Water Supply Administration

For Better Management of Water Supply Services

Course（A）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

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Water Supply Administration
For Better Management of Water Supply Services
Course（A）

AFGHANISTAN

Water Supply Administration
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AZERBAIJAN

Water Supply Administration for Better Management of Water Supply Services

Inception Report Presentation

1. Country: Azerbaijan
2. Name: Araz Ismayilov
3. Position: Head of Quality Control D.
4. Organization: "Azersu" OJSC

Inception Report Presentation

- Each applicant is kindly requested to make presentation of Inception Report (M/S Power Point file with **less than 15 slides** which cover the following 6 topics about the individual water supply company/public water supply authority to which the participant is belonged.
- Presentation time: 15 **minutes including Q/A**
- **6 topics:**
  - **1. Management of water quality**
  - **2. Reduction of non-revenue water**
  - **3. Water supply service standards**
  - **4. Management of water supply service on a self-supporting basis**
  - **5. Major recent achievement in improvement of water supply services/management**
  - **6. Expectation for the Japanese private companies**
- **6 topics should include the content of "**Current situation and major problems, Current actions against the problems and any achievement."

General Country Profile: Background

The Republic of Azerbaijan is in the South Caucasus region of Eurasia, straddling Western Asia and Eastern Europe.

Land borders:

Turkey
Iran
Russia
Georgia
Armenia

Whole Country:

Area : 86.000 km²

Population : 9.600.000 Habitants

Coverage Water Supply: % 62.5

Selected Water Supply System/City: Baku/Absheron

Service Area : 2110 km²

Population Served: 2.950.000 million/ thousand

My Mission (sharing among participating friends)

- Mission of my organization is supplying drinking water and sanitation services in a centralized manner.
- My mission in the organization is leading quality control and procurement management for all international and national projects implemented by Azersu OJSC.
- My actual job to achieve the mission is collaborating with Contractors, Consulting companies, Manufactures and related Departments to manage system accordingly.

1. Management of Water Quality (MWQ)

MWQ is Planning, developing and implementation of water quality policies and strategies

- 1. Current Situation

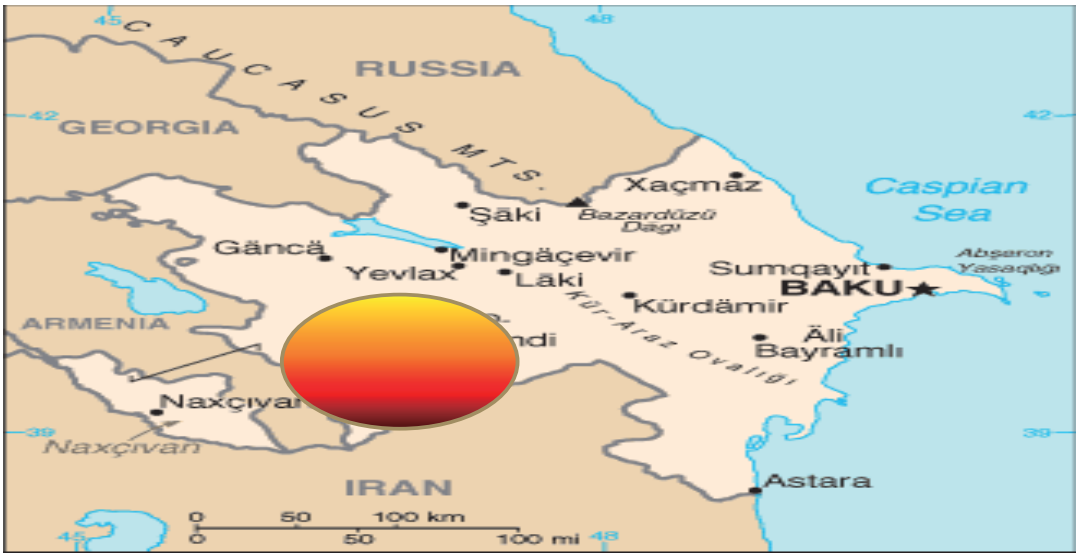
Lack of water resources
Old water supply networks
Old water treatment facilities.
Inadequate qualified Human Resources
Maintenance activities.

- 2. Current Actions

Diversification of water resources
Replace old networks pipelines
Modern facilities.

- 3. Monitoring System

Quality of water being tested in online basis, Labs



Inability to provide water resources and waste water treatment services to the Karabakh region of Azerbaijan Republic, which is inaccessible due to the occupation by Armenian military forces.

1.4 million out of total population of 9.5 million are refugees

2. Reduction of Non-Revenue Water 2

Current Situation

Leakage losses due to old distribution network, Commercial losses due to insufficient flow meters Problems in reimbursing money from clients.

Current Actions

New online billing system is launched to track payments.
Electronic flow meters integrated with online billing system.
Flow meters are being installed on upstream of every distribution network to track water supplied
Pre paid smart card meters
Replacing old pipes

3. Water Tariff

Domestic: Cost/m3 = 0.33 $

Non Domestic: Cost/m3 = 1.33 $

Average: 0.83 $

4. Water Supply Service Standards / Performance Indicators

(Parameter)	(Unit)	(Result)	(start date)	(end date)	(method)	98/83 EC Directive	ГОСТ 2874-82
Physic-Chemical Analysis							
(Odor)		no	22.05.2016	22.05.2016			
(Taste)		no	22.05.2016	22.05.2016			
(Color)		no	22.05.2016	22.05.2016			
*pH	(pH unit)	8,18	22.05.2016	22.05.2016	SM 4500-H+B	6,5-9,5	6,0-9,0
(Turbidity)	NTU	0,53	22.05.2016	22.05.2016	SM 2130 B	1	1,5 mg/L
(Free Chlorine)	(mg/L)	0,11	22.05.2016	22.05.2016	Kit metodu	-	0,3-0,5 mg/L
(Conductivity)	(µS/sm)	656	22.05.2016	22.05.2016	SM 2510 B	< 2500 (20^0C)	
Ammonium (NH_4^+) (Ammonium)	(mg/L)	<0,02	22.05.2016	22.05.2016	Kit Metodu	0.5	
Biological and Microbiological Analysis							
(Total Coliform Bacteria)	CFU/100 mL	38	22.05.2016	24.05.2016	ISO 9308-1	0	<3
(E.Coli)	CFU/100 mL	0	22.05.2016	24.05.2016	ISO 9308-1	0	-

5. Management of Water Supply Service on a Self-Supporting Basis

Water supply services from intake to households and all necessary actions managed and implemented by "Azersu".

Azersu OJSC receive the governmental support for all projects and issues.

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6. Major Recent Achievement in Improvement of Water Supply Services/Management (PART1)

Please fill in variation of the indicators below based on your situation!

Baku/Absheron

2003	INDICATORS	2015
	Production capacity m3/d	1.728.000m3/d
None	Water quality	WHO Guidelines
	Coverage area	96%
	Supply duration	24hr/d (95%)
	Supply pressure	2-6 bar

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6. Major Recent Achievement in Improvement of Water Supply Services/Management (PART2)

1. **Jeyranbatan UF plant 520.000 m3/day “the biggest UF in the world” (2015)**
2. **Pirshaga WWT plant 100.000 m3/day (on going project)**
3. **Main distribution pipes across country**
4. **Hovsan WWT plant discharge parameters improved to EPA**

7. Expectation for the Japanese Private Companies & Water Supply Utilities

Techniques or technologies of Japanese water private companies may hold to tackle effectively the issues mentioned above

Understanding the management approach of Japanese Water companies in all segments of water management; Program Mgt., Project Mgt., Operations and Maintenance Mgt., Sales and billing systems.

Water Supply Administration
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Course（A）

ETHIOPIA

ADDIS ABABA WATER & SEWERAGE AUTHORITY

ADDIS ABABA CITY WATER SUPPLY AND DISTRIBUTION SITUATION

ADDIS ABABA WATER & SEWERAGE AUTHORITY

ADDIS ABABA CITY WATER SUPPLY AND DISTRIBUTION SITUATION

COUNTRY REPORT PRESENTATION

- country : Ethiopia
- capital city: Addis Ababa
- Area : 1.1 millionKm²/420mile square/
- Population: about 90million
- SupplCoverage of Watery 88%
- Service area: 540 Km²
- Population Served: about 3.2 million

COUNTRY REPORT CONT.....

Missionof the organization:

- To deliver sustainable & adequate water & liquid waste disposal service in line with the city's speedy development via working hand in hand with stake holders.
- My mission in the Organization is to manage one of the eight branches as to accomplish the mission of AAWSA.

1. Current situation of water supply service

1.1. Current Situation and Major Challenges/ Problems

- AAWSA produce water from two type of sources :
  - Surface water sources
    and
  - Ground water sources
- Current daily production from these sources is 608,000 m3/day.
- The sources are from dams and boreholes:
  - Legedadi dam 195000m3/day
  - Gefersa dam 30000m3/day

1. Current situation of water supply service

1.1. Current Situation and Major Challenges/ Problems

- Akaki fase 1 30000m3/day
- Akaki fase 2 73000m3/day
- Akaki fase3A 70000m3/day
- Akaki fase3 B 70000m3/day
- from city boreholes 140000m3/day

1. CURRENT SITUATION OF WATER SUPPLY SERVICE

1. Current Situation and Major Challenges/ Problems

- AAWSA has 435672 water customers
- Among these 80% is a 24 hr.users,15% is 16-18hr users and 5% is 12hrs users.
- The Current daily demand of the city is 670,000 cubic meter
- Coverage is 90%
- AAWSA has started to built another dam(gerbi dam) with in 2 years to full fill the coverage which produce more than 76000m3/day

1.1 Management of Water Quality

AAWSA has water quality case team in its stracture which managesthe quality of water from the source to the tap.

At the catchment regular monitoriy is conducted, farmers are trained to follow safe agricelltural activities for the dams (type of fertilizers and crops type)

- After the water is produced in the treatment plant, it is distributed to the city. While the produced water is in the distribution system, it is checked for its microbiological quality by taking about 30 sampls a day.

Management of Water Quality

1.2. Current actions against those challenges/ problems and any achievements.

- Controlling the residual chlorine in the network
- Replacement of GS pipe with HDPE
- Dis- infection of pipes when ever maintenance done in the network
- Customer feedback concerning quality is changed to positive

1. Management of Water Quality

1.3. Monitoring System/ plan of safety of supplied drinking water by your organisation/ regulatory body/ independent institution/ any other

- Daily monitoring by own water quality department
- Federal ministry of Health central laboratory by random sampling

1. Management of Water Quality

1.4. Implementation of water safety plans or similar effort

- No effort done with this respect

2. Reduction of Non Revenue Water

2.1. Current Situation and Major challenges/ Problems

- NRW is estimated to be about 37% – 40% including both physical & commercial loss
- There are two major problems

a. No automated control of the distribution system is manually operated and controlled

b. Old water infrastructure, not laid as per the city new master plan

2. Reduction of Non Revenue Water

2.2. Current actions against those challenges/ Problems

- Updating current city water supply network
- Define district metering Area (DMA)
- Installation of Electromagnetic flow meter in each DMA
- Estimate the DMA water demand and update the network as per the demand defined

2. Reduction of Non Revenue Water

2.3. Any Achievements

- Awareness is created with in the customer to be part of the authority in monitoring & controlling physical losses.
- Map updating of existing system is under way.
- NRW reduction strategy already drawn by international consultant

2. Reduction of Non Revenue Water

- *Water Tariff*
- Public tap for all tariff 1.75 Birr/m³

Domestic (Consumption ,m³)	Birr	Non-Domestic
1-7	1.75	Consumption x 1.75
8-20	3.80	„ x 3.80
21-40	4.75	„ x 4.75
41-100	5.95	„ x 5.95
101-300	7.45	„ x 7.45
301-500	9.30	„ x 9.30
>500	11.60	„ x 11.60

3. Water Supply Service Standards

3.1 *Water Supply Service Stanndards/Perfermance Indicators*

There are about13 water supply service standards the major ones are the following.

Types of activity	*standard time*	*length/m&km*
1. new conncection for customer.....	*time 14 hr*	*for 12 meter*
2. water line upgreading.....	*time 14hr*	*for 12 meter*
3. water line transfer.....	*time14hr*	*for 12 meter*
4. water line maintenance.....	*time 4 hr*	*for 3meter*
5. water pipe laying.....	*time 3hr*	*for 1 km*

3. Water Supply Service Standards

3.1. Current situation and major challenges/ Problems

- Major challenge to give service as per the standards are shortage of trained man power, hand tools, pipes and fittings and field vehicles

3. Water Supply Service Standards

3.2. Current actions against those challenges/ Problems

- New structural setup are under discussion
- Bulk purchase of pipes and fittings from local manufacturers and foreign purchase
- Training are under going local and abroad by stockholders cooperation
- New vehicles procurement is under way.

4. Management of Water supply Service on a self supporting Basis

4.1. Current situation and major challenges/ problems

- No self support scheme implemented

4. Management of Water supply Service on a self supporting Basis

4.2. Current actions against those challenges/ problems

- No action taken

5. Major recent achievements in improvement of water supply services/ Management

- The major achievement is increase in water supply from 350,000 m3/day in 2014 to 608,000 m3/day in 2016.
- Provide alternative water supply by truck and local 20 M3 water tanks in water shift areas at least 12 hours per day and 7 days per week.

3. Water Supply Service Standards

3.4. Any Monitoring by performance indicators (PI)

- Not applied yet

6.Expectation for the Japanese Private Companies

6.1. Presentation, information materials, technologies or techniques to tackle effectively the problems/ issues /mentioned from 1 – 5 above

6.2. Share best practices on water supply network management or

6.3 share best practices on customer service provision

6.4 Share my challenges and draw solutions for problems with Japanese Private companies with better experience on water supply management.

6.5 Share new Technology on water monitoring and distribution

7. EXPECTATIONS TOWARD THE PROGRAM

7.1. Practical training on the problem

7.2. Soft and hard materials on the subject matter so that I can share with my staff when I return home

7.3 Technologies which can easily applied in developing country like mine

Water Supply Administration
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Course（A）

IRAN

In the name of God

Water Supply Administration for Better Management of Water Supply Services

Inception Report Presentation

Tokyo, Japan, June 2016

1. Country: *Islamic Republic of Iran*
2. Name: *Bahieh Jafari Bibalan*
3. Position: *Head of Planning Group*
4. Organization: *Ministry of Energy-Water and Wastewater Deputy-Water and Wastewater planning Bureau*

IRAN

Area	1.648 million km^2
Population	>79 million
No of provinces	31
Average Rainfall	243mm
Neighboring Countries	Afghanistan, Pakistan, Iraq, Turkmenistan, Azerbaijan, Armenia, Turkey , Arab States in Persian Gulf
Language	Persian

Capital: Tehran (12,000,000)
Population growth rate: 1.29
Number of major basins (first order): 6
Number of sub basins (second order): 30
Number of Ministries: 18
Ministries dealing with water: MOE, MOJA, and DOE.

Based on 2014 year statistics

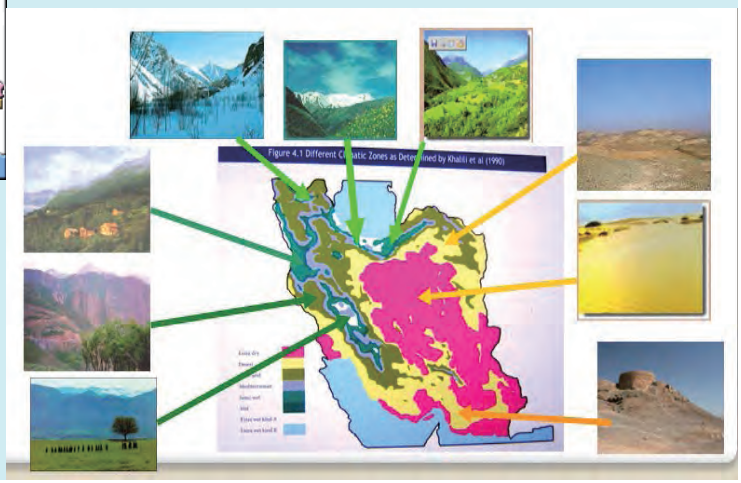
Major Basins in Iran

1.Persian Gulf
2.Markazi
3.Caspian Sea
4.Urmia Lake
5.Gara Gom
6.Hamoon

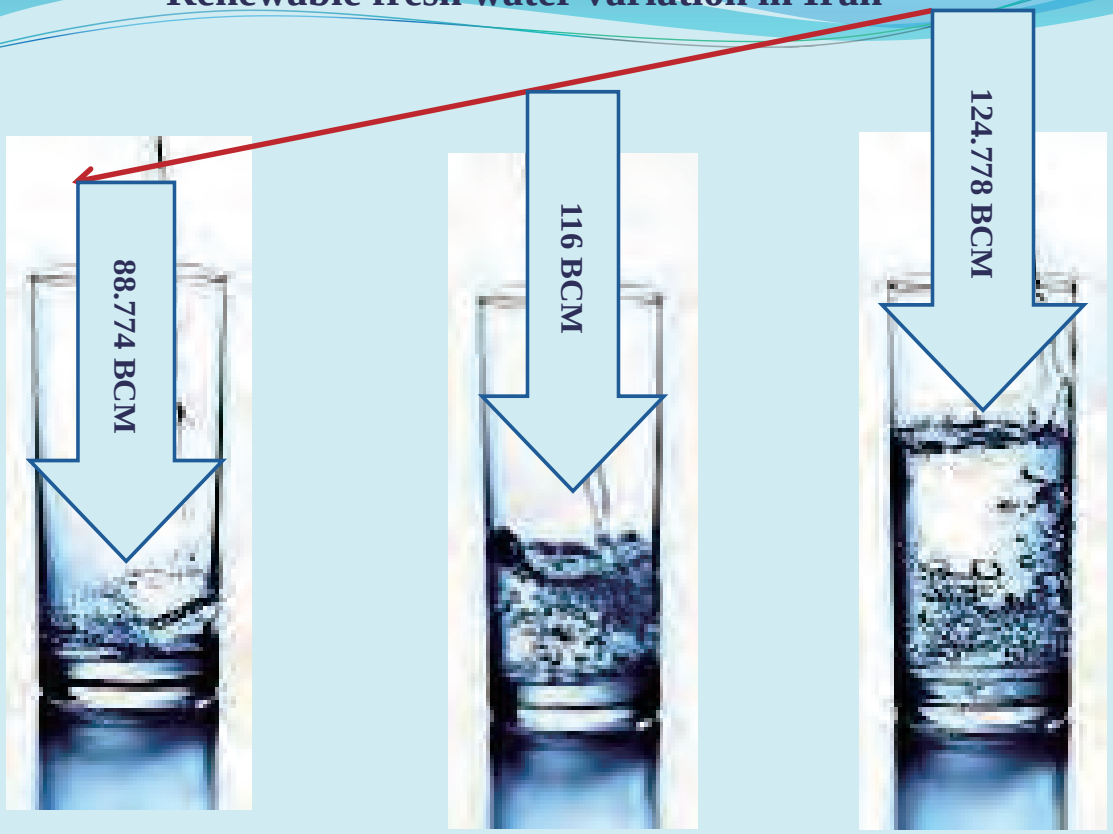
Climatic Status

Iran is located in an arid and semi arid climate

- **15 % humid and semi humid**
- **20 % semi arid**
- **65 % arid.**

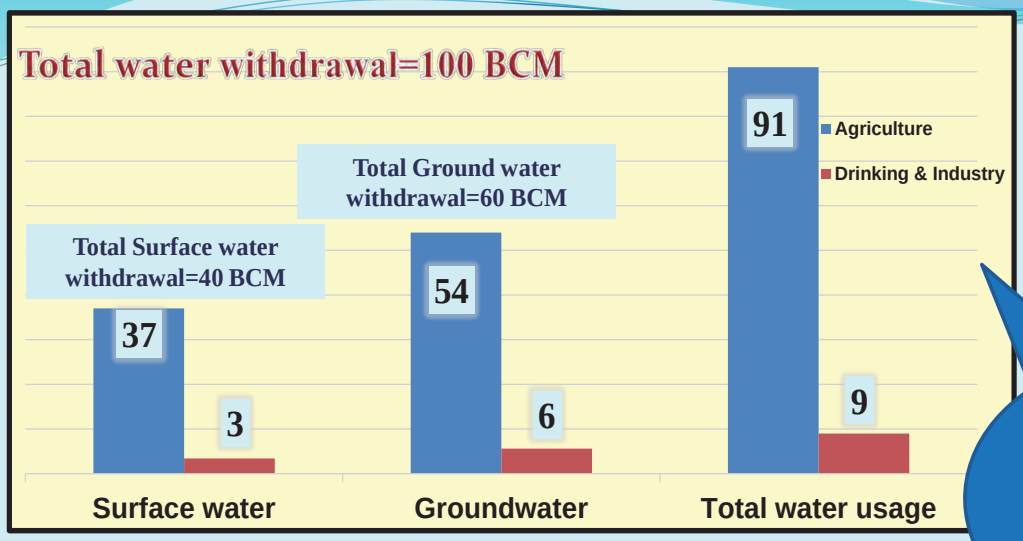


Renewable fresh water variation in Iran



Last 17 years | Long term average | 30 years-up to 1998

Water Withdrawal

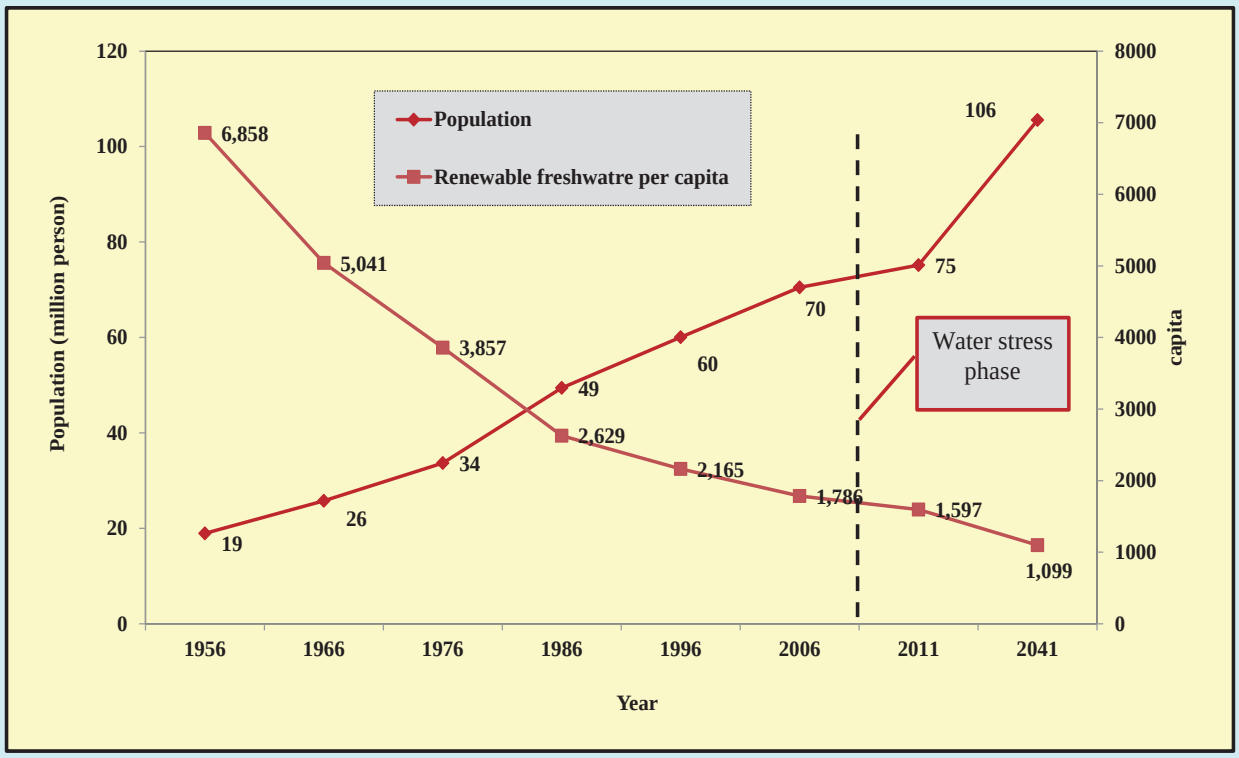


Percentage of total renewable water resources withdrawn =86% (upper than normal percentage (40%))

Water Allocation by Sector

- ✓ Domestic: 6.5%
- ✓ Industrial: 1.5%
- ✓ Agriculture: 92%

Relation between population Growth & freshwater per capita



Main Water Challenges in Iran

- ✓ **Climate change & Drought**
- ✓ **Renewable fresh water reducing & water scarcity**
- ✓ **Groundwater drawdown (more than 115 billion cubic meters cumulative overdraft)**
- ✓ **Lakes & Lagoons Drying/Dust Storm**
- ✓ **Deterioration of water quality**
- ✓ **Insufficient drinking water in urban & rural regions (quantity & quality)**
- ✓ **Low irrigation efficiency and Low water productivity specially in Agricultural section**
- ✓ **Lack of economically view to water (high difference between the marginal cost and the sale price of water to the consumers)**
- ✓ **Increasing of water stress (between users)**
- ✓ **Land fragmentation and farms in small size**
- ✓ **Lack of native water technologies (gap between current technologies and new technologies)**
- ✓ **Careless use of unconventional water resources**
- ✓ **Lack of volumetric water delivery (specially in agricultural section)**

Iran' water Policies

- ➢ Coordination in different parts of consumption through the High water Council
- ➢ Establishment of River basin organization
- ➢ Rehabilitation and Equilibrium of groundwater resources (recovery)
- ➢ Climate change study and its impacts on water resources
- ➢ Comprehensive studies of drinking water, industry and mining in Iran through looking at the use of unconventional water with a focus on costal saline resources
- ➢ Water recycling and use of gray water
- ➢ Consumption management and improvement of water efficiency in all sectors of consumption
- ➢ Using new technological tools in water management - (as: RS, GIS)
- ➢ Study of Deep and karst water resources
- ➢ Pay serious attention to basic studies of water resources and Installation and Upgrading the Measurement Tools for monitoring the quality and quantity of water resources and consumption
- ➢ Establishment of water market
- ➢ Upgrading water standards and criteria
- ➢ Studying of water master plan based on IWRM Approaches
- ➢ Revision in the methods water allocating

Iran and Its provinces

Mega cities are:

- ✓ Tehran
- ✓ Karaj
- ✓ Mashhad
- ✓ Tabriz
- ✓ Ahvaz
- ✓ Isfahan
- ✓ Shiraz
- ✓ Rasht

People Access to drinking water :

- **Urban: 99.1%**
- **Rural: 74%**

People Access to Improved Sanitation (Sewerage system):

- Urban: 92.8%
- Rural: 82.3%

People Coverage that connecting to Modern Sewerage system (collection and treatment):

- Urban: 42.2%
- Rural: 0.4%

My Mission:

✓**Mission of my organization(Ministry of Energy)** **as one of important governmental organization in Iran, is management of water resources and electricity power for all users. The ministry is responsible for policy making, proposed necessary laws, rules and regulations for water and electricity in the country. Also. The ministry is responsible for supplying sustainable drinking water through holding company and other subsidiaries.**

✓**My mission in the organization** **is short-term, medium-term and long-term Planning and policy making for better water resources management and water supply for various uses (annual planning, developing program and preparing of water and wastewater Vision)**

✓**My actual job to achieve the mission** **is planning, Meetings with holding companies, Obtaining activity reports and preparing performance reports, Explain the strengths and weaknesses of the system, …**

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Management of Water Quality

- ✓ **Developments in the Iran's population over the past few decades has led to urbanization rate of about 30% from 1956 to reach more than 70% in 2011. Similarly villagers from 68% in 1956 to less than 30% in 2011 had reached its.**

- ✓ **One of water & wastewater companies' goals is to deliver water to people with standard quality. In this regards, free residual chlorine index (drinking water distribution network) in urban and rural area is more than 90%. Also Microbial index (drinking water distribution network) in urban and rural area is more than 99.8% and 99.2%, respectively.**

Major challenges in water quality

- ➢ **Entry of various pollutants in water resources that supplies drinking water**
- ➢ **The high cost of water treatment**
- ➢ **Avoiding the use of advanced technology for water treatment**
- ➢ **Entry of agricultural drainage containing fertilizers and pesticides to drinking water sources and increasing rate of nitrate especially in groundwater**
- ➢ **More than 70% of the drinking water depended to ground water and Decline in groundwater levels and salinity of the water and the presence of some heavy metals in water resources in some areas**
- ➢ **Fluctuation of the quality of surface water especially during the rainy seasons**

Current Actions against Those Challenges/Problems and Any Achievements:

The quality of the drinking water is assured by:

- ✓ Controlling the proportion of surface water and the underground water.
- ✓ Increasing the efficiency of water treatment plants by using Online quality control systems, increasing of process efficiency with adding the optimum dose of coagulant & poly-electrolyte, control of settling and clarifier units effectiveness by re- adjustment parameters based on raw water quality changes
- ✓ Quality control and measuring the amount of pollutant nitrate and other parameters in 6 month periodic well water sampling.
- ✓ Start using of Nano technologies for water treatment

Systems available on the Companies for drinking water monitoring are as follows:

- ✓ Online quality control systems in water treatment plants (including turbidity, PH, EC, CL2, TOC)
- ✓ Water quality laboratories at water treatment plants for measuring chemical, biological and microbiological parameters based on international standards.
- ✓ Reference Water quality laboratory at company for measuring heavy metals, THMs parameters based on international standards.
- ✓ Water quality laboratory for measuring chemical, biological and microbiological parameters in well waters based on international standards
- ✓ Online and portable quality control systems at storage reservoirs (including turbidity, PH, CL2)
- ✓ And also Water quality laboratory for certificated that established in Universities of Medical Sciences

Reduction of Non-Revenue Water

<table>
<tr><td rowspan="4">System input volume
5838 MCM</td><td rowspan="2">Authorized consumption
4410 MCM</td><td>Revenue water
4317 MCM</td><td>Billed authorized consumption
4317 MCM</td><td>4317MCM/year
(74%)</td><td rowspan="4">26%</td></tr>
<tr><td rowspan="3">Non Revenue Water (NRW)
1521 MCM</td><td>Unbilled authorized consumption
(ex. fire fighting, cleaning)
93 MCM</td><td>93 MCM/year
(1.6%)</td></tr>
<tr><td rowspan="2">Water losses
1428 MCM</td><td>Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)
634 MCM</td><td>634 MCM/year
(10.86%)</td></tr>
<tr><td>Real losses (Leakage)
794 MCM</td><td>794 MCM/year
(13.6%)</td></tr>
</table>

Major Challenges/Problems

- ✓ The high cost of reducing non-revenue water
- ✓ very difficult to locate leakages using regular and normal methods
- ✓ lack of legal action with illegal branches
- ✓ Inaccuracy of measurement equipment

Current Actions against Those Challenges/Problems

- ✓ Locating leakages using regular and normal methods (for example sound methods).
- ✓ Remove of illegal branches
- ✓ Zoning and management of distribution network pressure
- ✓ Replacement of defective counter

Water Tariff

- ✓ The price of water is not economic in the our country and more water and wastewater companies are facing with accumulated losses.
- ✓ Drinking water tariff in Iran is about 11.4 cent, while the marginal cost per cubic meter of water is about 28.5 cent and therefore only 40% water tariff covers costs for water production.
- ✓ The water price that paid by users is calculated by consumption levels, so the user that more water consume (more than defined consumption patterns) more cost deals (as follows table).

Tariff ($/m^3)	Water use level
0.041	0-5 m^3/month
0.061	5-10 m^3/month
0.085	10-15 m^3/month
0.107	15-20 m^3/month
0.157	20-25 m^3/month
0.246	25-30 m^3/month
0.34	30-35 m^3/month
0.448	35-40 m^3/month
0.97	40-50 m^3/month

Management of Water Supply Service on a Self-Supporting Basis

- ✓ There aren't central and advanced monitoring and management systems (intelligent and online system) in all cities (very limited there are in some mega cities such as Tehran and Isfahan).
- ✓ In ministry of Energy, at now, we defied new project for establishing an intelligent and online system for water supply management in one of Capital district. Also we want establishment these systems with use of foreign investment and experiences of other country such as Korea.

Major Recent Achievement in Improvement of Water Supply Services/Management

1997	INDICATORS	2015
3691	Production capacity MCM	10710
1053-national	Water quality	1053 corrected-national
96.16%	Coverage area	99.1
8960	1000 Number of connections	20790
32%	NRW	26%
10440	Volume of tanks (1000 m^3)	18611
48900	Transmission Link (km)	125748
131520	Distribution line(km)	314906

Major Recent Achievement in Improvement of Water Supply Services/Management

- ✓ The preventive maintenance systems (PM) are established recently in some cities.
- ✓ We have the SCADA (*Supervisory Control And Data Acquisition*) system in some cities but there aren't tele-command systems.
- ✓ At now, we want use of foreign investment and experiences of other country for this purpose (at now some water and wastewater companies have contract with other foreign companies).

Expectation for the Japanese Private Companies & Water Supply Utilities

- ✓ Online systems for measuring qualitative parameters
- ✓ New technologies of locating leakages in pipelines
- ✓ Modern methods and technologies for repair and maintenance of transmission line, distribution network, WTP and etc.
- ✓ Knowledge Management System and documentation
- ✓ Investment in reduction non-revenue water and new methods in this regards

Expectation toward the Program

- ✓ Acquaintance of the experiences of Japan in the field of management of water supply services
- ✓ Acquaintance of technologies used in Japan for supplies and water purification and in the country
- ✓ What measures Japan to supply water in crisis periods
- ✓ How optimization of drinking water supply from surface water and ground water to customers
- ✓ How reduce of non-revenue water and water loss
- ✓ Visit of water treatment plants and water supply services departments in Japan

Water Supply Administration
For Better Management of Water Supply Services
Course（A）

LEBANON

Water Supply Administration for Better Management of Water Supply Services

Inception Report Presentation

Country: **Lebanon**

Name: **Maya Srour**

Position: **Water Quality Coordinator**

Organization: **Ministry of Energy and Water – Lebanon**

OUTLINE

General Country Profile: Background

My Mission

1. Management of Water Quality
2. Reduction of Non-Revenue Water
3. Water Tariff
4. Water Supply service Standards / Performance Indicators
5. Management of Water Supply Service on a Self-Supporting Basis
6. Major Recent Achievements in Improvement of Water Supply Services/Management
7. Expectations from the Japanese Private Companies & Water Supply utilities

General Country Profile: Background

- **Whole Country:**
  - Area: 10,452Km^2
  - Population: 4.547 million

Registered Syrian refugees 1.048 million

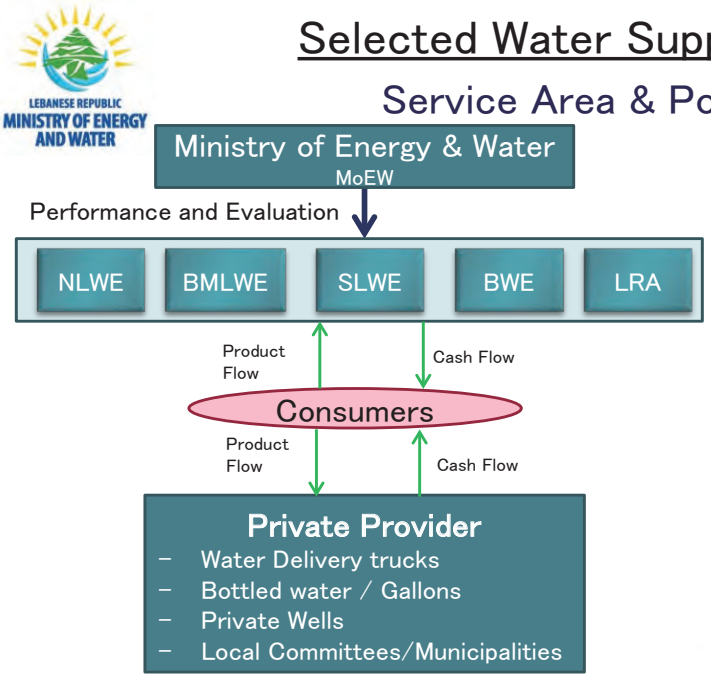
Registered Palestinian refugees 425,000

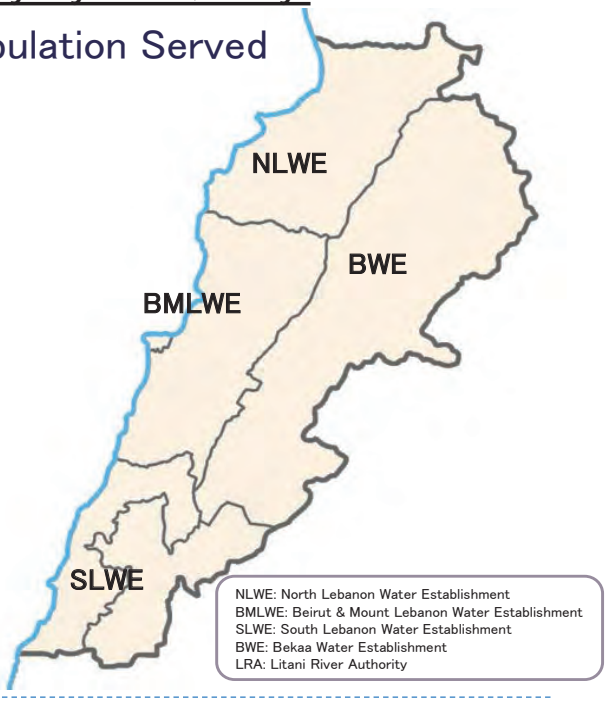
  - Coverage Water Supply: 79% (MENA average 75%)

General Country Profile: Background cont.

Selected Water Supply system/City:

Service Area & Population Served



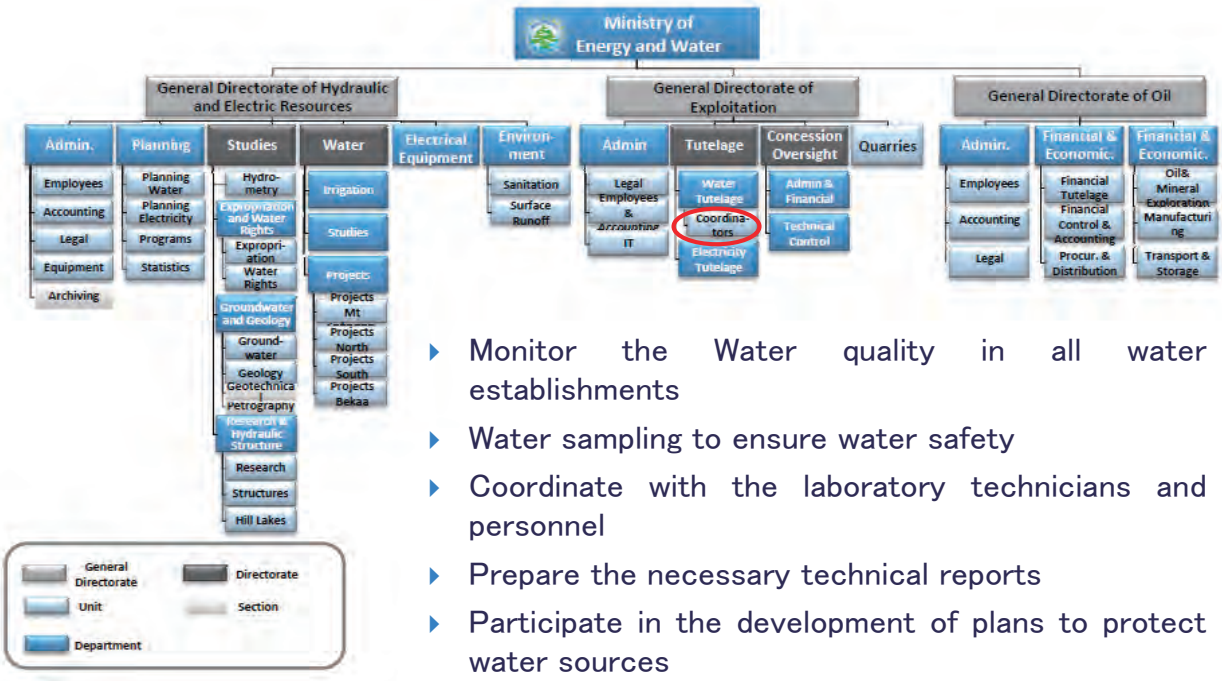


Mission

- **The mission of the General Directorate of Exploitation at the MoEW** is to monitor administratively and financially the public utilities and establishments of water and electricity.

Mission cont.

- **My Mission as a Water Quality Coordinator is to:**

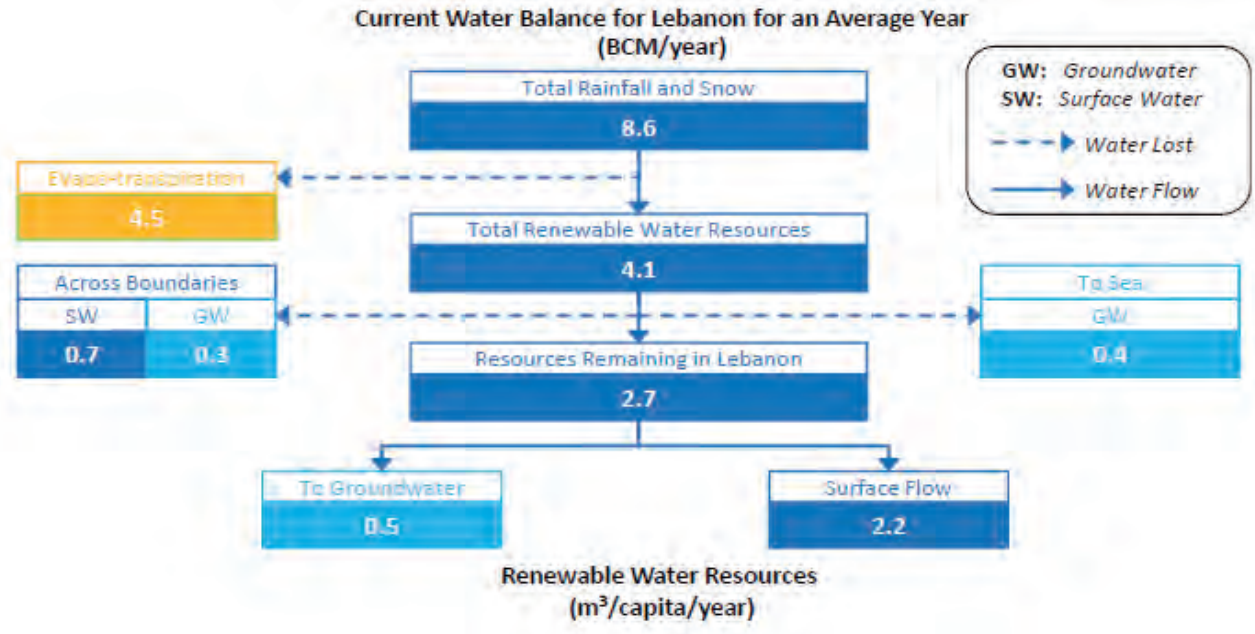


- Monitor the Water quality in all water establishments
- Water sampling to ensure water safety
- Coordinate with the laboratory technicians and personnel
- Prepare the necessary technical reports
- Participate in the development of plans to protect water sources

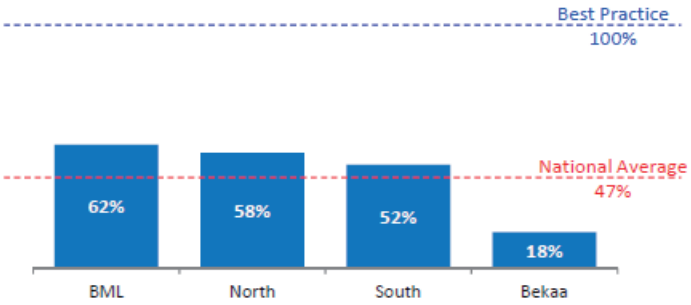
1. Management of Water Quality

- Water quality is managed through the results delivered form the laboratory personnel.
- Laboratory results are based on bacteriological and physio-chemical samples.
- Each water establishment has regional laboratories and one main core laboratory where detailed physio-chemical results take place.
- The coordinators' unit at MoEW check the control and help the establishments to resolve pollution issues.
- Major challenges and problems faced are:
  - bureaucratic delays
  - lack of personnel
  - shortage in machineries and detailed laboratory test

2. Reduction of Non-Revenue Water

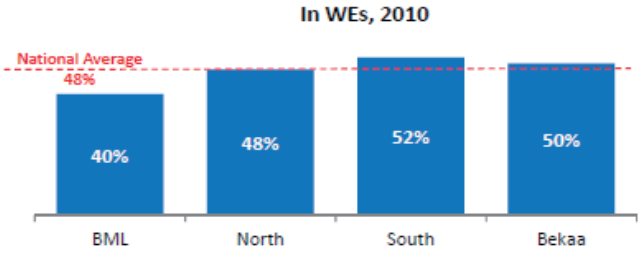


2. Reduction of Non-Revenue Water cont.



Collection rate in 2010

- Best practice in MENA region: Palestinian Authority: 10%
- MENA average: 37%
- World Average: 35%



% of Unaccounted for Water

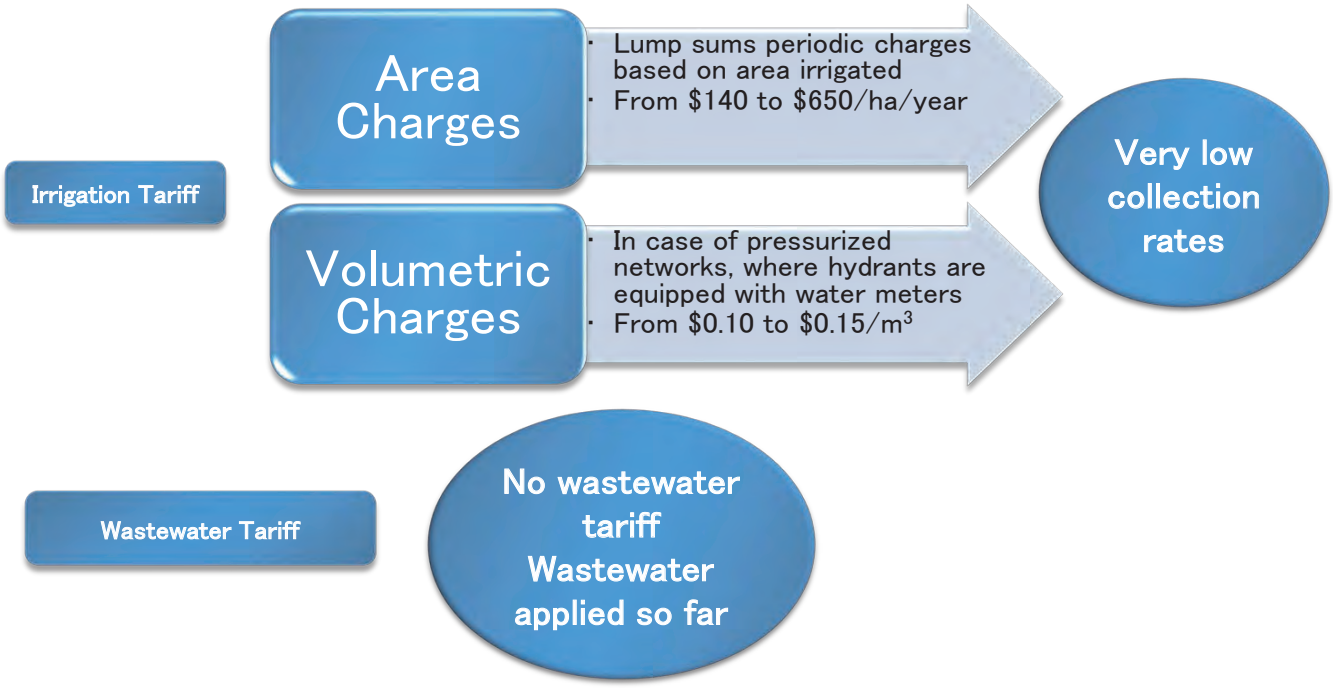
2. Reduction of Non-Revenue Water cont.

- Lebanon is one of the very few countries still adopting a flat tariff structure.
- The inefficient and poorly maintained systems and networks, is leading to:
  - high losses
  - supply interruptions
  - limited focus on demand management
- Although coverage is better than the regional average, more than 50% of transmission and distribution networks are past their useful life leading to Unaccounted for Water levels 13% higher than world average.

3. Water Tariff

- Lump-sum flat tariff based on contracted volumes of water, disconnected from real consumption
- Although around 10% of the connections in Lebanon are metered, volumetric tariffs based on real consumption are still not applied
- Customers' registers are not regularly updated

3. Water Tariff cont.



4. Water Supply Service Standard / Performance Indicators

MISSION: *"Ensure water supply, irrigation and sanitation services over all the Lebanese territory on continuous basis and at optimal service levels, with a commitment to environmental, economic and social sustainability"*

- **Production**
  - Improve the quality of surface water
  - Improve management and protection of groundwater resources
  - Fulfil deficits through groundwater and/or surface storage according to potential; and availability per region
- **Transmission and distribution**
  - Ensure proper and continuous access to high quality water supply
  - Provide adequate quantities and quality of irrigation water
- **Wastewater**
  - Increase coverage of wastewater collection networks and treatment capacities
  - Optimize current wastewater treatment processes

5. Management of Water Supply Service on a Self-Supporting Basis

- **Institutional**
  - Support a full implementation of the water sector reform
  - Improve on capitals spending responsibilities
  - Improve the management of the irrigations sector
- **Financial & commercial**
  - Introduce and implement new tariff strategies
  - Promote private sector participation
  - Gradually achieve operation and management and then full cost-recovery
- **Legal and regulatory**
  - Enhance and modernize the legal setup
  - Enforce a regulatory regime
- **Environmental concerns**
  - Achieve advanced climate change knowledge
  - Improve water quality, flood mitigation and protection of recharge zone
- **Awareness and conservation**
  - Implement awareness and conservation campaigns

6. Major Recent Achievements in Improvement of Water Supply Services/Management

2010	Indicator	2016 Assumptions
1.93	Staff /1,000 connections	N.A.
1,589	Production capacity MCM/year	N.A.
Lebanese Norms Decree 161/1999	Water Quality	Decree Update Ongoing
79%	Coverage Area	N.A.
10hrs / day	Supply Duration	N.A.
N.A.	Supply Pressure	N.A.
N.A.	Number of Connections	N.A.
N.A.	NRW	N.A.
47%	Collection Ratio	N.A.
WE: 1,324 MoEW: 110	Staff Number WE + MoEW	WE by law: 4,050 MoEW by law: 597

7. Expectations from the Japanese Private Companies & Water Supply utilities

- To acquire additional experience, knowledge and information regarding **water supply management, administration and maintenance**.
- To understand the best ways to **reduce non-revenue water**.
- To gain the knowhow of **water quality management** and implementation of **water safety plans** in order to develop my control and coordination work with the water establishments.

Water Supply Administration
For Better Management of Water Supply Services
Course（A）

MALAWI

WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES

INCEPTION REPORT PRESENTATION

1. Country : Malawi
2. Name : Valentine Kaupa
3. Position : Distribution Engineer (Northern Zone)
4. Organization : The Lilongwe Water Board

JUNE 2016

Presentation Outline

- General Country Information
- Mission
- Management of Water Quality
- Reduction of Non-Revenue Water
- Water Tariff
- Water Supply Service Standards / Performance Indicators
- Management of Water Supply Service on a Self-Supporting Basis
- Major Recent Achievement in Improvement of Water Supply Services/Management
- Expectation for the Japanese Private Companies & Water Supply Utilities

General Country Profile: Background

- Malawi is located on the Eastern part of Southern Africa.
- There are four Cities; Lilongwe, Blantyre, Mzuzu and Zomba
- Lilongwe is the Capital City and the largest city.
- The Lilongwe Water Board (LWB) is a state owned statutory corporation responsible for supply of water to the City of Lilongwe
- LWB abstracts raw water from Lilongwe River which originates from Dzalanyama Ranges

Whole Country:
Area : 118,484 km^2
Population : 16,407,000 Habitants
Coverage Water Supply: -
Lilongwe Water Board Water Supply System:
Service Area : 456 km^2
Population Served: 800,000 people
Daily water production: over 100,000 cubic meters
Length of pipeline: 2,800km

My Mission

- Mission of my organization is to *provide adequate water supply services in a sustainable, efficient and customer responsive manner*
- My mission in the organization is to implement the boards objectives to achieve its vision through team work, personal commitment to high standard of work and innovation in solving challenges of water supply services
- My actual job to achieve the mission is to design, implement, manage and maintain the organization's water infrastructure and oversee day to day operations of water distribution and supply in the Board's service area

1. Management of Water Quality

- The following measures have been put in place to ensure adherence of LWB's water to WHO standards

Six stage water treatment process:

- Raw water screening
- Natural Sedimentation
- Coagulation and flocculation
- Sedimentation
- filtration
- Disinfection (+ process control tests that are carried out every 3 hours)

1. Management of Water Quality cont'd

Raw Water quality control:

- Rehabilitate and conserve catchment area/water source
- Enhance Stakeholder involvement and participation
- Improve the policing of detrimental human activities along the river and at the catchment

Treated Water Quality Control

- Improved Water Quality Monitoring and Testing System (water analyzers for analyzing heavy metals, equipment used for routine water analysis such as pH meter, turbidity meters, filtration unit for culture, flocculator etc.)
- Customer feedback on water quality (lab tests on water samples leaving the treatment plant and samples at consumer tap
- Sterilization of new mains, + periodic flushing out

2. Reduction of Non-Revenue Water (NRW)1

- Constitution of Non-revenue Water

System input volume 35,340,000 m^3 /year	Authorized consumption	Revenue water	Billed authorized consumption	22,617,600 m^3 /year (64 %)
		Non Revenue Water (NRW)	Unbilled authorized consumption (ex. fire fighting, cleaning)	2,120,400 m^3 /year (6%)
	Water losses		Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)	4,947,600m^3 /year (14%)
			Real losses (Leakage)	5,654,400 m^3 /year (16%)

2. Reduction of Non-Revenue Water 2

Current measures in place to reduce NRW

- Implementing a NRW strategy
- Undertake Water Balance through DMAs
- Implement Pressure Management
- Reduce apparent losses through registration of all Never connected accounts, training of meter readers
- Carrying out leak detection exercises -Pilot
- planned replacement of mains
- Lowering of pipelines
- Customer verification exercise
- Introduce prepaid meters-Pilot

3. Water Tariff

- Water consumption is divided into the following demand/consumption categories
  - Domestic
  - Kiosks
  - Industrial/Commercial/Institutional
- Water tariffs vary based on these categories

- Lack of realistic water pricing regime

- Domestic consumption tariff; K1,100.00 (US$ 1.52) for using 25 drums (5 cubic meters) of water
- K3,150.00 (US$ 4.38) for using up to 50 drums (10 cubic meters) of water
- Rest of information on tariffs is provided on the printed sheet

(Exchange Rate of 1USD=MK720.00 – June 1, 2016)

4. Water Supply Service Standards / Performance Indicators

Element	Indicator
Water coverage	Supply coverage increased to 70%
Water supply distribution across the supply area	Number of low pressure/no water complaints reduced to 20%
Improved system reliability	Continuity of supply (24 hour supply in most areas)
New water sources developed	Number of new water sources developed e.g. Lumbadzi groundwater project is near commissioning
Percentage of Non-Revenue Water reduction	• Less occurrence of pipe breaks and leaks • Downward trend in percentage of monthly NRW since January 2016
Raw water quality and Treated water quality	• Reduced chemical usage in water treatment • Vegetative cover on river catchment area • Few customer reports/queries on water quality

5. Management of Water Supply Service on a Self-Supporting Basis

- Maintenance of all pipeline and small infrastructure upgrades done by internal revenue
- Limited financial capacity for infrastructure development
- Major projects e.g. Dam Raising, new Treatment Works, new abstraction point, etc. require loans from institutions like the World Bank, European Investment Bank, African Development Bank
- All expansion works to the existing mains system are fully funded by LWB revenue
- Decentralization of general administration to operational zones
- Increased revenue collection

6. Major Recent Achievement in Improvement of Water Supply Services/Management (PART1)

2005	INDICATORS	2015
1,800 km	Length of mains	2,600 km
75,000	Production capacity m3/d	120,000
WHO Guidelines	Water quality	WHO Guidelines
51%	Coverage area	70%
14hr/d	Supply duration	20hr/d
10m	Supply pressure	20m
29,000	Number of connections	45,000
40%	NRW	36%
79%	Collection ratio	85.%
700	Staff number	462

6. Major Recent Achievement in Improvement of Water Supply Services/Management (PART2)

- Upgrading the existing infrastructure for abstraction, treatment and distribution of water.
- Strengthening the financial sustainability of the Board through containment of costs and improvement of revenue collection that has seen the Board become a profitable entity.
- Strengthening the capacity of staff through various training interventions, for them to be able to deliver efficiently and effectively.
- Strengthening arrangements for dealing with customers through decentralized management structures and processes and undertaking interactive meetings to improve customer relations.

6. Major Recent Achievement in Improvement of Water Supply Services/Management (PART2) Cont'd

Key Challenges

- Inadequate and aged infrastructure (treatment production, transport mains, distribution system);
- Environmental degradation resulting in a diminishing water resource in terms of quality and quantity;
- System vulnerability and weak emergency preparedness in areas of energy and water sources i.e. currently LWB does not have alternative source of energy and water;
- Uncoordinated planning by city development stakeholders and inadequate research reflected in inability to appropriately project the rapid population growth and urbanization, compounded by uncoordinated development and growth of the city;
- Lack of realistic water pricing regime;
- High Non-revenue water;
- Poor customer relations;
- Inadequate financial capacity for infrastructure development

7. Expectation for the Japanese Private Companies & Water Supply Utilities

- Identify best practices from well performing water utilities that LWB can implement to the advancement of its mission.
- Learn how to achieve customers' trust and create significant shareholder value in the process.
- Learn at how Japanese water utility companies are utilizing available resources to achieve high productivity whilst satisfying their customer needs

Water Supply Administration
For Better Management of Water Supply Services
Course（A）

NIGERIA

Water Supply Administration for Better Management of Water Supply Services

Inception Report Presentation

1. Country: Nigeria

2. Name: Mr OLATUNJI Bamidele
3. Position: Chief Hydrologist/ Head Technical Cooperation & Water Intelligence
4. Organization: F.C.T Water Board

Inception Report Presentation

- Each applicant is kindly requested to make presentation of Inception Report (M/S Power Point file with **less than 15 slides** which cover the following 6 topics about the individual water supply company/public water supply authority to which the participant is belonged.
- Presentation time: 15 **minutes including Q/A**
- **6 topics:**
  - **1. Management of water quality**
  - **2. Reduction of non-revenue water**
  - **3. Water supply service standards**
  - **4. Management of water supply service on a self-supporting basis**
  - **5. Major recent achievement in improvement of water supply services/management**
  - **6. Expectation for the Japanese private companies**
- **6 topics should include the content of "**Current situation and major problems, Current actions against the problems and any achievement."

General Country Profile: Background

Body sentence of the profile / Background

- Nigeria is geographically located in West Africa. Shares land borders with the Republic of Benin in the west, Chad and Cameroon in the east, and Niger in the north
- Most populous country in Africa; Nigeria population as at 2008 was 148,003,542. 374 per sq. mile but projected to 160 million presently
- Land mass area of 923,768 sq.km
- Ethnic groups of 250; while Hausa-Fulani, Igbo, Yoruba, and Kanuri are the largest
- The official language is English, while Hausa, Igbo, Yoruba, Fulani, Kanuri are common local languages
- Nigerians life expectancy as at 2010 was 48.4 years; slight improvement, lowest in WA (UNHD 2010 Report)
- The 2010 report, put Nigeria's Human Development Index (HDI) at 0.423, which ranked the country 142 out of 169 countries with comparable data.
- Nigeria has huge water resources potential estimated at **267 billion** cubic meters of surface water and **92 billion** cubic meters of ground water
- The current water supply service coverage in the country is **58%, i.e. 86 million** people while sanitation is **32% i.e. 47 million.**
- In FCT Abuja, water supply service coverage in Federal Capital City (FCC) is around 30%

Whole Country:

Area : 923,768 km^2

Population : 160 million Habitants

Coverage Water Supply: <60 %

Selected Water Supply System/City:

Service Area : 230 km^2

Population Served: million/ thousand

Selected Water Supply System/City

- **Infrastructure:**

The Abuja Water Supply Master Plan -frameworks for the provision of infrastructure: It provides for the following facilities in phases:

- Raw Water Source
  - First Phase
    - LUD (100mcm)
  - Final Phase
    - Gurara Water Transfer Scheme (850mcm)
- Water Treatment Plants
  - 12 WTP of 5,000m^3 capacity each
    - 1-Nr to provide for Phases I of FCC
    - 2-Nr to provide for Phase III
    - 3-Nr to provide for Phase III
    - 6-Nr to provide for Final Phases (Phase IV)
- Transportation and Storage
  - About 29km 1500mm – 1000mm DI pipe to Tanks 3 & 4 (24,000m^3 each), for Phase I
  - About 39km 1500mm – 1000mm DI pipe to Tanks 2 & 5(45,000m^3 and 40,000m^3 respectively), for Phase II
  - 2 lines of Combined lengths of 62km to Tanks 1 & 6 (40,000m^3 each, originally 30,000m^3 and 40,000m^3), for Phase III
- 3 lines to feed Tanks 7, 8, 9 and 10 (40,000m^3, 45,000m^3, 45,000m^3 and 24,000m^3), for the Fourth and Final Phases

My Mission (sharing among participating friends)

- Mission of my organization is ……

To be a World Class Utility which is consistent in Excellent Service Delivery and Uncompromising in the Quality of its product - Potable Water.

- My mission in the organization is …..

To contribute my skills, technical know-how capacity, time and energy for the production of potable water to entire populace of Abuja.

- My actual job to achieve the mission is ….
- Monitor, coordinates and approved all urban water connections.
- Verify the quality and quantity of materials for water connections.
- Recommends appropriate metering system for water connection
- Recommends water connection to urban poor areas
- Coordinates, monitor & evaluate all Donors intervention with FCTWB
- Support FCTWB/Donor programmes formulation

1. Management of Water Quality

- 1.1. **Current Situation**
- Water quality is monitored from the catchment (Lower Usuma river and its tributaries) to Lower Usuma Dam to the treatment plants, from the distribution network up to the consumer end point.
- The water storage tanks are periodically washed and disinfected
- Both Nigerian Standards for Drinking Water Quality (**NSDWQ**) and World Health Organization (**WHO)** guidelines were used.

Water Quality Challenges

- Insufficient treatment plants, laboratory and shortage of reagents
- Lack of mobile laboratory
- Uncontrolled human activities along the catchment area of the Usuma River and its tributaries
- Drain of waste (household & industrial)into the reservoir during rainy season).
- Vandalization of water pipes
- Restocking of fish by Department of Agric.
- Criss crossing of water lines with sewer pipes
- Intrusions from expired G.I. pipes
- Technology/chemicals

2. Reduction of Non-Revenue Water 1

- Constitution of Non-revenue Water (If you have the data, please fill in the table) The Data is still under collection through the JICA Supported NRW Reduction Project

System input volume	Authorized consumption	Revenue water	Billed authorized consumption	xx m^3 /year (%)
		Non Revenue Water (NRW)	Unbilled authorized consumption (ex. fire fighting, cleaning)	xx m^3 /year (%)
	Water losses		**Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)**	xx m^3 /year (%)
			Real losses (Leakage)	xx m^3 /year (%)

2. Reduction of Non-Revenue Water 2

Is a big challenge in FCT; NRW is estimated at 60%
Government of Japan through JICA is currently supporting FCTWB to reduce NRW (2014-2017)
Installation of bulk meters, zonal meters and consumer meters are on-going in the 3 selected PMAs; also isolation valves and chambers construction. Leak detectors & some equipment has been procured.
Pilot Metering Areas (PMAs) and Sub Metering Areas (SMAs) have been identified
Training on NRW management is on-going both in Nigeria & Japan

3. Water Tariff

- Four (4) types of Tariff plans were implemented: (see table below)

s/no	Tariff Plan	Amount (N:K)
1	Domestic meter rate	80:00/m3
2	Commercial meter rate	150/m3
3	Domestic flat rate	4,000/month
4	Commercial flat rate	30,000/month

4. Water Supply Service Standards / Performance Indicators

- Water supply service standard are categorized into the following sub-themes in FCTWB.

1. Water connection: Types of pipe used for secondary & tertiary: Upvc and PE pipe (25-50mm)
2. Metering system: Conventional meter, AMR, pre-paid
3. Staff ratio per connection: over 20
4. Volume of water treated: less down 30,000m3
5. Power consumed: monthly
6. Coverage ratio: less down 40%
7. NRW: estimated 60%
8. Water quality: WHO & NWQS Guidelines
9. Supply duration: 24hrs in FCC ; rationing in Satellite towns

5. Management of Water Supply Service on a Self-Supporting Basis

- Effort to improve on technical know-how and improve service delivery through cooperation with JICA
- Effort to conserve & prevent wastages of treated water supply through jingles and public enlightenment
- Effort to pass the Law establishing FCTWB through advocacy & public enlightenment
- Effort to increase financial base to fund operations these include; metering of all properties
- Effort to increase tariff
- Effort to increase efficiency of use of resources
- Effort to formulate key performance indicators for better water magt

6. Major Recent Achievement in Improvement of Water Supply Services/Management (PART1)

Please fill in variation of the indicators below based on your situation!

(Example)

2003or2004?	INDICATORS	2013or2014
50-60	Staff/1,000 connections	22-25
240,000	Production capacity m3/d	400,000
NWQ&WHO	Water quality	NWQ&WHO Guidelines
25%	Coverage area	33%
24hr/d	Supply duration	<24hr/d
2 bar	Supply pressure	<2 bars
33,367	Number of connections	<200,000
<50%	NRW	<45%
>60%	Collection ratio	50-60%
1,300	Staff number	798

6. Major Recent Achievement in Improvement of Water Supply Services/Management (PART2)

- Completion of treatment plant 3 & 4 with the combined capacity of 20,000m3/hr
- Completion of tank 1 & 6 with combined capacity of 80,000m3
- Kick start Reduction of NRW project by the support of JICA (2014-2017)
- Introduction of Clean energy with Solar Power generation by JICA
- Use of prepayment meter to boost revenue collection
- Introduction of AMR meters to enhance billing efficiency & revenue generation
- Separation of water lines to high –rise buildings
- Conversion of flat rate billing to metered billing
- Introduction of stakeholders consultations to enhance customers satisfaction

7. Expectation for the Japanese Private Companies & Water Supply Utilities

- Technology and skills transfer to reduce NRW through KCC
- Formulation of performance indicators for FCTWB & water supply services standards
- Understand and implement water safety plan for WQM to promote better management of water supply services in FCT
- Build my capacity on effective facilities maintenance, procurement of pipe materials & customers management skills
- Build a network for FDI to water sector of Nigeria
- Build a network for establishment of local assembly of water equipment & materials in Nigeria
- Support for the implementation of 'improvement plan' for better management of FCT water supply services on return
- Financial investment through FDI/ Yen Loans Project

15

JICA KNOWLEDGE CO-CREATION PROGRAM
(Group & Region Focus)

WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES (A)

JFY 2016
No. J16-04389 / ID. 1684472

INCEPTION REPORT ON WATER CORPORATION OF OYO STATE (WCOS), IBADAN.

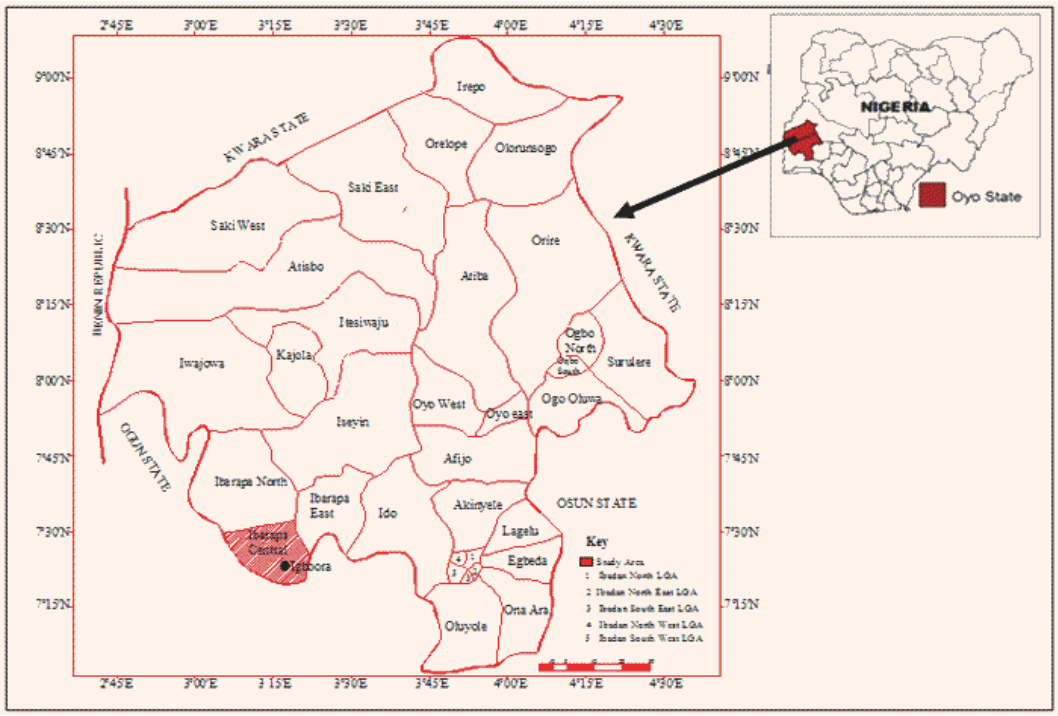
JUNE 2016

INTRODUCTION

- The Federal Republic of Nigeria is one of the west African countries.
- It is made up 36 states and the Federal capital, Abuja.
- The states are grouped into six geographical regions namely: North West, North East, North Central, South East, South West and South South.
- Nigeria is regarded as the most populous country in Africa.
- The last census was carried out in 2006 and the population then was put at 140, OO3, 542
- Using a growth index of 3.41% the population of Nigeria as at 2015 can be estimated to be 189, 322, 341
- The Water Demand (Ltr/Day) using 100Ltr per capital = 18,932,234,100 ltr/day.
- Public water supply started in Nigeria in the early twentieth century in few towns and was managed at the lowest administrative level (local Government)
- The first Water Corporation was formed in the Western Region in 1966
- .Today, all 36 States and the Federal Capital Territory have water boards/corporations or public utility boards managing their public water supply.
- Oyo state is one of the six states in the south west region of Nigeria.
- The state was founded in 1976 and it is divided into 33 Local Government, the state capital is Ibadan.

INTRODUCTION
MAP OF NIGERIA

MAP OF OYO STATE



INFORMATION ABOUT OYO STATE THE WATER CORPORATION OF OYO STATE (WCOS)

- According to 2006 census figure, the Population of the state was 5,580,894
- Projected Population by 2016 using +3.41% growth index = 7,804,214
- Water Demand (Ltr/Day) using 100Ltr per capital = 780,421,400 Litres
- WCOS is the parastatal of the state government vested with the responsibility of providing potable water for human, agriculture, commercial and industrial use.
- Presently, WCOS has Thirteen (13) existing waterworks and four new ones are under construction.
- The total design production capacity of all the Seventeen (17) waterworks is about 420 Million Liters per day.
- As such, water production potential in the state is about 50%.
- These seventeen (17) waterworks is spread across twenty (27) out of Thirty-three (33) local government in the state while the remaining six (6) Local Governments, depend on boreholes, deep wells, streams and hand dug wells.
- Design capacity, year of commissioning and present production capacity of the existing and new waterworks is shown in Table 1 and 2 respectively

INFORMATION ABOUT OYO STATE THE WATER CORPORATION OF OYO STATE (WCOS) CONT'

- The oldest and smallest water supply schemes in the state are koso and Atori waterworks. They are still operational and were commissioned in 1935., with design capacity of 1200 litres/day each.
- They are located in Iseyin Local Government area of the state.
- The largest waterworks in the state is the Asejire waterworks located in Ibadan, the state capital, with a total design capacity of 186,000 litres/day.
- Due to epileptic electricity supply and some other challenges, the present production capacity of Asejire water supply scheme is 66% .
- The Corporation has total length of distribution network of **956.36Km** of various sizes and types of pipes (Abestos Cement (AC), Galvanized Iron (GI), Cast Iron (CI), Unplasticized Polyvinylchloride (uPVC), Steel, Ductile Iron (DI) and Reinforced Concrete Pipes (RCP), with AC pipes having the highest percentage of 74.5%.
- These AC pipes were installed between 1935 and 1972 when the first set of waterworks were constructed.
- Table 3 gives the percentage of various pipe types in the transmission and distribution network.

Table 1: **EXISTING WATER SUPPLY SCHEMES IN OYO STATE**

S/N	WATER SUPPLY SCHEME / BOOSTER STATION	DESIGN CAPACITY (m^3)	TYPE OF TREATMENT	YEAR OF COMMISSION	PRESSENT PRODUCTION CAPACITY (%)	REMARK
1	Asejire Waterworks phase 1 phase 2	 82,000 104,000	 Conventional Conventional	 1972 1996	66%	Epileptic electricity supply and ongoing rehabilitation
2	Eleyele waterworks	27,000	Conventional	1942	50%	Epileptic electricity supply
3	Ogbomosho waterworks	6,600	Conventional	1964	20%	Epileptic electricity supply
4	Oyo waterworks	7,700	Conventional	1964	70%	Epileptic electricity supply and rehabilitation works on filter beds

TABLE 1 CONT'

S/N	WATER SUPPLY SCHEME / BOOSTER STATION	DESIGN CAPACITY (m^3)	TYPE OF TREATMENT	YEAR OF COMMISSION	PRESSENT PRODUCTION CAPACITY (%)	REMARK
5	Eruwa waterworks	3,300	Conventional	1967	20%	Epileptic electricity supply, obsolete Electomechanical equipment
6	Shaki waterworks	2,200	Conventional	1967	40%	Epileptic electricity supply and inadequate electro mechanical equipment
7	Koso waterworks	1,200	Partial	1935	70%	Epileptic electricity supply, Obsolete / inadequate electromechanical equipment

TABLE 1 CONT'

S/N	WATER SUPPLY SCHEME / BOOSTER STATION	DESIGN CAPACITY (m^3)	TYPE OF TREATMENT	YEAR OF COMMISSION	PRESSENT PRODUCTION CAPACITY (%)	REMARK
8	Atori waterworks	1,200	Partial	1935	70%	Epileptic electricity supply, Obsolete / inadequate electromechanical equipment
9	Kishi waterworks	1,980	Conventional	1993	70%	Epileptic power supply and inadequate electromechanical equipment
10	Igbeti waterworks	1,000	Partial	2001	10%	Epileptic electricity supply and on going expansion works
11	Ago amodu waterworks	500	partial	2007	80%	Epileptic electricity supply

TABLE 1 CONT'

S/N	WATER SUPPLY SCHEME / BOOSTER STATION	DESIGN CAPACITY (m^3)	TYPE OF TREATMENT	YEAR OF COMMISSION	PRESSENT PRODUCTION CAPACITY (%)	REMARK
12	Igboho waterworks	1,980	Partial	2003	10%	Inadequate power supply and electomechanical equipment
13	Osengere waterworks	13,500	conventional	1996	0%	Ongoing expansion and rehabilitation

TABLE 2: WATER SUPPLY SCHEMES UNDER CONSTRUCTION

S/N	WATER SUPPLY SCHEME / BOOSTER STATION	DESIGN CAPACITY (m^3)	TYPE OF TREATMENT	COMPLETION TIME
1.	Eleyele mini waterworks	4,800	Conventional	September 2016
2	Ilero Waterworks	72,000	Slow sand filtration	2017
3	Iganna mini waterworks	9,600	Conventional	September 2016
4	Ayete waterworks	72,000	Slow sand filtration	2017

DISTRIBUTION NETWORK BREAKDOWN

MATERIALS	AC	CI	DI	GI	uPVC	RCP	Total
Pipe length (m)	712,542	18,923	94,717	15,482	52,577	62,119	956,360
% of Total Length	74.5	1.98	9.9	1.62	5.5	6.5	100
Average Diameter (mm)	131	236	406	64	150	632	
Average Age (Yr)	50	32	30	17	15	60	

THE EDICT, MISSION AND VISION OF THE WATER CORPORATION OF OYO STATE (WCOS)

- **EDICT**

  WCOS evolve out of the then Western Region of Nigeria through the enabling WCOS edict No. 24 of 1977 and as reviewed by the WCOS (Amendment) law 2006.

- **MISSION**

  To provide efficient, cost effective and sustainable production and distribution of potable water for human, agriculture and industrial uses through operation and maintenance of all necessary water production and distribution infrastructure on behalf of Oyo State Government.

- **VISION**

  To be an all time best performing Agency of Government of Oyo State that would ensure un-interrupted provision of potable water both for drinking and industrial development purposes of Oyo State at reasonable charges with improved healthy living and enhanced social and economic activities as the resultant effects.

Notable Challenges and Action Plan

Notable Challenges

- Non availability of regular and adequate electricity supply to all Water Supply Schemes and Booster Stations
- Inadequate and aged reticulation system/pipe networks throughout Oyo State
- Old and depreciated Water treatment facilities / Water Supply Schemes in the State.
- Willful damage to various facilities of Water Corporation, especially, pipeline, and Electric power cables.
- High Operational Cost
- High Level of Non-Revenue Water
- Low Revenue Generation

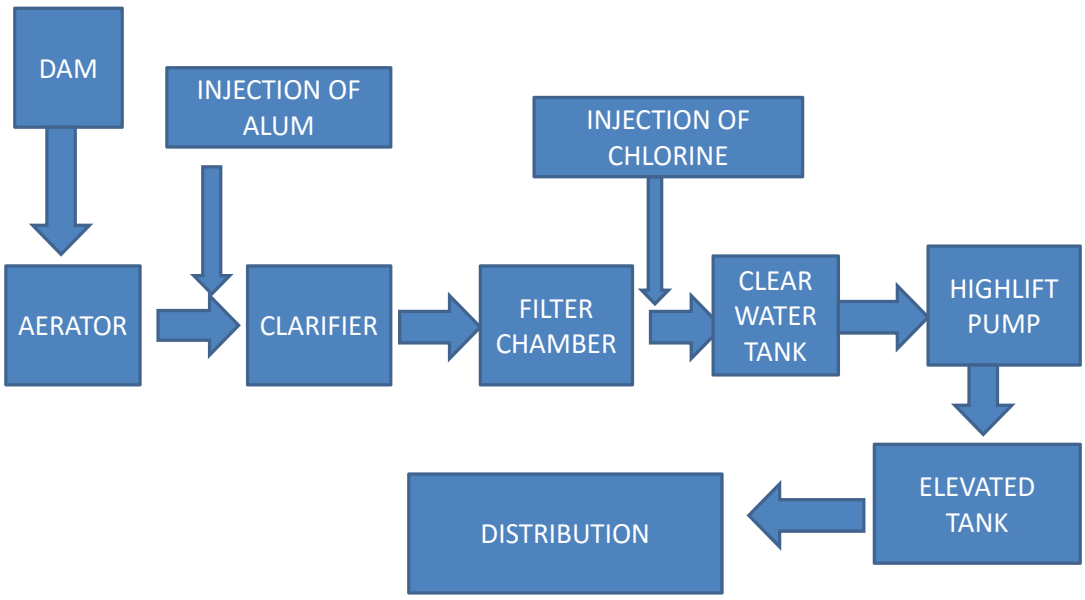
Action Plan

- Rehabilitation & Expansion of existing Water Supply Schemes
- Replacement of the aged pipelines
- Extension of water pipelines to new areas within the State
- Purchase and Installation of Alternative Energy Sources (Gas Plant)
- Consumers Enumeration and use of Geographical Information System (GIS) Services
- Policy Reform and Institutional Development Program
- Management, Commercialization and Technical Support Program
- Construction of New Waterworks
- Capacity Building and Technical Training Program

MANAGEMENT OF WATER QUALITY

- The existing policy on water quality is the compliance with the Nigerian Standards for Drinking Water and the World Health Organization Standards for Drinking Water.
- It is absolutely unacceptable for quality deficient water to be supplied to the public for consumption.
- The policy and its practice have contributed to the absence of water borne diseases in Oyo State despite the large population being served.
- Most essentially emphasis is placed on physio-chemical and bacteriological properties of water before it can be allowed for public consumption.
- Average test result of some Quality Parameters is:
- Residual Chlorine = 0.8mg/Ltr pH = 7.2
- Nitrate ion = 0.01mg/Ltr Iron(II) = 0.01mg/Ltr
- Coliform count = 0mg/Ltr
- Samples of treated water are taken for test on hourly bases before release to the public and randomly at consumers' taps.
- Chemicals used for treatment are Alum sulphate, lime and chlorine gas or HTH in the small schemes.
- Figure 1 shows the process of water treatment used in WCOS

SCHEMATIC DIAGRAM OF WATER TREATMENT



REDUCTION OF NON-REVENUE WATER

Currently, the percentage rating of Non-Revenue Water is about 40%

FACTORS CONTRIBUTING TO NON-REVENUE WATER

- Metering Problem
- Leak Detection Problem
- Inadequate Human Capacity Development
- Distribution Network Leakages
- Unbilled Metered Consumption
- Unmetered Consumption
- Illegal Connection / Water Theft
- Metering Inadequacies and Poor Data Handling
- Slow Response to Leakages
- Lack of Water Tracking Devices
- Poor handling of Billing Software
- Poor Revenue Collection System

REDUCTION OF NON-REVENUE WATER CONT'

As at now, essential steps being taken to reduce Non-revenue water include

- Adoption of Metering System
- Use of Geographical Information System (GIS) on distribution networks (in pipe line)
- Reduction of illegal connection / water theft
- Provision of network maintenance

WATER SUPPLY SERVICE STANDARDS

- Meet with the provision in the existing establishing edict.
- To cover the social service responsibility of the Government
- To meet the water right of every citizen of Oyo State
- To meet the utmost delight of the consumers in terms of quality and quantity
- To serve the interest of Oyo State Government and its people in the area of food security

MANAGEMENT OF WATER SUPPLY SERVICE ON A SELF-SUPPORTING BASIS

- Currently WCOS is a parastatal of the Government
- It is enjoying a semi-Autonomous status
- The Corporation produce and distribute, then generate revenue
- The revenue generated is used by the Corporation to cover part-payment of staff salary and running of Day-to-Day operational activities of water provision.
- The Corporation operates under the Civil Service rules and regulations
- The Government sustains the Corporation in the areas of monthly subvention, payment for electricity consumed, purchase of and Water Treatment Chemicals and executing Capital Projects
- The new focus is to grant the Corporation full Autonomy under Commercial Principles that will be self- sustaining. (Corporatization)

RECENT ACHIEVEMENTS IN IMPROVEMENT OF WATER SUPPLY

- Water Production and Distribution was raised from 10% as at Year 2001 to 65% as at Year 2015
- Water Production potential of Oyo State was 242 million Litres per day as at Year 2011. It is expected to reach about 420 Million Liters per day by the end of 2017.
- Accessibility of water is being increased from 20% to 80% under the Water Supply and Sanitation Improvement Projects being co-financed by the African Developmental Bank
- Rehabilitation of number of existing Waterworks which improved their production efficiency
- Construction of new water supply schemes

EXPECTATION FOR THE JAPANESE PRIVATE COMPANIES AND EXPECTATION TOWARD THE PROGRAM

- Foreign Investors in the following areas:
- Assistance in Non Revenue Water Reduction
- Providing technical assistance in form of training, especially on operation and maintenance, to professionals in the Corporation.
- Providing information on other cost effective alternative electricity power supply and methods of minimizing electricity cost.
- Full rehabilitation of existing waterworks
- Construction of New waterworks to meet with the water demand of the populace
- Production and Laying of pipes to improve the reticulation systems
- Provision of technical support services e.g. Geographical Information System (GIS), Commercial, Policy Reform and Management restructuring services
- Provision of Alternative Power Supply e.g. Gas Power Plant, Solar Power Plant etc.
- Opportunities for Public Private Partnership especially in the areas of infrastructures operation and maintenance.

Water Supply Administration
For Better Management of Water Supply Services
Course（A）

PALESTINE

Knowledge Co-Creation Program

Water Supply Administration for Better Management Of Water Supply Services

No. J16 – 04389 / ID. 1684472

Inception Report Presentation

- Country : State Of Palestine.
- Name : Nour Eddine Mansour.
- Position : Maintenance Engineer.
- Organization : Palestinian Water Authority.
- Department : West Bank Water Department

2016

* Country Profile :

(1). Boundaries of Palestine:

- West: The Mediterranean Sea.
- East: Kingdom of Jordan.
- North: Lebanon & Syria.
- South: Egypt.

(2). Area of Palestine:

- The historical area of Palestine about 27,009 Km2.

(3). Capital of Palestine:

- Jerusalem which became known as Al-Quds.
- Divided into East and West after 1967 war.

(4). Time Zone:

- G.M.T+2 hours (in winter) G.M.T+3 hours (in summer).

* Country Profile :

(5). Climate of Palestine :

- A Mediterranean climate.

(a). Summer (hot and dry).
(b). Winter (cold and rainy).

(6). Language:

(a). Arabic : Official Language.
(b). English : Large percentage of the population.

(7). Population:

(a). West Bank :

Area (5572 Km2) , Population (2.9 M).

(b). Gaza Strip :

Area (0367 Km2) , Population (1.8 M).

W.B.W.D

سلطة المياه الفلسطينية
PALESTINIAN WATER AUTHORITY

WEST BANK

WATER DEPARTMENT

West Bank Water Department (WBWD) :

Background:

* WBWD was a branch of the Jordanian natural resources authority.

* In the year 1966 a branch was established in Jerusalem.

* After June of the year 1967, the Israeli occupation and as result of a military order made by a military ruler, the name of the department was changed from natural resources authority to WBWD and assigning an Israeli officer to look after it.

* In 1996, Control over WBWD was relinquished by Israel to the Palestinian National Authority.

* WBWD is a governmental institution ,producing, purchasing and distributing potable water for the Palestinian communities in affordable price and insure good quantities of water with high quality.

West Bank Water Department (WBWD) :

Authority of The WBWD:

(1). The Water Department has regional authority for monitoring, implementing and inspection on the water resources in the west bank as well as maintenance of water pipe networks.

(2). Reading of water meters of cities and regional councils and the issuance of notes regarding consumed water by these cities and regional councils.

(3). Preparation of detailed plans, specifications and tenders to implement different water projects for these cities and regional councils. Also complete monitoring over these projects.

(4). Giving assistance regarding water issues for semi-governmental establishments and the rest of the municipalities, in addition to providing consultancy services.

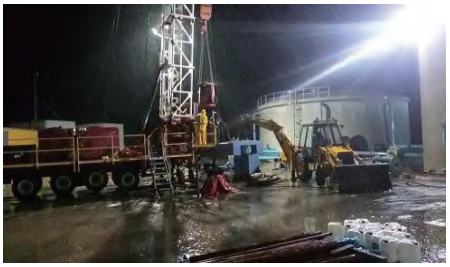
(5). Working on permissions issuance for water projects, water reservoirs, wells and main pipelines in all parts in the West Bank.

My Mission in my organization :

Maintenance Engineer - Stations Department.
Northern Area of the West Bank.

My Actual Job :

(1). Preparation of necessary technical reports regarding wells stations.



(2). Responsible for all maintenance operations for the northern production wells.

(3). Inspection of pumps, equipment and stations, Identifying and fixing malfunction.

(4). Following up rehabilitation projects of the wells with the donors.

(5). Following up all pumping operations from the production wells to the municipalities and regional councils through transmission pipelines.

(6). Following up installation of well pumps and boosters.

1. Management Of Water Quality :

* **Safe Water** : the definition of safe drinking water according to the World Health Organization Guidelines is “does not represent any significant risk to health over the lifetime of consumption, including different sensitivities that may occur between life stages.”

* **Safe Water Characteristics :**

(a). Free of Pathogenic organisms.
(b). Clear, tasteless and colorless.
(c). Low in concentrations of toxic compounds.
(d). No interaction with transmission pipes, fitting & storage containers.

* PWA conducts chemical and biological tests to assure quality control of water in its own lab.

* Water quality is checked by the Palestinian Ministry of Health(MOH) at all sites.

1. Management Of Water Quality :

* All water quality tests carried out in the WBWD with accordance to the WHO standards.

* The following table shows the performance indicators relating to water quality.

- **(Unit: %)**

No.	Key Performance Indicators	2012	2013
01.	Samples (in the main supply lines) containing free chlorine residual (CR).	100	93.43
02.	Samples (taken at source) free from total coliform contamination.	80	100
03.	Samples (taken at source) free from fecal coliform contamination.	98	100
04.	Samples (in the main supply lines) free from total coliform contamination.	95.83	100
05.	Samples (in the main supply lines) free from fecal coliform contamination.	100	100
06.	Microbiological tests carried out.	3.56	56.00

2. Reduction of Non-Revenue Water (NRW):

* **NRW is a water** which is supplied (produced and purchased) but not paid for due to : technical losses (leakage) ,Not billed water, illegal connections, Poor water meter performance and Inaccurate reading and accounting of metered flows.

* Palestine is a special case in the region because of political and security situation.

* In Palestine control over the different areas is not directly the responsibility of the PA forces, and that leads to inability to reach many areas which are under Israeli control to make rehabilitation and stop illegal connections.

* Despite all the obstacles, PWA makes all efforts to improve water situation and reducing non revenue water by all means available (rehabilitations projects, flow monitoring , installing new pipelines with different diameters ,….. etc).

* Percentage of NRW (2007 – 2015) : **(Unit: %)**

2007	2008	2009	2010	2011	2012	2013	2014	2015
10.61	14.26	12.18	18.94	12.78	11.34	12.58	14.99	13.85

2. Reduction of Non-Revenue Water : (01/01/2015 – 31/12/2015)

<table>
<tr><td rowspan="4">System Input Water
84,320,517 m3/year
(100%)</td><td rowspan="2">Authorized consumption
72,638,866 m3/year
(86.15%)</td><td>Revenue water</td><td>Billed authorized consumption</td><td>72,515,644 m^3 /year
(86.0%)</td></tr>
<tr><td rowspan="3">Non Revenue Water (NRW)</td><td>Unbilled authorized consumption</td><td>126,480.775 m^3 /year
(0.15 %)</td></tr>
<tr><td rowspan="2">Water losses
11,681,651 m3/year
(13.85%)</td><td>Apparent losses (Unauthorized consumption)</td><td>8,432,051 m^3 /year
(10.0 %)</td></tr>
<tr><td>Real losses (Leakage)</td><td>3,246,339 m^3 /year
(3.85 %)</td></tr>
</table>

3. Water Tariff in WBWD : (01/01/2015 To 31/12/2015)

* Source Of Water in WBWD:

- The main sources of drinking water in the West Bank Water Department are :

(a). 19 production wells managed by WBWD : Cost Per m3 : (0.565 $).

(b). Purchased water from the (Israeli) Water Companies, Mekorot and Hagihon.

- The following table shows water tariff in WBWD : (1$ = 3.8 NIS)

No.	Source Of Water	Category (million m3)	Cost price WBWD (USD)	Selling price To Customers (USD)
01.	Mekerot	1.0 – 46.160 > 46.160	0.753 0.949	0.684
02.	Mekorot (Bardalah)	-	0.139	0.108
03.	Hagihon	-	1.299	0.815
04.	WBWD wells	-	0.565	0.684

4. Water Supply Service Standards / Performance Indicators.

* A performance monitoring system for water and wastewater services is essential for improving the quality of services.

* Key performance indicators (KPIs) offer a sound and internationally accepted form of measure of service quality and allow for transparent and objective comparisons between different providers.

* Key performance indicators (KPIs) of WBWD :

A. Technical Indicators :

No.	Key Performance Indicators	2012	2013	Unit
01.	Non-revenue water	11.34	12.59	%
02.	Non-revenue water per km in the supply lines per year.	14,847	17,656	m3

4. Water Supply Service Standards / Performance Indicators.

B. Financial Indicators :

No.	Key Performance Indicators	2012	2013	Unit
03.	Working Ratio.	1.26	1.47	No.
04.	Collection efficiency.	62.35	31.60	%
05.	Operating costs per m3 of water sold.	0.821	0.968	USD
5.1.	Personnel costs per m3 of water sold.	0.031	0.034	USD
5.2.	Water purchase costs (at purchase point) per m3 of water sold.	0.605	0.747	USD
5.3.	Energy costs per m3 of water sold.	0.128	0.132	USD
5.4.	Other operating costs per m3 of water sold.	0.057	0.055	USD

C. Water Quality Indicators :

Kindly See 6 KPIs in Slide No.9, Management Of Water Quality.

D. Other :

No	Key Performance Indicators	2012	2013	Unit
12.	Staff Productivity Index	0.58	0.62	No.

5. Management of Water Supply Service on a Self-Supporting Basis :

* WBWD is a governmental institution, therefore, the source of its own budget is the Palestinian Ministry of finance.

* The cost of purchasing and producing drinking water in the West Bank are expensive.

* The Palestinian government is supporting the price of water in Palestine.

* WBWD is the bulk water supplier for water service providers, and it supplies water at a fixed rate of 0.684 $/m3 which is less than its cost .

* Operating costs per cubic meter of water sold is high compared to a selling price, added to that, operational costs of the water department of the Israeli civil administration are carried onto the WBWD.

* WBWD reported a major decline in collection efficiency to a low of 31.6% for 2013 compared to 62.35% for 2012. This decline is due to lack of commitment from water service providers in paying water bills.

* Low collection efficiency, high non-revenue water, insufficient revenues, combined with the additional contested charges have placed the WBWD in a poor financial state.

5. Management of Water Supply Service on a Self-Supporting Basis :

*** Example : (01/01/2015 – 31/12/2015)**

Financial Indicator	Unit	Value	%	Total
Produced Water	m3	20,492,399	24.30	**84,320,517 m3**
Purchased Water	m3	63,828,118	75.70	
Quantity of billed water	m3	72,638,866	86.15	**84,320,517 m3**
Non Revenue Water (NRW)	m3	11,681,651	13.85	
Amount of water sales invoiced	USD	48,095,056	-	**48,095,056 USD***
Collection thru Ministry of Finance	USD	5,898,196	12.25	**46.50 %**
Cash Collections of water fees	USD	15,524,377	32.25	
Collections thru local bodies	USD	996,117	02.07	
Cost of purchased water	USD	59,907,589	-	**72,364,455 USD***
Cost of produced water	USD	11,593,337	-	
Other costs related to water service	USD	863,529	-	
Total Deficit		**- 24,269,399 USD**		

6. Major Recent Achievement in Improvement of Water Supply Services / Management (PART1) :

2007	INDICATORS	2015
160,000	Production capacity m3/d	231,000
WHO Guidelines	Water quality	WHO Guidelines
85 %	Coverage area (Customers)	97 %
13 - 24 hr/d	Supply duration	15 - 24 hr/d
10 – 25 bar	Supply pressure	10 - 25 bar
371	Number of Bulk connections	439
11 %	NRW	14 %
31 %	Collection ratio	46%
106	Staff number	234

- **WBWD is the bulk water provider in the West Bank.**
- **Water Supply lines length : 1,170 km.**

6. Major Recent Achievement in Improvement of Water Supply Services / Management (PART 2) :

* Despite of the obstacles and difficulties faced due to the Israeli occupation and almost complete control over water resources which are mainly the right of the Palestinian side.

* PWA has worked on the development of water sector in Palestine in all ways and means available in collaboration with partners and friends in the donor countries, municipalities and the services councils.

* During the past few years, PWA has implemented several development projects in the infrastructure of the water sector in the communities and villages that suffer from a lack of sanitation and drinking water sources.

* Those projects have contributed to alleviating the suffering of the citizens and improve the standard of living in those areas.

* The following table shows an example for some of those projects in the west bank:

6. Major Recent Achievement in Improvement of Water Supply Services / Management (PART 2) :

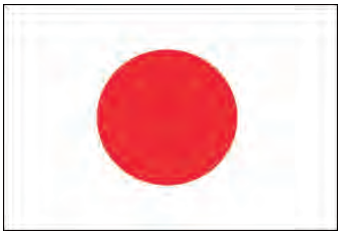
No.	Task Order Name	Value (USD)	Year	Status (%)
01.	Qabatiya Well Pump Station And Conveyance System Project	7,708,760	2016	100
02.	Well Flow Monitoring Project	4,950,980	2015	100
03.	Well Rehabilitation Project (Arrabah & Sanur) , (Saadah)	14,721,856	2016 2014	100
04.	Nahaleen Main Pipeline Project (4", 6", 8", 10" and 12")	12,214,885	2015	100
05.	Deir Sha'ar Main Pipeline Project (4", 6", 8", 12" and 30")	16,512,214	2015	100

6. Major Recent Achievement in Improvement of Water Supply Services / Management (PART 2) :

No.	Task Order Name	Value (USD)	Year	Status (%)
06.	Deir Sharaf Main Pipeline Project (4", 6", 10" and 12")	6,859,034	2015	100
07.	Reef Dura Pipeline (8")	110,000	2015	100
08.	Ras Al Tawil Project Phase 1A	4,462,836	2015	100
09.	NEJ Phase (1) (Elevated Reservoir + Booster station)	11,045,919	2016	Ongoing
10.	South West Jenin (SWJ) Water Project (Elevated reservoir, Booster Station, Internal Water Network And Construction 5 on ground reservoirs)	12,949,433	2017	Ongoing

The Total Value of the above projects is (91,535,917 $)

7. Expectation for the Japanese Private Companies and Water Supply Utilities.



* Japan was the first non-Western country to successfully modernize its society and industrialize its economy.

* We are looking for acquaint of accumulated Japanese private companies experiences on water supply administration and technologies.

* Capacity building on administration, management, operation and maintenance.

* Gaining more experience in supply of safe, stable quantities of drinking water for many more people in my country.

* Supporting our country with all recent technologies in management of water supply services.

* Providing training programs in water utilities development.

Water Supply Administration for Better Management of Water Supply Services

Inception Report Presentation

1. **Country: Palestine**
2. **Name: Saleh Mustafa**
3. **Position: Water Engineer**
4. **Organization: T-JWSSC**

Inception Report Presentation

- Presentation time: 15 **minutes including Q/A**
- **7 topics:**

1. **Management of water quality**
2. **Reduction of non-revenue water**
3. **Water supply service standards**
4. **Water tariff**
5. **Management of water supply service on a self-supporting basis**
6. **Major recent achievement in improvement of water supply services/management**
7. **Expectation for the Japanese private companies**

General Country Profile
Background

Whole Country:

Area : 5572 km^2 (WB) and 367 km^2 (GS)

Population : (2,9 M) (WB) and (1.8 M) (GS) Habitants

Selected Water Supply System/City:

Service Area : 83 km^2

Population Served: 49,900 thousand

My Mission

- Mission of my organization is

To secure safe and potable water for people within area of responsibility

- My mission in the organization is

To work on achieving my organization's mission

- My actual job to achieve the mission is

Water Engineer / technical department

1. Management of Water Quality

- T-JWSSC buys water from WBWD
- WBWD is the national body in charge of water supply to Municipalities and joint councils
- WBWD is responsible on assurance of supplying water satisfying WHO standards
- MOH is responsible on making periodic tests on water samples taken from water sources and networks
- We have no water laboratory to monitor water quality
- We are trying to secure fund to cover preparing the lab or at least getting movable water quality test tools

2. Reduction of Non-Revenue Water 1

- Non-revenue Water (2015)

System input volume 1,350,030 cm	Authorized consumption	Revenue water	Billed authorized consumption	1,015,323 m^3 /yr. (75.2%)
		Non Revenue Water (NRW)	Unbilled authorized consumption (ex. fire fighting, cleaning)	0 m^3 /yr. (0 %)
	Water losses		**Apparent losses and Real losses (Leakage)**	334,707 cm m^3 /year (24.8%)

2. Reduction of Non-Revenue Water 2

- PPWM
- Monitoring water meters
- SCADA system
- Rehabilitation of the networks
- Electronic tools

3. Water Tariff

Package (m3)	Tariff ($)
1-10	1.04
11-20	1.3
21-30	1.82
>30	2.6

- Connection fees 190 $
- A project to evaluate the tariff is going on

4. Water Supply Service Standards / Performance Indicators

- Consumption rate 60 l/c/d
- % domestic consumption 92.92%
- % bulk consumption 7.08%
- NRW 23.95%
- Average selling price 1.44$/cube
- Samples containing free RC (network) 88.07%
- Samples free from total coliform (source) 83.33%
- Samples free from total coliform (network) 96.35%
- Samples free from fecal coliform (source) 91.67%
- Samples free from fecal coliform (network) 96.35%
- Samples free from nitrate (source) 100%
- Microbiological tests carried out 489.64%

5. Management of Water Supply Service on a Self-Supporting Basis

- T-JWSSC started in June, 2013 as a joint council of 3 localities
- Work under the umbrella of MOLG
- Have BOD , EM, 19 employees
- Buy water in bulk from WBWD
- Income from water bills only
- Responsible on 6 tanks, 3 booster stations, and the network

6. Major Recent Achievement in Improvement of Water Supply Services/Management (PART1)

Before TJC	INDICATORS	2014
1.3	Staff/1,000 connections	3.08
0	Production capacity m3/d	0
WHO	Water quality	WHO Guidelines
65%	Coverage area	90%
1d/w	Supply duration	24hr/d
1-13 bars	Supply pressure	1-13 bars
5750	Number of connections	6500
55%	NRW	24%
40%	Collection ratio	67%
5-10	Staff number	20

6. Major Recent Achievement in Improvement of Water Supply Services/Management (PART2)

- T-JWSSC
- SCADA system
- Rehabilitation and extension for network
- New 4 tanks and 2 booster stations

Village	Before JWSSC	Now
Tubas	• Poor Water service • problems in water resources and networks • source : agriculture wells and Tammoun well	•source from Tubas and Tammoun wells. •24 hr service •Rehabilitation project is going on
Tammoun	• Water by Trucking • source :Agriculture wells and then from Tammoun well .	•New network •24 hr. services
Aqqaba	• Poor Water service • problems in resources and network • source Qabatiya well.	•Still have problems •Rehabilitation project is going on •still uses trucks
Tayaseer	•No water service •Water by Trucking	•Network project is going on

7. Expectation for the Japanese Private Companies & Water Supply Utilities

- Expect more than could imagine
- Very low NRW
- Very high quality water
- High quality water service management
- Advance tools, equipment, and softwares
- Full coverage water supply

Water Supply Administration
For Better Management of Water Supply Services
Course（A）

SOUTH SUDAN

WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICE

INCEPTION REPORT:

Country: REPUBLIC OF SOUTH SUDAN

NAME: ELNOUR JOSEPH SULE TANGON

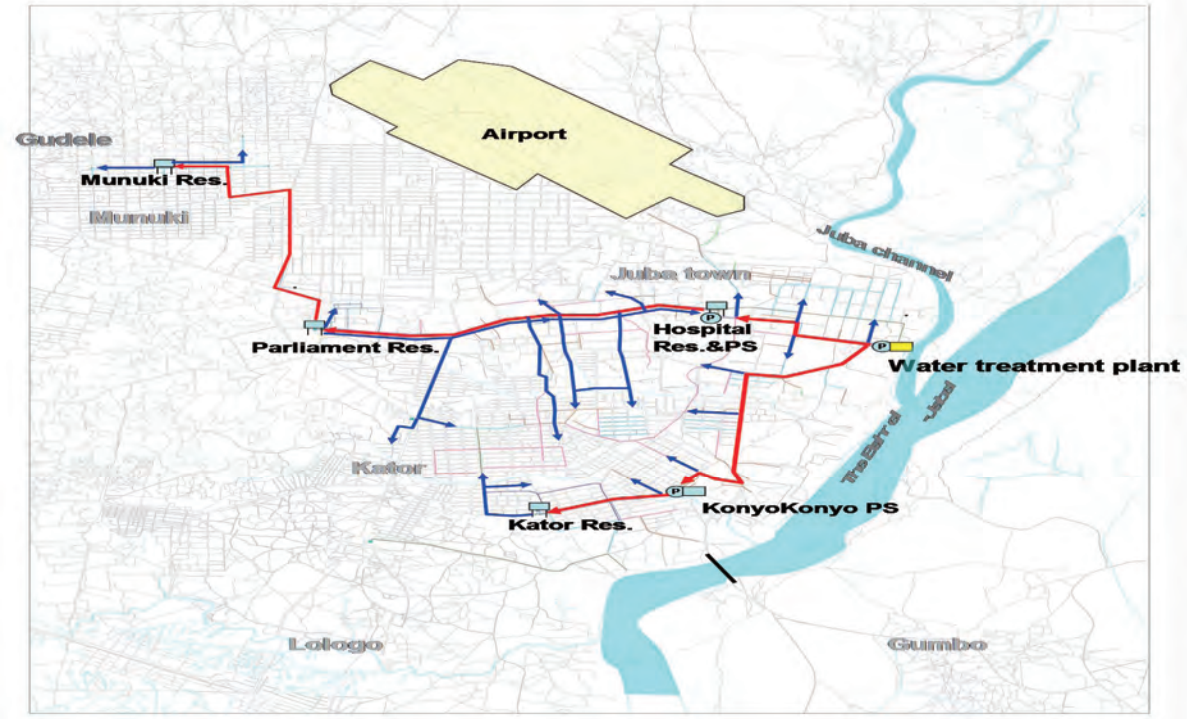
POSITION: AG/AREA MANAGER, JUBA STATION

ORGANISATION:SSUWC/JUBEK STATE JUBA.

BACKGROUND:

- Juba station was build in 1939,rehabilitated in 1974,and finally in 2009 the expanded to 7,200m3/day.
- Number of staff is 160 persons.
- **Area**: not determined
- **Service area**: sporadic/71 km lenghth
- **Population:** About one(1) million.
- **Population served:** about 100,000 people.
- **Water supply coverage:**10%

Juba Water Distri.system

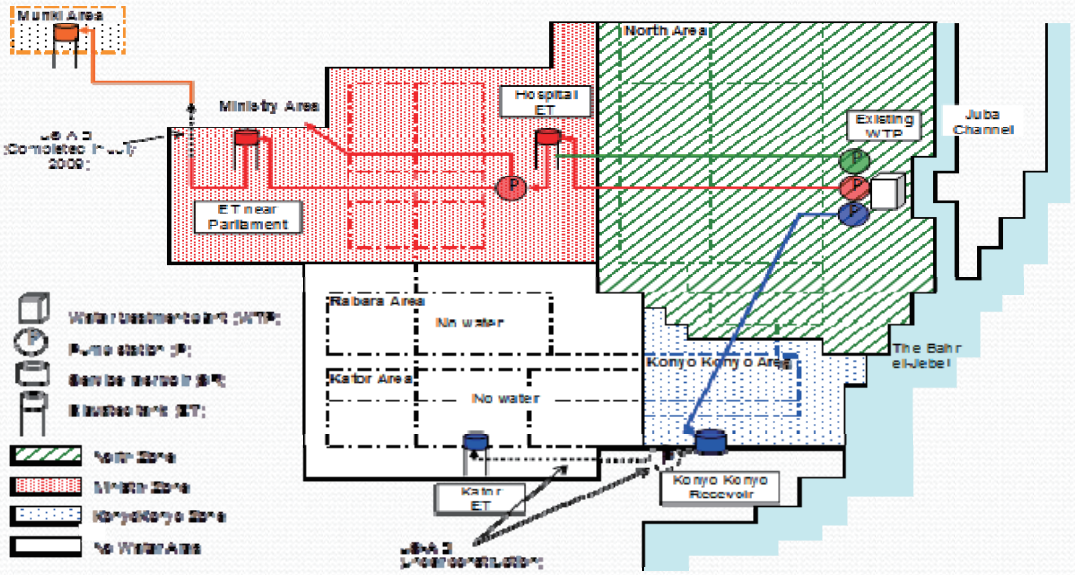


1-2. Specification of transmission and distribution system

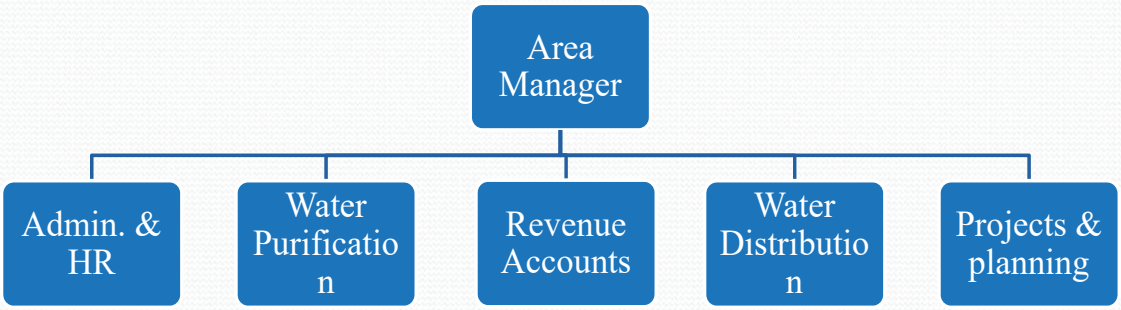
- Transmission and distribution pipeline

Material	Length (m)	%
Asbestos cement (AC)	49,041	69%
Galvanized iron (GI)	1,295	2%
Polyvinyl chloride (PVC)	16,403	23%
Steel (ST)	4,575	6%
Total (m)	71,314	100%

Water supply system/Juba



Currently the plant is composed of the following departments.



Management of Water Quality.
(Daily, Weekly & Monthly sampling)

Sampling locations:

- ❑ taps and tanks
  - ❑ Household taps

Monitoring operation.

Experiment to produce cleaner water
(Filter backwash test)

Filter backwash

Some time after filtration of settled water, filter becomes stacked with dirty materials, and filter has to be washed to restore its function

Old method:

Air blower: 3 minutes
Water backwashing: 4~5 minutes
Frequency: 2~3 times/filter/day

New method

: 5 minutes
: 10 minutes
: 1 times

Reduction of Non revenue water

- **Non revenue water(NRW):**40%.
- **Leakage ratio:** very high.
- **Daily supply:**

NRW reduction strategy.

- **Monitoring & reporting**
- **distribution Dept. Standby maintanance team.**
- **Avail spare parts such fittings.**

Leak repair Activity.

Water supply service standards

Our goal as a utility is to provide excellent service of pure drinking water in conformity with the world standards and specifications e.g South Sudan water quality, WHO and Iso.

Management of water supply service in self-supporting basis.

- Revenue collected is being used for operation and maintenance of the utility:
  1. Fuel
  2. Fittings.
  3. Motivation.
  4. Facilitation of JICA Grant Aid project.
  5. Repair of vehicles.

Pump repair activity

Achievements in improvement of water supply

- Installation of a new 330kva power generator.
- Extension of distribution network by 3 km.
- Purchasing of chemicals E.g. Alum & chlorine.
- Repair of leakages, sustaining old vehicles & damaged pumps.
- Removal of obstacles hampering the grant aid project of JICA.

Expectation for the Japanese private companies.

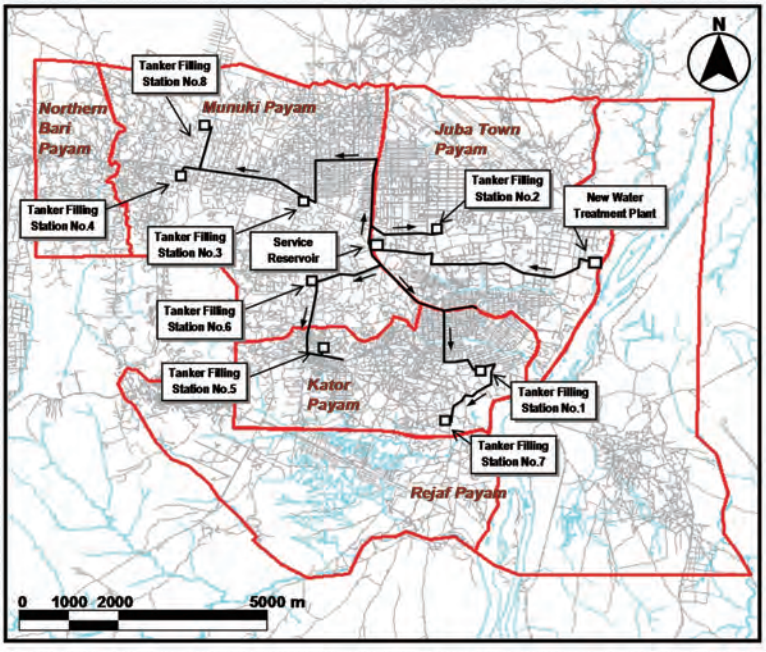
- Water supply materials such as:

1. Pipes
2. Meters
3. Leak detection equipments.
4. Pumps.
5. Fittings.
6. Laboratory instruments.

Expectation toward the program

- New knowledge and technology shall be gained.
- New experiences and relationships.

Proposed grant aid Distribution



Water Supply Administration
For Better Management of Water Supply Services
Course（A）

SUDAN

Water Supply Administration for Better Management of Water Supply Services

Inception Report Presentation

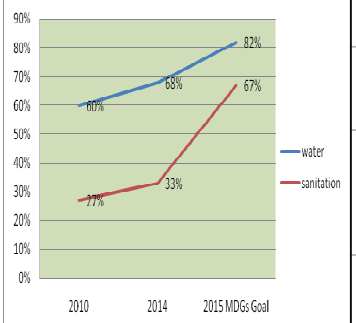
1. Country: SUDAN

2. Name:Modawi Ibrahim M. Ahamed
3. Position:Director of Foreign Aid Dept.
4. Organization:DWSU –MoWRI&E

General SUDAN Profile:Background

•Capital Khartoum Official languages Arabic, English Area 1,88,068 km2 Population estimate 2014: 37,289,406

WASH Situation in SUDAN



Water and sanitation 2014

MICS Indicator		Indicator	Description	Value
4.1	MDG 7.8	Use of improved drinking water sources	Percentage of household members using improved sources of drinking water	68.0
4.2		Water treatment	Percentage of household members in households using unimproved drinking water who use an appropriate treatment method	4.1
4.3	MDG 7.9	Use of improved sanitation	Percentage of household members using improved sanitation facilities which are not shared	32.9
4.4		Safe disposal of child's faeces	Percentage of children age 0-2 years whose last stools were disposed of safely	53.0
4.5		Place for handwashing	Percentage of households with a specific place for hand washing where water and soap or other cleansing agent are present	25.8
4.6		Availability of soap or other cleansing agent	Percentage of households with soap or other cleansing agent	55.4

My Mission (sharing among participating friends)

- Mission of my organization is: Responsibility for water supply and sanitation in the country is vested on the Ministry of Water Resources and Electricity (MoWRE)/ Drinking Water and Sanitation Unit (DWSU) ,with a responsibility for planning and implementation of national water and sanitation supply projects, provision of technical and financial support to national investment projects and to state authorities' , up keeping of standards and training of staff and development of the sector polices and strategies , supervision of the nationalist character projects, and loans and grants coordination , guidelines and standers Procurement and supply water State Corporations with all water inputs (materials, equipment, and chemical….etc.).To ensure providing adequate and equitable and affordable safe drinking water and sanitation for all.
- My mission in the organization is : Responsible for administrate and manage implementation and operation and maintains of many schemes and water facilities in the development program in different states in Sudan and water emergency respond water facilities , and his role to avail administrative guidance to projects mangers as technical back up and to build their capacities for better performance and to introduce new innovation to be adopted.
- My actual job to achieve the mission is: Water Environmental Sanitation Program National Coordinator, directorate of foreign aid projects and as coordinator of Water Sector reform

Inception Report Presentation

-. anagement of water quality

- DWSU is committed to improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials by applied Sudanese Standards for water quality introduced by SSMO with contribution from DWSU based on WHO standers , supporting states by institutional and human capacity building to manage the water quality in their water supply systems, , preparedness for interventions in emergency mode and technical support and monitor performance of water provider (SWCs, Water facilities & private sector) in the country .
- The major challenges and problems are : adoption of standards by service providers , institutional and human capacities , supply chain , high turbidity during the rainy season , water quality against water quantity , financing and Implementation of Water Safety Plans .

Inception Report Presentation

1- . anagement of water quality:

- Removing of the bottlenecks : monitor adoption of standers, working with water authorities to build capacities , using revolving fund to maintain supply chain , introduced technical solutions to mange high turbid water , and up grade facilities to match the needs in peak periods, Also allocation of enough budgets to provide chemicals and advanced equipment for testing.

Inception Report Presentation

2-\eduction of non-revenue water:

- The flat rate system was widely adopted in Sudan water facilities in collecting revenue, few of them depend on metering system , calculating of non –revenue water is depend on estimations rather than real calculation formula , beside using bad quality of water meter in other hand in water facilities whom introduce metering system .
- The non paid bills , non authorized connections, poor operation and maintains and monitoring programs , low skills for computing non-revenue water contribute to have low cabbalists of counting and reduction of non-revenue water .
- Linkage of water bill with electricity bills ,introducing good quality water meters , introducing O & M system , control of un-authorized connections and introduce community participation for quick contact in case of pipe burst or leakages apart of problem solving mechanism.

Inception Report Presentation

3-ater upply ervices tandards

- Drinking water and sanitation unit (DWSU) formulate about 11 guidelines standard manuals for water systems, design and technical specifications which distributed widely within water sector to all concern partners .
- This guidelines are not fully adopted , due to insufficient fellow up and lose accountability among sector partners , they need up grading to suit new demand for more issues to be talked , and to some extent availability of high quality materials standard supplies in local market .
- Review of those standards are planned ,including dissection and action around accountability and functionality, up grading and explore and produce addition manuals which are not captured all needs.

Inception Report Presentation

4-\eduction of non-revenue water:

- The flat rate system was widely adopted in Sudan water facilities in collecting revenue, few of them depend on metering system , calculating of non –revenue water is depend on estimations rather than real calculation formula , beside using bad quality of water meter in other hand in water facilities whom introduce metering system .
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Inception Report Presentation

5-Management of water supply service on a self-supporting basis:

Most of Water facilities in Sudan have repayable finance, following a policy based on partially self-autonomy basis with shared administration between the Gov. and water board , Government always provide investment cost , from revenues the facilities covered O &M cost. The Government management system.

Due to low water tariff financing gap which lead of poor serves delivery , loss of skill staff , shorting of the life span of the water facility , customer satisfaction, accordingly replacement and new extension are not affordable.

Inception Report Presentation

6- Major recent achievement in improvement of water supply services/management :

- Conducted Bottleneck analysis to identify shortfalls within existing institutions, capacities and proposed remedial measures to ensure sustainable service delivery for all. Identified major interventions needed to harmonize & align SDGs and Sudan Quarter Century plan Targets to ensure water and sanitation for all.Plan to: Endorse draft Water Supply and Sanitation Policy; Develop a New WaSH Strategic Plan (2017-2020); Undertake Sector Assessment , Establishment of the Sector Coordination, Needs and Gaps Assessment of the WASH M&E system, Strengthen the capacity of the institutions to deliver and, Review and update regulations and laws for harmonization
- Building Water and Sanitation atlas which will guide formulation of strategic plan 2017-2021 called Zero Thrus Plan.

Inception Report Presentation

6-Major recent achievement in improvement of water supply services/management :

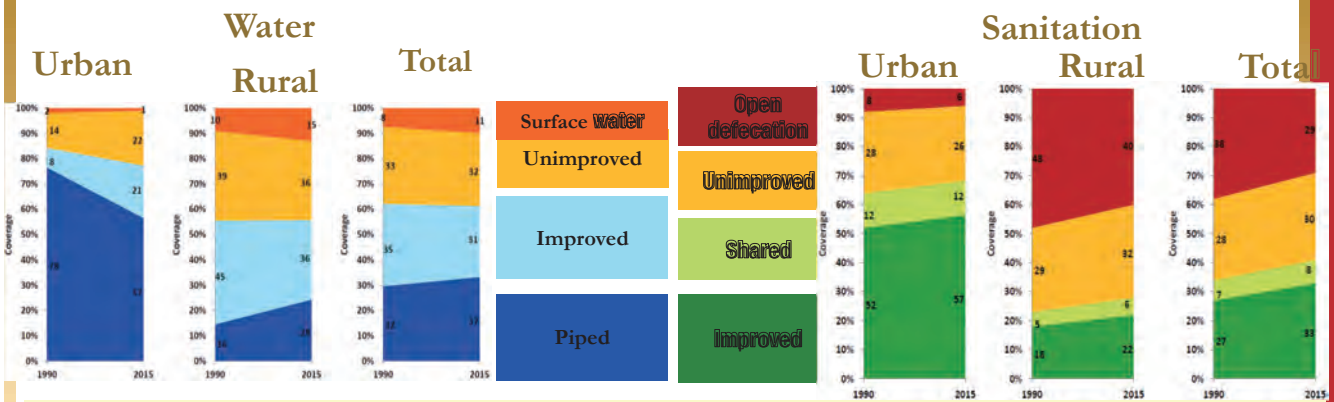
Outcomes

- 37% of the population of Sudan used piped water in their houses while 68 % of them find the safe water when they needed.78% of the population in the towns have access to safe drinking water .
- A Proposed Sector reform and institutional capacity building is driven by political will and Government leadership to improve enabling environment to achieve considerable progress in water targets to meet SDGs ,
- Linkage and harmonization among the sector and inter-sectoral engagement to ensure sanitation and water for all

Next Steps

- Implementation of sector reform program financed by AfDB and Government
- Ongoing formulation of a strategic framework for scaling up water a partnership between government Donors UN

The big picture: current sector outlook



% of population with access to **improved water** sources in 2015:

- Urban: 78%
- Rural: 63%
- Total: 68%

% of population with access to **improved sanitation facilities** in 2015:

- Urban: 57%
- Rural: 22%
- Total: 33%

Based on MICS Data 2014

The big picture: what are the Challenges ?

SDGs emphasis:

	Challenges	
	Water	Sanitation/ Hygiene
Universal	• 11% of the population still drinking Surface Water • 32% of the population using unimproved water sources • 33% of Schools without basic water facilities	• 29% of the pop. practicing Open Defecation • 30% of the pop. using unimproved sanitation facilities • 45.8% schools without basic hygiene and sanitation facilities
Equitable	• % gap in access to improved water sources between: - Rural and urban population: 14% - Highest and lowest wealth quintiles: 50.5%	• % gap in access to improved sanitation between: - Rural and urban population : 35% - Highest and lowest wealth quintiles: 72% -
Safely managed (Quality/availability/ accessibility)	• % of population using an improved water sources that are:Located on premises 37% ✓ Available when needed 68% ✓ Free from contamination 68%	% of pop. who using improved sanitation that is: ✓NOT shared 33% ✓Where faecal waste safely disposed in situ ✓/ transported and treated offsite 41% ✓With Handwashing with soap and water 26%

Inception Report Presentation

7-Expectation for the Japanese private companies:

Learn new Techniques& technology in Water supply services administration and management .

Enhance the ability in term of Management Planning ,Implementation , Monitoring and Reporting , Operation and Maintenance process for Water supply services .

By end of the course , I should have been capable to practice management and admin . experience and knowledge .

To tackle the problems such as reducing non-revenue water, leakage detection , water safety management, standards and M&E ,and have solutions of shared difficulties which can be removal or solved with experience gained from Japanese private sector and explore to what extent they can support in the future .

Water Supply Administration
For Better Management of Water Supply Services
Course（A）

TANZANIA

THE UNITED REPUBLIC OF TANZANIA
REVOLUTIONARY GOVERNMENT OF ZANZIBAR

A COUNTRY REPORT ON

WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES

PRESENTED BY

HASSAN J. ALI
PRINCIPAL HR OFFICER

ZANZIBAR WATER AUTHORITY (ZAWA)
MINISTRY OF LAND, WATER, ENERGY AND ENVIRONMENT
ZANZIBAR - TANZANIA

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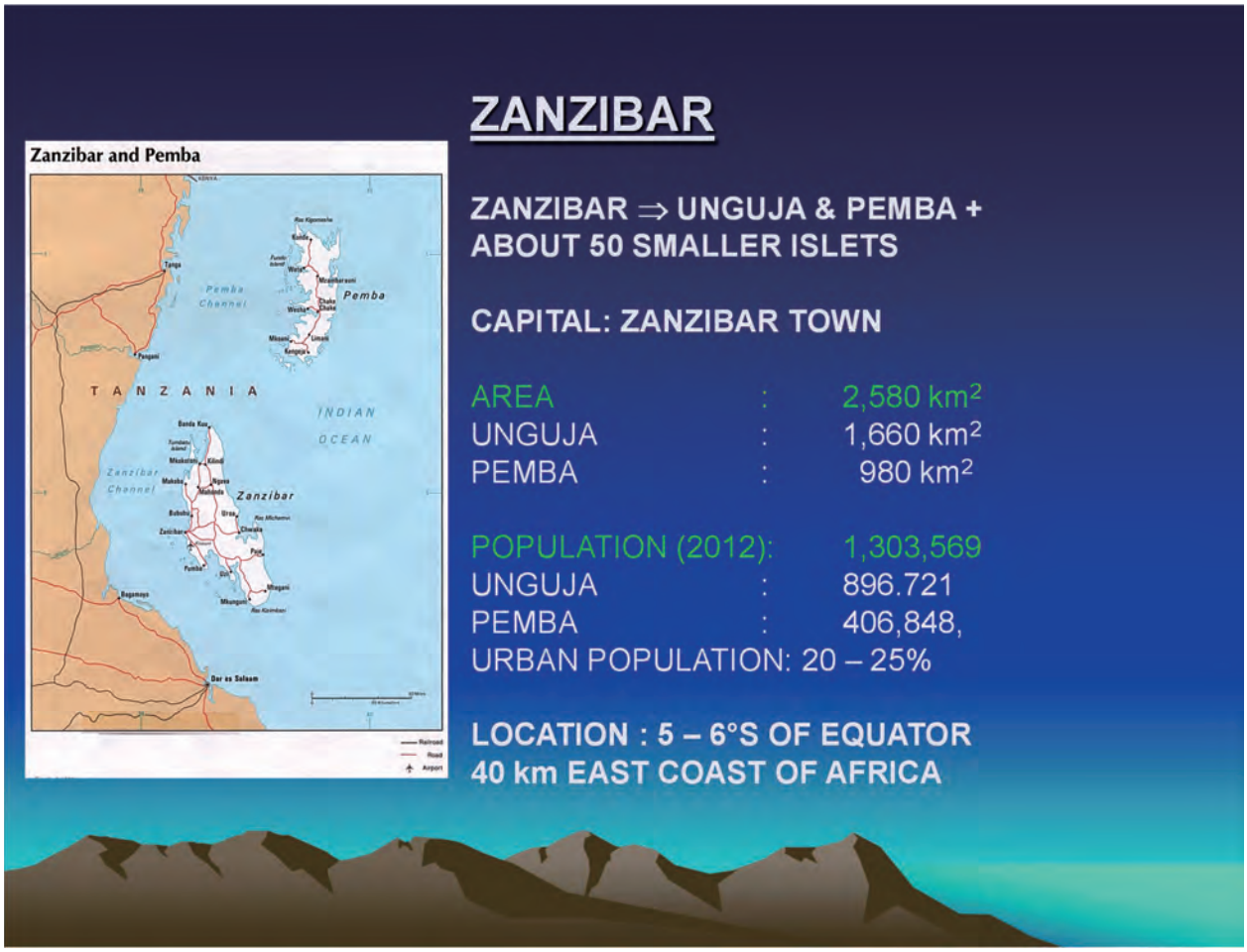

3

ECONOMY AND CLIMATE

- **ECONOMY**
- Agriculture (clove as main cash crop) contributes about 75% of Foreign Exchange)
- Other minor economic activities:-
  - Tourism
  - Carpentry
  - Petty business,
  - Small-scale industries.
- **CLIMATE**
- Zanzibar experiences a tropical climate with:-
- Heavy rains during March /June (called Masika)
- Hot east monsoon winds during December/February (Kaskazi).
- Cool weather during June/August (Kusi).
- Short rains during September / October (Vuli).
- TEMPERATURE : max 39° c, average 25° c
- ANNUAL RAINFALL: UNGUJA: 1,857mm – 1,625mm Pemba : 1,912mm – 1,531mm

4

ABOUT ZANZIBAR WATER AUTHORITY

- It is a semi-autonomous water utility established in 2006
- Historically, it was a Central Government Department.
- It is responsible for clean and safe water supply services in both Urban and rural areas of Zanzibar.
- The main source of water supply is the ground water with about 311 boreholes out of which, 160 In Unguja and 151 In Pemba. There are however, some springs and caves that produce water for people.
- The total production of the operation boreholes are estimated to be between 163, 038, 281 litters/d with the existing transmission mains convey pumped water from the boreholes to either the storage tanks or direct to the distribution system. The GIS database provides 56km of transmission mains made of AC – DICI-PE-PVC pipes from 100 to 600mm

5

THE ORGANIZATION CHART OF ZAWA

- Zanzibar Water Authority falls under the Ministry of Land, Water, Energy and Environment.
- The Director General is the Chief Executive Officer who is appointed by the President of Zanzibar and is in charge of all Jurisdictional responsibilities in both Unguja and Pemba Islands. He is an ex-Officio member of the Board of Directors and responsible to the Chairman of Board of Directors who is also appointed by the president and the three members appointed by the Minister responsible.
- The DG is assisted by four directors who form top management of ZAWA, the Technical Operation Director, Commercial & Customer Service Director, Finance & Administration Director and Pemba Branch Office Director (see the organizational structure below).

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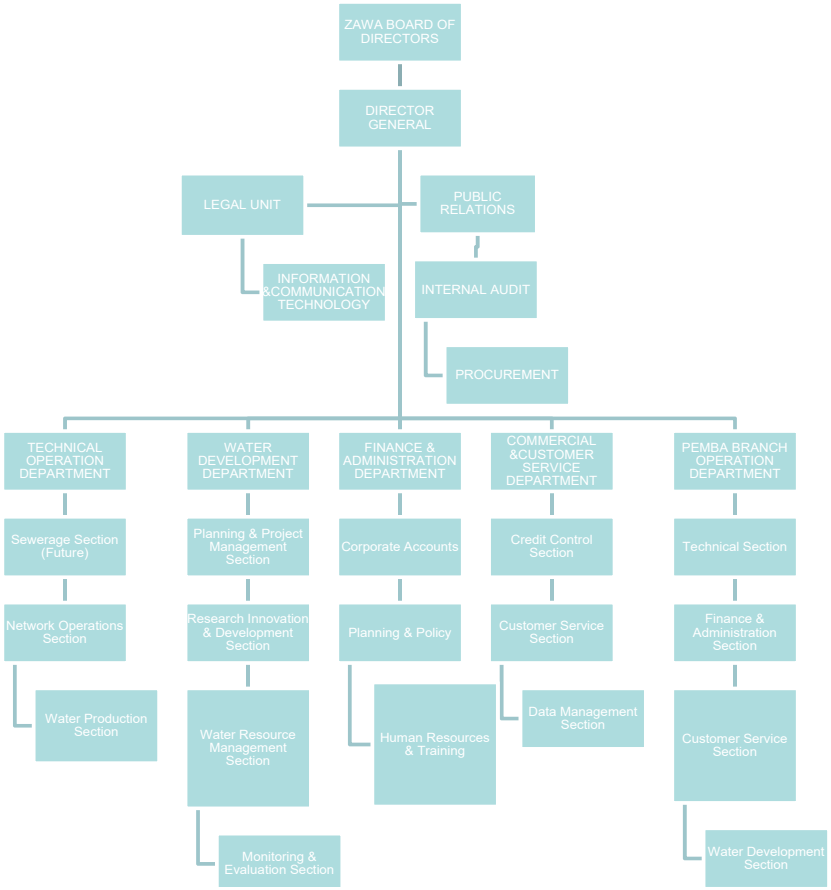
ZAWA ORGANIZATIONAL STRUCTURE



7

REDUCTION OF NON-REVENUE WATER

- The percentage of water lost due to leakage is around 30%

- **Leakages**

- Leakage which is caused by frequent break down of pipes in distribution system is the leading part of unaccounted water in Zanzibar.

- The major causes of leakages are old age systems, corrosion, vandalism and quality of pipe and fitting materials. They altogether contribute to about 20%of unaccounted water

- **Leakage repair**

It comprises many processes including:-

- Collecting and documenting of the complains from the customers through mainly customer complaints. (see the table below).

A table showing Collecting and documenting of complains from the customers

No	Name	Date	Place	Phone Number	comments
1	Muarabu A. Hamad	8/1/2016	Michenzani Block/10	0777 489097	They complain to have taken many days since they sent their application
2	Daudi M. Daudi	11/1/2016	Malindi Brunch	0777437219	They complain not to have received water for six months
3	Khamis M. Machano	11/1/2016	Magogoni	0777475648	They complain for a pipe

- Survey work which comprises the network staffs surveying the area to determine the nature of the problem like size, material and types of fittings required for that particular repair.
- Repairing the leakage where, the network people now repair the leakage so as to improve the service to the people

A Picture showing some ZAWA staffs doing leakage repair

- **Illegal Use of Water**

- it has become a scenario since the introduction of water fees especially in irrigation and other business activities.
- The Zanzibar Water Authority suffers from legal shortcomings caused by over politicization of water sector, weak managerial authority, resulting into inadequate, poor sustainability of the water distribution to other customers and in many cases poor water quality due to unauthorized connection. Illegal use of water contributes to about 8% of all unaccounted for water in Zanzibar.

- **Measures Against Illegal Use of Water:**

- Increasing daily patrol for the networks.
- Reducing conflicts during registration of new customers.
- Promoting house connection group.
- Reducing registration fees.
- Supplying more water to users.
- Improving the penalty for persons found guilty of illegal connection.

- **Metering System:** There are two systems of metering used;
- Bulk systems installed in large consumers (see the diagram below).

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•Individual systems installed in small consumers

MANAGEMENT OF WATER QUALITY

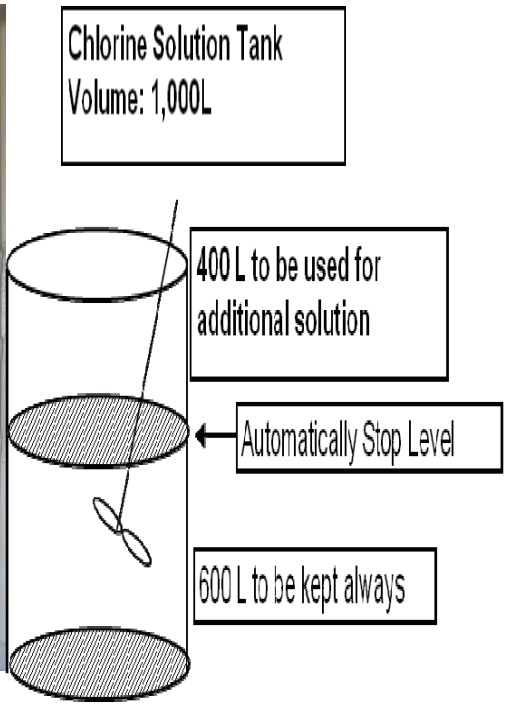
It can be looked into two perspectives. The first is from sources of water while the second is to the end user.

Starting with from sources of water, it is important to know that the main sources of water in Zanzibar are Boreholes (see the diagram).

Several initiatives are taken to ensure the quality and safety of water, including:-

- Chlorination/disinfection of water from water sources, it is conducted at the main water station at Saateni or in some other small plants (see the diagram).

- The bacteriological tests are done monthly. Although in some part of the islands, water is directly pumped to the distribution system, but the practice is greatly discouraged as it is now insisted that any built up scheme shall include the construction of a distribution tank (see the diagram).



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- Location of Well at a reasonable Distance from the Ocean and residential houses. Wells in Zanzibar are located at a reasonable distance from the ocean beaches. In this respect, the salt water in the aquifer can be held far enough from the seaward by the remaining fresh water flow so that the well can always yield fresh water.
- Control of Pumping hours to Prevent Seawater Intrusion. The pumping time is controlled (i.e. less than average recharge) in order to maintain the interface between salt water and fresh water at a safe distance from the seaward to the well site in order to prevent seawater intrusion.
- Well Field Management. Wells are being managed right from exploration before construction of water facilities, i.e. perform geophysical survey test drilling, test pumping, draw accurate map of test holes, and record fluctuation of groundwater levels.

On the side of the end user, some surveys are conducted to see the amount of residual chlorine.

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WATER QUALITY

a) Raw water (from Mtoni and Mwanyanya springs)

Turbidity: 0.02 – 0.03 NTU

Color: Colorless

pH: 7.1 average (Neutral)

b)Tap water (Treated water)

Turbidity: 0.02 NTU

Color: Colorless

pH: 7.1 average (Neutral)

Iron: 0.02 mg/l Fe (kaburi Kikombe 2-5mg/l)

Manganese: Negligible

v Hardness: 70mg/l $CaCO_3$ Moderate hard

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Nitrogen Nitrate: 0.2 – 0.5 mg/l NO_3

WATER SUPPLY SERVICE STANDARDS

- **Water coverage**

According to the vision 2020, access to water should reach 100%. In 2005 it should be 95% for urban and 60 % for rural. For Pemba should be at least 50 %. It is good to mention that the water coverage so reached to those stout goals by the ZPRP.

- **Urban water supply**

The present urban water supply comprises of four urban water supply schemes: The Zanzibar town in Unguja, Wete, ChakeChake and Mkoani towns in Pemba under the assisstance of Finland through FINNIDA. These schemes serve about 300,000 inhabitants. Despite all improvements assisted by FINNIDA since 1991 as well as the efforts from the Government, the condition of the schemes and service standard are still unsatisfactory. There are distribution interruptions mainly due to old and worn infrastructure and poor maintenance. There is about 10% of urban population, which is yet to be served. The current supply for four towns from the operational sources is as shown in the table below .

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Number	Description	Zanzibar town	Wete	Chake	Mkoani
1	Source				
	Borehole	77	13	8	7
	Springs	2	1	2	0
	Local wells	1	0	0	0
	Water production m^3/day	66,298,584	12,929	11,200	11,948

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- **Rural Water Supply**

The Government of Zanzibar has implemented the Zanzibar Rural Water Supply Project with the assistance funds from ADB and Abu Dhabi Fund for Development. The actual implementation covered a population of more than 250,000 people since they are operational during the year 2000. The old schemes established before the preparation of the Master Plan for the rural areas continue to serve more than 60,000 inhabitants in their respective areas.

- **Service Ratio**

If we compare the total population with the served population, the service ratio is about 62%. Though the service ratio is high in terms of Coverage, demand/supply ration is a major setback towards the total satisfaction of those favorable consumers.

This situation has instigated a number of households to install booster pumps and indoor water storage and provided a flourishing business for water boozers.

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- **Service Hours**

Since the water distribution system are in both, gravity flow and pumping system, the service hours is 24 hours a day, 7 days a week.

- **Water Supply Capacity**

Practically, the current water sources have capacity of producing 99,080m^3/day. But this production is not fully realized due to various interactions which include lower capacity pumps, pump breakdown, power failures etc. Water supply network expansion based on capacity has always led to the intermittent supply in some areas covered by piped water supply schemes.

- **Average Water Supply Volume**

The average water supply production is about 75,106m^3/day for both Unguja and Pemba islands. The average supply volume that is estimated to reach the consumers is 228, 716, 430 litres/day.

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MANAGEMENT OF WATER SUPPLY SERVICE ON SELF SUPPORTING BASES

- Clean and safe water supply service delivery is entrusted to ZAWA alone in Zanzibar as per the Water Act of 2006. However there are a lot of other private providers of the service including the politicians, NGOs, SBOs, and other institutions. The role of ZAWA is also to set the standards and ask such private providers to follow the standards.

- **Major recent achievements in improvement of water supply**

There is an improvement of water supply service delivery in Zanzibar. The main reasons behind it being the various water projects supported by The UN and others including:-

UNDP, UNICEF, IRAN, USA WORLD BANK, Red Cross, JICA, and Alyouseif Charitable Society.

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More specifically, the JICA funded projects including The Zanzibar

- Water Supply Improvement Projects which had two phases. In this project, a total of four (4) water tanks have been constructed which Are Welezo Water Tanks (2) with the storage capacity of 8,000,000 liters, Kijichi Water Tank with the storage capacity of 2,000,000 liters, Kinuni Water Tank with the storage capacity of 2,000,000litres

- JICA Makadara Pilot Area project, this project aims at capacity building to ZAWA staffs so as to apply the same knowledge and expertise to the remaining area of the Islands soon after the project completion, again it aims at replacing the old pumps with the new ones.

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EXPECTATIONS FOR THE JAPANESE PRIVATE COMPANIES AND EXPECTATIONS TOWARD THE PROGRAM

With the ongoing cooperation between Japan and Tanzania specifically Zanzibar, coupled with various projects. The Japanese private companies have a good chance to apply for expertisement in such projects. Again they have a good chance of increasing production of the plumbing materials in their companies and sell to Zanzibar because most of our network is outdated/aged and need replacement.

Toward the program, the trainee will increase the capacity regarding issues of water through various lectures, visits and discussions with water practitioners from various countries. By transferring the expertise back to Zanzibar, the country will also benefit by having more effective and efficient management of water supply services.

Water Supply Administration
For Better Management of Water Supply Services
Course（A）

TUNISIA

Ministry of Agriculture

Tunisian Water supply Utility (SONEDE)

www.sonede.com.tn

Inception Report : TUNISIA

WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES (A)

05 – 18 June 2016

SOUROUR ZARDOUM

First and Last Name : SOUROUR ZARDOUM

Nationality : Tunisian

Title : Senior Engineer

Saving Water Department

Tunisian Water supply Utility (SONEDE)

Professional Experience : 8 Years

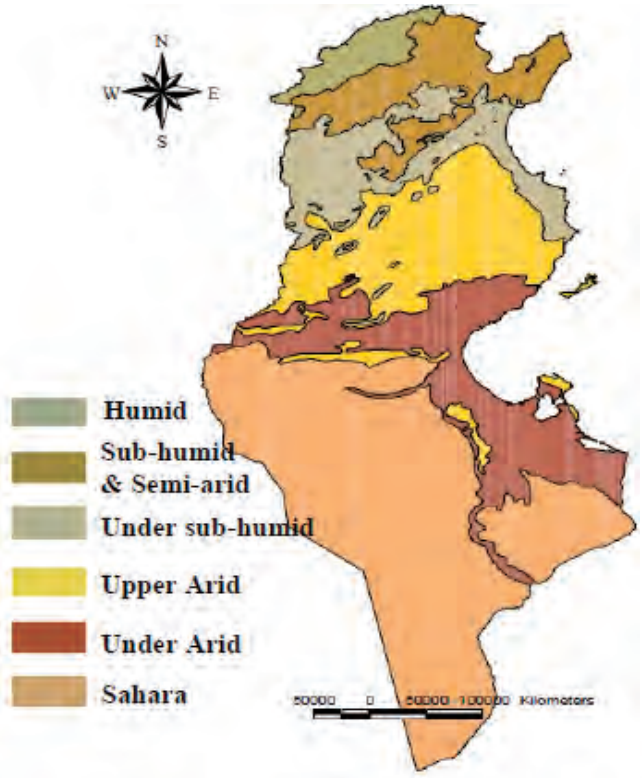
Age : 36 years old

E-mail : s.zardoum@sonede.com.tn

Qualifications :

- ✓ Certified Expert in internal audit systems of drinking water systems
- ✓ Engineering Degree in Hydraulics

TUNISIA

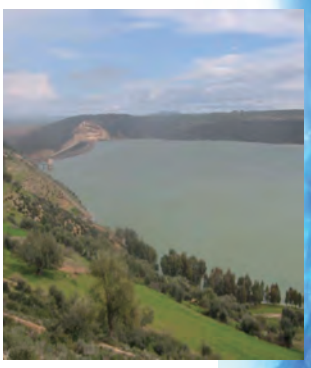


Location	North Africa
Area	165 km^2
Coastline	1300 km
Population	11,075,000 persons
Urban pop	65%
Governorates	24
Districts	264
Rainfall	37 Mm^3 (Annual Average)
North Rainfall	579 mm/Year
Center Rainfall	289 mm/Year
South Rainfall	150 mm/Year
Aridity	75% of the territory
Evaporation	1,300mm-2,500mm

TUNISIA : Water Resources (m^3/Year)

Provision of water: 460 m^3 / citizen / year in 2014

315 m^3 / citizen / year in 2030

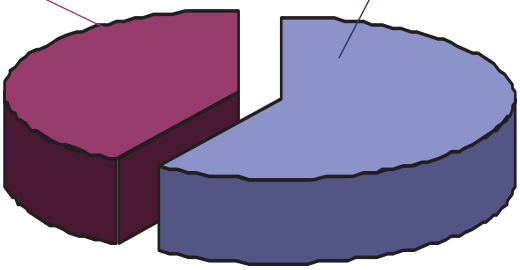


Groundwater

1900 Mm^3 (40%)

Surface water

2700 Mm^3 (60%)



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SO.N.E.D.E: Tunisian Water supply Utility

SONEDE was established on the 2nd of July 1968.

It is under the supervision of the Ministry of Agriculture Hydraulic Resources and Fishing. It is a non administrative public utility.

It was created to ensure :

- Water production: production, treatment and transport,
- Water distribution: management and maintenance of drinking water network and equipment and management of customers,
- Development: studies, works and supply.

MAIN INDICATORS OF SONEDE

Customers

Customer	2014
Served population (Million)	9.3
Number of subscribers (Million)	2,637

All subscribers are provided with individual water meters

Supply rate (2014)	98,1%
- Urban	100%
- Rural served by SONEDE	51,3%
- Rural served by GDA	42,8%

Turnover (2014)	271 MDT (127 M Euros)
Average price of cubic meter	0,698 DT (0,3 Euros)

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MAIN INDICATORS OF SONEDE

Infrastructure

Infrastructure	2014
Network length (Km)	50 697
Number of treatment plants	14
Number of desalination plants	5
Number of pumping station	1300
Number of storage tanks	1100

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MAIN INDICATORS OF SONEDE

Operating activities

Annual activity	2014
Water produced volume (Mm^3)	627,5
Water distributed volume (Mm^3)	570,7
Water consumed and billed volume (Mm^3)	433,4
Global Network efficiency (%)	71,6
Distribution network efficiency (%)	79,1
Service hours	24 hours / day

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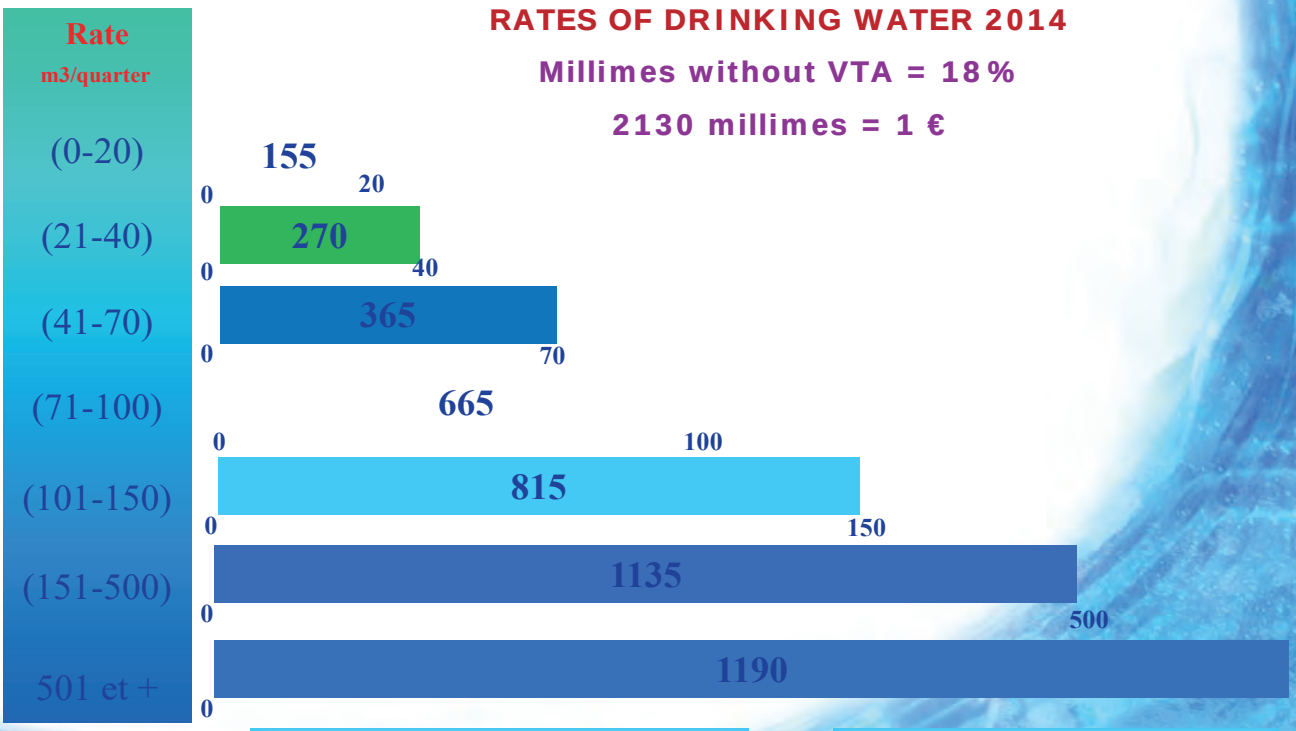
Reduction of NRW

- ✓ Rehabilitation of networks and lead pipes
- ✓ Renovation of connections
- ✓ Improved counting means
- ✓ Regulation of water systems
- ✓ Pressure management
- ✓ Continuous monitoring of volumes distributed
- ✓ Leak detection

WATER TARIFF



WATER TARIFF

Tunisian tariff system of drinking water is progressive as usual:

- ✓ **The first tariff is intended for users with modest incomes connected to the drinking water system and whose consumption does not exceed 20 m^3 per quarter.**
- ✓ **The tourist water is paid by the upper edge (1190 millims/m^3).**

The mode of progressive pricing is used by SONEDE as a tool for demand management. Each consumer should be careful not to exceed the upper limit of the normal edge of consumption and avoid water waste.

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WATER BALANCE (2014)

<table>
<tr><td rowspan="4">Distributed volume
570,7
Mm^3</td><td rowspan="2">Authorized consumption
444,6 Mm^3</td><td>Revenue water
433,4 Mm^3</td><td>Billed authorized consumption
433,4 Mm^3</td><td>433,4 Mm^3
(75,9 %)</td></tr>
<tr><td rowspan="3">Non Revenue Water (NRW)
137,3 Mm^3</td><td>Unbilled authorized consumption
(ex. fire fighting, cleaning)</td><td>11,2 Mm^3
(2 %)</td></tr>
<tr><td rowspan="2">Water losses
126,1 Mm^3</td><td>Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)
36,5 Mm^3</td><td>23,4 Mm^3
(4,1%)</td></tr>
<tr><td>Real losses (Leakage)
151,5 Mm^3</td><td>102,7 Mm^3
(18 %)</td></tr>
</table>

SONEDE CHALLENGES

Since its inception (1968), SONEDE has always provided a continuous drinking water service (24/7) to all subscribers (90% of the Tunisian population).

Now it is facing three major challenges:

- Maintaining service 24/7 in the context of increased demand and scarcity of resources.
- Request new rural areas to be served by SONEDE.
- Improving the quality of distributed water (salinity).

Water Supply Administration
For Better Management of Water Supply Services
Course（A）

ZAMBIA

Inception Report

WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICVES

- ROBERT CHELA
- KAFUBU WATER AND SEWERAGE COMPANY LIMITED

Introduction.....

- Operations started in 2000.
- Services three towns: Ndola,Luanshya,Masaiti.
- Population serviced: 690,530
- Number of Connections: 60,462
  - 57,917 Domestic,2,545 Non-Domestic
- Number of staff: 655

Japan International Cooperation Agency

Management of Water Quality……

- Turbidity up to 40NTU,Kafubu Dam. Reduced to 0NTU.
- Aluminium Sulphate at 20-25mg/l at 375m3/hr.
- Prechlorination at 12kg/hr
- Postchlorination at 18kg/hr

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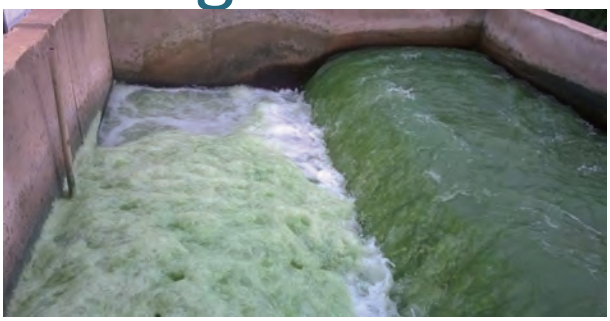
Management of Water Quality…….



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Management of Water Quality.....

Parameter	Limits	Number of Monthly Tests Conducted	Number of Tests in Compliance	Percentage Compliance
Residual Chlorine	0.2-0.5 mg/l	382	347	90.8
Bacteriological(F.C)	0/100mL	186	162	87.1
pH	6.5-8.0	119	119	100
Turbidity	5NTU	119	116	97.5
Colour	15Hz	119	119	100
Based on	Report for	April 2016	Under ZABS	Standards

Reduction of Non-Revenue Water...

- Strategic plan drawn up in 2015.
- To reduce NRW from 67% to 40%
  - 69% Metering Ratio
  - 63% Collection Efficiency

Reduction of Non-Revenue Water…

Japan International Cooperation Agency

Water Supply Service Standards……

- Water Service Coverage: 87.5%
- Hours of Supply: 20 on average
- Supply governed by Service Level Guarantee made by the company to it's customers through the regulator.

Japan International Cooperation Agency

KAFUBU WATER & SEWERAGE COMPANY - SERVICE LEVEL GUARANTEE

	Service Indicator	Service Level Guarantee NDOLA	Service Level Guarantee LUANSHYA AND MASAITI
1.	Drinking water quality	92% of samples (in line with NWASCO Guidelines on minimum No. of samples) meet the NWASCO standard for Chlorine residual. 95% of samples (in line with NWASCO Guidelines on minimum No. of samples) meet the NWASCO standard for Bacteriological test.	92% of samples (in line with NWASCO Guidelines on minimum No. of samples) meet the NWASCO standard for Chlorine residual. 95% of samples (in line with NWASCO Guidelines on minimum No. of samples) meet the NWASCO standard for Bacteriological test.
2.	Service Hours	22 hours in all areas Office opens for 40 hours per week Main Pay stations open 44 hours per week (at Head Office, Shoprite, Kansenshi Shopping Centre, and Jacaranda Mall).	20 hours in all areas Office opens for 40 hours per week Town Office Pay station open 44 hours per week
3.	Billing for services	All customers billed once a month. Meter read once a month for all metered customers. Minimum period for payment after bill delivery 14 days.	All customers billed once a month. Meter read once a month for all metered customers. Minimum period for payment after bill delivery 14 days.
4.	Response time to written complaints Response time for new connection Response time for meter installation request Response time for meter testing Waiting time to pay bill or file complaint Telephone contact holding time	5 working days 10 working days 5 working days 5 working days 10 minutes 3 minutes	5 working days 10 working days 5 working days 5 working days 10 minutes 3 minutes
5.	Interruption of water supply and blockage of sewer Unannounced interruption of between 36-48 hours Unannounced interruption of more than 48 hours	20-36 hours interruption will affect <10% of customers for water and <10% for sewer blockage. < 8% for water and <8% for sewer <1% for water and <1% for sewer	20-36 hours interruption will affect <10% of customers for water and <10% for sewer blockage. <8% for water and <8% for sewer <1% for water and <1% for sewer
6.	Unjustified Disconnections	Connections subjected to unjustified disconnections in a year to be <0.5%.	Connections subjected to unjustified disconnections in a year to be <0.5%.
7.	Sewer Flooding	Reduction of sewer flooding of customer's premises to be <5% of connections in particular service area.	Reduction of sewer flooding of customer's premises to be <5% of connections in particular service area.
8.	Quality of discharged water	No. of tests carried out(bacteriological and chemical) to be according to the ZEMA license conditions 93% of nutrients and BOD meet ZEMA standards	No. of tests carried out(bacteriological and chemical) to be according to the ZEMA license conditions 93% of nutrients and BOD meet ZEMA standards

CONDITIONS OF SUPPLY

1. Unless payment is made within 14 Days from date of Invoice, the supply may be disconnected and will only be reconnected upon full payment of the account balance plus reconnection fees.
2. This invoice serves as a disconnection notice for any balance that is 14 days overdue.
3. Although accounts may be in dispute, payments must be made on or before the due date. Any necessary adjustments will be made in retrospect and will appear on the next statement(s) or invoice.
4. The total sum owing should be paid in full. In the event that the payment made is insufficient to settle the total balance due, the amount paid shall be appropriated first to the oldest debt and then to the balance.
5. Kafubu Water and Sewerage Company may institute legal proceedings for the recovery of any debt outstanding and charge the cost to the customer.
6. Payments can be made at the Company Head Office, Luanshya Branch, or at the nearest Customer Services Centre or any approved Agent.
7. KWSC reserves the right to issue interim service account or average consumption for various reasons e.g. faulty meters, locked premises etc.
8. Water meters will be tested against a fee deposited as prescribed in the Conditions of Supply (if tests conform to the limits of tolerance allowed, the fee will be appropriated).

WATER WISE HABITS

1. Fix all leaking taps, pipes and toilets, as leaks can waste a lot of water.
2. Use buckets rather than hosepipes to water your gardens and wash your car.
3. Take short showers and shallow baths.
4. Turn off taps and report leakages in public places.
5. Do not use the toilet to flush small things; a toilet is not a trash can.
6. Use a cup when brushing your teeth.
7. Avoid washing dishes with the tap running.
8. Water your lawns/gardens in the evening when it is cool to avoid water.
9. Water your lawns/gardens in the evening when it is cool to avoid water evaporation.
10. Report any cases of vandalism/theft of water installations to the nearest Company office or to the Police.

Management of Water Supply Services on a Self Supporting Basis.....

- Cost Recovery Based on Collection Efficiency and Production Loss (NRW).
- Affected by
  - Investment
  - Size of Utility
  - Metering Ratio, Non-Revenue Water, Collections
  - Service Quality
  - Tarrifs
  - Asset Management

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Major Recent Achievements in Improvement of Water Supply……

- Projects:
  - JICA, $ 25m
    - Increased production at Kafubu Dam, 51,000m3/day to 80,000m3/day
    - Reduced water losses in the trunk mains
    - Improved delivered water quality
  - Internal Projects

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Expectations for the Japanese Private Companies and Expectations Towards the Program……

- Build capacity to optimise usage of manpower and resources for improvement of service offered to customers at reduced operational costs.
- Develop short and long term planning and goal setting for the continuous improvement of operations and services.

Japan International Cooperation Agency

KAFUBU WATER & SEWERAGE COMPANY LIMITED (KWSC)

INCEPTION REPORT ON NON REVENUE WATER

BY: ANDREW WISDOM ZULU-PERI URBAN ENGINEER

1. INTRODUCTION

- Establishment – WSS Act No. 28 of 1997
- Serving :
  - Ndola
  - Luanshya
  - Masaiti

2. INFRASTRUCTURE

- Poor condition
- Increased population
- Long years of usage
- Needs rehabilitation

TECHNICAL CHALLAGES

- High Non Revenue Water (52%)
- Low metering ratio (49%)
- Low supply hrs (18hrs)
- Old network
- No updated network drawings

Objectives of Action Plan

Application of knowledge and techniques learnt to:

- Reduce NRW by using appropriate leak repair method and materials.
- Reduce system downtime by improving system reliability by having updated network drawings.
- Protect assets(pipes and related appurtenances) and prolong their useful lives.
- Increase service levels.
- Promotes renewal of old pipe networks.

Current Issues

Needs/ Issues	Techniques / Knowledge acquired	How they will be applied	Obstacles	To Whom the information will be disseminated	When to disseminate	How to disseminate	Feasibility
Lack of comprehensive Pipeline Maintenance System	Inspection Systems and Installation Practice	Devise a pipe line inspection system	None	Director Eng. Director Planning. Water distribution Network staff Water Audit staff	September 2016	Dept. Staff meeting presentation	Very Feasible
	Network Maintenance Scheduling	Draw up maintenance schedule for selected Pilot area	None	Water distribution Network staff	September 2016	Hold meeting with staff	Very Feasible
	Pipeline Maintenance activities	Implement Pipeline Maintenance activities	Timely availability of repair material.	Water distribution Network staff	October 2016	Execute Action plan	Feasible
High Non Revenue Water	District Management Area design.	Select Pilot area with respect to DMA design	Unclear boundaries	Director Eng. Director Planning. Water distribution staff, Network Audit staff and Meter readers	September 2016	Present report	Very Feasible
	Analysis of distributed volume	Meter Pilot DMA and analyze distributed volume.	Availability of meters	Water distribution staff, Network Audit staff and Meter readers	September 2016	Execute Action plan	Very Feasible
	Emergency Leak prevention measures	Repair all visible leaks	Timely availability of repair material	Water distribution staff, Network Audit staff	October 2016	Execute Action plan	Feasible
	Leak Control and pressure management	Leak detection and repair Pressure regulation	Timely availability of repair material	Water distribution staff, Network Audit staff	October 2016	Execute Action plan	Feasible

Water balance

Non Revenue Water (NRW)

System Input Volume	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption	Revenue Water
			Billed Unmetered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Non Revenue Water (NRW)
			Unbilled Unmetered Consumption	
			Illegal fire hydrant use	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Customer Metering Inaccuracies	
		Real Losses	Leakage on Transmission and/or Distribution Mains	
			Leakage and Overflows at Utility's Storage Tanks	
			Leakage on Service Connections up to point of Customer metering	
			Leakage at consumer points	

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3. SOLUTIONS

- Mobilisation of resources
- Modernization
- Expansion to meet demand

Current KWSC position – PI

S/N	PERFORMANCE INDICATOR	LEVEL @ INCEPTION	PRESENT LEVEL	REMARKS
1	NRW	53 %	41%	Mainly due to metering & spot network repairs
2	METERING RATIO	8%	51%	24,623 customers are now metered.
3	COLLECTION EFFICENCY	50%	88%	
4	WATER COVERAGE	50%	89%	

4. COMMERCIAL OVERVIEW

- Ndola
- Luanshya
- Masaiti

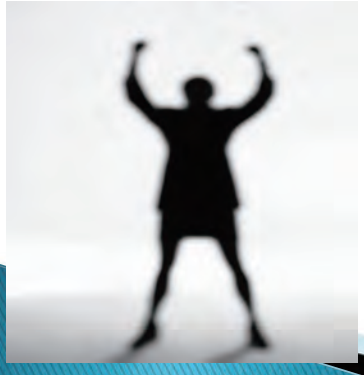
5. REMEDIES FOR POOR COMMERCIAL PERFORMANCE

- Metering
- Refurbishment of infrastructure
- Prompt government payment

Conclusion

The success of the first pilot project done in the selected area will be replicated at double the effort in other areas so that NRW is reduced to a minimum.

This will improve the performance of my organization.



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