Water Supply Administration

For Better Management of Water Supply Services

Course（A）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

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Course（A）

AFGHANISTAN

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ETHIOPIA

Federal Democratic Republic of Ethiopia
Ministry of Water, Irrigation and Energy

Presentation

on

Water Supply services Management in Ethiopia

by Zebider Alemneh

May, 2015

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Presentation outline

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1. Introduction

- Official Name= Federal Democratic Republic of Ethiopia(FDRE)
- Land Area =1,100,000 square kilometers
- Total Population = 88,011,000 (2014), more than 80 Ethnics
- Rural Pop. = 80.9%, Urban Pop. = 19.1%
- River Basin = 9 Wet and 3 dry basins (SW= 122b^3,GW=36-40b^3)
- Economy = 46% Services, 40% Agriculture & 14% Industry
- Economic Growth Rate = More than 10% (for the last 10 years)
- GDP/Capita = 632 USD
- Administration = 9 Regions and 2 City Administration
- World Heritage Sites = 10 Heritage sites

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2. Water Supply In Ethiopia

Enabling Environment

❖ Policy, Strategy and Plans

- Water Resources Management Policy (1999)
- Ethiopian Water Resources Management proclamation (197/2000)
- Ethiopian Water Sector Strategy (2001)
- Establishment of Regional Water Bureaus, Woreda Water Office, Town Water Utilities & Water Resource Development Fund
- Ethiopian Water Resources Management Regulations (115/2005)
- WIF (2013)
- Water Supply and Sanitation Plans
  - UAP I (2005-2012) , GTP-I (2010-2015) or Revised UAP (2010-2015)
- Recently One Wash National Program(OWNP) (2013-2020)

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Core principle of the Policy

Water Supply (Urban)

- ✓ Enhance self-financed and total cost recovery programmes
- ✓ Insure that urban tariff structures are based on the basis of toward full cost recovery
- ✓ Establish progressive tariff rates, in urban water supplies, tied to consumption rates.
- ✓ Ensure that the management of water supply systems to be at the lowest and most efficient level of institutional set up

Sanitation /Liquid waste/

- Recognize that water supply and sanitation services are inseparable and integrate the same at all levels through sustainable and coherent framework
- Promote the involvement of non-governmental organizations, external support agencies and the private sector in sustainable sanitation programmes.
- Control and ensure that water bodies are protected from pollution by waste water and other wastes

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National Water Strategy (2001)

regard to Water Supply and sanitation, mainly aims at:

- More decentralized decision-making
- Promoting the involvement of all stakeholders, including the private sector
- Increasing levels of cost recovery
- Integrating water supply, sanitation and hygiene promotion activities.

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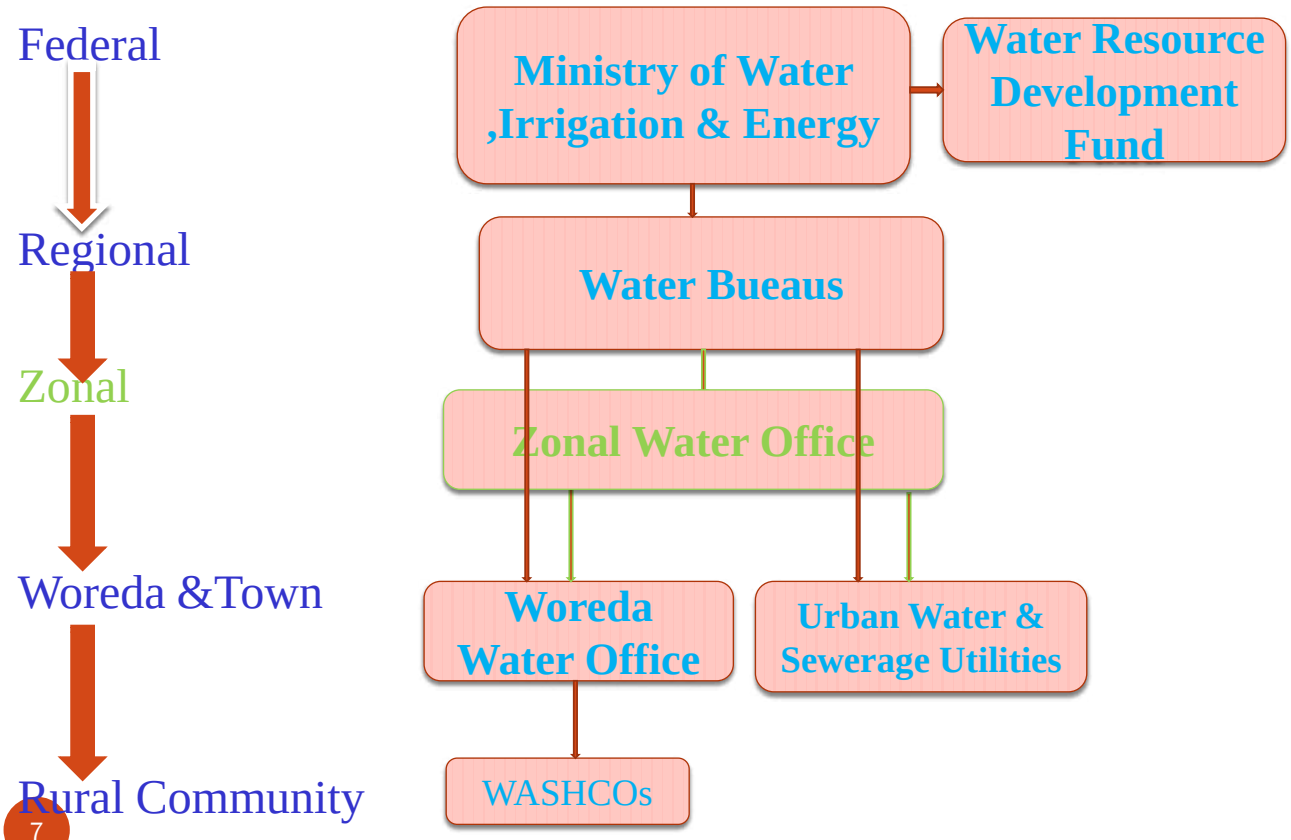
Institutional Arrangement & Responsibility



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- **Federal Ministry of Water, Irrigation & Energy (MoWIE)**
  - Formulate Policy , Strategy and National Plan and Establish Standards
  - Regulate and Coordination the implementation of Water supply and Sewerage systems
  - supervising and following up on the implementation of policy and strategy instruments as well as overall sector standards
  - Coordinate and Monitor Water Supply Projects financed by Federal Government Budget
  - Conduct capacity building activities
- **Water Resource Development Fund (Established by Federal Gov.)**
  - Grants long term loans to Town for Water Supply investment on the basis of the principle of cost recover
  - Set criteria for granting loans and administer the fund
  - Issue directives on the procedure of collection of the Fund and withdrawal and payments of money from the Fund;
  - Manage and Collect timely the down payment from water Utilities

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…cont'd

- **Regional Water Bureaus (Established by Regional Government)**
  - executive organ responsible for the implementation of federal policies, strategies and action plans through adapting them to the specific conditions of the region
  - Plan, Implement, Monitor and Evaluate Water Supply projects
  - Coordinate and Monitor projects implemented by Woredas and Urban Water Utilities
  - Exercise regulatory duties delegated to them by the Ministry
  - Draft Laws and Regulation for Town Water Supply and Sewerage Enterprises
- **Zonal Water Office (**Supporting arms of the Water Bureaus**)**
  - Mandated to provide technical support to Woreda Water Offices and Town Water Supply Offices
  - Responsible for coordinating activities, consolidating plans and reports of woredas

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- **Woreda Water Office**
  - Plan, Implement and Monitor, small water supply schemes
  - Conduct capacity building activities for WASHCOs
- **WASH Committee**
  - Operate and Maintain Rural Water Supply Schemes
- **Town Water and Sewerage Utilities**
  - Plan, Implement and Monitor water supply systems
  - Operate & Maintain Water supply systems
- **Town Water Board**:- Play overall management role of Town Water Supply Utilities (Big and medium towns)

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Current Water Supply Situation

- **Source of Water Supply**
  - Ground Water + Spring (>90%)
  - Surface Water (<10%)
- **Technology in Use**
  - **Rural**:- HDW,MH, spring on spot, spring with distribution, SW on spot, BH with distribution, River diversion, Water harvesting techniques , etc
  - **Urban** :- Spring with distribution, BH, River diversion with treatment plant, Dam(Reservoir) with treatment plant
- **Water supply Access Rate (as of July 2014,** Ministry Report**)**
  - Rural :- 75%,Urban =84%, Overall =76%
  - Non functionality rate of Rural schemes=16%
  - NRW in Urban Water Supply = 20%-50%
- **Current Water Supply Minimum Standard (GTP-I)**
  - Rural =15L/C/day within 1.5km
  - Urban=20L/C/day within 0.5km

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12 **Different Water Supply source and Technology in Use**

National Water Supply, Sanitation and Hygiene Program

- A 7 years plan (2013-2020) developed which is called One WaSH National Plan
- The plan /program is Instrument for achieving the goals set in GTP-I and beyond GTP for Water Supply, Sanitation & Hygiene
- The Plan includes institutional WaSH (Health Centres & Schools)
- Implementers are Government , CSO ,NGOs and others
- Financers: Government, Donors, CSO, NGO & others
- MoU, WIF and POM produced and agreed by government side (MoWIE, MoH,MoE,MoFED & line sectors) and donors
- **Consolidated Wash Account(CWA)** is part of OWNP and opened for the component financed by Four major donors(IDA,DFID,AfDB & UNICEF)
  - CWA (431 M USD) covers only 18-20 % of the total estimated cost of OWNP
  - 70% fund for water supply and 30% for Institutional WaSH
  - Supports 382 Woredas & 144 Towns (124 Small & 20 Medium)

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Urban WS Future Plan

- Need to revise Minimum service level due to
  - Urban population growth is very fast
  - Industrialization is growing Rapidly
  - Usage of current household facility technologies is increasing
- Under GTP-II

  Towns are categorized in to five groups and Minimum service level is also planned increase based on the category

Category No.	Urban Category	Population	Minimum Water Quantity (l/c/d)	Maximum Fetching distance(m)	No. of Towns
I	Metropolitan	> 1,000,000	100	-	1
II	Big Cities	100,000-1,000,000	80	-	16
III	Large Town	50,000-100,000	60	-	19
IV	Medium Towns	20,000-50,000	50	-	82
V	Small Towns	< 20,000	40	500	767

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Challenges further needs attention and the Way forward

- ✓ *Continuous engagement – to bring behavioral change(Education, Media, Community leaders, Community ownership/ participatory approach)*
- ✓ *Strengthening/set up of public services providers and regulatory body with clear mandates and responsibilities*
- ✓ *Conducting assessment study on sanitation situation and establishment of baseline for future intervention*
- ✓ *Consideration of the Urban Sanitation and Hygiene as key area during planning and implementation of projects*

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- ✓ *Solving timely Land acquisition problems for construction of WaSH Facilities*
- ✓ *Encourage involvement of the private sector*
- ✓ *Formulate best practices (domestic , overseas) and implement*
- ✓ *Setting National targets and implement (Short term, Medium term and long term)*
- ✓ *Establishment of Understanding among Stakeholders /**Integration**, **Harmonization** ,**Alignment** **and** **partnerships**/*
- ✓ *Search of fund for investment /fund raising/*
- ✓ *Law enforcement **(polluter and user pays)***
- ✓ *Considering both Waste water issue and Water sources protection as a key issues in Urban Master plan preparation and updating*

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Water Supply Administration
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Course（A）

FIJI

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

JICA, Tokyo, Japan

17th- 30th May, 2015

Mr. Puamau Sowane
Deputy Secretary Infrastructure
Ministry of Infrastructure & Transport
FIJI

ORGANIZATIONAL PROFILE

- ***Name:*** Ministry of Infrastructure and Transport
- ***Official Position***: Deputy Secretary Infrastructure
- ***Organizational Structure***

WATER RESOURCES

- Fiji consists of 332 islands of which 110 are inhabited.
- The total land mass for Fiji = 18,274sq.km
- coastline =1,129km.
- Land use in Fiji is 9.03% arable land, 4.65% permanent crop and other takes up 86.32%.
- Irrigated land is 30sq.km
- Total renewable water resources is 28.55 cu.km
- freshwater withdrawal for domestic is 30%, industrial, 11% and 59% for agriculture.
- Precipitation - The wet season in Fiji is basically from November to April. During the wet season, tropical cyclones are also expected to occur. Fiji experiences average rainfall of 1000mm to 3500mm annually

Annual Total Rainfall from 2005 to 2014

Year	Labasa Airport	Savusavu Airfield	Penang Mill	Nadi Airport	Nausori Airport	Laucala Bay	Matuku	Lakeba
2005	1876.2	1259.3	1516.9	1686.8	3276.6	3596.2	1120.2	2287.5
2006	2337.8	1270.8	1823.6	1689.2	2968.1	2796.7	1831.3	1383.3
2007	3162	2028.6	2616.2	2523.5	3309.2	3495.6	2259.4	2476.7
2008	3037.9	2680	3380.1	2459.4	2982.6	2572.5	1675.1	2815.5
2009	2545.5	2554	3040.6	2799.2	2868.9	2808.9	2144.6	1980.9
2010	2351.1	2048.5	1643.6	1334.2	3215.8	3310.1	1555.5	1873.5
2011	2261.4	1781.7	3238.7	2782.6	3064.6	3072.5	2685.5	2474.5
2012	2645.7	2790.8	3956.8	3547.9	3202.1	3383.7	2459.9	2325.2
2013	1049	1898.2	2342.7	2031.7	3224	3012.5	2102	2260.1
2014	692.2	1504.4	2109.6	1305.6	2904.4	3323.6	1404	1348.8

MANAGEMENT OF WATER QUALITY

- Size of WAF's area of responsibility is basically the whole of Fiji archipelago with an area of 18,274 sq.km but is more concentrated on the two main islands, Viti Levu and Vanua Levu in which 98% of consumers resides in the urban and peri-urban areas
  - The water quality in Fiji is monitored by the Ministry of Health.
  - The Ministry had just launched the Fiji National Drinking Water Quality Standards.
  - The challenges that is being faced in managing the water quality in Fiji is the various water sources especially in rural areas that is vulnerable to high contamination.

Current Actions against the problems & achievements

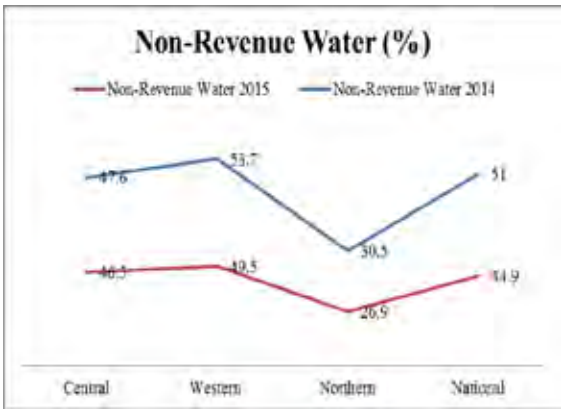
- Water quality tests are carried out by Water Authority of Fiji and also the Department of Water & Sewerage.

Monitoring System/Plan of Safety of Supplied Drinking Water

- Water Authority of Fiji has in place water safety plans for urban areas. The rural areas have the Rural Water and Sanitation policy that has in place the Water Supply Management Plan to cater for water safety planning.

REDUCTION OF NON-REVENUE WATER

- Percentage of NRW in respective divisions
  - Year 2014:
    - Central = 47.6%
    - Western = 53.7%
    - Northern = 30.5%
    - National = 51% (Qtr. 4, 2014 – actual)
- ***Current situation***
  - The current stats for NRW for the three respective division are as follows:
    - Central = 46.5%
    - Western =49.5%
    - Northern = 26.9%
    - National = 44.9% (Qtr. 1, 2015 – provisional)



Water Modelling Software Tool

Current actions against Problems

- Introduction of District Metering Area (DMA)
- Meter Replacement Program
- Replacement of old and ageing pipes and pumps
- Installation of Master Meters at DMAs
- Automation of systems (GIS, SCADA, etc.)
- Introduction of Water Modelling Software tool.
- Installation of Water Pressure Reducing Valves
- Installation of air valves
- Technical expertise assistance from Fukuoka City, Japan via JICA
- Enhancement of Leak Detection Unit operations.

Achievements

- Non-revenue water has been decreasing, hence, improved infrastructures and increased revenue due to continual water supply at 24 hours

WATER SUPPLY SERVICE STANDARDS

Current Situation and Major Challenges/problems

- Currently there is no service standard in place for the water supply sector as after the reform of the Department of Water & Sewerage. The Water Act 1955 and Sewerage Act 1985 were repealed in 2007 through the Water Authority of Fiji Promulgation Act.

Current actions against Problems

- The Department of Water & Sewerage is in the process of conducting a review on the Water and Sewerage legislation that will enable it to draw up a service standard for the water supply sector.

Achievements

- The review of the legislation and establishment of the new will enable the Department of Water and Sewerage to regulate water and sewerage services effectively in the country

MANAGEMENT OF WATER SUPPLY SERVICE ON A SELF-SUPPORTING BASIS

1. Current Situation and Major Challenges/problems

- The Water Authority of Fiji is not on a self-supporting platform as the organization still relies on Government to provide funding.
- The challenges that are faced are:
  - i. lack of funding for infrastructure renewals and replacement
  - ii. past under-investment in infrastructure renewals and maintenance
  - iii. water prices set below sustainable levels (do not support full lifecycle cost recovery)
  - iv. lack of reliable funding sources
  - v. dependence upon ad hoc government funding

Current actions against Problems

- An increase in Government funding in the water sector as per budget allocation this year, 2015, giving an amount of $63,156,600 for operation and $176,064,900 for capital expenditures

MAJOR RECENT ACHIEVEMENT IN IMPROVEMENT OF WATER SUPPLY SERVICES/MANAGEMENT

URBAN	2010	2011	2012	2013	2014
Water Supply and Wastewater Systems	Reservoir Upgrade – Tovata, Wainibuku, Upper Tacirua & Tamavua $1M	Upgrade of Waila and Tamavua Water Treatment $23M	Rehabilitation of the Kinoya Sewerage Treatment Plant €3,045,036.48+ FJ$1.8M	Installation of new five standby generators. Units cost between $200,000 - $600,000 each	Meter verification and replacement program $5.8M
	Navau to Benau Pipe Laying and Construction of Break Pressure Tank $8M	Laying of 375mm/300mm/150 mm Pipes from QVS to RKS $3.4M	CCTV Sewer Inspection for Suva/Nausori Sewer. $4M	New pipes laid at Vaturu Dam. $900,000.00	Taking over the Balevuto Water Supply project as a result of governmet intervention after an outbreak of heptatis A and leptospirosis which affected 400 families. $1.2M
	Laying of 4Km of 375mm diameter pipe at Denarau - $450,000.00	600mmduplicate main from Waimalika Junction to Sabeto Junction. Cost = $8m.	Commission of the new Valele Reservoir which benefited 8,000 people living along Nailaga – Sarava corridor.		
RURAL					
Increased Rural Coverage	Total of 2,531 schemes has been covered by WAF covering approximately 400,000 people. $16M				
	Implementation of Ecological Purifier System (EPS) in Rural $180,000				

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

HONDURAS

Water Supply Administration for Better Management of Water Supply Services

Country Report Outline Format

1. Country: Honduras

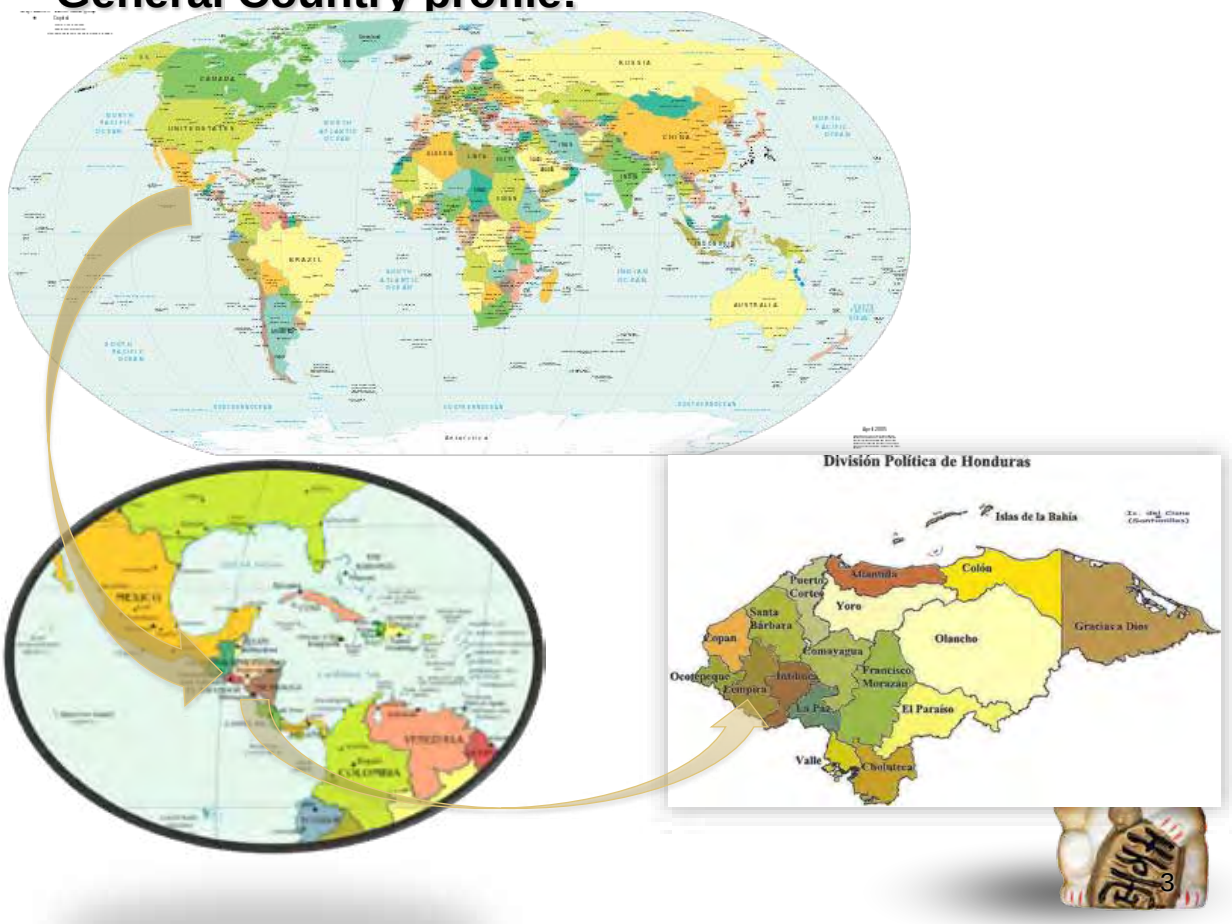
2. Name: Marco Antonio Moreno
3. Position: Project Coordinator
4. Organization: SANAA

Country Report Presentation

- **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 include "**Current situation and major problems, Current actions against the problems and any achievement, etc."

General Country profile:



General Country profile: Background

- Honduras is a republic in Central America. The country is bordered to the west by Guatemala, to the southwest by El Salvador, to the southeast by Nicaragua, to the south by the Pacific Ocean at the Gulf of Fonseca, and to the north by the Gulf of Honduras.

Whole Country:

Area : 112.492,0 km^2

Population : 8.894.975 Habitants

Coverage Water Supply: 95 (goal in 2015) %

Selected Water Supply System/City:

Service Area : 201.5 km^2

Population Served: 1.2 million

My Mission

- Mission of my organization is:

Being experts infrastructure providers and water and sanitation services in urban and rural areas of Honduras.

Efficiently use available resources, in close cooperation with the institutions of the water sector in order to contribute to the welfare and development of the Honduran people.

- My mission in the organization is:

Conceptualize, develop studies and coordinate the implementation of projects that promote access to drinking water and infrastructure to ensure proper treatment and disposal of domestic wastewater.

- My actual job to achieve the mission is:

Coordinate projects of drinking water, treatment and disposal of domestic wastewater and use of water for hydropower generation. SANAA Coordinator by the execution of “Micro-Hydroelectric Power Generation Project in Metropolitan Area of Tegucigalpa, currently under construction and financed by JICA.

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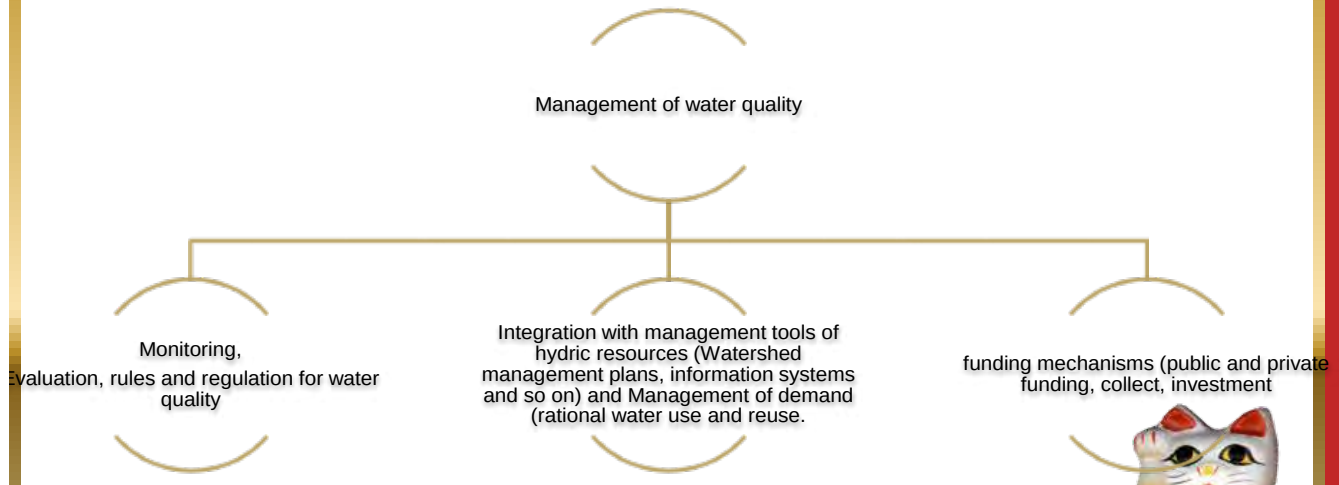
1. Management of water quality

- The management of water quality in the metropolitan aqueduct of Tegucigalpa is based on the fulfillment of the Technical Standard for Drinking Water Quality of Honduras and fulfillment of plans to preserving water quality standards in pre-phase supply in homes.



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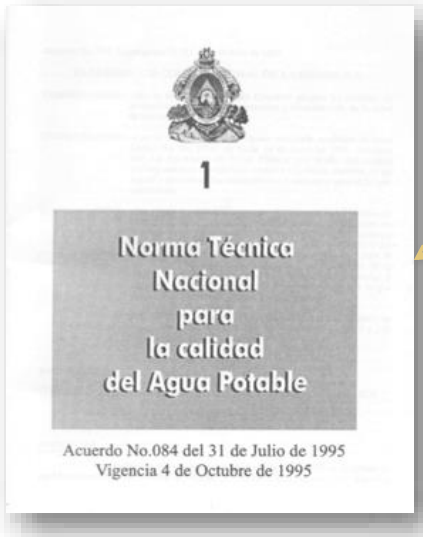
1. Management of water quality

- The management of water quality in the metropolitan aqueduct of Tegucigalpa is based on the fulfillment of the Technical Standard for Drinking Water Quality of Honduras.



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1. Management of water quality

- Institutional Framework related:

CONASA	• Policies • Planning • Sector coordination
ERSAPS	• Regulation and • Control
SANAA	• Technical Secretary of CONASA • Technical Entity • SANAA also operates the water distribution system of Tegucigalpa.
Municipalities and Water Concils	• Holders of drinking water service

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1. Management of water quality

- Current situation of drinking water service capacity

DESCRIPTION	VALUE
Tegucigalpa's population (2013)	1,210,830 hab. (500 neighborhoods)
Served population	800,000 hab (66%)
Media required production	308,500 m^3/d
Service capacity	258,509 m^3/d
Deficiency	49,991 m^3/d
Number of connections	118,548 clients

1. Management of water quality

- **Current situation and major challenges/problems:**

1. Deficit in drinking water installed capacity, about 17%.
2. Continuity of service water supply is very low, rationed 4-6 hour/day average.
3. The pipe distribution network has many years of service, remains empty for long, caused by low continuity of service or with very low pressure, which produce income contaminated groundwater.

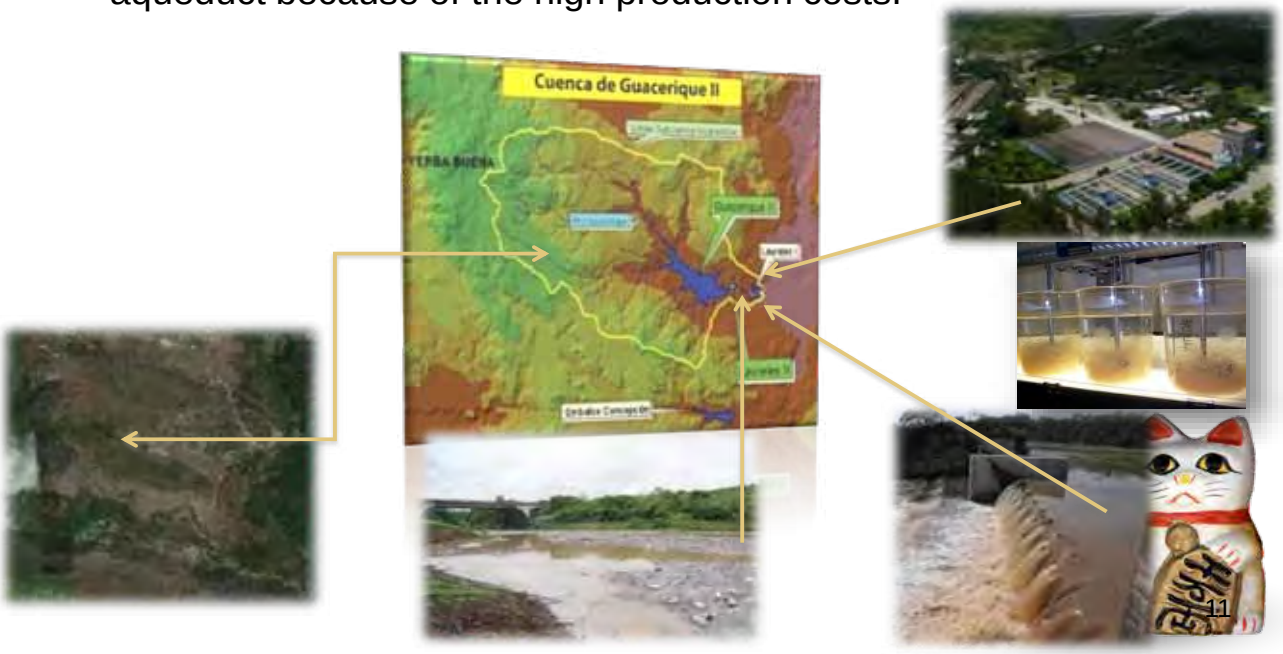
Periodo: Viernes 16 al Sabado 31 de Mayo d

Sect.	Centro de Distribucion	HORARIO	16 Vi	17 Sa	18 Do	19 Lu	20 Ma	21 Mi	22 Ju	23 Vi	24 Sa	25 Do	26 Lu	27 Ma	Mi	Vi	Sa
4	Loarque																
	1.1 Loarque	8PM-7AM		X			X			X			X				
	1.2 Barrios en Desarrollo (Aldea Germania)	8AM-7PM		X			X			X			X				
	1.4 Loarque Sur	6AM-10AM		X			X			X			X				
	Altos de Loarque																
	1.1 Altos de Loarque (Tanque Elevado)	12MD-4PM	X			X			X			X			X		
	1.2 Altos de Loarque (Tanque Superficial)	4PM-9PM	X			X			X			X			X		
	1.3 San Jose de Loarque	4PM-10PM		X			X			X			X				
4	La Cañada Cerro Grande																
	Yaguacire	6AM-6PM		X			X		X		X			X			
	Vileda Morales	6AM-6PM			X			X				X			X		
	Concepcion	6AM-6PM	X			X				X			X				
4	Toncontin																
	0.1 Lomas y Altos de Toncontin	12MN-7AM		X			X			X			X				
	0.2 Residencial Toncontin, Palma Real	12MN-7AM	X			X			X			X			X		
	0.3 Villas Corinto y San Jorge	12MN-7AM		X			X			X			X				
	0.4 Res. Concepcion	10AM-2PM		X			X			X			X			X	

1. Management of water quality

- **Current situation and major challenges/problems:**

4. High degradation of watersheds, in the rainy season, the water increased turbidity, resulting in increased use of chemicals for water treatment and produces difficulties in maintaining operating the aqueduct because of the high production costs.



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1. Management of water quality

- **Current situation and major challenges/problems:**

5. It is necessary to implement a monitoring network and effective monitoring of water quality.

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1. Management of water quality

- **Current actions against the problems and any achievement:**
  1. Interventionism pilot projects in watersheds (reforestation).
  2. Weekly water analysis.
  3. Construction project, inter-basin water transfer.
  4.




2. Reduction of non-revenue water1

- Constitution of Non-revenue Water (If you have the data, please fill in the table)

System input volume	Authorized consumption	Revenue water	Billed authorized consumption	51.6 million m^3 /year (60%)
		Non Revenue Water (NRW)	Unbilled authorized consumption (ex. fire fighting, cleaning)	- m^3 /year (-%)
	Water losses		**Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)**	34.2 million m^3 /year (40 %)
			Real losses (Leakage)	- m^3 /year (- %)

2. Reduction of non-revenue water

- We need a program to reduction of non-revenue water.
  - Low rate of micro measurement.
  - Low rate effective measurement in distribution centers (main tanks).
  - Low segmentation of the distribution network.
  - No defined and controlled hydraulic circuits.
  - Without pressure control in distribution networks.

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3. Water Tariff

CATEGORY	RANGE M3/MONTH	Minimum water consumption per segment L./Month	rate L. M3/Month	Fixed cost per connection L./Month	Approximate value per month	
SEGMENTO 1 DOMÉSTICA	0 - 20	31.8	1.59	-	31.8	$ 1.45
	21 - 30		3.17		95.1	$ 4.33
	31 - 40		5.23		209.2	$ 9.52
	41 - 50		9.1		455	$ 20.70
	51 - 55		12.92		710.6	$ 32.33
	56 Mas		16.11		902.16	$ 41.05
SEGMENTO 2 DOMÉSTICA	0 - 20	65.8	3.28	25	108.5	$ 4.94
	21 - 30		4.05		153.375	$ 6.98
	31 - 40		6.18		310.5	$ 14.13
	41 - 50		10.54		660.25	$ 30.04
	51 - 55		13.12		903.5	$ 41.11
	56 Mas		16.79		1176.8	$ 53.54
SEGMENTO 3 DOMÉSTICA	0 - 20	88.4	4.42	70	182	$ 8.28
	21 - 30		5.23		197.625	$ 8.99
	31 - 40		7.37		370	$ 16.83
	41 - 50		11.4		714	$ 32.49
	51 - 55		14.42		992.875	$ 45.17
	56 Mas		18.24		1278.3	$ 58.16
SEGMENTO 4 DOMÉSTICA	0 - 20	141.6	7.08	150	328.5	$ 14.95
	21 - 30		8.9		335.25	$ 15.25
	31 - 40		10.93		548	$ 24.93
	41 - 50		13.58		850.25	$ 38.68
	51 - 55		16.86		1160.625	$ 52.81
	56 Mas		19.42		1360.9	$ 61.92
CATEGORIA COMERCIAL	0 - 20	119	5.95	175	325.25	$ 14.80
	21 - 30		7.96		300	$ 13.65
	31 - 40		12.17		610	$ 27.75
	41 - 50		16.03		1003.375	$ 45.65
	51 - Mas		22.48		1547	$ 70.38
CATEGORIA INDUSTRIAL	0 - 20	299.6	14.98	250	626	$ 28.48
	21 - 40		19.67		985	$ 44.81
	41 - Mas		29.12		1493.9	$ 67.97
CATEGORIA GOBIERNO	0 - 20	299	14.98	150	526	$ 23.93
	21 - 40		19.67		985	$ 44.81
	41 - Mas		29.12		1493.9	$ 67.97
CATEGORIA PATRONATOS Y JUNTAS DE AGUA	0 - 40	116	2.9	-	74	$ 3.37
	41 - Mas		2.9		146.5	$ 6.67

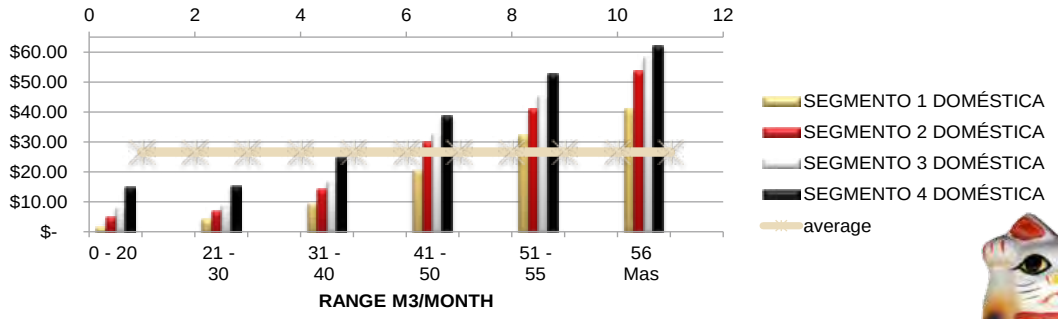
Tariff Efficiency = Monthly Invoincing* 100 = 120%
Monthly expense

2014

MES	Invoincing	Expense	Tariff Efficiency
ENERO	L. 60,789,865.92	L. 71,278,896.24	85.28%
FEBRERO	L. 59,881,050.96	L. 52,490,164.20	114.08%
MARZO	L. 61,429,899.66	L. 59,723,148.42	102.86%
ABRIL	L. 62,031,748.44	L. 64,099,440.93	96.77%
MAYO	L. 61,563,181.02	L. 59,235,503.13	103.93%
JUNIO	L. 63,237,036.80	L. 104,299,374.81	60.63%
JULIO	L. 78,338,951.29	L. 65,122,569.72	120.29%
AGOSTO	L. 62,216,533.20	L. 73,205,840.97	84.99%
SEPTIEMBRE	L. 65,883,349.71	L. 57,217,329.37	115.15%
OCTUBRE	L. 61,997,098.25	L. 63,176,700.51	98.13%
NOVIEMBRE	L. 61,801,105.10	L. 63,138,081.11	97.88%
DICIEMBRE		L. 85,715,731.13	
PROMEDIO	**L. 63,560,892.76**	**L. 68,225,231.71**	**98.18%**

16

3. Water Tariff

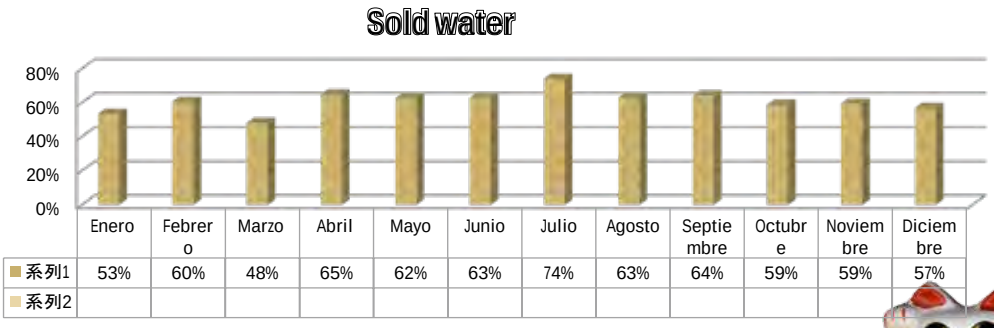


17

4. Water supply service standards /Performance Indicators

- Sold water

Agua Comercializada =	m³ invoiced / m³ Produced	Jan	Feb	March	April	Mayo	June	July	August	Sept	Oct	Nov	Dic	average	Range
		53%	60%	48%	65%	62%	63%	74%	63%	64%	59%	59%	57%	61%	≥80%



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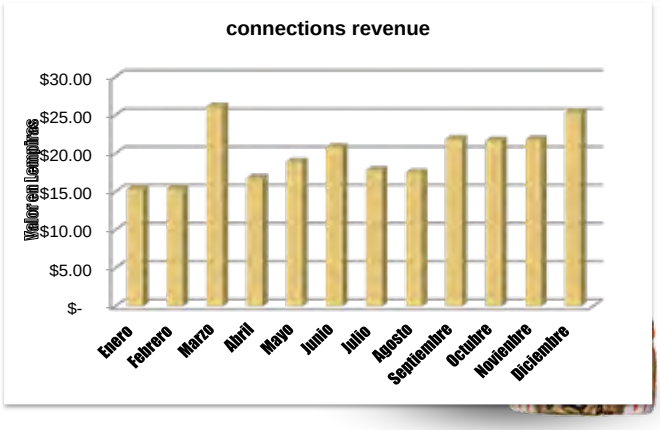
4. Water supply service standards /Performance Indicators

Collection Efficiency (2014)

		Jan	Feb.	March	April	Mayo	June	July	August	Sept	Oct	Nov	Dic.
Collection Efficiency =	Month revenue invece	65%	66%	110%	70%	80%	85%	59%	71%	85%	90%	91%	79%

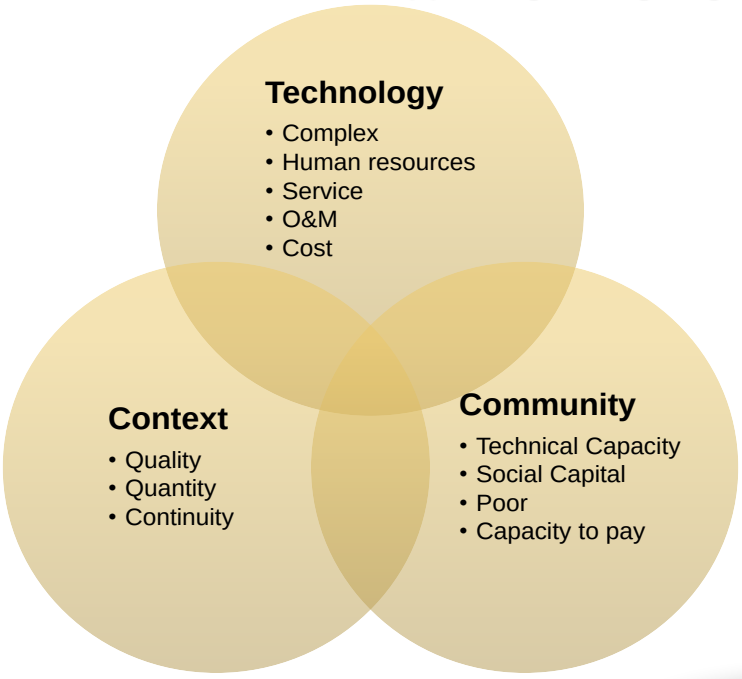
Connections revenue (2014)

Mes	Ingreso Mensual	Clientes Directos	Ingresos por Conexión (IM/CD)	connections revenue (IM/CD)
Enero	L. 39,492,045.79	117187	L. 337.00	$15.33
Febrero	L. 39,742,266.18	117221	L. 339.04	$15.43
Marzo	L. 67,510,915.65	117460	L. 574.76	$26.15
Abril	L. 43,436,841.23	117493	L. 369.70	$16.82
Mayo	L. 48,995,553.60	117599	L. 416.63	$18.96
Junio	L. 53,971,991.38	117565	L. 459.08	$20.89
Julio	L. 46,184,713.63	117703	L. 392.38	$17.85
Agosto	L. 45,348,256.91	117766	L. 385.07	$17.52
Septiembre	L. 56,879,796.50	118064	L. 481.77	$21.92
Octubre	L. 56,479,739.71	118410	L. 476.98	$21.70
Novienbre	L. 56,785,599.45	118473	L. 479.31	$21.81
Diciembre	L. 66,347,703.69	118548	L. 559.67	$25.46



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

- Element that contribute to the Self-supporting in Tegucigalpa



20

6. Major recent achievement in improvement of water supply services/management (PART1)

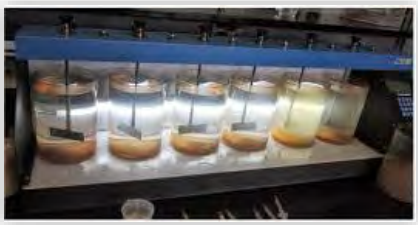
2004	INDICATORS	2014
8.3	Staff/1,000 connections	11.6
258,509	Production capacity m3/d	258,509
T.S.D.W.Q. of Hnd	Water quality	T.S.D.W.Q. of Hnd.
-%	Coverage area	66%
7 hr/d	Supply duration	5 hr/d
- bar	Supply pressure	2.5 bars
-	Number of connections	118,548
40%	NRW	≈ 40%
-%	Collection ratio	79%
1,200	Staff number	1,680

6. Major recent achievement in improvement of water supply services/management (PART 2)

- Final design studies of a new dam.
- Updating drawings distribution networks.
- Construction of two micro hydroelectric power generation to reduce operating costs.

7. Expectation for the Japanese private companies & Water Supply Utilities

- Learn how to prepare water safety plans
- Learn about management models that allowing Japanese companies to have appropriate services indicators.
- Learn about structural and nonstructural actions to get reduce the non-revenue water.
- Learn how to create a effective network of quality monitoring water, self-sustaining.



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

IRAQ

Water Supply Administration for Better Management of Water Supply Services

Country Report Outline Format

1. **Country: IRAQ** – Kurdistan region
2. **Name**:Bakhtyar Taher Raouf and bayar taqeadeen qader
3. **Position**:Directors
4. **Organization**: sulaimanyah surrounding water directorate

1

General Country profile:Background

Whole Country:

Area : 384520 km^2

Population : 5450000 Habitants

Coverage Water Supply: 90 %

Kurdistan region area are including land . Mountain landscape area and we have two main river Furat and degla which are the main surface water source of our water supply system .

2

My Mission

- Mission of my organization is to supply clean water to distric – sub distric and villages we depend in our project on government fund ,some time(N.G.O)or in international loan can fund our project
- our mission in the organization is to get the water network for all town and villages and operate the water projects.
- our actual job to achieve the mission is managing the director in the best way to bring the best water quality for the citizen.

3

1. Management of water quality

- We have the quality control department in our directorate and they manage the water quality daily by making test for water quality by biological and chemical tests. With separate water monitoring by ministry of health .

4

2. Reduction of non-revenue water1

- Constitution of Non-revenue Water (If you have the data, please fill in the table)

System input volume	Authorized consumption 80%	Revenue water	Billed authorized consumption	xx m^3 /year (%)
		Non Revenue Water (NRW) 80%	Unbilled authorized consumption (ex. fire fighting, cleaning)	xx m^3 /year (%)
	Water losses **50%**		**Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)**	xx m^3 /year (%)
			Real losses (Leakage)	xx m^3 /year (%)

3. Water Tariff

- Now project of instillation of meters under constriction
- We have constant for each houses 5000 ID which is =4 $

4. Water supply service standards /Performance Indicators

- our Water supply service standards depends on the number of population and water sources and deep wells .

We are working on WHO standards

7

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

- Coaching pasting ads and distributing ads on citizens for decreasing water waste .

- We have ordinary staff which are managing water serves in rural and urban area our government support us in our organization .

8

6. Major recent achievement in improvement of water supply services/management (PART1)

2003or2004?	INDICATORS	2013or2014
22	Staff/1,000 connections	3.2
50,000	Production capacity m3/d	250,000
WHO Guidelines	Water quality	WHO Guidelines
55%	Coverage area	80%
2hr/d	Supply duration	6hr/d
1.0 bar	Supply pressure	2.0 bars
60,000	Number of connections	178,155
30%	Collection ratio	80%
1,000	Staff number	3379

9

6. Major recent achievement in improvement of water supply services/management (PART2)

- Installing meters for house hold connection and warking on water low in Kurdistan parlament

7. Expectation for the Japanese private companies & Water Supply Utilities

our Expectation for the Japanese private companies is to help us in our projects to make the water networks and water quality better and to have lasts information about water field such as (pipes-software programs to analyze water network-new technology in water project.

11

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

JORDAN

WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES

Country: Jordan
Name: Mohammed Hossam Sallam
Position: NRW Director
Organization: Water Authority of Jordan

JORDAN

- Whole Country:
- Area : 89342 km^2
- Population : 6.5 m Habitants
- Coverage Water Supply: 97 %
- Selected Water Supply System/City:
- Service Area :less than 89342 km^2
- Population Served: 8 million

MANAGEMENT OF WATER QUALITY

Directorate of Central laboratories of WAJ is responsible to implement random sampling of drinking water all over Jordan, the analysis results shown a conformity of drinking water quality (bacterial) with a ratio of (99.4%),

REDUCTION OF NON-REVENUE WATER

- The NRW rate is around 49%, the major challenge we are facing is the influx of refugees from the surrounding countries, which adds to our already bad situation, emergency plans have been executed in most of Kingdome's governorates to ensure speedy supply of water to more than 1.5m refugees scattered all over the Kingdome which meant extension of networks ,additional quantities of water to be supplied in a strict rationing regime adding to NRW figures .

WATER SUPPLY SERVICE STANDARDS

Water supply services in Jordan is already covering 97% of the population, challenge facing this issue of high rate of supply coverage is the gap between demand and available supply in light of the scarcity of resources, and the distance of water sources from demand centers, which implicate high cost of energy per cubic meter.

MANAGEMENT OF WATER SUPPLY SERVICE ON A SELF-SUPPORTING BASIS

Management of water supply services is faced by scarcity of resources and the ever increasing demand for water due to population growth and the requirements of development and the successive migrations caused by the political situation in the region .

MAJOR RECENT ACHIEVEMENT IN IMPROVEMENT OF WATER SUPPLY SERVICES/MANAGEMENT

Fresh water resources are being directed only to serve drinking purposes, reclaimed water from treatment plants is being used for agriculture in Jordan , new Resources of Disi carrier, Red-Dead - and water harvesting are on track already .

Challenges Facing Water Sector

1. Exacerbate the gap between demand and available in light of the scarcity of resources and the increasing demand for water due to population growth and the requirements of development and the successive migrations caused by the political situation in the region to the Kingdom of

2. Distance of water sources from demand centers which implicate high cost of investment in developing ,storing , and distribution of water ,in addition to high cost of pumping to high elevations.

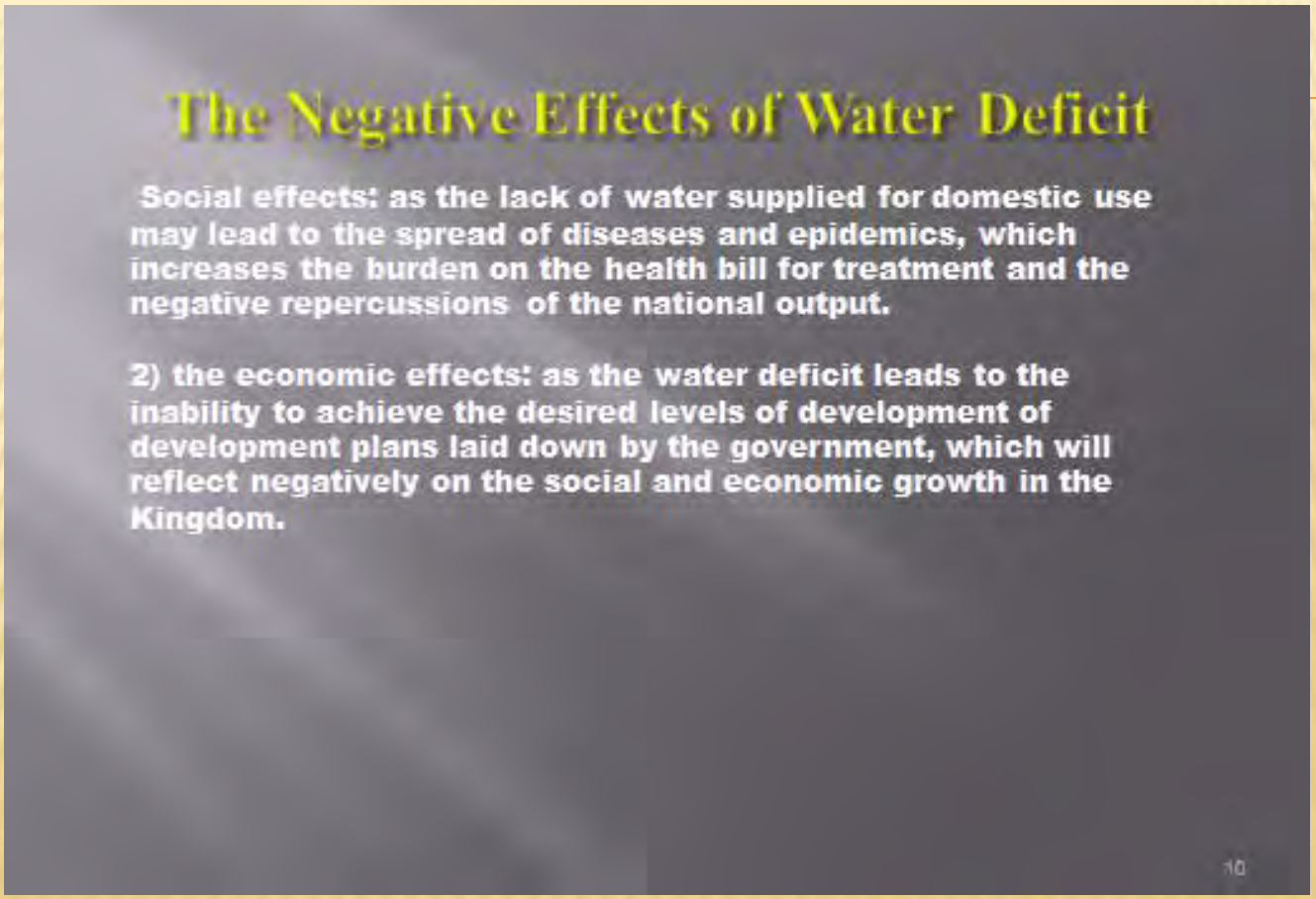
3. Depletion of aquifers as a result of over pumping to meet the immediate needs of the citizens

4. Limited sources of funding required for the implementation of new projects and rehabilitate existing ones

5. Diminishing water resources as a result of increased cross-border exploitation before they enter the territory of the Kingdom

6. Challenges of the water sector to face the successive migrations of refugees

7. Challenges of climate change and global warming



WATER SUPPLY SERVICE STANDARDS /PERFORMANCE INDICATORS

- The already used P.I at present is %NRW although this indicator should linked with other P.I such as NRW/sub ,or /house connection . And finally ILI. This is being worked at for this year 2015.

MY MISSION

- Mission of my organization is to produce , treat ,and distribute good quality safe water in the distribution networks and, to collect and treat waste water.
- My mission in the organization is to launch a program of NRW in governorates.
- My actual job to achieve the mission is to reduce NRW and to make available more quantities of water.

11

WATER TARIFF

- Water tariff in Jordan per m3 is split in to categories , starting at low price per cubic meter of less than 0.2 JD for the first 18 cubic meters per quarter (3months) and going all the way to 1.6 JD for the category of more than 127 cubic meter per quarter .

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

MALAWI

Water Supply Administration for Better Management of Water Supply Services

Country Report

Country: MALAWI

Name: LETTON EPHRAIM CHILONGO

Position: PLANNING MANAGER

Organization: NORTHERN REGION WATER BOARD

1

General Country profile:Background

Geographic Location:

- Malawi is a landlocked country in South East Africa. It is bordered by Zambia to the northwest, Tanzania to the northeast and Mozambique to the east, south and west.

Economy

- Malawi is among the least developed countries in the world with a per capita nominal GDP of less than USD253 (2012). The economy is heavily dependent on agriculture which accounts for 35% of GDP. Industry accounts for 19% and services for the remaining 49%. Main agriculture products are tobacco, sugarcane, cotton, tea, corn, potatoes, sorghum, cattle and goats.

Whole Country:

Area : 118,000 km^2

Population : 16,800,000 Habitants

Coverage Water Supply: 78 %

Selected Water Supply System – Northern Region Water Board:

Service Area : 210 km^2

Population Served: 278,000

2

My Mission

- Mission of my organization is:

  To supply potable water to the urban and peri-urban centers of Northern Region of Malawi.

- My mission in the organization is:

  Management of planning activities for water supply in the Board's statutory area.

- My actual job to achieve the mission is:

  1. Initiating and carrying out the Board's water supply development plans
  2. Managing and conducting feasibility and design processes of the Board's projects to improve water supply services.
  3. Working with consultants on feasibility studies for developmental projects
  4. Coordinating the Board's performance monitoring activities

3

1. Management of water quality

Current situation/ challenges

- Water quality management unit existing within NRWB with 6No permanent staff.
- Water quality deteriorating in all surface sources due to environmental degradation and climate change factors
- Resulted into high usage of chemicals, rising treatment cost, rising plant investment costs
- Lack of suitable equipment and laboratories for carrying out tests

Planned action

- Comprehensive catchment/water source management programs
- Establishment of partnerships for integrated catchment management
- Comprehensive monitoring systems and safety plans

Achievements

- Partnerships with Forestry Department, Army and Councils
- Annual re-afforestation programs in protected catchments
- Regular monitoring system in place
- Collaboration with other laboratories, Universities for tests

4

2. Reduction of non-revenue water1

- Constitution of Non-revenue Water –

Note: Data not sufficient since water balance is not carried out

System input volume (10,600,000)	Authorized consumption (7,200,000)	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 (3,400,000)		**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 water2

Current Situation

- NRW is high at around 36% for the Board
- Water Balance not carried out, only pilot project in one scheme Karonga Town.
- Biggest scheme Mzuzu City NRW at 40%
- NRW reduction Unit still under establishment, efforts to reduce NRW being done by individual schemes

Strategies and Action

- Establishment of a NRW reduction Unit to coordinate NRW reduction
- Rezoning schemes into DMAs
- Meter replacement and management program
- Rehabilitation of old distribution networks
- Implement Water Balance in all schemes

Achievements in NRW reduction

- Setting up of the NRW reduction unit and recruitment of staff
- Implementation of Water Demand Management (WDM) project in Mzuzu city (biggest scheme) to focus on establishment of DMAs and NRW reduction
- Karonga scheme pilot Water balance model

6

3. Water Tariff

Current Situation

- Water tariff is set by the organization NRWB but subject to approval by the Government
- Tariff has 4major categories; commercials, institutions , domestic individuals and low income Communal water points (CWPs).
- Tariff setup subsidizes for low income communities
- Tariff provide for full cost recovery and minimal profit margins as governed by Government policy.

Challenges

- Bureaucracy delays timely implementation of tariff changes
- Political factors play part in course of getting approval from Government
- Untimely bill payment by some Government institutions like Army and Police who are major customers results into cash flow problems and accumulation of debtors

Strategies

- Planning for automatic tariff adjustment system
- Proposal to have an independent regulator for water utilities
- Implementation of prepaid metering system to improve cash flow

7

4. Water supply service standards /Performance Indicators

Current situation

- 79% supply coverage in designated NRWB supply areas
- 18hours/day average supply time due to power outages and inadequate raw water sources
- Monthly, quarterly and annual performance monitoring in place

Challenges

- Unreliable power supply main challenge in all schemes
- Old dilapidating distribution networks that require rehabilitation
- Inadequate raw water sources in some of the schemes
- Challenges to source funding for investment projects to improve supply standards

Plans, Strategies and actions

- Plans to pilot alternative energy supply like solar and wind
- Design and construction of new dams as additional raw water sources in some of the schemes facing raw water sources inadequacies
- Rehabilitation and upgrading supply networks
- Collaborating with development partners to source funding

8

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

Current situation

- Current tariffs provides for NRWB to run on a self supporting basis but there are cash flow problems due to delays in approving adjustments, and failure of major institutions to honor their bills on time.
- There is no subsidy from the Government for operations of the Board but the Government facilitates investment loans and access to grants from banks and developing partners.
- The Board conducts regular cash collection campaigns and negotiations to improve cash flow.

Actions to address challenges/problems

- Implementation of prepaid metering system to improve cash flow
- Establishment of debt collection unit in all schemes to coordinate cash collection activities
- Regular cash collection campaigns conducted in all schemes
- Need for an independent regulator for water utilities

6. Major recent achievement in improvement of water supply services/management (PART1)

(NRWB)

2007	INDICATORS	2014
14	Staff/1,000 connections	10
20,000	Production capacity m3/d	29,000
WHO Guidelines	Water quality	WHO Guidelines
62%	Coverage area	79%
18hr/d	Supply duration	18hr/d
1.5 bar	Supply pressure	2.0 bars
18000	Number of connections	36000
40%	NRW	36%
65%	Collection ratio	75%
250	Staff number	330

6. Major recent achievement in improvement of water supply services/management (PART2)

- Rehabilitation and upgrading of treatment, transmission and distribution systems in some of schemes like Mzuzu city
- Introduction of prepaid metering system in major schemes of Mzuzu and Karonga in 2013
- Twinning program with sister water companies in RSA, Lesotho and Zambia that have staff exchange programs
- Implementation of online bill payment system in all schemes
- Piloting online monitoring of storage tanks levels in Mzuzu

11

7. Expectation for the Japanese private companies & Water Supply Utilities

- Water quality management: Japan is a leading manufacturer of electronic instruments. I expect Japanese water companies to have advanced water quality monitoring technologies and measuring equipment/instruments as well as techniques that can be adopted by our organization (NRWB).
- Non revenue water reduction: I expect Japanese water companies to have very low levels of NRW and that they carry out full water balance performance monitoring. This will be an opportunity to learn from their experiences, approaches as well as techniques and equipment on how best to reduce non revenue water in the set up of our organization (NRWB).
- Water supply service standards: Since Japanese cities are big, advanced and highly industrialized I expect to gain knowledge in supply service planning, water demand management, pressure management, quality control and performance monitoring.
- Self supporting management and tariffs: I expect to learn from existing policy and regulation in the Japanese water industry. How Japanese water utilities set up tariffs and how they plan and finance investments.
- Water Safety: To learn on how water safety plans are implemented in Japan and adopt similar water safety plan for NRWB.

12

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

NIGERIA

WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES
COUNTRY REPORT

1. Country: Nigeria (FCT)
2. Names: (a) Mallam Hudu Bello
&
(b) Mrs. Ololade Y. Okobi

3. Positions: (a) Director
&
(b) Asst. Director (Quality Control)

4. Organization: FCT Water Board

1

GENERAL COUNTRY PROFILE: BACKGROUND

The Nigerian Flag, officially adopted on October 1, 1960, consists of three vertical bands of green, white and green.

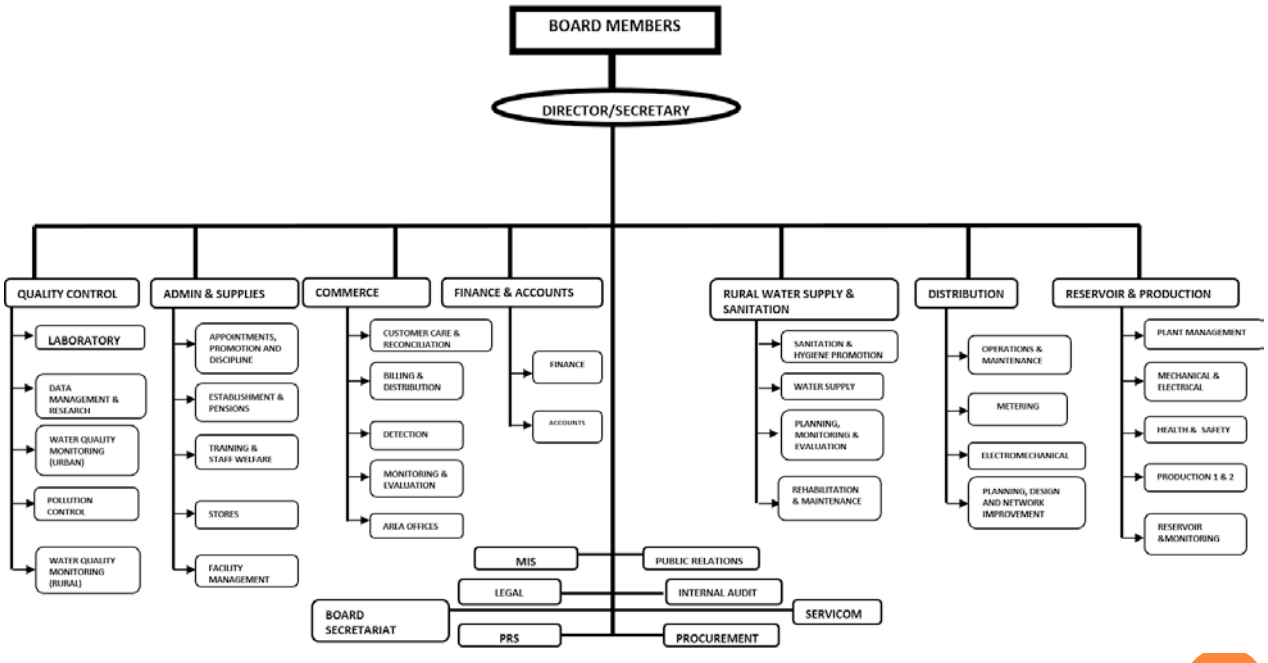
Official Name Nigeria
Continent : Africa
Lat Long7.6219° N, 6.9743° E
Capital :Abuja
Largest City Lagos
Official Language : English
Major Religion : Christianity 50.80% Islam 48.80% Others 0.40%
National day1 October (1960)
Form of Government Federal presidential republic
President Goodluck Ebele Jonathan
Vice President Namadi Sambo
Currency Nigerian naira
GDP$522.180 billion 2014 estimate
Area Covered : 923,768 KM^2
Population : 162,470,737

2

MISSION

- The Mission of my organization is to provide water of adequate quantity and quality at an equitable rate to the residents of FCT.
- My mission in the organization is to harmonize and direct all resources (human, capital, machinery etc) to achieve the objective of providing safe water supply and quality service to the residents of the FCT and also ensure optimum revenue generation for the organization.
- My actual job to achieve the mission is directing and managing the entire daily operations of the organization.

3



1. MANAGEMENT OF WATER QUALITY

- This is being improved nationally. The Federal Ministry of water Resources is currently the regulatory agency for national water quality monitoring. The Ministry has 6 functional regional laboratories located across the 6 geo political zones of the country.
- A national Drinking Water Standard has been developed in collaboration with the Standards Organization of Nigeria (SON)
- The FCTWB monitors water from the catchment area through the treatment stage to the consumer point on a regular basis.
- Attend to customer's complaint promptly

5

2. REDUCTION OF NON-REVENUE WATER1

- The available data for non –revenue water is from a study conducted in 2007 as outlined below. The study puts the percentage of non revenue water at 66%

<table>
<tr><td rowspan="8">Water Production (144,000)</td><td rowspan="3">Authorised Consumption (51,120)

36%</td><td rowspan="2">Billed Authorised Consumption (49,392.14)</td><td>Billed Metered Consumption (13,829.80)</td><td rowspan="2">Revenue Water (49,392.14)

34%</td></tr>
<tr><td>Billed Un-metered Consumption (35,562.34)</td></tr>
<tr><td>Unbilled Authorised Consumption (1,727.86)</td><td>Unbilled Metered Consumption (190.06)</td><td rowspan="3">Non-revenue Water (95,327.86)

66%</td></tr>
<tr><td rowspan="5">Unauthorised Consumption (93,600)

64%</td><td rowspan="2">Apparent Losses (56,160)</td><td>Unbilled Un-metered Consumption (1,537.79)</td></tr>
<tr><td>Unauthorised Consumption (30,888)</td></tr>
<tr><td rowspan="3">Real Losses (37,440)</td><td>Meter and Estimation Inaccuracies

(25,272)</td></tr>
<tr><td>Leakage on Transmission and Distribution mains (12,355.20)</td></tr>
<tr><td>Leakage and Overflows at Storage Tanks

(8,236.80)</td></tr>
<tr><td>Leakage on Service Connections up to Metering Point (16,848)</td></tr>
</table>

6

2. Reduction of non-revenue water2

- There is a dearth of data because of lack of infrastructure and adequate training on management of non – revenue water (eg zonal meters, aging GI pipes etc).
- Effort is been made in collaboration with JICA on NRW for the Board.
- A Smart Metering programme is also about to commence in the WB

7

3. Water Tariff

- The Water Board has a mandate to charge an equitable rate for water supply. The tariff structure is differentiated as domestic and commercial. Tariff is set and reviewed periodically after due consultation with relevant stake holders, supervised by an independent body, the Utilities Charges Commission. Final approval is given by the Honourable Minister of FCT.
- It is inconclusive if the current tariff is commensurate with cost of production

8

4. Water supply service standards /Performance Indicators

- FCTWB strives to comply with the international best practice in water supply standards. Some of the indicators we have set for ourselves are as follows:

▪Volume of water treated
▪Optimizing power use
▪Total population served
▪Hours of available water supply
▪Network leakage
▪Volume of water distributed
▪Continuity of service
▪Number of water quality complaints received per month and per year etc.
▪Maintenance of plant and equipment
▪Optimizing chemical use
▪Water treatment plant capacity utilization

9

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

- The current situation of the management of water supply services in the FCT is that the infrastructure is provided by the Engineering Department of the Federal Capital Development Agency (FCDA), an arm of the FCTA while the FCTWB is responsible for daily operation and maintenance of the plants, appurtenances and other infrastructure

10

6. MAJOR RECENT ACHIEVEMENT IN IMPROVEMENT OF WATER SUPPLY SERVICES/MANAGEMENT (PART1)

2004	INDICATORS	2014
22	Staff/1,000 connections	3.2
480,000m3/d	Production capacity m3/d	720,000m3/d
WHO	Water quality	WHO Guidelines
50%	Coverage area	70%
*24hr/d	Supply duration	*24hr/d
4 bars	Supply pressure	3.5 bars
26,881	Number of connections	191,092
*65%	NRW	* 60%
48%	Collection ratio	52.9%
1,650	Staff number	824

11

6. MAJOR RECENT ACHIEVEMENT IN IMPROVEMENT OF WATER SUPPLY SERVICES/MANAGEMENT (PART2)

- Advanced metering systems (AMR & Smart Meter)
- Zonal Bulk metering
- Collaboration with JICA on reduction of NRW
- Improvement in Maintenance of leakages (surface)
- Completion and Commissioning of 3rd & 4th Treatment Plants

12

7. Expectation for the Japanese private companies & Water Supply Utilities

- Supply of innovative water supply technology
- Exchange of ideas on best practices
- Capacity development
- Knowledge of leakage devices

13

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

SOUTH SUDAN

Water Supply Administration for Better Management of Water Supply Services

INCEPTION REPORT:

Country: REPUBLIC OF SOUTH SUDAN.

NAME: NANCY ELUZAI MANASSHE

POSITION: Assistant Engineer water Distribution

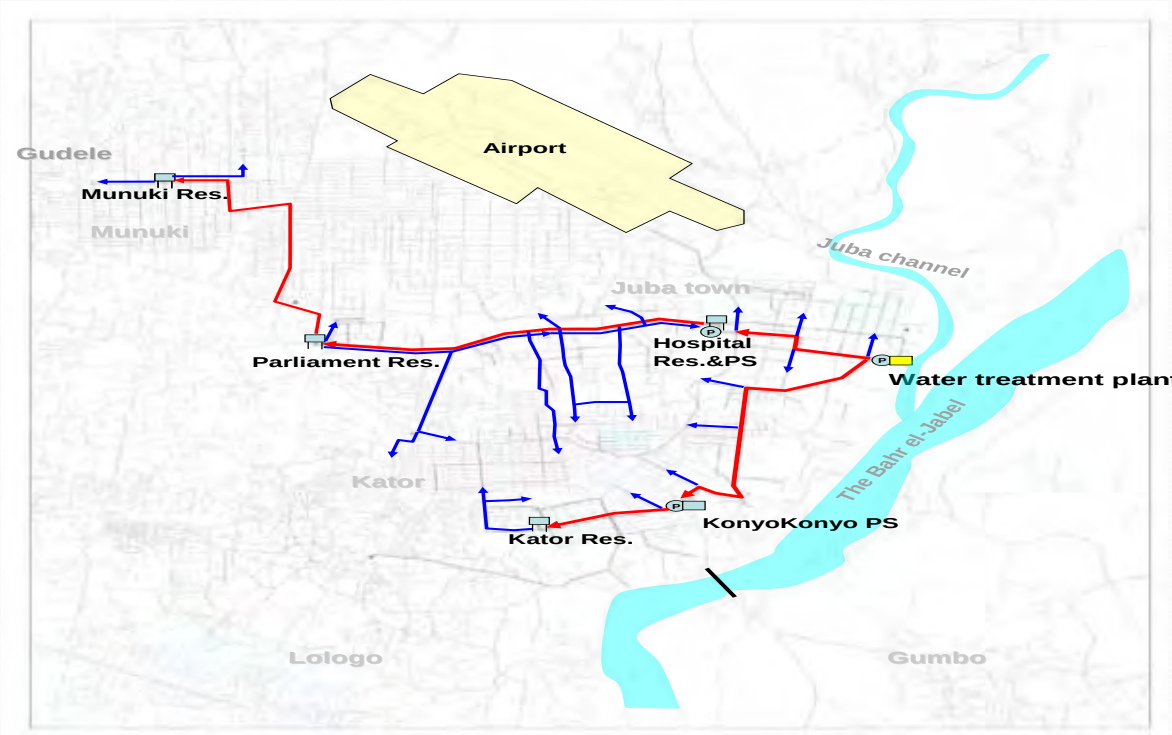
ORGANISATION: South Sudan Urban Water Corporation/Juba Station

TOKYO Japan- May 17- 30 2015

Juba water supply Station

- **Area**: not determined
- **Service area**: 72km length
- **Population:** Above one(1) million.
- **Population served:** 1,900 plus.
- **Water supply coverage:**15%

Juba Water Distri.system



Management statistics

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

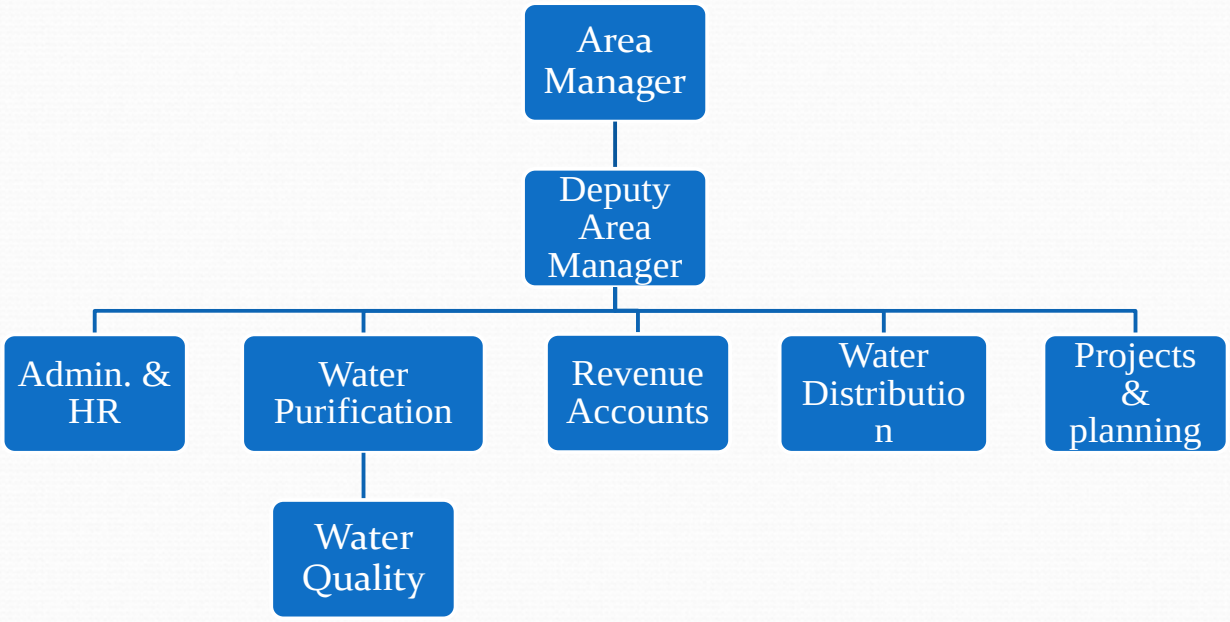
6,000 m3/day when city power is available.

3,500 m3/ using old inefficient standby Gens,above 14hrs/24 operation.

Average water rate: 2USD/m3.

Water Tariff collection:30%

Organization of Juba Station



Intake Mains

Two centrifugal pumps

capacity : 158 cubic meter per hour

Three pumps ,two operational, one standby.

Monitoring operation.

Juba Water treatment plant

Juba water treatment plant was constructed in 2006 and commissioned in 2009.

Capacity:7,200 m3/ day.

System component.

Intake, Raw water pumps, raw water tank Alum dosing unit, Coagulation, baffles,sed.,Filtration HOCL disinfection unit& clear water tanks

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

High lift Pumps

Three centrifugal pumps.

Capacity:150cubic meters per hour

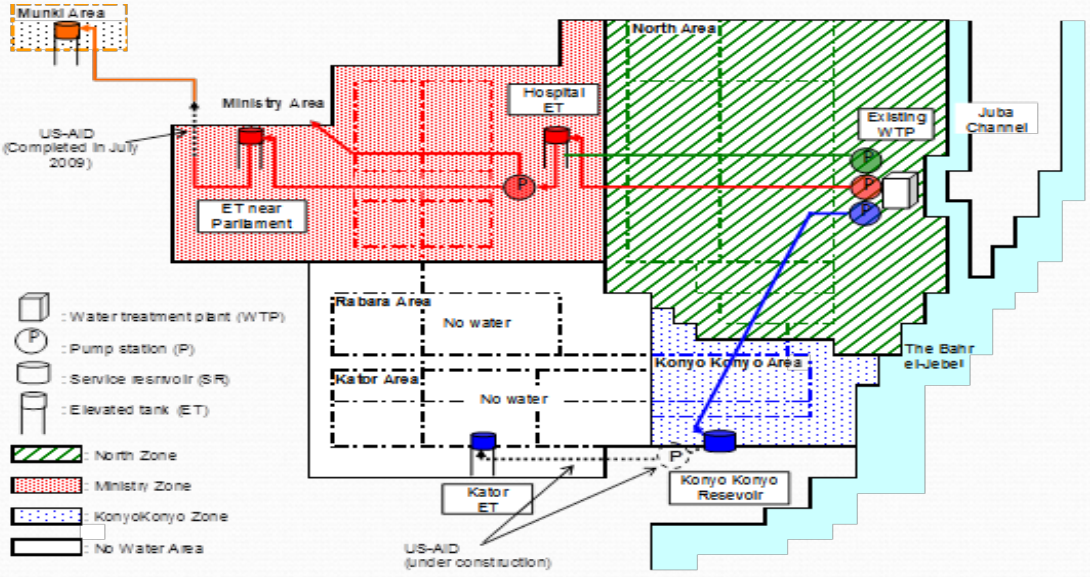
Two operational,one standby.

Water Quality Management Plan (Monthly Test)

Sampling locations:

- ❑ taps and tanks
  - ❑ Household taps

Water supply system/Juba



A tanker Filling station & public tap stand –Two km from the water treatment plant.

Leak repair Activity.

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%

Distribution Network

91Km long,

71Km, Dilapidated
Mainly GI and Asbestos.
Distribution reservoirs:
1 Elevated Booster substation,
Two gravity 250 m3 capacity.
One ground distribution tank.

Japanese peace planning to assist ssuwc by ex

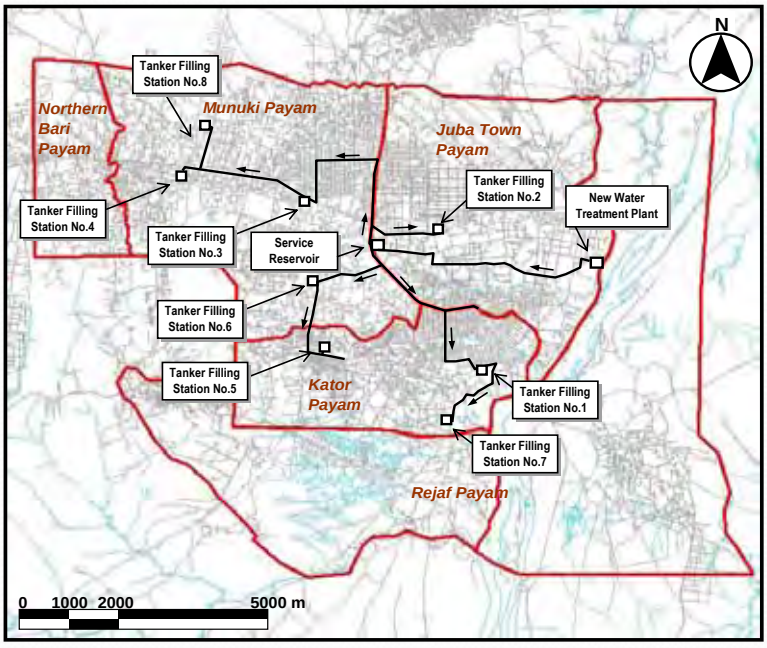
Challenges:

- Inadequate funds to meet operational cost.
- Spare parts not available.
- Some customers don't pay bills(mostly gov't institutions and VIPs).
- WTP capacity is small(**7,200m3/day**) compared to demand,
- Dilapidated or Damaged distribution network.
- High rate of NRW(Illegal connection, leakage & bill payment.
- power supply is a problem.
- Lack of fuel.
- No excavator.
- HR.
- Malfunction of the Billing section PCs(No internet to keep Antivirus updated.

Efficient water supply

- Construction of new water supply facilities/200,000m3.
- Replacement of the damaged existing distri. network
- Implementation of the grant aid(JICA) project.
- Procure water quality equipments.
- Recruit professional HR.
- Distribution management plan(leakage repairs Installation of meters & GIS mapping).
- Customer care & education programs.
- Avail stock(fittings,Gen ,vehicles,electric,pump parts fuel)
-

JICA grant aid Project



The Project for Improvement of Water Supply System in Juba

- Under implementation
- Funded by Japanese Government
- Capacity 10,800 m^3
- length 37 km
- Contracted: by Dai Nippon Construction (DNC)

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

SUDAN

Country Report

Group Training (Leaders Training)
Water Supply Administration for Better Management of Water Supply Services (A)

Name: Mohamed Abdelgadir Mahdi
E-Mail: mohgadir@hotmail.com
Country: Republic of Sudan
Organization: Hawata Wad-Elageili Water Corporation

General Information

- Sudan is the second country in Africa according to the area1,865,813) square kilometer.
- The total population of Sudan is(30,894,000) census 2008.
- Shares its boarders with Egypt to the north, the red sea to the north east, Eritrea and Ethiopia to the east, South Sudan to the south, the Central African Republic to the south west, Chad to the west and Libya to the north west.
- Khartoum is the political capital.
- The form of government is federal presidential republic.
- Major religion is Islam (96.7) %, small Christianity minority.
- Official language are Arabic and English .
- National day on first of January each year(1956).
- National currency is the Sudanese pound (SDG).

Sudan Economy:

- About (80)% of the population depend on Agriculture (Cotton, Ground Nuts, Peanuts, Sorghum, Millet, Wheat, Gum Arabic, Sugar Cane, Potatoes, Sesame, Livestock).
- Some (10)% of the population depend on Forestry Production.
- About (7)% of the population depend on Industries (Oil, Cotton Ginning, Textiles, Cement, Edible Oils, Sugar, Soap Distilling, Shoes, Petroleum Refining, Pharmaceuticals, Armaments, Automobile, Light Truck Assembly).

1.<u>Organizational profile</u>:

1.1The name of my organization is Hawata Wad-Elageili Water Corporation.

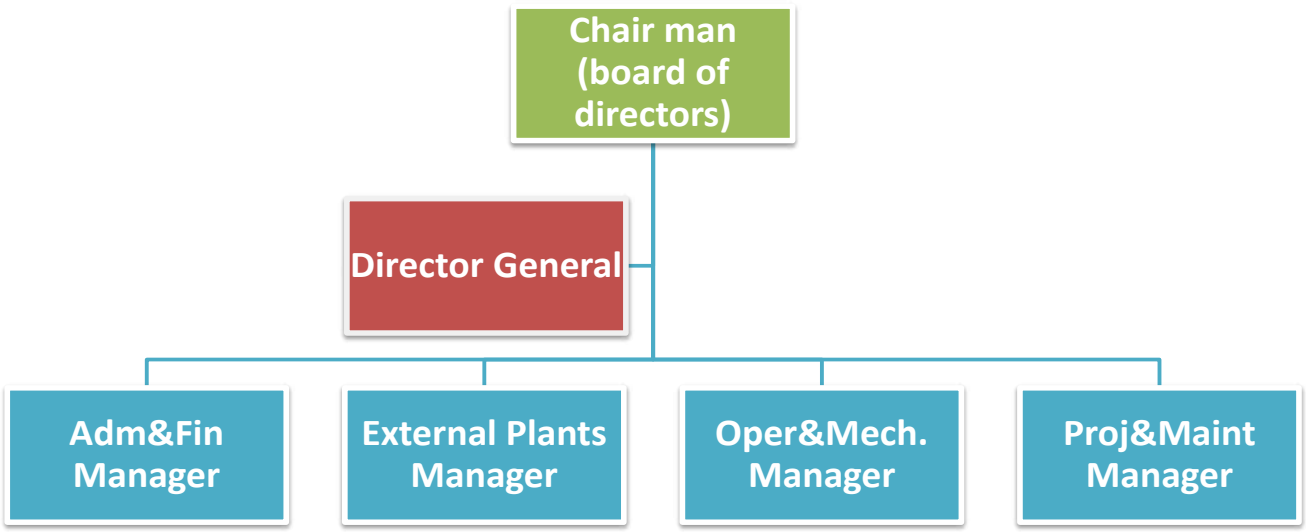
1.2 It works to supply the beneficiaries with potable drinking water.

1.3 It is a local public corporation works in parts of tow states (Gedarif and Sennar).

1.4 I am the Director General of this corporation and responsible for good administration ,finance budgeting, operation &maintenance and procurement and replacement of the whole units.

Organizational Management

- The administration of Hawata W.C. based on sharing bases between the beneficiaries(Board of Directors) and the executive administration of H.W.C. without political interference.
- Departments managers carry over their responsibilities with full authority.
- Village water man is responsible to call for any breakdown to the system within his vicinity.
- Decisions usually taken in group discussion.
- Water man and kiosk operator is the choice of the village committee leaders.
- Hawata W.C. has an information sharing system.


Chair man (board of directors)
Director General
Adm&Fin Manager
External Plants Manager
Oper&Mech. Manager
Proj&Maint Manager

2. Water Resources:

2.1 The geographical background of Sudan:

- The total area of forestry come to about 10% of the whole area of Sudan.
- The Nile is the dominant feature of Sudan, flowing (3000) kilometers from Uganda in the south to Egypt in the north.
- The Blue Nile and the White Nile originating in the Ethiopian high lands and the Central African lakes, respectively.
- Other Nile tributaries are the Atbara, Dinder and Rahad rivers.

2.2 Annual Precipitation

Town	Annual Precipitation(mm)	State
Karima	20.7	Northern
Hudeiba	39.4	Northern
Atbara	59.9	River Nile
Shendi	77.6	River Nile
Shambat- Khartoum	127.5	Khartoum
Aroma	193.6	Kassala
Halfa Elgedida	238.3	Kassala
Kassala	251.2	Kassala
Wad medani	306.6	Gezira
Elshowak	501.9	Gedaref
Gedaref	603.7	Gedaref
Elfasher	212.5	North Darfur
Ennnahud	335.9	West Kordofan

Annual Precipitation

Town	Annual Precipitation(mm)	State
Kosti	351.1	White Nile
Eddueim	237.2	White Nile
Elobaid	318.5	North Kordofan
Sennar	420.1	Sennar
Ummbenin	534.2	Sennar
Abu Naama	556	Sennar
Elgeneina	523.8	Central Darfur
Nyala	398.3	South Darfur
Kadugli	633.1	South Kordofan
Rashad	717.7	South Kordofan
Damazin	712.9	Blue Nile

2.3 Type of available water resources:

- ✓The main resources of water are the Nile and its tributaries .
- ✓Deep boreholes in the areas with rich aquifers .
- ✓Dug hafirs(water pools) where there is no ground water.
- ✓Hand pumps (shallow wells) with poor production.

2.4 The type of the future water resources:

- ❖Large water treatment plants along the rivers to supply the cities and towns with potable water.
- ❖Collective well fields to supply many villages and communities with unique pipe network.
- ❖Water harvesting technics to make use of the rain water for livestock.

3. **Policy and Regulations**:

- ❑Sudan have (18) State Water Corporations +Hawata Wad-Elageili Water Corporation
- ❑Before 1994, National Water Corporation was the responsible body for water activities in all the states.
- ❑After that each State Water Corporation became responsible for water resources, supply and distribution.
- ❑These policies and regulations put national water corporation as a coordinator for the water projects that budgeted on national level only.

4. Water rates and Bill collections:

4.1 The water rates system:

- Each State have its own system of water rate and will be approved by the state legal council.
- This water rate may not cover all the expenditure of the State Water Corporation.
- Always there was a deficit in the budget of the state water corporations.
- Hawata W.C. is the only one that have an adequate system(Law) that approve the budget by the Board of Directors(Beneficiaries).

4.2 The bill collection system:

- There are many types of bill collection depend on the policy of each state.
- Some use flat rate system classified according to the Diameter of house connection.
- Some use flat rate with the collection throw electrical windows.
- Few are using water meters difference as consumption mainly Hawata W.C.

Hawata Financial Management

- Setting of water tariff based to cover all the production cost including reserve for replacement and procurement of units and components.
- Annual budget and water tariff will be approved by the board of directors.
- Revenue collection based on water meters difference for water points and house connections.
- Water operators have incentives (3 tins/m^3) free to cater for water splash and losses.
- Finance report made every month , quarterly and annually.

5. Water Supply Services:

5.1 About 65% of the Sudanese population was served by potable and clean drinking water.

5.2 There is no continuous supply in Sudan but may reach to 18 hours per day of water availability.

5.3 The potable water will be collected in reservoirs or elevated tanks and then distributed to consumers through pipe network.

5.4 Non revenue water is always as a constraint to an adequate operation and maintenance system.

6.Private sector participation:

6.1 According to the policies of the government the private sector participation will be limited only to work as contractor for the projects that financed either by the government or authorized fund donors in the field of water resources development, water treatment, water distribution. Organization management, leakage repair will be done by the state water corporations workmanship. Some state practiced bill collection through private companies but they failed and now many are doing it throw the national electricity windows.

6.2 The national government or state governments are the main pointer to water supply services(e.g. water rates, personnel employment, capital investment) . O/M budgeting is done by the state water corporations.

7.Privatization in water supply systems:

7.1 According to the polices mentioned privatization is practiced in a limited water supply services (e.g. projects study and design, executing as contractors, operation and maintenance for newly executed projects etc.).

7.2 Privatization will be on form of concession to some companies or as BOOT system with other companies and mainly with national or state owned companies.

7.3 As water is the vital important to human being we hope that the government will change its policy towards water supply services and try by some regulations or laws to involve the private sector to carry some activities in water supply systems and I think it will succeed as we have a practice of Hawata project which managed on sharing basis between the beneficiaries (board of directors) and the administration without political interference.

Water Supply Administration for Better Management of Water Supply Services (A) in Japan:

Country: Sudan

Name: MOHAMED ABDELGADIR MAHDI MOHAMED

Organization: Hawata Wad-Elageili Water Corporation

I. **Service Area:**

1. Size of utility's area of responsibility: (25,000 sq.km)
2. Size of utility's present service area: (22,000 sq.km)
3. Population of utility's area of responsibility: (327274)
4. Population of utility's present service area: (190741)
5. Population served by the utility with piped water supply :(48901)
6. Number of towns served with piped water: (3)

II. **Infrastructure Description**:

1. Source of raw water
   - Ground water
   - Direct river abstraction
2. What are the main methods of treatment used?
   - Disinfection
   - Flocculation and sedimentation
3. Capacity of production systems: (6100 m^3/day)
4. Length of water distribution network: (400 km)
5. Capacity of storage in network: (3870 m^3)
6. Piped water supply connections:

Domestic(households)	Non Domestic	TOTAL
2520	217	2737

7. Number of connections with operating water meters:(km)
8. Typical length of service connection from water main to water meter: (3 to15 meters)

III. **Water Consumption & Production**:

1. Volume of water produced by the utility:
   (1634927 million m^3/year)
2. Volume of water bought in bulk from other utility/company:
   (million m^3/year)
3. Volume of water metered: (1404409 million m^3/year)
4. Estimated un-metered consumption: (% of metered consumption)
5. Estimate of average meter inaccuracy at typical flows rates:
   (% of metered consumption)
6. Volume of water billed/sold: (million m^3/year)

Domestic (house hold)	Non domestic Ind.,comm.,Ins.	Bulk water sales	Total
292337	45370	1066702	1404409

IV. **Water supply system performance**:

1. Number of customers who received intermittent supply:
   (connections)
2. Typical duration of supply (planned and unplanned supply interruptions): (24 hours/day)
3. Typical mains water pressure in your pipe network:
   (100 meters)
4. Number of water pipe breaks in the distribution network:
   (688 /year)
5. Required number of tests of treated water for residual chlorine:
   (52 /year)
6. Number of tests of treated water for residual chlorine carried out:
   (24 /year)
7. Number of tests of treated water for residual chlorine passed:
   (24 /year)

V. Staff

1. Who does the work in your company:
   - Permanent staff, salaried Government employees

- Permanent staff with contract
- Contracted out to outside company

2. Number of FTE staff in the company

Corporate services (management,Admin,Finance, Techn, etc.)	Water supply (O&M, Customer services, support services, etc)	Other non water supply	TOTAL
76	224		300

VI. Customers

1. Number of new customers connected to water supply system during the year: (436 /year)
2. Number of customer complaints recorded during the year: (724 /year)
3. Means by which customer can make a recorded complaint:
   - in person
   - by telephone
4. How does the Utility find out the views of its customers?
   - From customer interactions (letters, telephone calls, enquiry counter, etc.)
   - By responding to customer complaints
5. Typically what is the connection charge for new customers?

Domestic (Households)	Non domestic	Bulk water sales	Average of all categories
Differ according to individual distance and requirements			

6. Typically what is the fixed water supply charge/month?

Domestic (Households)	Non domestic	Bulk water sales	Average of all categories
Differ according to consumption through water meter diffrence			

7. Typically what is the water tariff for metered consumption?

Tariff block	Domestic	Non domestic	Bulk water sales
1	5.5 SDG/m^3 =0.6 USD/m^3	5.5 SDG/m^3 =0.6 USD/m^3	5.5 SDG/m^3 =0.6 USD/m^3

8. What would be the monthly water bill for a household consuming 6 m^3 of water/month? (33 SDG = 3.75 USD)

VII. Questionnaire on Major Constraints in water supply sector

Constraints	Rating of Constraints		
	Very severe	severe	moderate
1.lack of definite government policy for the sector	""		
2.funding limitations	""		
3.Inadequate or outmoded legal framework			""
4.Inappropriate institutional framework			""
5.Inadequate water resources		""	
6.Insufficient knowledge of water resources		""	
7.Inadequate cost-recovery framework	""		
8.Insufficiency of trained personnel:			
(1) Professional			""
(2) Sub-Professional		""	
9.Lack of planning and design criteria		""	
10.Inappropriate technology		""	
11.Intermittent water service		""	
12.Operation and maintenance		""	
13.Logistics		""	
14.Import restrictions	""		
15.Non-involvement of communities			""
16.Insufficient health education efforts	""		

Country Report-Sudan

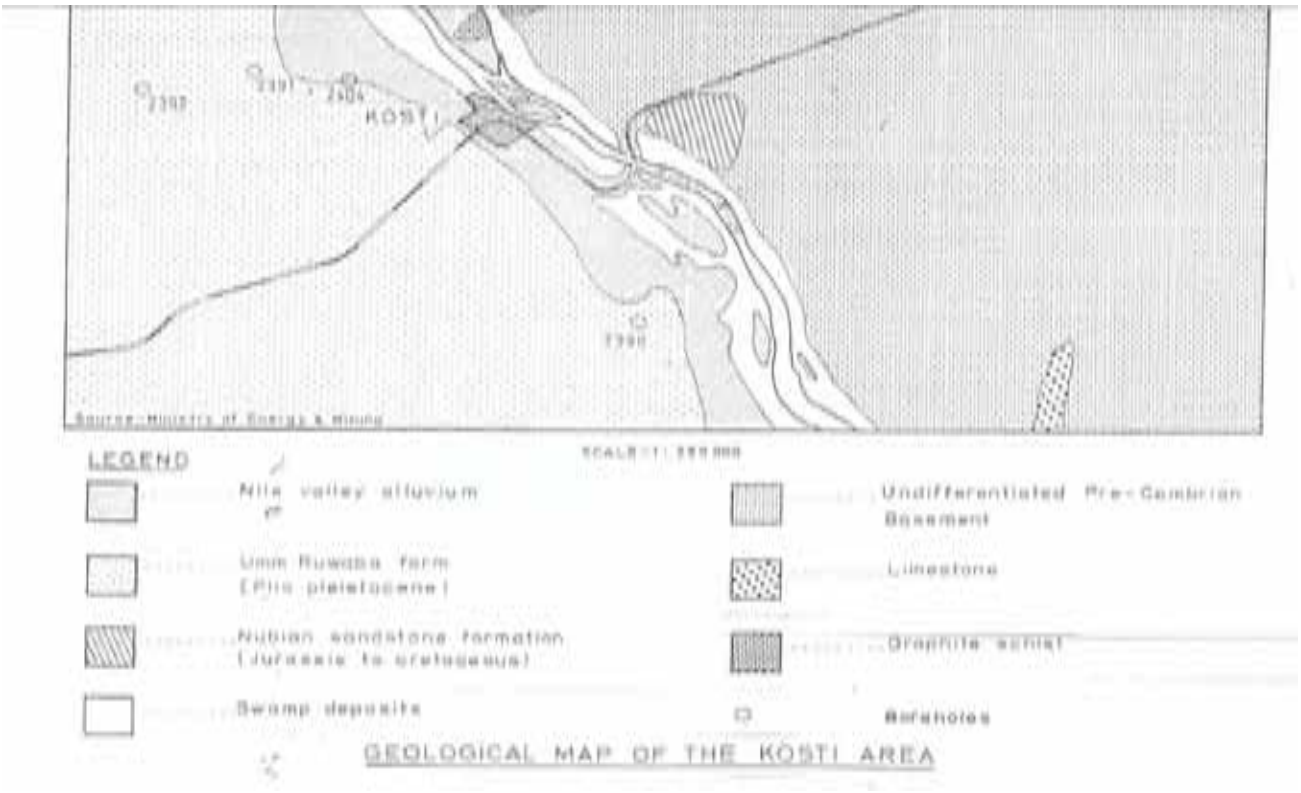
Introduction

Kosti is a major and expanding town located on the west bank of the White Nile river at a longitude of 32^0 40' east and a latitude of 13^0 10' north, about 300 km South of Khartoum.

Water Resources

The Hydrogeological of Kosti City

The Hydrogeological of Kosti city is basement complex .



GEOLOGICAL MAP OF THE KOSTI AREA

The main Intake of Raw Water Supply to Kosti city from White Nile river and twins transmition line size 12" long about 2.4 km.

Main Intake located Near Nile Port

Income

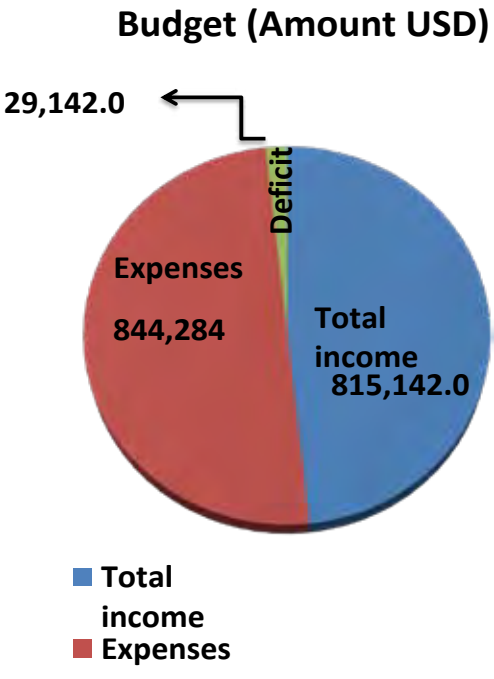
Payment from Users	617,142,08	%79
Subsidy from government	131,999,98	%14
New connection	47,142,85	%5
Non-Revenue Water Ratio	18,857,14	%2
Total Income	**815,142,05**	**100%**

Expenses

Salary	462,857
Courts fines	84,857,13
Chemicals	68,571
Electricity	131,999,98
Repair	85714
others	10285
Total	**844,284**

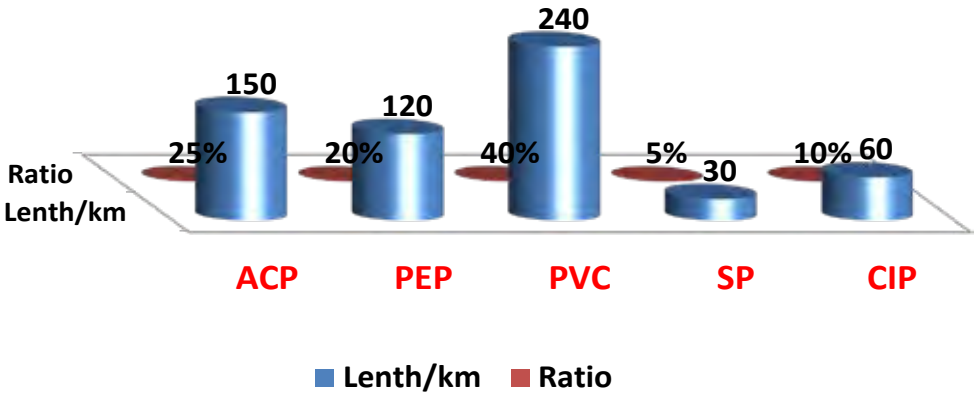
Budget

Total income	815,142,05
Expenses	844,284
Deficit	**29,142,06**



Kosti Network

Description	Length /km	Ratio
CIP (Cast Iron Pipe)	60	10%
SP (Steel Pipe)	30	5%
PVC (Poly-Viny1Chloride)	240	40%
PEP(Poly-Ethylene Pipe)	120	20%
ACP(Asbestos Cement Pipe)	150	25%
Total	**600**	**100%**



(Raw Water Pumps low lift)

Pump No.	Q(m^3/h)	H(m)	Pump Condition
1	500	36	working
2	500	36	working
3	500	35	working
4	500	35	working
5	500	35	working
6	500	36	working
7	500	36	working
8	500	36	working
Total	4000 m^3/h		

Diagram of Intake , Transmition Line & clarifiers

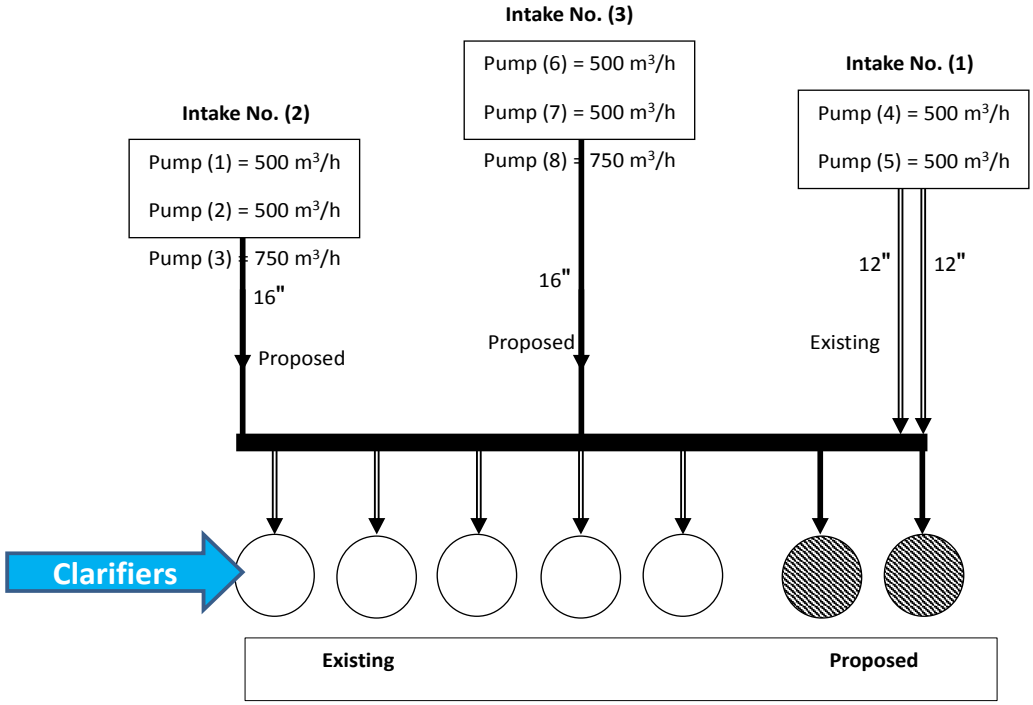
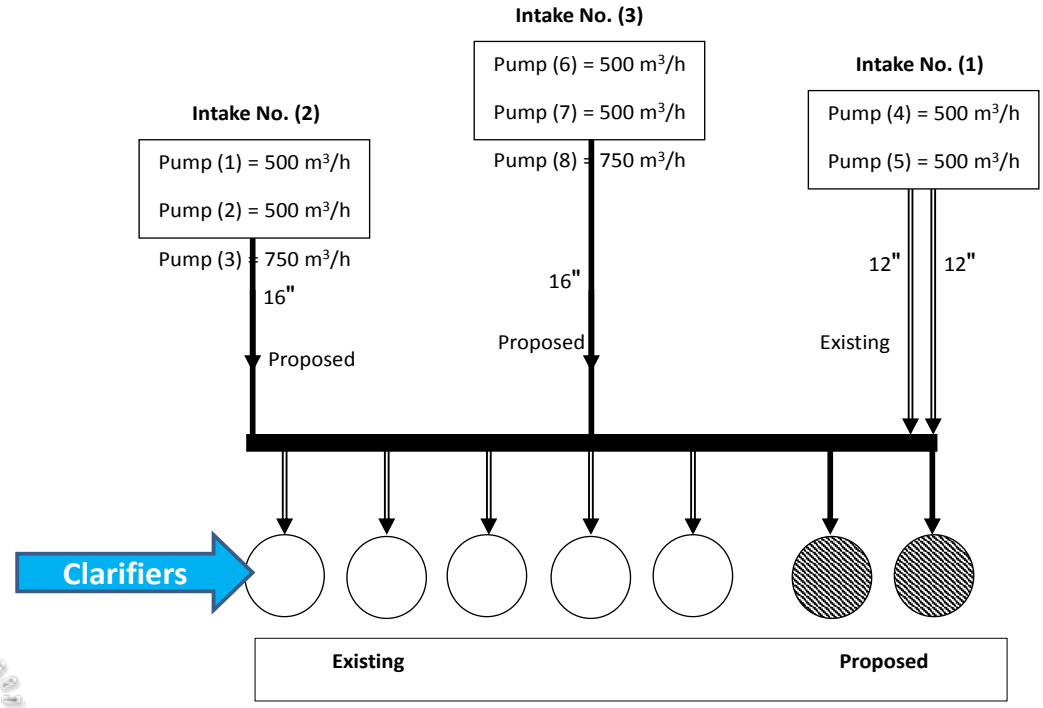


Diagram of Intake , Transmition Line & clarifiers



Intake Pumps

Intake No. (1), Low Lift Pumps

Intake No. (2), Low Lift Pumps

Characteristics of the Existing Clarifiers

Clarifier No	Diameter (m)	Average Depth (m)	Q (m^3/h)(Inflow)
1	10.5	3.0	120
2	9.2	4.0	90
3	9.2	4.0	90
4	13.0	4.0	240
5	13.0	4.0	240
Total			780

Conveyance System(Raw water)

Characteristics of the Existing Clarifiers

Clarifier No	Diameter (m)	Average Depth (m)	Q (m^3/h)(Inflow)
1	10.5	3.0	120
2	9.2	4.0	90
3	9.2	4.0	90
4	13.0	4.0	240
5	13.0	4.0	240
Total			780

Clarifiers No1

Clarifiers No 2 -3

Clarifiers No 4

Clarifiers No 5

High Lift Pumps

Pump No.	Q(m^3/h)	H(m)	Pump Condition
1	500	70	working
2	500	50	working
3	500	50	working
4	500	50	working
5	750	70	working
6	750	70	working
7	500	70	working
Total	4000 (m^3/h)		

High Lift Set of Pumps

Purification Water Distribution System

Main Problems of Kosti Water Treatment Plant

	Problems	Causes	Solutions
Technical	Bad maintenance & operation	Technical labor shortage	The provision of skilled labor
		Lack of training & rehabilitation	Attention to the training of engineers & workers
			Use of the main maintenance system using computer programs
	Frequent wastage of water produced	Lack of application in planning, design & operation	Raise the efficiency of workers in the design &operation
			Training on leak detection equipment
			Make the participants are fully aware of the concepts of water loss management.
	Electric supply is unstable	Deficit in water supply	Provide electric generators
		Influence the operation of pumps and networks	connect the station with stable & lasting electric line.
	Lack of health and safety rules	Employment at risk	Improving skills to ensure their safety
		Suspension of work & lack of production	Establishment of security & safety department.

	Problems	Causes	Solutions
Technical	Treatment of drinking water purification	Movable diseases by water	Training for Chemical engineers
		The high proportion of turbidity	Use modern type of laboratory equipment
	Amount of water produced is limited coverage	Water purification unit is eligible	Improve water plant raise productivity by modern means
Managemental	Lack of independence of water	Representive government intervention in the political	The independence of the water to generate sufficient income .
		Income not enough to cover operation cost	Activate the low of water to punish abstainers to push them to pay invoices or bill.
	Writing Report	Writing by hands	Improve Computer Skills
	Water Administration board	Ineffective	Activation the Administration board
		No regularly meeting	

	Problems	Causes	Solutions
Managemental	Fees set up not enough	Lack of water meters	Install flow meter
		Lack of financial calculation	Advance Training for accountant s

Kosti Water Treatment Plant

Problem of Kosti water treatment plant
1/Capacity for sedimentation basins is small.
2/capacity for filters is small.
3/ capacity of the storages tank are small. This capacity is not enough for current needs of Kosti population.

4/ pollution in the intake.
5/ chemical pollutions from agricultural fertilizers.
6/ chemical pollutions from River transport.

7/ there is no fence in the intake
8/ the grass and scums
9/ the grass and moss inters through the intake channel
10/ pollution in the intake from River transport
11/ frequent damage pumps
12/ water leaking in the pipe from intake

13/ water treatment plant operates more than design capacity
14/ storage capacity of pure water is not enough
15/ the rapid mixing is broken
16/ the media is not good
17/ water leaking around the plant make the grass growing frequent
18/ the discharge of Kosti city located up stream.
19/ lack of chemicals for treated water.

20/ quick mixing in the clarifier (1) are not working.
21/ the scraper is not working so will lead to accumulation of silt in the sedimentation basin.
22/ rust in the steel filters from inside chemically affect the water.
23/ the media is to short.
24/ leaking in the pipe of the back washing.
25/ leaking in the pipe from pure water to the tank.
26/ flouting valves are not working.
27/ some damage in the control valves.
28/ lack of drainage water on top of reserves tank.
29/ short of reserves tank.
30/ there is no control valves in the network pipes.
31/ the equipment in the laboratory are insufficient.
32/ the environment of the laboratory are not good.
33/ lack of chemicals for treated water all year

34/ quick mixing is not operate.
35/ scraper is not function.
36/ for chemicals they are not use it all time.
37/ the moss on top of the sedimentation basin.
38/ no maintains for washing valves.
39/ mixing in the filters 1-2-3 are not working.
40/ the flow water filter too quickly so that it defect the media.
41/ all valves washing is not operating.
42/ inefficient air pump.
43/ the grass growing around the clarifiers.
44/ the level of reservoirs below ground level.

Present Situation

1-White Nile State Water Co Profile:-

1-1 White Nile State Water co

1-2The main work of our organization is providing drinking water for urban and rural area.

1-3 White Nile State Water Co is local government.

1-4 My official position is manager of project and research department and my qualification is mechanical engineer.

1-5 The organization chart of White Nile State Water Co (attach).

2-Current situation of White Nile State Water Co:-

2-1 Geographical background

2-2 Precipitation per one month and/or one year. Please attach the last 10 year.(not available)

2-3 The main water resource is White Nile River, ground water and rain water.the situation of those resources is rich.

2-4 The intake water volume of Kosti city is 36000 m^3 per day. 12,960,000 m^3 per year.

2-5 The type of water resources for the future is White Nile.

3-Current situation of policy and regulation in White Nile. (attach)

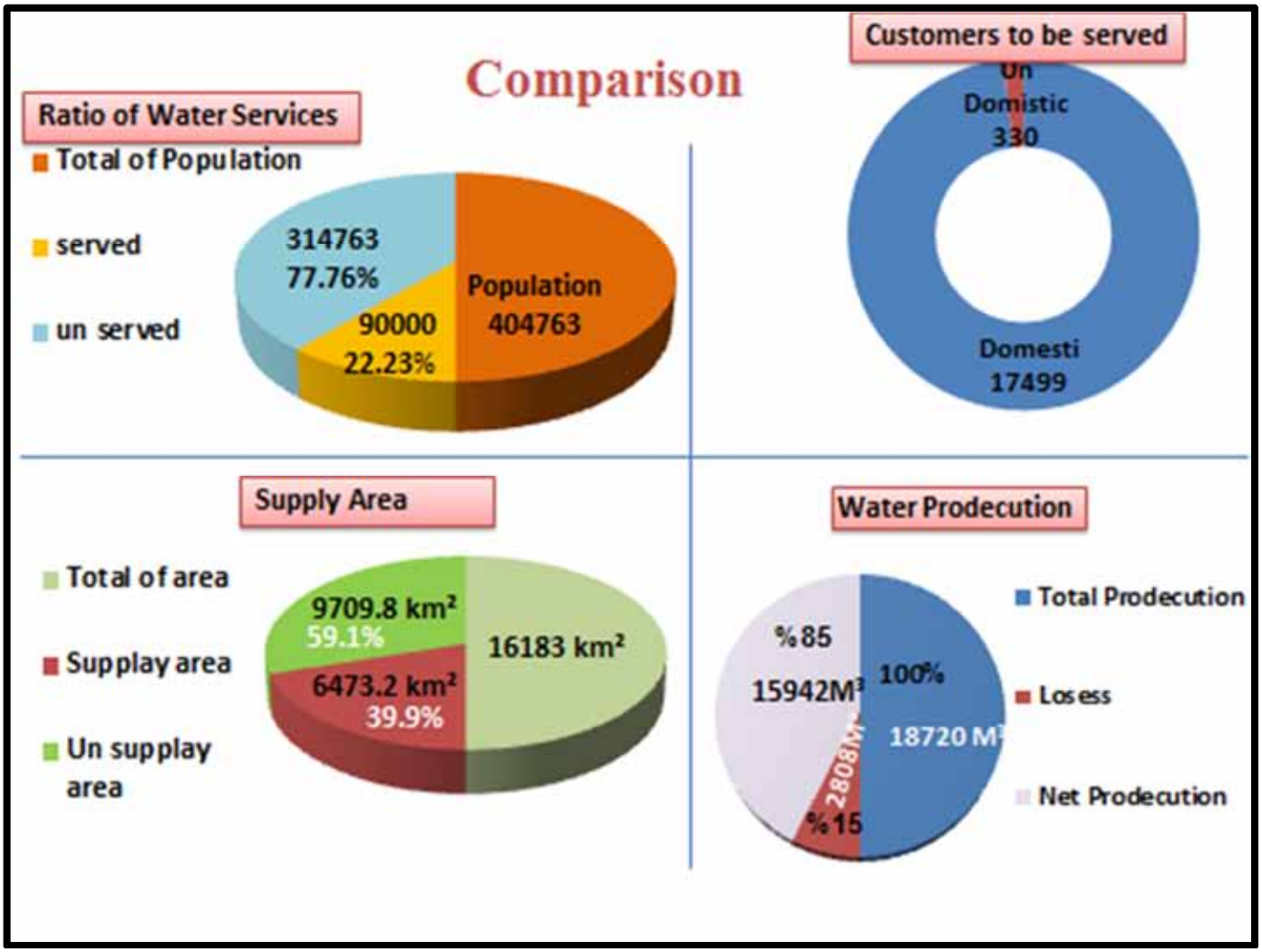
4- Current situation of water rate and bill collection system in White Nile.

4-1 Water rate systems (W.N water tariff) attach.

4-2 Bill collection system through electric company in one bill and direct collection by SWC's.

5- Current situation of water supply services.

5-1 Population Ratio



5-2 proportion of consumers with 24 hours supply, average number of hours per day of water availability to most people about 10 hours.

5-3 The distribution water use for the potable water directly.
5-4 Non revenue water (NRW).
5-4-1 Martyr (free)
5-4-2 staff (free)
5-4-3 Unregistered
5-4-4 Water loses.
5-4-5 Water stealing
5-4-6 Water sharing

6- Current situation of private sector participation.

6-1-Water resources development by:-
- Ministry of water sources and electricity.

- International organization -JICA (Kassala project) Chinese (Sinja WTP).
- Water (treatment, distribution, leakage repair and management) by SWC's.
- Bill collection system through electric company in one bill and direct collection by SWC's.

6-2- Current situation of involvement of national government in water supply services:-
-Water rates (Water tariff shall be adopted by Legislative Council)
-Personal employment and O/M budgeting from revenue of water.

7- Current situation of privatization:-

7-1 Privatization in Water sector in:-
- Drilling of water yard
- installing of water tank
-Construction of Water treatment plant.
-Funding big water project by BOOT system (international organization).

7-2 Construction of pipe network by state owned company.

7-3 Future privatization (Unclear vision) in case of the political situation.

I. Service Area:-(Kosti city)

1-Size of Utility's area of Responsibility :(16183 sq.km)
2- Size of Utility's present service area :(6473.2 sq.km)
3- Population of Utility's area of Responsibility (404763)
4- Population of Utility's present service area (314763)
5- Population serviced by Utility with piped water supply (314763)
6-Numer of towns served with piped water (8 towns in White Nile State).

II. Infrastructure Description:-

1-Source of raw water
-From White Nile River.
2- The main methods of treatment used is flocculation and sedimentation.

3-Capacity of production systems (18720m³/day).
4- Length of water distribution network (600km).
5-Capcity of storage in network (2000m³).
6-Piped water supply connections:-

Domestic (Household)	Non Domestic (Industrial,commercial,Institutional,other	Total
17499	330	17829

7-Number of connections with operating water meter (0)
8-Typical length connection from water main to water meter (0)

III. Water consumption and production:-

1-Volume of water produced by the utility :(6739 million m³/year)
2- Volume of water bought in bulk from other utility/company). (not available)
3- Volume of water meter :(not available)
4- Estimated un-metered consumption :(not available)
5- Estimated of average meter inaccuracy at typical flows rates :(not available)
6- Volume of water billed /sold: 6.739 million m³/year)

Domestic (Household)	Non Domestic (Industrial,commercial,Institutional,other	Bulk water sales	Total
3.209	0.297	3.233	6.739

IV. Water Supply System Performance:-

1-Number of customers who received intermittent supply (17829 connections)
2-Typical duration of supply (planned and un planned supply interruptions) :(10 hours/day)
3- Typical mains water pressure in your pipe network.(60 m)
4- Number of water pipe breaks in the distribution network (144/year)
5-Requared number of tests of treated water for residual chlorine :(365/year).

6- Number of tests treated water for residual chlorine carried out :(365/year).

7- Number of tests treated water for residual chlorine passed :(365/year).

V. Staff:-

1- The work in our company was done by:

- Permanent staff, salaried government employees.

2-Number of FTE*staff in WNSWC:-

Corporate Services (Management,Admin, Finance and Technical	Water Supply(O&M/Customer Services and Support Services)	Other non-water supply(e.g. wastewater, drainage and environment)	Total
87	120	0	207

VI. Customers:-

1- Number of new customers connected to water supply system during the year (360 / year)

2-Number of customers complains recorded during the year (2550/year)

3- Means by which customer can make a recorded complaint:-

-In person and letter

4- The Utility find out the views of its customers by:-

- Customers interaction

5-Typicaly*what is connection charge for new customers?

Domestic (Household)	Non Domestic (Industrial, commercial, Institutional, other	Bulk water sales	Average of all categories
1ST class=(830)SDG 2nd class =(730)SDG 3rd class=(626)SDG	From (905)SDG up to (1580)SDG	-	-

6-Typicaly*what is fixed water supply charge /month?

Domestic (Household)	Non Domestic (Industrial, commercial, Institutional, other	Bulk water sales	Average of all categories
1ST class=(45)SDG 2nd class =(35)SDG 3rd class=(25)SDG	From (75)SDG up to (300)SDG	-	-

7- Typically*what is water tariff for metered consumption?

- No metered consumption only flat rate.(see the details in water tariff)

8- What would be the monthly water bill for household consumption 6m³ of water/month?

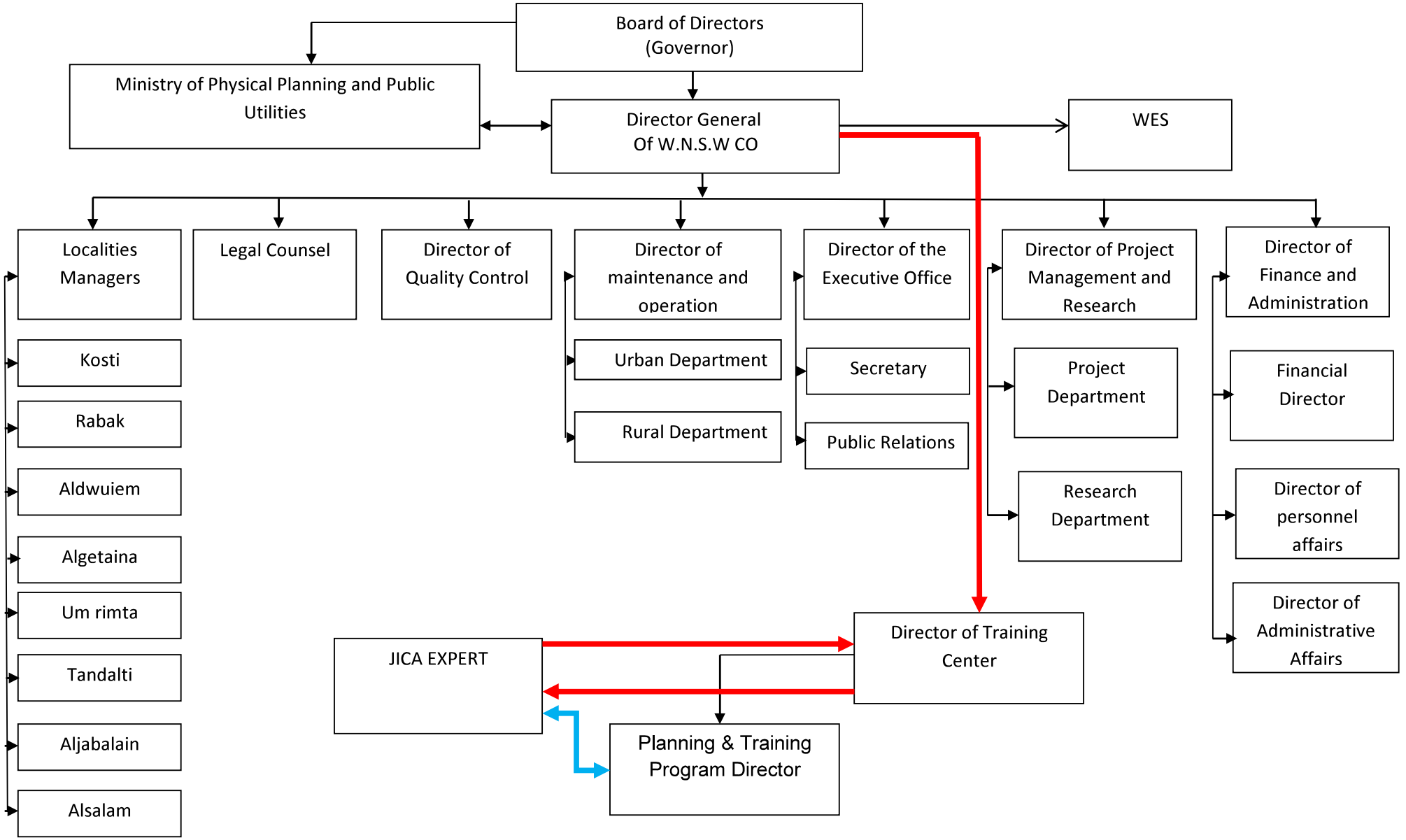
Firstly there is no water meter but only flat rate according to the pipe size e.g.:-

Pipe Size (inch)	Water Tariff (SDG/month)
"1	45
"3/4	35
"1/2	25

VII. Questionnaire on Major Constrains in Water Supply Sector:-

Constraints	Rating of constraints		
	Very Severe	Severe	Moderate
1. Lack of definite government policy for the sector			✓
2. Funding limitations			✓
3. Inadequate or Outmoded legal framework			✓
4. Inappropriate institutional framework		✓	
5. Inadequate water resources	✓		
6. Insufficient knowledge of water resources		✓	
7. Inadequate cost-recovery framework			✓
8. In sufficiency of trained personnel			✓
(1) Professional			✓
(2) Sub-professional			✓
9. Lack of planning and design criteria			✓
10. Inappropriate technology			✓
11. Intermittent water service			✓
12. Operation and maintenance			✓
13. Logistics			✓
14. Import restrictions			✓
15. Non-involvement of communities			✓
16. Insufficient health education efforts			✓
17. Others (specify):	-	-	-

White Nile State Water Corporation Chart



W.N.state

Ministry of Planning and Public Utility

Drinking Water Corporation

Law of Drinking Water Corporation
Working with rules of transitional constitution rules of the W.N.state(26/4/42/b) for the year 2005 the legislative council of W.N.S has accepted the following law:-
First: - name of the law and starting date
It is named law of W.N.state D.W Corporation law for the year 2011 and starts doing with it soon being signed. The new rule cancels any other rules
Second: - explanation
In this law words are to be understood as explained unless the context is to refer to an else destination
Corporation - tends to mean drinking water Corporation for the W.N.S
Refers to the head of the corporation
Chairman refers to the Administration Council Chairman
Council –refers to D.W Administration Council that is published according to passage of the D.W.C law
Director General- refers to the director general of D.W.Co the W.N.S in accordance with article (9)
Consumer – any person or destination who can obtain water services from D.W.C
Tariff – means price lists for supply water in urban and rural areas that is approved by the D.W.C Council involving contributions and costs explained in the attached schedule
Corporation asserts
Includes equipment's, machine, vehicles, pumps, devices, chemicals, basins, and all that concerns corporation.
Water Resources:
Refers to the water pumps for the W.N. River, ground wells, and haffers establish by corporation and its administration
The corporation has its own independent budget according to the law and financial principles
Financial resource are :-
1/ drinking water income
2/ services income
3/ support of the state
4/ loans
5/ grand's
6/ others
Expenditure:-
According to the law article(11)
1/ services and development
2/ salaries, wages, rewards

3/ operation , consuming , modernizing , upgrading , of machines and equipment
4/ pay back the loans and others expenditure
5/ others
Water tariff
Council suggest and revise water tariff all over the state often the acceptance of the state cabinet
Accounts
According to the financial procedures for (1995) the corporation should keep accurate accounts with its different activities
Review
General review is to revise the corporation accounts and annually report to the council .
Common rules
Allowance for using water sources
The corporation is only destination that allows water resources to be used for drinking . no one allowed to import drinking water for investment unless permitted by the corporation
Due to the article (16-b) the corporation has the right to use ,supervise and own all drinking water resources including wells ,ponds and other water nets inside the state
Self support organizations
All machines and water plants those who are required prepared by self support for drinking are to be under the control of the state water corporation
Principles
The board issues needed principles
Penalties
Penalties and punishment may reach imprisonment for not more than a year or fine not more than five thousand SDG or both.

Summary of Water Tariff in White Nile State

Category		Pipe Size (inch)	Water Tariff (SDG/month)	
Urban Area	Household	1	45	
		"3/4	35	
		"1/2	25	
	Commercial (Company)	any	from 30 to 500	
	Governmental Utility, Institution	any	from 75 to 20,000	
Rural Area	Jerry Can	-	from 10 to 15 piaster	in Tandalti &UM RIMTA only
	Drum	-	from1SDG to 1.5 SDG	in Tandalti &UM RIMTA only
	Cubic meter	-		nothing (some times free (hafeer)

COMMERICAL		
	Description	Water Tariff (SDG/month)
	Bank	300
	Petrol stations (Laundry)	500
	big Hotel	500
	small hotel	300
	Pharmacies	50
	Clinics	50
	Arboretum	300
	Large tourist restaurants	300
	Regular restaurants	100
	Bakeries	75
	Public baths	30
	Schools	50
	Workshops	75
	Grain mills	75
	Petrol Service stations without washing	200
	Washing station	250
	Private schools	300
	Parks	250
	Stadiums	200
	Cafeterias tourist	200
	normal Cafeteria	200
	Cinema	100

Companies and governmental bodies and institutions		
	Description	Water Tariff (SDG/month)
	Government Offices	150
	Railway offices and houses	11282
	Offices of river transport	6037
	Offices Administration of Electricity	500
	Communications	500
	Branches of government institutions	75
	Textile mills	1000
	Ice factory	1000
	Factories of Taihanih and oils	500
	A small factory	500
	Bricks factory	750
	Water factories	5000
	Office complex health insurance	1000
	Health centers	250

*1Dollar =(5.9722)SDG (According to Central bank of Sudan on12/May/2015 -http://www.cbos.gov.sd/currency_archive

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

TADZHIKISTAN

Water Supply Administration for Better Management of Water Supply Services

Drafting Improvement Plan

1. Country: Tajikistan

2. Name: RAHIMOV Nazarali
3. Position: Director
4. Organization: Vodokanal of Kurgan-Tyube city

Contents of Improvement Plan Presentation

- ✓ Plan Title: "Decrease of Non Revenue Water"
- ✓ Background
- ✓ Input (Resources required)
- ✓ Activity
- ✓ Due Date
- ✓ Outcome
- ✓ Cost
- ✓ Verification (Evaluation)

Background

- Water Supply and Sewerage Services of Kurgan-Tyube city (Vodokanal of Kurgan-Tyube) is an Affiliated Enterprise of State Unitary Enterprise “Khojagii Manzilii Komunali”. State Unitary Enterprise “Khojagii Manziliyu Kommunali” is under direct subordination of the Government of the Republic of Tajikistan.
- The Republic of Tajikistan is located in the south-eastern part of Central Asia. The area of the country is 143.100 km2. Tajikistan is a mountainous country: 93 % of its area is mountainous. Tajikistan has huge reserves of fresh water. Kurgan-Tyube is the city located in south-west of Tajikistan, and is the administrative centre of Khatlon region. Kurgan-Tyube city is located 100 km far from Dushanbe city.
- Kurgan-Tyube Vodokanal has two water resources: underground and river water. Main water resource is river water which comes from Vakhsh river. The underground wells are very old, constructed in 1970th, therefore it is needed of reconstruction.
- The intake water volume is 22000m3 per one day and around 8 million cubic meters per one year.
- The population ratio to be served drinking water in Kurgan-tube city: 70%; not to be served: 30%
- Total of 38% of Non revenue water: 5% unbilled consumption, 8% apparent losses, 25% real losses.

Improvement Plan Worksheet

No	Activity to be carried out	Resources required	Person Responsible	Due Date	Estimated costs (USD)	Expected Outcome	Indicators for verification
	Installment of new water pipelines. Installment of water meters.	II Phase of Improvement of water in Kurgan-Tyube city by EBRD (under consideration) Other Resources	Kurgan-Tyube Vodokanal, KMK	2018	Around 6 million USD	The water loss is decreased due to repalcement of old pipes. The installed watermeters will prevent actual water losses in consumers.	The NRW is decreased up to 20%: It is expected that 35% of existing pipelines will be replaced and around 6000 water meters will be installed in 2nd Phase of EBRD’s Project (15% has been already replaced in Phase I of the Project).

Input (Resources required)

List inputs from your side,

Manpower,
Place,
Information.

Person Responsible and role

- **Keyperson: Director of Kurgan-Tyube Vodokanal**
- **Key ministry: SUE “KMK”**
- **Task force: KT-Vodokanal and KMK**
- **Steering committee: KT-Vodokanal, KMK, Donor Agency, Local Government.**

Activity to be carried out

Under Phase I of EBRD's Project in Kurgan-Tyube 15% of old pipelines were replaced. And under Phase II of the Project it is expected that 35% of pipelines will be replaced.

Phase II of the EBRD's Project is also considers installation of around 6000 units of water meters.

Due Date

- **Short Term**
- **Mid, Long Term: 3 years (2018)**

Expected Outcome

The installation of new pipelines will decrease the real losses, which is 25% for the time being.

Installation of water meters will decrease the apparent losses.

All these will promote to decrease of NRW in Vodokanal.

Estimated costs (USD)

Around 6 million USD is expected for replacement of pipelines and installation of water meters:

0.5 million USD for water meter;

5.5 million USD for water pipes;

Indicators for verification

8000 consumers in total will be provided with water meters;

75 km of existing pipelines in total will be replaced by new pipelines;

NRW will be reduced up to 20%.

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

ZAMBIA

COUNTRY REPORT

Chambeshi Water and Sewerage Company Limited

Current Operations, Achievements, Challenges and Way forward

ZAMBIA

Willard M Mutoka – Director Technical Services - ChWSC

1. MANAGEMENT OF WATER QUALITY

1.1 CURRENT SITUATION AND MAJOR CHALLENGES

CURRENT SITUATION

- ✓ Water Chlorination is usually manual.
- ✓ One Fixed Laboratory to analyze RC and Bacteriological and limited Physio-chemical tests available.
- ✓ Portable kits available to analyze RC only.
- ✓ Qualified and experienced Chemist (at Diploma Level) available for water quality analysis
- ✓ 91% Compliant to Zambia Bureau of Standards(below the minimum % Compliant)

Kaputa District – Existing water Intake at Choma river

MAJOR CHALLENGES

- ➢ Dilapidated water treatment, storage and distribution infrastructure
- ➢ Too basic water supply systems (no sedimentation, flocculation filtration, and storage reservoirs)
- ➢ No Integrated approach to water safety planning as a Water Sector
- ➢ Sources are multi-purpose results heavy contamination
- ➢ Reactive approach to water quality management
- ➢ Limited both fixed and portable laboratories for bacteriological tests, turbidity meters, etc
- ➢ Lack of control on Land use in the water source catchment areas
- ➢ Distant geographical locations of Districts from the main fixed Laboratory

Mbala District – Existing water treatment Tank at Chila Plant

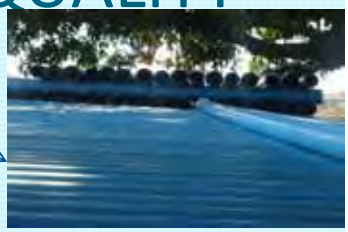
Chambeshi

1.MANAGEMENT OF WATER QUALITY

1.2 CURRENT ACTIONS AND ANY ACHIEVEMENTS

CURRENT ACTION AGAINST THE PROBLEMS

- ✓ Ongoing projects to overhaul of distribution networks, modernizing water treatment plants, installation of motorized online chlorinators
- ✓ Establishment of Water Safety Teams
- ✓ Capacity building by training District Managers and Plant Operators on Water Safety Planning
- ✓ Plan of equipping of current Lab and constructing of a new fixed Lab educe on geographical distances and procuring portable Kits in 2015
- ✓ Strengthening the water quality management by employing SHEWA,.
- ✓ Stakeholder engagement in water source catchment preservation planned for 2015 and beyond



Kaputa Water Project – Distribution Network Matls

Chinsali Water Project – Modular Plant Installation

Isoka District – Construction of 750m3 Ground Water Reservoir

ANY ACHIEVEMENT

Raising water quality compliant from 81% - 91% for 2014 Water Quality Results (National Water and Sanitation Council).

Chambeshi

1. MANAGEMENT OF WATER QUALITY

1.3 MONITORING SYSTEM

- Annual water Sampling , Monitoring Reporting plans exist and are approved by the National Regulator

Kaputa District Stakeholders Engagement

1.4 IMPLEMENTATION OF WATER SAFETY PLANS

- Strengthening the water quality management by employing SHEWA.
- Stakeholder engagement in water source catchment preservation and water supply quality customer feedback began in 2013 and in progress

Mpika District Stakeholders Engagement

Chambeshi

2. REDUCTION OF NRW

2.1 CURRENT SITUATION AND MAJOR CHALLENGES

CURRENT SITUATION

- ✓ 58% NRW 2014 NWASCO Report
- ✓ Established a WDM Team
- ✓ 44% Metering ratio on 16, 450 individual connections
- ✓ Calculation based on estimates, due to low metering ratio and lack of production meters

Elevated Tank at a School in Mpika

MAJOR CHALLENGES

- ➢ Dilapidated water treatment, storage and distribution infrastructure
- ➢ Lack of adequate water distribution storage Reservoirs, hence into direct pumping.
- ➢ Vandalism of Primary Distribution Main
- ➢ Illegal Water Consumers
- ➢ Lack of Water Demand Management Equipment
- ➢ Lack of Network Repair materials.

Vandalized TAZARA Rising Main – Chitulika, Mpika District

Chambeshi

2. REDUCTION OF NRW

Kasoka Intake -Before

2.2 CURRENT ACTIONS AGAINST PROBLEMS

- ➢ Ongoing overhaul of Distribution networks, construction of Elevated water reservoirs.
- ➢ Metering exercise to attain 100% metering ratio by 2016
- ➢ Equipping and strengthening of the WDM Team
- ➢ Zoning of Supply areas and install Zonal Meters
- ➢ Stakeholder engagement to sensitize them on cost of vandalism

Kasoka Intake after Rehab

2.3 ANY ACHIEVEMENT

- ✓ Reduction of NRW from 67% - 58 % *
- ✓ Increased Metering ratio from 33% - 44%*
- ✓ Increased Hours of supply from 10hrs – 13hrs*

note * approved by NWASCO for 2014 Sector Report

196m3 Elevated Tank Rehab in Kasama

Distribution network rehab in Kasama

Metering Exercise in Mpika District

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3. WATER SUPPLY SERVICES STANDARDS

3.1 CURRENT SITUATION AND CHALLENGES

CURRENT SITUATION






54% O &M Cost Coverage	Water Quality 91% Compliant	66% Water Supply Coverage	44% Metering Ratio	20% Sanitation Coverage	74% Collection Efficiency

CHALLENGES

- Lack of Capital Investment in Sanitation expansion projects
- Poor Power supply services (low and unstable voltages)
- Lack of Standby Pumping sets
- Frequent breakdown of machinery due to old state
- Unskilled Operative and Maintenance staff
- Dilapidated Infrastructure and inadequate water storage reservoirs
- Uneconomical Tariff
- High labour turnover due to poor remunerations

Chambeshi

3. WATER SUPPLY SERVICES STANDARDS

3.2 ACTIONS TO MITIGATE

- ✓ Currently Construction and Rehab of Water Supply and Sanitation Systems going on in 5 District at a cost of more than **USD29 Million**
- ✓ Currently Consultancy Services being undertaken in 3 Districts to design a complete water supply and sanitation systems at cost of more than **USD1.6Million**
- ✓ Consultancy Services are completing a Prefeasibility Study for the Company to Priotise Investment and Development of a Master Plan for investment attraction
- ✓ Implementation of a Preventive Maintenance Management started in 2015
- ✓ Recruitment of Qualified Staff and In-house training started in 2013 is ongoing.

3.3 MONITORING BY PERFORMANCE INDICATORS

- Three year Minimum Service Level Guarantees are signed with the Regulator NWASCO
- Performance Contracts with all Staff introduced in 2014
- Annual Strategic Plans and Quarterly Review
- Benchmarking with other commercial Utilities through Interactive visits.

NWWSSC & ChWSC Staff in August 2014

Chambeshi

4. MANAGEMENT OF WATER SUPPLY SERVICE ON A SELF-SUPPORTING BASIS

4.1 CURRENT SITUATION MAJOR CHALLENGES

CURRENT SITUATION

- Low water coverage at 66%
- Low collection efficient at 74%
- Lack of investment funds

MAJOR CHALLENGES

- Low expansion rate to new developed areas due to lack of capital funds
- Low economic activities in service areas; mostly GRZ workers, retirees, low income groups, less privileged.
- Uneconomical Tariff
- Political Interference

4.2 CURRENT ACTIONS AGAINST THE PROBLEMS

- ✓ Cost sharing (or Capital Contribution) with Stakeholders (e. g developers); in agreement with the Water Policy to open new areas.
- ✓ Ring fencing of Investment Account and Bulk Procurement of New Connection Materials.

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5. RECENT MAJOR ACHIEVEMENTS IN WATER SUPPLY SERVICES/ MANAGEMENT

- ✓Improving water quality from 81% - 91%
- ✓Employment of Qualified Staff
- ✓Prudent implementation of ongoing Capital Projects
- ✓Construction Head Office
- ✓Improvement of Water Supply Hours from 10 – 13

6. EXPECTATIONS FORM JAPAN WATER SUPPLY SERVICES/ MANAGEMENT

- Real Solutions to Non Revenue Water Reduction and Implementations – Case Studies

- Case Studies on Water Safety Plans formulation and Implementation

- Meter Selection and Policy formulation
- Simplified Sanitation Designs and Implementation for Per-urban or Low income communities.
- Strategies on Energy Efficiencies, Energy Policy and Motor Policy formulation
- Equipment and Measuring Techniques employed in NRW Monitoring, Water Demand Management, and Pressure Management.

COUNTRY REPORT

Chambeshi Water and Sewerage Company Limited

Present Situation of the Water Supply Service (Annex 2)

ZAMBIA

Willard M Mutoka – Managing Director - ChWSC

1. ORGANISATION PROFILE

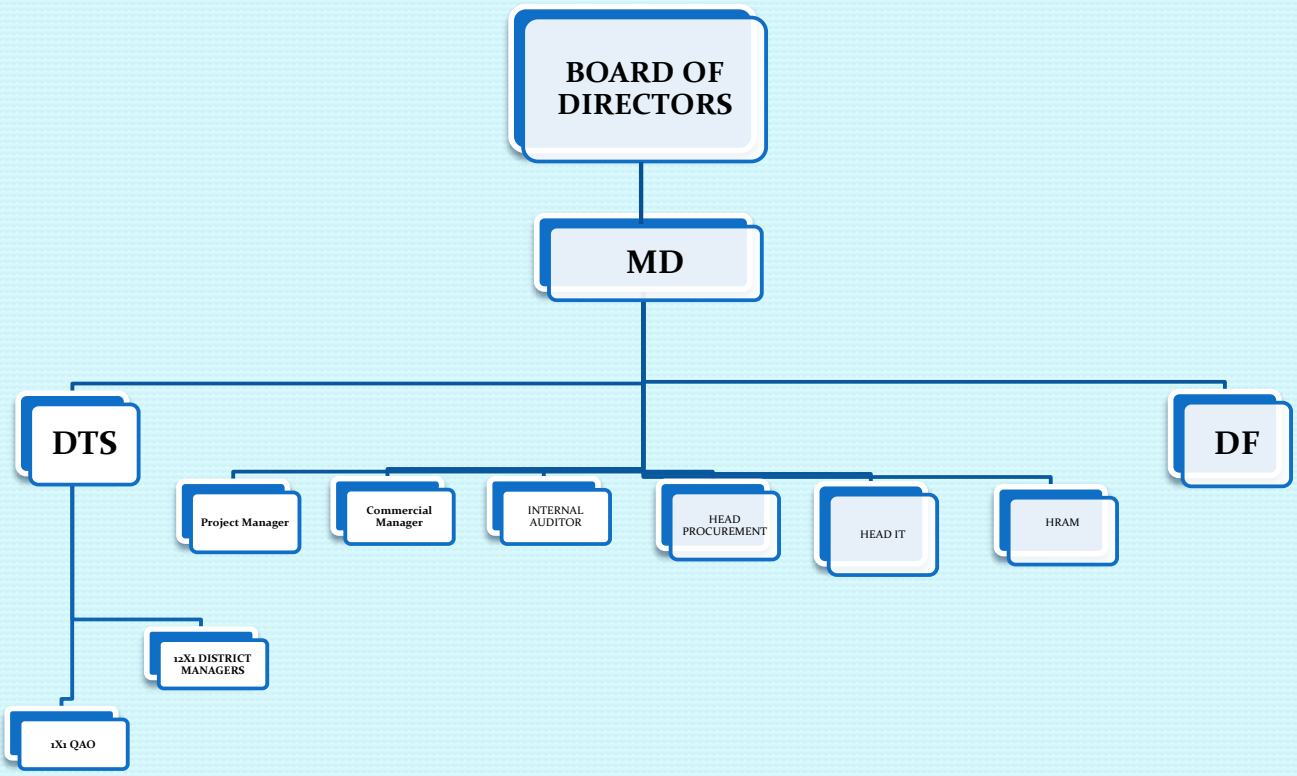
1.1 Name: **Chambeshi Water and Sewerage Company**

1.2 Type of Work and Services: **Portable Water Supply and Sanitation Services**

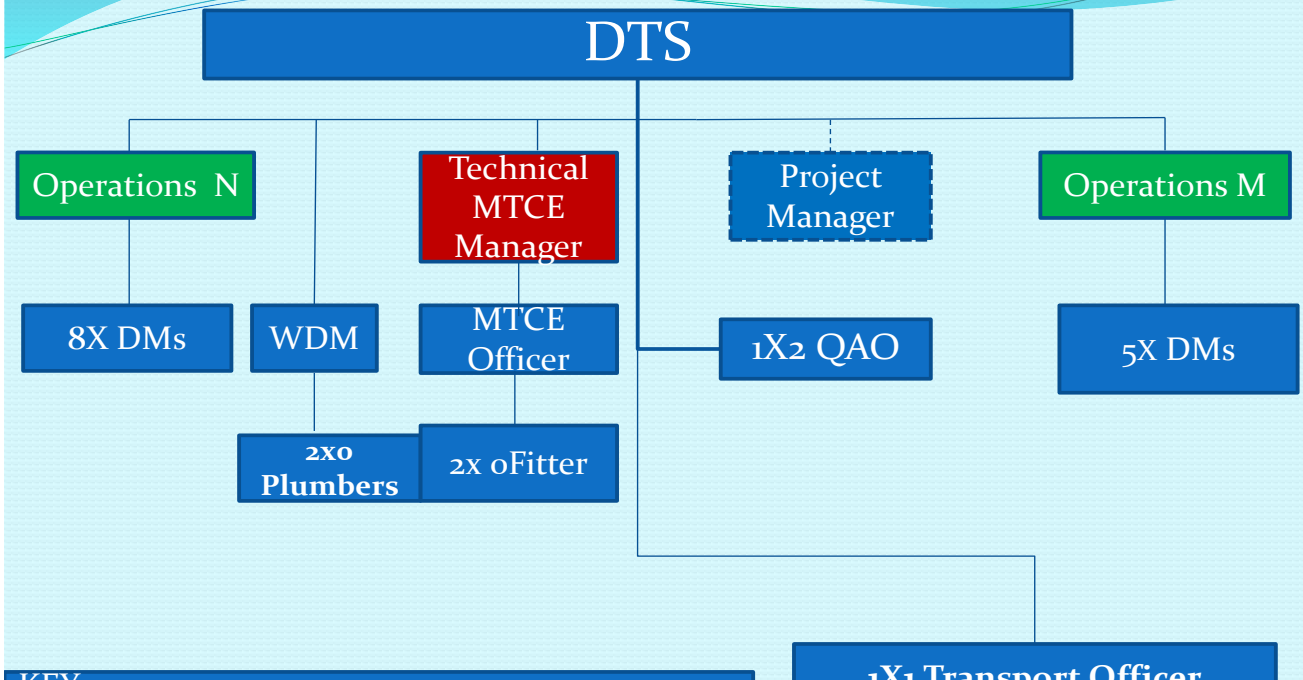
1.3 Type of Organization: **Private Company, registered under Company's Act, and owned by 12 Local Councils under the Ministry of Local Government and Housing (MLGH)**

1.4 Official Position: **Managing Director**

1. ORGANISATION PROFILE

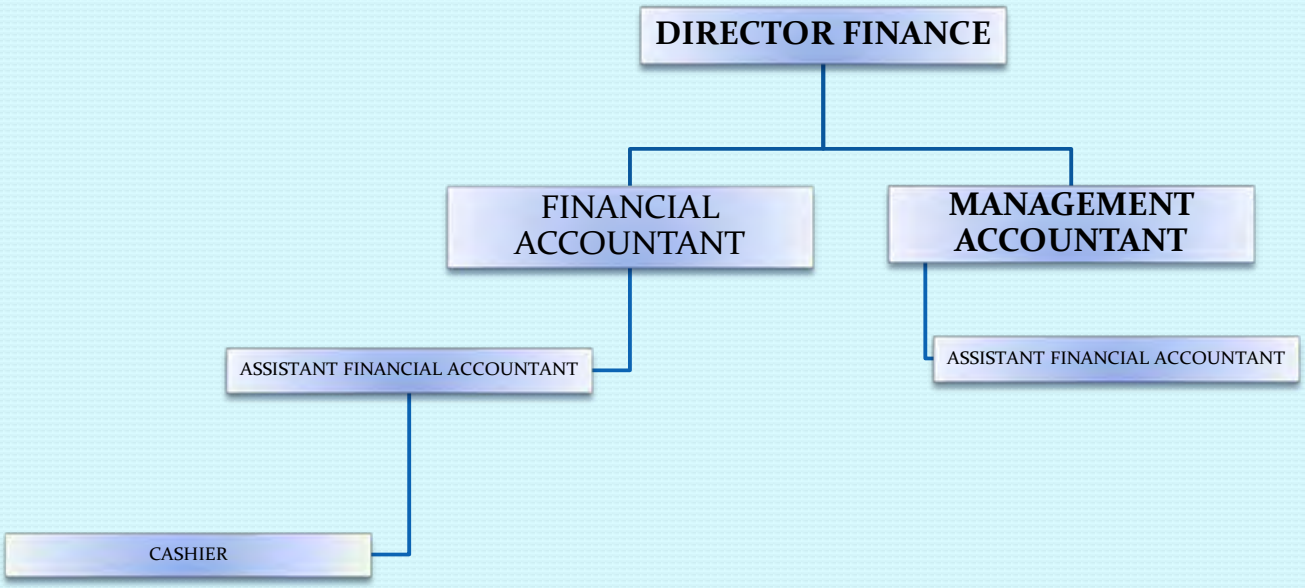


TECHNICAL DEPARTMENT



KEY:
Green – Vacant Positions
Reports to DTS till company is able upgrade to Director status
Red – Recruited waiting to report.
Luwingu, Mporokoso, Mpika and Mbala no DMS

1. ORGANISATION PROFILE



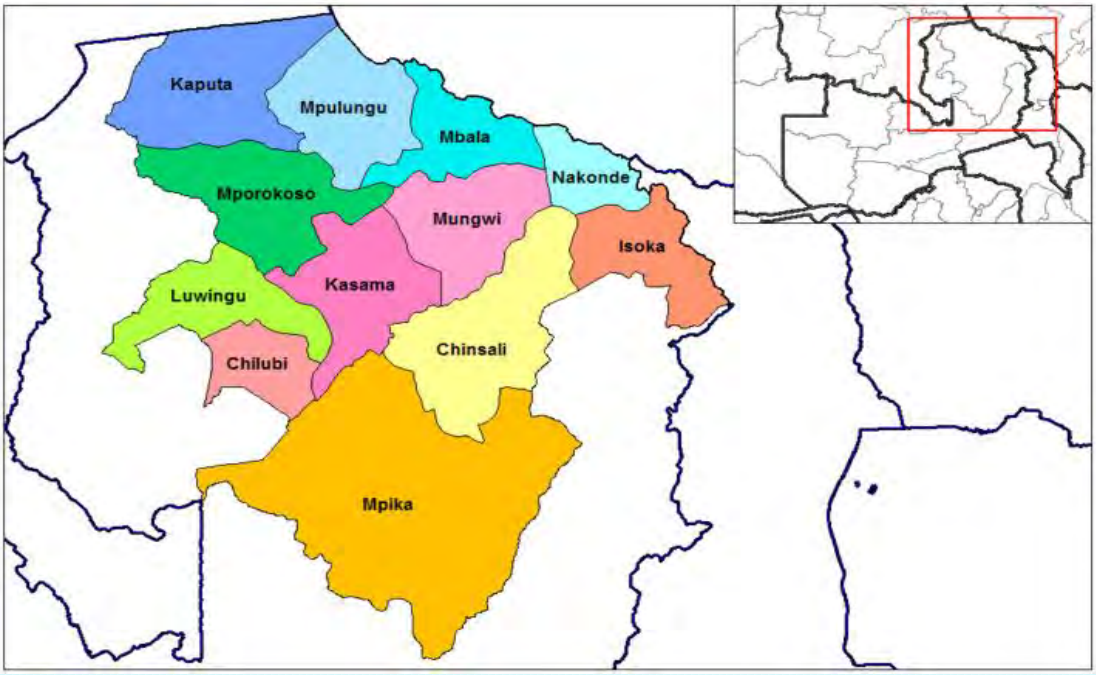
2. WATER SOURCES

2.1 Geographical Background

Note: District

2. WATER SOURCES

2.1 Geographical Background



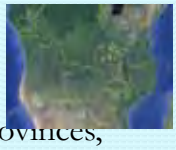
Chambeshi

2. WATER SOURCES

2.1 Geographical Background

Note: District

2. WATER SOURCES



2.1 Geographical Background

The CU lies in the Northern part of Zambia, servicing Northern and Muchinga Provinces, covering about a fifth of Zambia, 8° S, 29° E north of the province and 11° S, 32° E south of the province , within 11° south of the equator. The area is characterized by four seasons; cool dry winter running from June – July, the dry, warmer, windy and humid pre – rainy season running from August – October, the wet, humid rainy season from November – March and the cool, dry post rainy season from April – May.

The area is also influenced by hilly topography, with Muchinga Escarpment on the east, and various hills scattered in the region.

The climate is influenced by the shifting of the Inter-Tropical Convergence Zone (ITCZ), due to the position of the sun, hence causing a marked pattern of precipitation. The northern part of the area in Kaputa receives an average of 1300mm of rainfall while the southern part, Mpika receives a minimum of 850mm annually.

The temperature varies between 7°C and 37°C in the cold and hot season, respectively.

Chambeshi

2. WATER SOURCES

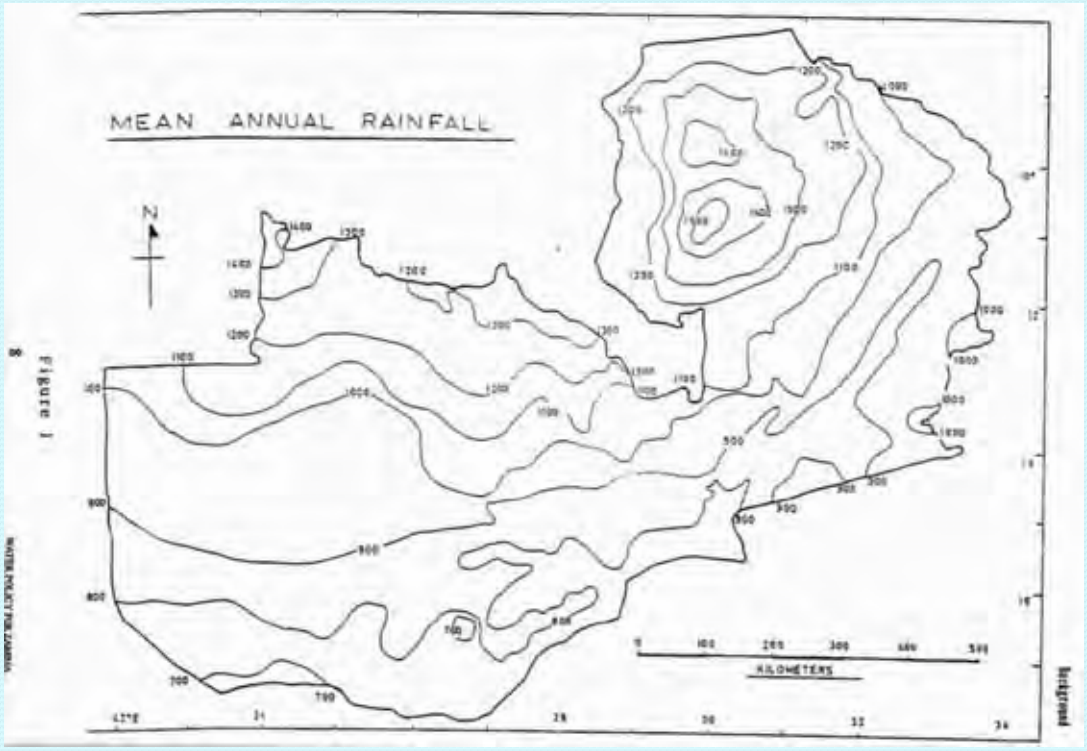
2.2 Precipitation

Table of Precipitation for Isoka District (source Met Dept. – Kasama)

S/NO	SEASON	ANNUAL PRECIPIATION (MM)
1	2014/2013	-
2	2013/2012	1,856.6
3	2012/2011	796.8
4	2011/2010	877.4
5	2010/2009	907.9
6	2009/2008	973.3
7	2008/2007	836.9
8	2007/2006	1,188.7
9	2006/2005	859.1
10	2005/2004	1,040.7

2. WATER SOURCES

2.2 Mean Annual Precipitation



(Source: Government Water Policy Document of 1994)

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2. WATER SOURCES

2.3 Types of Water resources

The region is rich in surfaces water, especially the north western part, where there is Lake Bangweulu, Lake Mweru, Mweru - Wantipa and Lake Tanganyika.

The area is also rich in big perennial rivers, including, Chambeshi river, Lukupa, Lubu, Lufubu, Lunzuwa, except in Nakonde and Isoka Districts where the river dries up, and only spring water is available, respectively.

Hence, the CU's source of water is surface water in all the districts except Isoka, where the two springs are supplemented with ground water. Chilubi and Mpulungu Districts are abstracting from Lakes Bangweulu and Tanganyika, respectively.

Note: CU – Commercial Utility

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2. WATER SOURCES

2.4 Daily and Annual Intake Volume

S/No.	Description	m³
1	Intake Water per day	31,342
2	Intake Water per Year	11,440,000

2.5 Type of Water Resources for the future

The water resources for the future remains as described above, in item 2.1.

This is largely dependent on the Governments effort to enhance water resource management, by conserving trees in water catchment areas and reduce human activities in these areas.

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3. Policy and Regulations

3.1 POLICY

Not until 1993, the Government had no policy on Water Resource Management. During that year the Gvt. came up with a project to develop a National Water Policy which was completed in Sept 1993 and Launched in 1994.

- the Integrated Water Resources Management and Water Efficiency Implementation Plan (2005-2030) and the Sixth National Development Plan (2011-15
- NATIONAL RURAL WATER SUPPLY AND SANITATION PROGRAM
- NATIONAL URBAN WATER SUPPLY AND SANITATION PROGRAM
- WATER RESOURCE MANAGEMENT AUTHORITY (WARMA)
- NATIONAL WATER SUPPLY AND SANITATION COUNCIL (NWASCO)

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3. Policy and Regulations

3.2 REGULATIONS

To ensure effective and efficient water resource management, utilisation and conservation, to support economic growth, poverty reduction, and water supply to domestic, commercial, industrial, and the pro-poor , agricultural use, the government came up with regulatory bodies;

1. **NWASCO**, Regulates;
   - Water supply quality
   - Water supply tariff
   - Water and sanitation coverage
   - NRW reduction
   - Hour of water supply, pressure, etc
   - Customer complaint and application for new connections
   - Approves licenses for Commercial Utilities and Private Operator schemes
2. **WARMA**, Regulates;
   - Water resources and grants licenses for water abstractions

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4. Water Rates and Bill collection

4.1 Water Rates (see slide 29)

Water rates are regulated and approved by Nwasco after the CU applies, stating reasons for increasing the water Tariff.

- The rates are categorized;
  - Domestic, - metered and unmetered for Public points, low, medium and high cost
  - Commercial, Institution, - metered and unmetered.
  - Bulk purchases, etc.
  - Pre-paid water consumptions

4.2 Bill Collection System

- Billing is done monthly, once bills are distributed manually, consumers are given up to 14 days to voluntarily pay there bills at designated collection points.
- Consumers are forced to pay by disconnecting water supply for outstanding bills for more than 14 days, after announcement is done and 7 days grace period is given.

5. Water Supply Services

5.1 Population Ratio

S/No.	Description	Figure
1	Total population	312, 298
2	Total Population Served	212, 298
3	Water Supply Coverage	66.1%

(Source: 2014 Nwasco Sector Report)

5.2 Hours of Supply

S/No.	Description	Figure
1	Proportion of consumers on 24hrs	6.4%
2	Average hours of water supply	13hrs

5.3 Does the distribution water use for the portable water directly: YES

5.4 Non Revenue Water (NRW): 58% (Source: 2014 Nwasco Sector Report)

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6. Private Sector Participation

6.1 Status of Private Sector Investment

NIL

6.2 Current Involvement of National Government in Water Supply Services

S/No.	Description	% Involvement
1	Water rates	100% Regulates through Nwasco
2	Personnel Employment	Nil
3	O/M Budgeting	Nil
4	Capital Investment	100%
5	Payment of GRZ Bills	10%

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7. Current Situation of Privatization

7.1 Current situation of Privatization

- Water Supply and Sanitation Act of 1997 made possible the formation Commercial Utilities.
- 11 CUs have been formed since then, and these are owned by various Local Councils that are the Ministry of Local Government and Housing (MLGH).
- National Water Supply and Sanitation Council, issues operating licenses to CUs.
- Private participation is very limited to water schemes for private companies where it is uneconomical for CUs to operate.

7.2 Type of Privatization

- State Owned Enterprises (or Quasi-Government), Local Councils, under MLGH, owns the CUs.
- The CUs are legal entities and are expected to operate commercially.

7.3 Future Direction of Privatization

- Not defined

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I. Service Area

1. Size of Utility's area of Responsibility: (165,456 sq.km)

2. Size of Utility's present service area: (109,200.6 sq.km)

3. Population of Utility's area of responsibility: (1,105,824)

4. Population of Utility's present service area: (321,104)

5. Population served by the Utility with piped water supply: (136,148)

6. Number of towns served with piped water: (12)

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II. Infrastructure Description

1. Source of raw water *(please tick relevant boxes)*
   - ❑ bulk water from another utility / company
   - ✓ storage reservoir / impoundment
   - ✓ direct river abstraction
   - ✓ ground water
   - ❑ other, please specify _____
2. Main methods of treatment *(please tick relevant boxes)*
   - ❑ none
   - ✓ disinfection
   - ✓ filtration
   - ❑ flocculation and sedimentation
   - ❑ aeration
   - ❑ desalination
   - ❑ other, please specify _____

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II. Infrastructure Description

3. Capacity of production systems: (36,752. 31 m^3/day)
4. Length of water distribution network (1.25 Km)
5. Capacity of storage in network: (22,274m^3)
6. Piped water supply connections: *please specify how many in each category (2015 Data)*

Domestic (Households)	Non Domestic			Total
	Industrial Commercial	Institutional	Other	
15,529	881	265		16,675

7. Number of connections with operating meters: (7,032Nos)
8. Typical length of service connection from water main to water meter: (571, 495 m)

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III. Water Production & Consumption

1. Volume of water produced by utility: (10. 36 million m³/year)
2. Volume of water bought in bulk from other utility / company: (0 million m³/year)
3. Volume of water metered: (1.30million m³/year)
4. Estimated un-metered consumption (% of metered consumption)
5. Estimate of average meter inaccuracy at typical flow rates (5% of metered consumption)
6. Volume of water billed / sold: *please specify how much* (million m³/year) in each category

Domestic (Households)	Non Domestic			Total
	Industrial & Commercial	Institutional	Other	
				4.140

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IV. Water Supply System Performance

1. Number of customers who received intermittent supply: (15, 000 connections)
2. Typical duration of supply (planned and unplanned supply interruptions): (4 hours / day)
3. Typical mains water pressure in your pipe: (6 meters)
4. Number of water pipe breaks in the distribution network: (# per year)
5. Requested number of tests of treated water for residual chlorine: (1,925 # per year)
6. Number of tests of treated water for residual chlorine carried out: (1,949 # per year)
7. Number of tests of treated water for residual chlorine passed: (1,616 # per year)

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V. Staff

1. **Who does the work in your company** *(please tick relevant boxes)*
   - ❑ **permanent staff, salaried Government employees**
   - ✓ **payment staff, with contract**
   - ❑ **casual / part-time, contract staff**
   - ✓ **casual / part-time, wages**
   - ✓ **contracted out to outside company /agency**
   - ❑ **other, please specify** _____

2. Number of FTE* staff in the company*(please tick relevant boxes)*

Corporate Services (Management, Admin, Finance, Technical, etc)	Water Supply (O & M, Customer Services, Support Services)	Other non water supply (e.g. waste water, drainage, environment services)	TOTAL
33	122	4	159

**FTE = Full Time Equivalent staff (i.e. convert part-time and casual staff to equivalent full time staff*

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VI. Customers

1. **Numbers of customers connected to water supply during the year: (588 # / year)**
2. **Number of customer complaint recorded during the year: (18,600 # / year)**
3. **Means by which customers can make a recorded complaint** (please tick relevant boxes)
   - ✓ **in person**
   - ✓ **by telephone**
   - ❑ **by email**
   - ✓ **by letter**
   - ✓ ***other method, please specify - Social network - Facebook***
4. **How does the Utility find out the views of its customers?** (please tick relevant boxes)
   - ✓ **from customer interactions (letters, telephone calls, enquiry**
   - ✓ **counter, etc.)**
   - ✓ **by responding to customer complaints**

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VI. Customers

- ✓ from customer surveys, questionnaires, etc.
- ✓ by market research
- ✓ Other method, please specify: Phone in radio programs

5. Typically* what is the connection charge for new customers? *(please specify how much in each category)*

Domestic (Households)	Non Domestic (Industrial, Commercial, Institutional, other	Bulk water sales	AVERAGE of all categories
Cost of 10 M pipe + associated fittings	Cost of 10 M pipe + associated fittings		

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VI. Customers

6. Typically* what is the fixed water charge / month? *(please specify how much in each category)*

Domestic (Households)	Non Domestic (Industrial, Commercial, Institutional, other	Bulk water sales	AVERAGE of all categories
See attached tariff			

7. Typically* what is the water tariff for metered consumption? *(please specify how much in each category)*

(see attached tariff)

8. What would be the monthly bill for a household consuming 6m³ of water / month? (K14.04 (USD1.82))

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Tariff* (USD equivalent divide by 7.7

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CHAMBESHI WATER & SEWERAGE COMPANY LIMITED

HEAD OFFICE ALONG LUWINGU ROAD, P.O. BOX 410307 KASAMA TELFAX: 04 221 302

APPROVED WATER TARIFFS FOR 2015

METERED CUSTOMERS	2014 TARIFFS	APPROVED 2015 TARIFFS	PERCENTAL CHANGE
ALL DISTRICTS			
(i) DOMESTIC (HC,MC,LC)			
Consumption block (m^3)	*Amount (K per m^3)*	*Amount (K per m^3)*	*% Change*
0 – 6	1.80	2.34	30
6 – 10	2.20	2.86	30
10 – 15	2.80	3.64	30
15 Plus	3.80	4.94	30
(ii) COMMERCIAL			
0 – 10	2.20	3.08	40
10 Plus	2.60	3.64	40
(iii) INSTITUTIONS			
0 – 10	2.20	2.97	35
10 Plus	2.60	3.51	35
UN-METERED CUSTOMERS	**2014**	**2015**	
DOMESTIC	*Fixed/ month*	*Fixed/ month*	*% Change*
Low cost H/hold	46.00	55.20	20
Medium cost H/hold	82.00	98.40	20
High cost H/hold	121.00	145.20	20
COMMERCIAL	*Fixed/ month*	*Fixed/ month*	*% Change*
Small	253.00	354.20	40
Medium	400.00	560.00	40
large	800.00	1,120.00	40
INSTITUTION	*Fixed/ month*	*Fixed/ month*	*% Change*
Small	253.00	303.60	20
Medium	400.00	480.00	20
large	800.00	960.00	20

OTHER MONETARY CHARGES

NEW WATER CONNECTION (Standard connection - Network in place)	2014	2015
Domestic	Cost of 10m pipe and associated fittings	Cost of 10m pipe and associated fittings
Non-domestic	Cost of 10m pipe and associated fittings	Cost of 10m pipe and associated fittings
NEW WATER CONNECTION (Nonstandard connection – New project)		
Domestic	40% cost	40% cost
Non-domestic	40% cost	40% cost
SECURITY DEPOSIT	Equivalent to 3 months bill/customer category	N/A
CHARGES FOR OTHER SERVICES		
SEWERAGE CHARGE		
% of Domestic Water	30%	30%
% of Commercial/Industrial Water	40%	40%
RECONNECTION FEES		
Domestic	100.00	80.00
Commercial	500.00	150.00
FIXED METER CHARGES		
Domestic	5.00	6.00
Commercial	10.00	12.00
METER TESTING FEE		
Domestic	0	50.00
Commercial	0	100.00
Water Bowser (Bulk water per m^3)	0/m^3	20.00/m^3
Hire of Vacuum Tanker (per load)	-	350.00
OTHER CHARGES (WSS ACT SECTION 31-3)	**2014**	**2015**
Unauthorized water connection/reconnection - Domestic	1,000 plus assessed consumption	1,000 plus assessed consumption
Unauthorized water connection/reconnection - Commercial	2,500 plus assessed consumption	2,500 plus assessed consumption
Unauthorized water connection/reconnection - Domestic	1,000 plus assessed consumption	1,000 plus assessed consumption
Unauthorized water connection/reconnection - Commercial	2,500 plus assessed consumption	2,500 plus assessed consumption
VANDALISM	As per WSS ACT	As per WSS ACT

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VII. Questionnaire on Major Constraints in water supply.

The constraint factor listed may prevent the participant's sector from accelerated development. Mark the appropriate boxes so that they will show whether these factors represent a very severe (vs), severe(s) or moderate (m) impediment to the overall development of the entire sector. Constraints are usually inter-related. Also, constraints ranking is subjective and will vary depending on the agency that makes the evaluation. However, it may be possible to determine the relative importance among them. Please indicate with the mark (√) for the situation of major constraints in the table below.

	Rating of constraints		
Constraints	VS	S	M
1. Lack of definite govt. policy for the sector			
2. Funding limitations	√		
3. Inadequate or outmoded legal framework			
4. Inappropriate institutional framework			√
5. Inadequate water resources			
6. Insufficient knowledge of water resources			
7. Inadequate cost-recovery framework			√
8. Insufficient trained personnel		√	

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VII. Questionnaire on Major Constraints in water supply.

	Rating of constraints		
Constraints	VS	S	M
(1) Professional		√	
(2) Sub-professional		√	
9. Lack of planning and design criteria			√
10. Inappropriate technology		√	
11. Intermittent water service			√
12. Operation and maintenance		√	
13. Logistics		√	
14. Import restrictions			
15. Non-involvement of communities			
16. Insufficient health education efforts			√
17. Others (specify) - Economic activities		√