economic opportunities, promoting community leadership, and partnering for greater access to education, essential health services, water, and sanitation services, leading to positive change in their communities.

2017	2019	2022	
131617	131943	135613	Population
53963	54097	55601	Female

Table 6.1 Male and Female distribution

	2022	2021	2019	2017
Average monthly income (Riyal)	50000	50000	40000	30000
Average monthly income by working women. (Riyal)	50000	50000	40000	30000
Average monthly income for Immigrant family (Riyal)	30000	30000	30000	30000
Average monthly income for poor family (Riyal)	25000	25000	25000	25000

Table 6.2 Monthly Income

The international organizations like USAID and GIZ and UN organizations helped through special programs to engage women in the public and private sectors. In 2022, USAID helped nearly 300 Yemeni women get jobs in healthcare, education, and manufacturing. USAID initiatives provide women with better access to loans and other financial products to support women-owned SMEs;

USAID provided more than $2 million in loans to women in the last year. USAID training and technical assistance in the agricultural and fisheries sectors is creating viable and sustainable livelihoods for women. In 2022, USAID provided training on agricultural productivity and food security to more than 1,700 women.

The current crisis has exacerbated the pre-conflict lack of access to clean water and led to an unprecedented cholera outbreak. The international organizations helped in rehabilitates WASH infrastructure to help provide access to safe water and sanitation facilities for women and girls, which in turn improves their access to education, health services, and economic opportunities as well as providing more safety, privacy and dignity. Women traditionally collect water, a responsibility that interferes with school and work and is often a dangerous task. Upgrades to water and sanitation facilities, and household latrines free up time for studies and employment, while reducing their exposure to gender-based violence along the trail to the water source.

To promote women engagement in the public and private sectors specifically in the LC's and LC activities including decision there is a need to organizes women-specific community outreach events; and encourages men to advocate for women's rights. In addition, there is a need to through financial support (small grants) to carry out initiatives in the coming years to increase participation of women in WASH programs. Public awareness for women on efficient uses of water or hygiene at house can be clear example on women engagement.

The gender information in Questionnaire A in the Annex lists the available information on women and potential women involvement in the LC activities.

7. Assessment of Water Supply and Management

Al Shehr city Local Corporation is responsible on the water and sanitation services in the city and rural areas around it. There is sanitation collection system but here is no wastewater treatment plant in the city. The total population in year 2022 is around 139256 served population with water supply from distribution networks in the city is around 132293 which form around 95%, Table 7.1 lists the changes in population served and coverage percentage through period from 2017 to 2022.

Year	2017	2019	2022
Total Population	120124	127439	139256
Served population with water network	114117	121067	132293
Population Coverage%	0.95	0.95	0.95
Average Per Capita in litre per person per day	70	70	80
Server population with tankers No data	5%	5%	5%
rea within LC responsibility km2	No data	No data	No data
Area served with water supply km2	No data	No data	No data

Table 7.1: Number and percentage of served population with water supply.

The number of water connections increased from 15342 in year 2017 to 17596 in year 2022 as shown below (Table 7.2). The average number of people per water connection is 7.

The population without water supply network is around 5%, they rely on water supply from tankers. The cost of a tank of water (18,000-28,000 litres) ranges from 12,000 to 15,000 Yemeni Rials ($50-$60). The only other option, particularly for people in the local community who could not afford water trucking, was to rely on seasonal rainfalls and attempt to collect and safely store rainwater.

	2017	2019	2022
Water Connections	15342	16305	17596
Average no of people per connection	7	7	7
Number of customers	15342	16305	17596

Table 7.2 Number of water connections

7.1 Water Production and Distribution

The only source for water supply is the ground water, there are 16 production wells supplying Al Shehr area from the following well fields.

- Al muweija well filed (9 wells)
- Al Dikdak well field (4 wells)
- Al Maqad well field (3 wells)

The average production capacity in cubic meters per day from all wells (working and not working) is around 15791 m3 per day while the total actual amount produced is 5684881 m3 in year 2022 as shown in Table 7.3. The current production amount from working wells is not enough to meet the water needs.

	2017	2019	2022
Average Production Capacity from all sources m^3/day	11765	13206	15791
Total amount of water production from wells in m3	1042356	4754294	5684881

Table 7.3 Wells water production capacity in cubic meters per day

The LC has meters to measure the water production and to document production records. The wells are maintained on regular basis to keep it working.

Wells

There are 14 meters installed at wells and reservoirs to measure the water production from wells and water flow from the reservoirs.

Reservoirs

The water supply system includes 8 reservoirs two of which are for collection and the remaining are for distribution. There are two reservoirs not working and two partially working and requires maintenance. Here are two elevated reservoirs with storage capacity of 2000 m3 while all others are ground reservoirs with total capacity of 1800 m3. Table 7.4 lists the reservoirs status and serving zones.

Reservoir	Purpose	Capacity m3	Status	No of service areas
Al Dikdak	collection	1000	working	6
Al Rosasah	distribution	1000	working	4
Al Muweija	collection	400	Working partially	4
Al Meian	distribution	250	Not working	2
Al Mansourah	distribution	300	Not working	1
Al Hakel	distribution	250	working	3
Al Qarya	distribution	100	working	1
Al Dulilah	distribution	400	Partially working	1

Table 7.4 Collection and distribution reservoirs

Water Network

Currently, around 95% of Al Shehr population receive water supply services by distribution network. The current water distribution network includes main transfer lines from well fields to reservoirs and distribution network from reservoirs to users (buildings). The length of water transfer lines is 6433 km while the length of water distribution network is around 183933 km. The water amount supplied by the water distribution network in year 2022 is 5,297 m3. There is no data on the existing network zones, material, diameter and type.

Water Supply System Needs

The LC identified their needs from water supply chain (sources transmission lines, reservoirs and water distribution network) as follows.

The LC listed the following needs shown in Table 7.5 to improve water production from wells with total estimated cost of 250,000 $.

Well Field	No of New wells	Capacity m3	Cost ($)	Priority
Al Dikdak	3		150,000	High
Al Maqad	1		50,000	High
Al muweija	1		50,000	Moderate

Table 7.5 Wells Needs

In addition to the well's rehabilitation the LC listed the needs for surface and submersible pumps as follows (Table 7.6).

Item	No of pumps	Cost ($)	Priority
Surface pumps	6	9450	High
Submersible pumps	16	5100	High
Generators	16	12500	Moderate

Table 7.6 Pumps Needs

The needs in the reservoirs side are listed below in Table 7.7

Area	Purpose	Capacitym3	Cost ($)	Priority
Al Hami	distribution	1200	200,000	High
Yamoud	distribution	150	30,000	High
Al muweija	distribution	4000	500,000	Moderate

Table 7.7 Reservoirs Needs

The needs in the distribution network are as follows (Table 7.8).

Area	Purpose	Diameter Mm
Al Mishraf	Water network	50,90
East of Ersal	Water network	50,90
Al Rahman	Water network	50,90
Area with 180 apartments	Water network	50,90
East of Al Hami area	Water network	50,90
West of Al Hami area	Water network	50,90
Muwaad Al Eis	Transmission line	160
Al Rasasah	Transmission line	250
Al Mweijah to Al Dakak	Transmission line	250

Table 7.8 Water Network Needs

The LC identified the following needs in the buildings (Table (7.9).

Building	Cost ($)	Priority
New building or LC	15000	low
Building for Al Hami unit	50000	moderate
Warehouse for Al Hami unit	18000	moderate
Store for Al Dakak unit	85000	low
Rooms for Al Mwiejah wells	25000	high
Rooms for Al Dakak wells	15000	high
Fence and guard room for Al Rasasah reservoir	70000	high
Fence and guard room for Al Dakak reservoir	81000	high

Table 7.9 Buildings Needs

7.2 Water Quality

The water quality from all production wells is good as per the information in the technical questionnaire. The LC keeps regular records on water quality tests. There is no water laboratory available for the testing and control of water. The LC proposed a site for the lab to be I Al Rasasah area, the lab issue is given moderate priority by the LC, but we recommend it with high priority due to the importance to monitor and test water quality on daily basis,

Due to lack of monitoring water and testing water quality from production wells, reservoirs and distribution network, most of the city population is not drinking from tap water, they buy drinking water from private water desalination plants, or they use bottled water. There are no contamination sources might affect wells water quality.

7.3 Non-Revenue Water

The LC keeps regular records on water production, consumption and losses. Several water meters are installed at the wells and reservoirs. Based on the available figures on the production and consumption, the estimated non-revenue water ranges from 35 to 55%. This figure is considered high and requires more efforts to reduce it and save the lost water for water supply. This can be achieved through improvement in the water networks, and water meters and control of illegal connections.

7.4 Operation and Maintenance

The LC mange water production and supply infrastructure. For sustainable water production and distribution there is high need to carry out regular maintenance for the water production and distribution infrastructure. This includes well, main transmission lines pumping stations, electricity generators, and distribution network. The LC has no standard operation and maintenance procedures. It also lacks regular maintenance, monitoring plan and documentation system for maintenance. The LC do maintenance once there is failure or one of the equipment or pumps, or generators stop working.

The main challenges facing LC in operation and maintenance of water supply facilities can be summarized as follows:

- Continuous electricity supply to operate the wells and pumping stations.
- High prices of diesel and other operation and maintenance cost.
- The difficulties to implement the contingency plan in case of crisis escalation since all the wells are far away.
- Operating the generator and pumps 24 hours per day in hot and humid climate; this decreases the life span of the generators by 3 to 5 years.
- Frequent pipeline blockage due to high content of dissolved salt.
- There is no laboratory for water quality monitoring and testing.

The LC listed the following needs to support the operation and maintenance (Table 7.10).

Item	Cost ($)	Priority
One Crane	Not available	low
One JCB	Not available	low
Four Trucks	Not available	moderate
Two Polyethylene Welding Machine for pipes with diameter 250 to 350 mm	Not available	high
Three Polyethylene Welding Machine for pipes with diameter 50 to 160 mm	Not available	high
Transformers and spare parts	57,000	high
Water laboratory	60,000	high
Wastewater laboratory	50,000	moderate

Table 7.10 O&M Needs

7.5 Energy Supply

The LC has in year 2022 13 pump for all activities from water pumping to lifting or boasting. The pumps capacity is 4211 KW. The LC has 6 electricity generators with total capacity of 1255 KW, only 3 generators are working with total generation capacity of 840 kw.

The electricity generators are diesel generators consume around 109620 litres of diesel with an estimated cost 110 million Riyal. This is high running cost, to reduce it the LC invested in solar energy. There is one solar unit but there is no information on the solar energy installed systems and their capacity.

Table 7.11 list the amount of energy consumed from the public electricity grid and the generators for water supply. The LC has in total 3 diesel generators. The estimated diesel cost is around 110.64 million riyal per year. The LC receives subsidy from the government and from the international organization to cover diesel cost.

Item	Pumped Water Amount M^3	Energy Consumed KW	Cost $
Energy Supplied from national grid	397,933,2	254,004,9	254,004,900
Energy Supplied from generators	170,542,8	110640 (Disel liter)	110,640,000
Energy from other sources	Not available	Not available	Not available

Table 7.11 Energy Consumption

7.6 Wastewater

There is wastewater collection network in Al Shehr city. The collection network is mainly PVC lines with diameter 160 to 300 mm while the main truck line is 630 mm. The collected wastewater from residential areas is transferred by gravity to the sea without any treatment. There are two lifting stations at Al Ramlalh area with three pumps. Table 7.12 lists the main characteristics of the wastewater network.

Year	2017	2019	2022
Total Population	120124	127439	139256
Served population with wastewater collection network	56458	59896	65450
Population Coverage %	47	47	47
Area served with wastewater collection (km2)	101	102	103
Length of wastewater network	10838	10838	15452

Table 7.12 Wastewater Collection Network

The wastewater needs are mainly focused on the treatment plant in Ersal Area with estimated cost of $ 3.5 million. In addition, they proposed to construct lifting station in Al Ramlah area with estimated cost of $10,000 and one electricity generator with estimated cost of $15,000.

8. Technical Assessment (TA) and Investment Plan

The previous section summarised the needs for both the institutional and technical sectors. The needs are based on the LC assessment in all sectors where several TA measures been identified.

The "Shortcomings" in the tables below provide an overview of the identified problems the LC is facing, and which have been outlined in previous chapters above. The "Recommendations" next to the "Shortcomings" explain the proposed measures in order to remedy the problems. For those recommendations where external support is required, reference is made to respective TA package. The period for the realization of the respective recommended activities is in the "Implementation" column. The implementation priority is grouped into three classes Low, moderate and high. Low means long term action after 5 years. Moderate means short term from 1 to 5 years while high means within one year (urgent). There is no cost estimate for the proposed institutional actions by LC.

For the institutional needs the LC needs to address the following issues as shown in Table 8.1 to improve the governance and management of the water and sanitation services.

Table 8.1 Institutional TA measures

Governance / Management / Organisational Structure / Resilience

Shortcoming	Recommendation	Implementation Priority
Organisational structure needs update to reflect new sections for Women and Statistics	Update organizational structure as per the real situation	Moderate
Some of the laws and regulations need update for LC benefits	Work with legislation bodies to modify old regulation to cope with LC needs	High
No contingency plan for emergency	Prepare contingency and risk management plan including drought management plan	Moderate
Lack of private sector involvement to carry out certain activities/services	Adjust regulations to allow for Private sector involvement	High
No capacity building plans to LC staff according to directorates needs	Prepare capacity building plan to LC staff according to directorates needs	Moderate
Low customers payment	Facilitate customers debit payment	High
No advisory committee involved in decision making	Form advisory committee to participate in the decision-making process.	Moderate

Human Resource and Capacity Building Management

Shortcoming	Recommendation	Implementation Priority
No Job description for staff	Prepare job description for staff	Moderate
Low qualification or skills of some employees	Hire qualified staff and carry out regular training for staff as per directorates needs.	High

Customer Service and Relation Management

Shortcoming	Recommendation	Implementation Priority
Considerable domestic customers without meters	Install more meters	High
Lack office equipment, computers, printers, data network	Purchase of more computers, printers for customers services	High
No workshop for meter maintenance	Construct workshop for maintenance of meters and other fittings	High
Improve customers collection efficiency	Provide incentives to encourage customers to pay bills	Moderate

IT and Office Requirement

Shortcoming	Recommendation	Implementation Priority
No Job description for staff	Prepare job description for staff	Moderate
Low qualification or skills of some employees	Hire qualified staff and carry out regular training for staff as per directorates needs.	High
Lack of computers, printers and servers	Purchase of computers and printers	Moderate

Gender Related Requirements

Shortcoming	Recommendation	Implementation Priority
Low number of women employees.	Hire more women in suitable jobs like secretary, finance, and IT	Moderate
No incentives for women work	Provide incentives for women work	Moderate

For the technical needs the LC needs to address the followings to improve the water and sanitation services shown in Table 8.2.

Table 8.2 Technical TA measures

Water Supply

Shortcoming	Recommendation	Implementation Priority
Water per capita is still low < 80 litre per person per day	Drill more wells to increase water supply	High
No spare pumps and no spare parts	Purchase stand by pumps and pumps spare parts	High

Water Distribution

Shortcoming	Recommendation	Implementation Priority
Still 5 to 10 % of the population without water supply network	Expand water distribution network to cover all population	High
Frequent pipeline blockage due to high content of dissolved salt.	Water quality treatment is needed to reduce salinity concentration	High
High water losses	Investment in network rehabilitation	Moderate

Water Quality Monitoring and Testing

Shortcoming	Recommendation	Implementation Priority
No water lab, no water quality monitoring	Construct water lab and hire qualified staff for water testing and monitoring	High

Operation and Maintenance

Shortcoming	Recommendation	Implementation Priority
Operating the generator and pumps 24 hours per day in hot and humid climate; this decreases the life span of the generators by 3 to 5 years	Purchase of standby generators and spare parts	High
The lack of maintenance equipment, electricity generators for the O&M of the pumps, and water network	Procurement of electricity generators and transformers for sustainable water supply	Moderate
No qualified staff for operation and maintenance	Carry out regular training for O&M staff	High
High water losses	Investment in network rehabilitation	Moderate

Energy

Shortcoming	Recommendation	Implementation Priority
Cost of diesel to run the electricity generators is high and not enough funds for it.	Work with government and NGOs to provide necessary funds	Moderate
Low use of solar energy units	Install solar energy units to reduce the pressure on diesel generators	High

Wastewater

Shortcoming	Recommendation	Implementation Priority
Sea contamination due to discharge of raw wastewater	Construct wastewater treatment plant	Moderate
Ground water contamination from Raw wastewater	Carry out monitoring program for water sources	High

Table 8.3 below presents the summary of recommended measures with respect to priority, implementation / procurement category and related cost estimates.

Package	Measures	Urgent $	Short-term $	Long-term $	Total $
1	Civil works on buildings and structures		359,000		359,000
2	Well rehabilitation and new construction		200,000	50,000	250,000
3	Water pumping station (surface and submersible)			14550	14550
4	Collection and distribution reservoirs		730,000		730,000
5	Water network rehabilitation and extension, water meters and valves				Not available
6	O&M tools and equipment	57,000			57,000
7	Generators	27,000			27,000
8	Solar energy systems		200,000		200,000
10	Water laboratory			60,000	60,000
11	Wastewater laboratory		50,000		60,000
12	Wastewater treatment plant		3,500,000		3,500,000
13	Collection Network				Not available
14	Wastewater lifting station		10,000		10,000
Total investment		84,000	4,849,000	124,550	5,057,550

Table 8.3: Cost estimate for prioritized investment measures

The total required estimated budget to implement the proposed TA measures for the technical part is $ 5,057,550 distributed in terms of priority as follows:

- Urgent measures: 84,000 $
- Short-term measures: 4,498,000 $
- Long-term measure: 124,550 $

Appendices to Annex 4

Assessment Report of Al Sheher Utility

Appendix A-1:
Pictures of Water Infrastructures

Administrative Building of the Utility

Administrative Building of the Utility

Main Entrance Gate of the Utility Administrative Building

Utility General Manager‘s Office