Water Supply Administration

For Better Management of Water Supply Services

Course（A）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

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

Tanzania

COURSE: WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES.

COUNTRY REPORT

Country: TANZANIA


North Atlantic Ocean
Spain
Turkey
Afghanistan
Iraq
Iran
Pakistan
Algeria
Libya
Egypt
Saudi Arabia
India
Thailand
Mali
Niger
Sudan
Chad
Nigeria
Ethiopia
Venezuela
Kenya
DR Congo
Tanzania
Brazil
Angola
Bolivia
Namibia
Madagascar
Botswana
Indian Ocean
South Atlantic Ocean
South Africa
Argentina
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Nairobi
Rwanda
Burundi
Zanzibar
Tanzania
Dar es Salaam
Kolwezi
Lubumbashi
Comoros
Map data ©2013 Google

POPULATION AND URBANIZATION

Zanzibar consists of two main islands (Unguja and Pemba) with a total area of about 2,620 km^2 and a total population of about 984,625 (2002 census), out of which 622,459 are in Unguja and 362,166 are in Pemba. The average annual population growth for both islands is 3.1%.

ZANZIBAR

ZANZIBAR ⇒ UNGUJA & PEMBA + ABOUT 50 SMALLER ISLETS

CAPITAL: ZANZIBAR TOWN

AREA	:	2,580 km²
UNGUJA	:	1,600 km²
PEMBA	:	980 km²

POPULATION (2012):		1,303,569
UNGUJA	:	896.721
PEMBA	:	406,848,

URBAN POPULATION: 20 – 25%

LOCATION : 5 – 6°S OF EQUATOR
40 km EAST COAST OF AFRICA

WATER SECTOR

Water sector development has been among the Zanzibar Government top priorities for years in reducing poverty as mentioned in Zanzibar Development Vision 2020, Millennium Development Goals (MDGs).

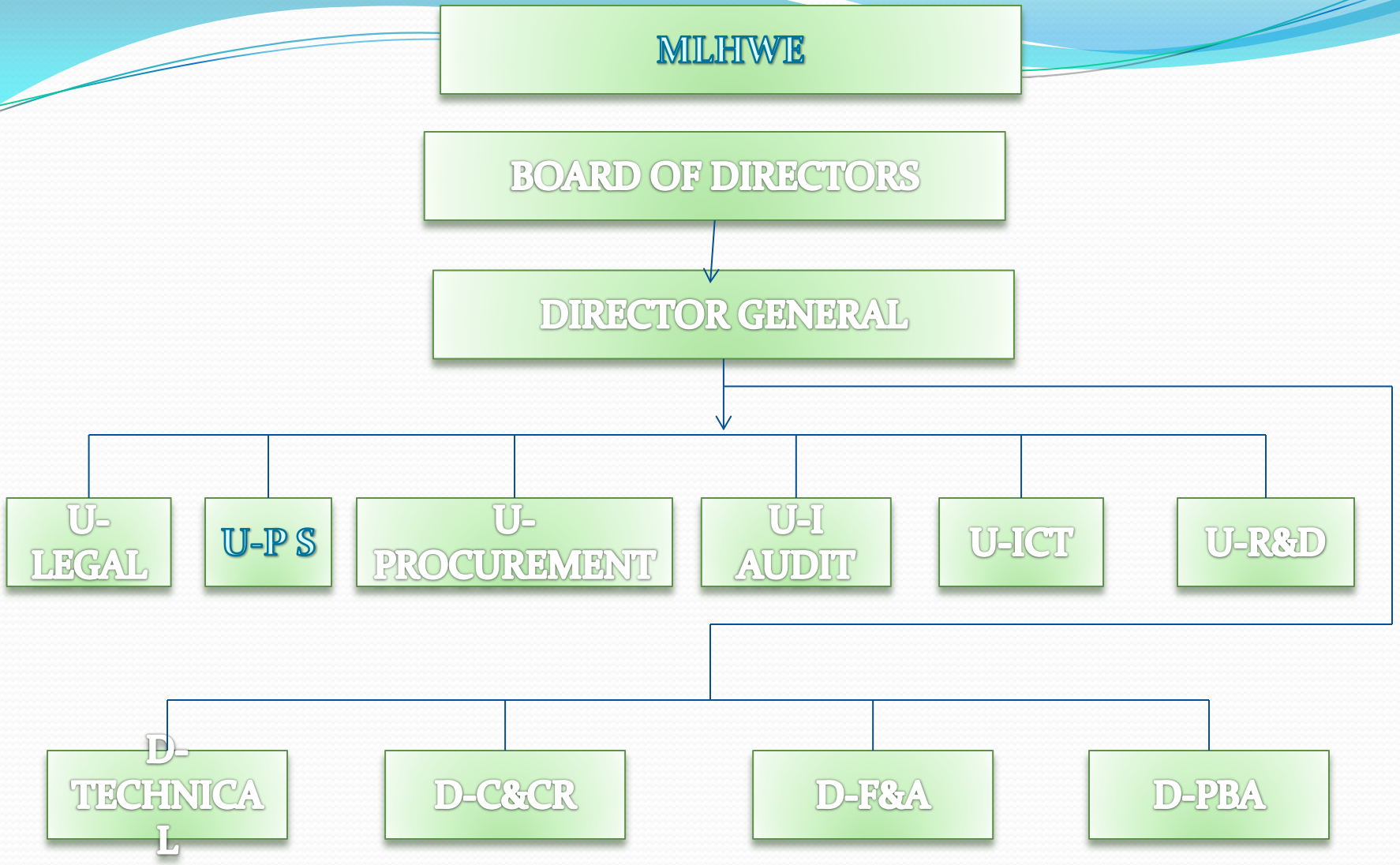
It has thus received attention as emphasized by the Zanzibar Strategy for Growth and Reduction of Poverty (ZSGRP) and MDGs.

However water demand, particularly in the urban and in tourist resort and hotel areas outpaces the supply and capacity of the sources and the Government ability to finance water supply has been in real terms decreasing, while demand for more and better water facilities is increasing.

THE ZANZIBAR WATER AUTHORITY ZAWA

The Zanzibar Water Authority (ZAWA) was established since August, 2006 after the Revolutionary Government of Zanzibar (RGoZ) through the House of Representatives passed the Bill and now become the Water Act No. 4 of 2006 and National Water Policy of 2008.

Responsibilities:
Water supply services
Water resources management
Drilling works


MLHWE
BOARD OF DIRECTORS
DIRECTOR GENERAL
U-LEGAL
U-P S
U-PROCUREMENT
U-I AUDIT
U-ICT
U-R&D
D-TECHNICAL
D-C&CR
D-F&A
D-PBA

CLIMATE

Zanzibar being a tropical country has the climate which is warm and humid (equatorial) and enjoys two main seasons of rainfall, Masika and Vuli.

The average rainfall varies from 1,531 mm to 2000 mm with most of the rain (about 50%) falling during the Masika season, normally (March to May).

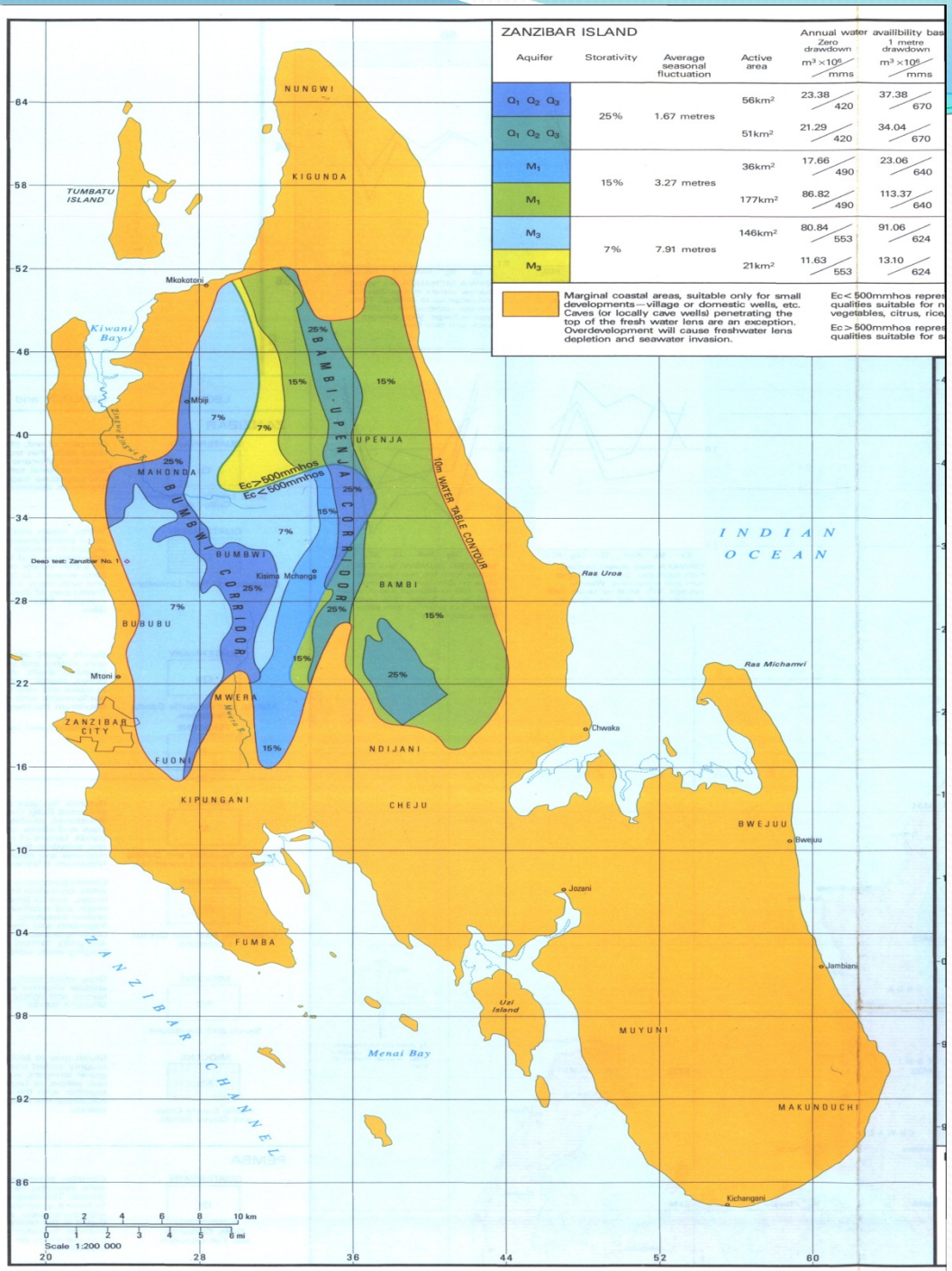
Average temperature is 23°C The predominant forests are found on eastern belts

Water Sources

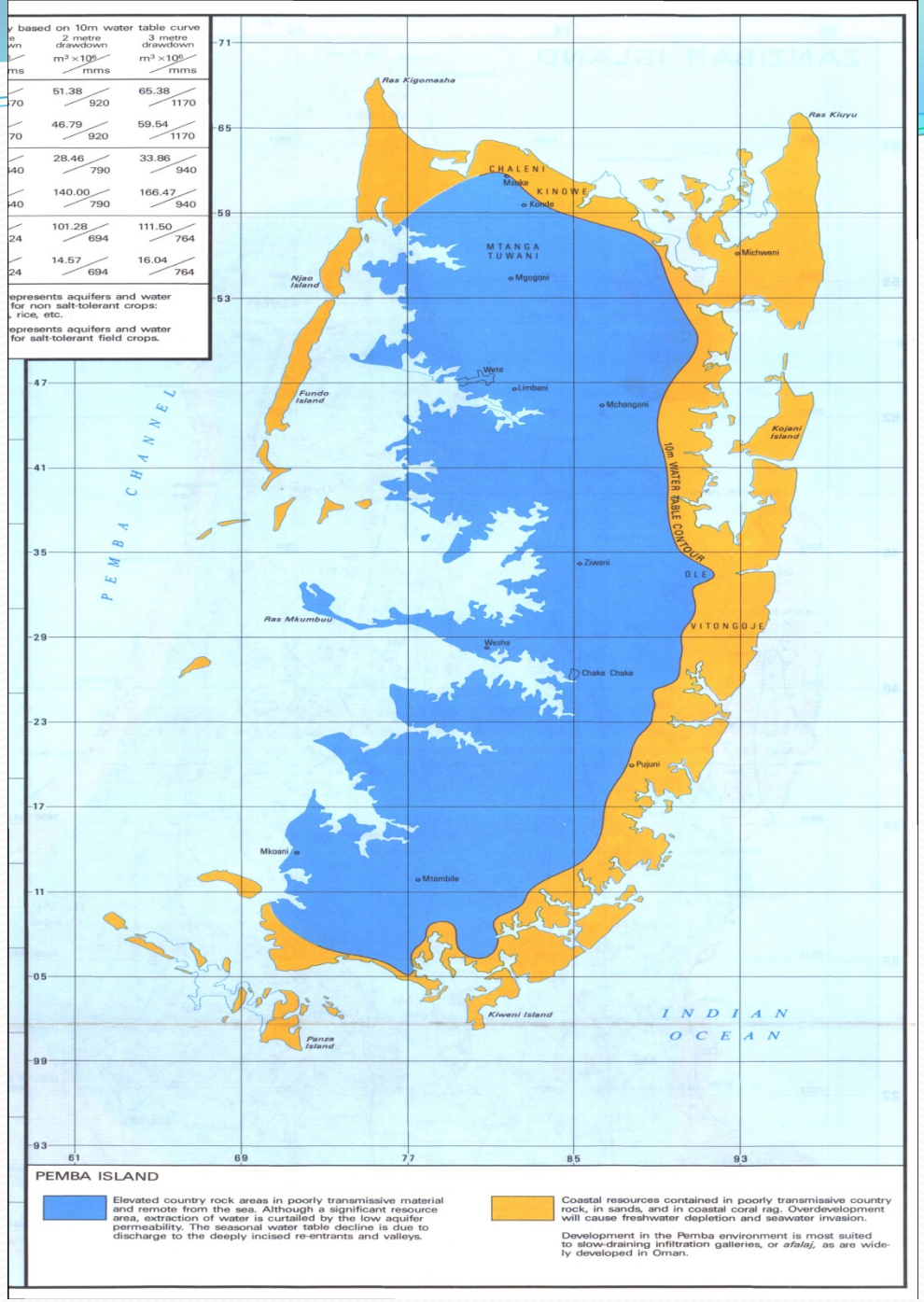
Zanzibar water resources include ground and surface water in a form of small streams, ponds, spring and wells.

Since in Zanzibar there is no big Lakes or Rivers, the main water sources for domestic and other uses rely completely on groundwater, extracted either from spring, shallow well, or deep well (Boreholes).

Ground water is used also for irrigation purpose.



WATER RESOURCES


based on 10m water table curve
2 metre drawdown
3 metre drawdown
m³ ×10⁶
mms
51.38
920
65.38
1170
46.79
920
59.54
1170
28.46
790
33.86
940
140.00
790
166.47
940
101.28
694
111.50
764
14.57
694
16.04
764
epresents aquifers and water for non salt-tolerant crops: rice, etc.
epresents aquifers and water for salt-tolerant field crops.
Ras Kigomasha
Ras Kiuyu
CHALENI
Maka
KINOWE
Konde
MTANGA TUWANI
Mgogoni
Michweni
Njao Island
Wete
Limbani
Mchangani
Fundo Island
Kojani Island
10m WATER TABLE CONTOUR
PEMBA CHANNEL
Ziwani
OLE
VITONGOJE
Ras Mkumbuu
Wesha
Chake Chake
Pujuni
Mkoani
Mtambile
Kiweni Island
INDIAN OCEAN
Panza Island
71
65
59
53
47
41
35
29
23
17
11
05
99
93
61
69
77
85
93
PEMBA ISLAND
Elevated country rock areas in poorly transmissive material and remote from the sea. Although a significant resource area, extraction of water is curtailed by the low aquifer permeability. The seasonal water table decline is due to discharge to the deeply incised re-entrants and valleys.
Coastal resources contained in poorly transmissive country rock, in sands, and in coastal coral rag. Overdevelopment will cause freshwater depletion and seawater invasion.
Development in the Pemba environment is most suited to slow-draining infiltration galleries, or *afalaj*, as are widely developed in Oman.

Z	R F	RC	FS	AY	Mcum
1	122.6	23.99	9.49	14.50	
2	251.8	68.53	35.04	33.49	
3	289.9	72.40	38.33	34.07	
4	285.1	59.64	35.59	24.05	
5	134.2	19.13	11.68	7.45	
6	178.1	35.27	18.25	17.02	
7	391.9	130.00	38.33	91.67	
8	174.4	36.75	12.78	23.97	
9	616.6	143.00	82.13	60.88	
Total	**2444.6**	**588.71**	**281.62**	**307.10**	

Distribution System

Distribution is direct and indirect system.

Direct system is where water pumped direct from the source to the users.

Indirect system is where water pumped from the source to the collection tank and then to the users.

Mkoa	Idadi ya vituo	Uzalishaji (m3/siku)	Mahitaji (m3/siku)	Upungufu/ (m3/siku)	Asilimia ya Uzalishaji	Asilimia ya upatikanaji
Mjini Magharibi	49	46,553	54,000	7,447	86.20	56.03
Kaskazini Unguja	27	14,952	29,000	14,048	51.55	43.52
Kusini Unguja	28	13,574	20,000	6,426	67.875	44.26
Kaskazini Pemba	28	14,022	18,426	4,404	76.09	65.65
Kusini Pemba	39	19,034	24,925	5,891	76.36	70.28
JUMLA	171	108,135	146,351	38,216	71.615	

Water Tariff

Zanzibar Water Authority Collects water charges from his customers either by cheque or cash after sending the water bill to them. The bill prepared every month.

Two types of bills:

Flat Rate: TZS4000 every month which is equivalent to US $5.

Volumetric rate: TZS500 per cubic liter

More than 90% of customers are flat rates

Water Quality

The ground water quality in both Unguja and Pemba has been general good. There have been no traces of heavy metals or toxic materials in the water. Analysis of water quality is continuously undertaken in one Treatment plants (Disinfectants with Chlorine) so as to be conversant with any variations. Chlorine is used to disinfect water from the springs, boreholes and other water sources. Analysis of water is also conducted in Ministry of Health Laboratory and ZAWA laboratory.

Also during the rainy seasons we distribute purification tabs for individual storages and with cooperation of Ministry of Health we advice peoples to boil water before drinking

Non Revenue Water

NRW is estimated to be 30 to 35%.

The major causes of Non Revenue Water are leakages and illegal use .

Measures in progress:
Installation of meters to all active customers
Installation of meters to the transmission system.
Leakage control programme that encourage timely reporting and prompt response.

CURRENT MAJOR PROJECTS

- Rehabilitation of Zanzibar Stonetown I
  Fund: Loan AfDB (US $2.1M)
- Infrastructures Facility Supports
  Fund: Grant UAE, Ras Al Khaimah (US $1M)
- Capacity Building to ZAWA
  Fund: Grant JICA

FUTURE PLANS

- Increase coverage up to 85% in 2015 Urban
- Increase coverage up to 75% in 2015
- Installation of water meter up to 50% by 2015
- Reduction of NRW from 30% to 15% by 2015

IT IS FROM WATER CREATED EVERY LIVING ORGANISM

AHSANTE SANA

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For Better Management of Water Supply Services
Course（A）

Mauritius

Water Supply Administration for Better management of Water Supply Services
(Number J13-00774)

Country Report Presentation

Country : Mauritius

Position : Executive Engineer

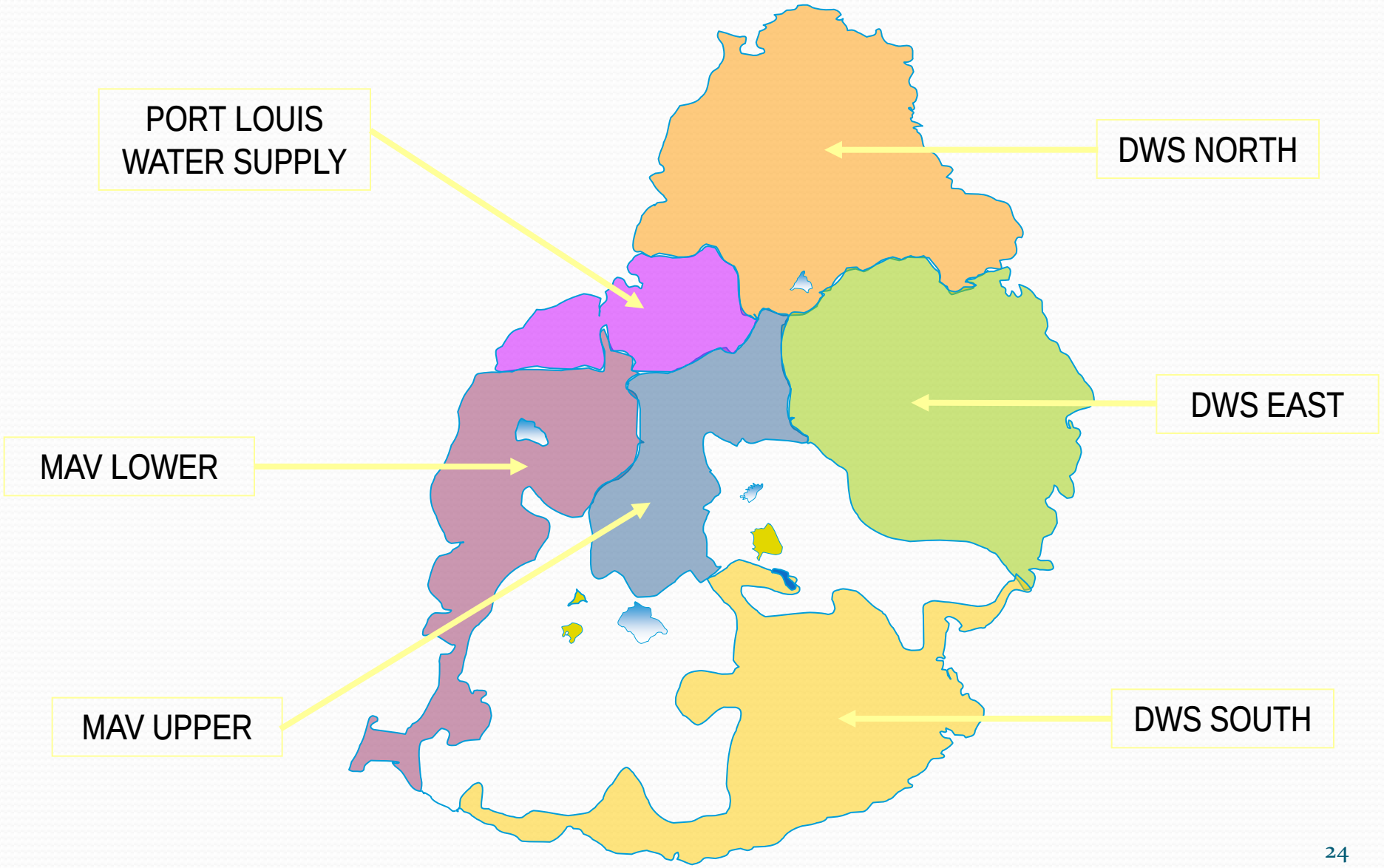
Organisation : Central Water Authority

General Country Profile

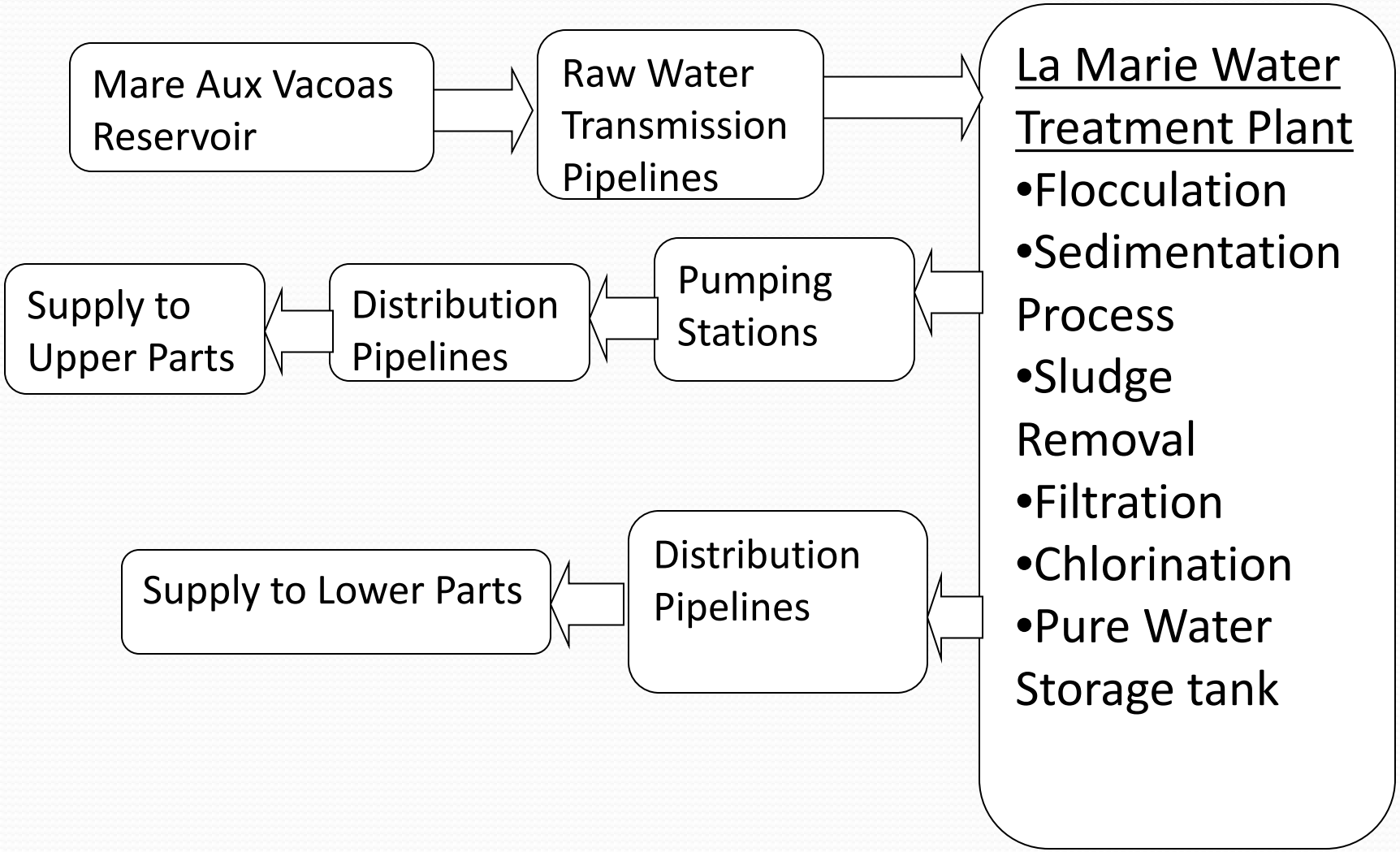
- ***The Republic of Mauritius comprises the Islands of Mauritius, Rodrigues and various smaller Islands. Mauritius is of volcanic origin. It is situated in the Indian Ocean.***

Whole Country	
Area (***km²***)	1852
Population	1,217,000
Coverage Water Supply	99.8 %
Selected Water Supply System	
Service Area (***km²***)	220
Population Served	216,400

WATER SUPPLY ZONING SYSTEM IN MAURITIUS



•Flow Chart for one representative Water Supply System



My Mission

- The mission of my Organisation is *to secure and provide an excellent sustainable water supply service, of an appropriate quality, at a reasonable price, which meets the growing needs of the people and to support the economic growth of the country.*
- My mission in the Organisation *is provide the technical and administrative support to continue upgrading the water pipeline network.*
- My actual job to achieve the mission *is to carry out feasibility and other hydraulic studies, detailed design for water pipelines, tender documentation, procurement, works supervision and contract administration and operation and maintenance of new water networks*

1. Management of Water Quality

- **Current Situation and Major challenges/Problems**

  Increased water demand has resulted in over-exploitation of water resources.

  Human activities due to farming and agriculture have accelerated deforestation and resulted in algae growth and silting reservoirs.

- **Current Actions and Achievements**

  Water Treatment Plants are being upgraded to include for algae treatment.

  Buffer zones are proposed to be created around reservoirs to control/limit inflow of chemicals/fertilisers through surface runoff.

- **Monitoring System**

  Constant monitoring of quality of borehole water in coastal zones.

  Establishment of Biological and Instrumentation Sections in the Water Quality Laboratory for the monitoring of algae and advanced testing.

- **Implementation of Water Safety plans**

  The Ministry of Energy and Public Utilities has set up a Surveillance Committee in 2012 to look into the water quality aspects of all reservoirs and river water.

- **Objective of Surveillance Programme**

  Water Quality Monitoring

  Establish baseline data for water quality

  Study the evolution of raw water quality for different use

  Initiate remedial action to abate adverse impact on water quality.

  Facilitate the Government to take appropriate policy decision for the protection of water resources

Reduction of Non Revenue Water

Constitution of Non revenue Water for Year 2012

<table>
<tr><td rowspan="4">System Input Volume

217,477,178 m^3</td><td rowspan="2">Authorized Consumption
96,457,461 m^3/ Year
44.3 %</td><td>Revenue Water</td><td>Billed Authorised Consumption</td><td>95,032,461 m^3/ Year
43.7 %</td></tr>
<tr><td rowspan="3">Non Revenue Water

122,444,717 m^3/ Year
56.3 %</td><td>Unbilled Authorised Consumption (Estimated Figure)</td><td>1,425,000, m^3/ Year
0.6 %</td></tr>
<tr><td rowspan="2">Water Losses
121,019,717 m^3/ Year
55.7 %</td><td>Apparent Losses</td><td>84,286,302 m^3/ Year
38.8 %</td></tr>
<tr><td>Real Losses</td><td>36,733,415 m^3/ Year
16.9 %</td></tr>
</table>

Actions undertaken to Reduce Non Revenue Water in 2012

- 49,266 leaks were reported and 48,841 were attended.
- Water meters replacement programme is ongoing to eliminate meters that under-read.
- An Antifraud Team continuously track down illegal connections and suspicious low consumption figures.
- Implementation of Telemetry system.
- Ongoing practice of pressure management and installation of pressure reducing valves.

Water Supply Service Standards/ Performance Indicators for Year 2012

Total New Supplies Connected	8, 532
Total Leaks Attended	48,841
Total Complaints (Other than Leaks) attended	60,293
New Pipelines Constructed	65 km
No. Of Consumers linked to GIS	316,411

Management of Water Supply Service on a Self Supporting Basis

- The Central Water Authority is responsible for the treatment and distribution of water for domestic, industrial and commercial uses.
- For the above purpose the CWA has all the necessary departments/ divisions for treatment, distribution, operations and maintenance, design, procurement and construction of major pipelaying network, billing, collection of revenue and other supporting services.
- The CWA is self supporting, but has access to financing from Government and other Financing Institutions through soft loans.

Major Recent Achievement in Improvement of Water Supply Services/Management

2005	Indicators	2012
4.71	Staff/1000 Connections	2.84
191,625,000 m^3	Production Capacity	217,477,178 m^3
WHO standards	Water Quality	WHO Standards
99 %	Coverage Area	99.8 %
6- 24 hours	Supply Duration	6 -24 Hours
0.4-1.0 bars	Supply Pressure	0.4- 1.0 bars
263,500	Number of Connections	334,433
56 %	NRW	56 %
	Collection Ratio	
1240	Staff Number	951

Major Recent Achievement in Improvement of Water Supply Services/Management

- ***Some 65 km of pipelines have been constructed in 2012.***

Project	*Cost (Million MUR) ----- Million USD*
Pipeline from Old Plaine des Papayes Reservoir to New Plaine des Papayes Reservoir.	(124) ---- 4.13
Transfer of Water from Mont Ida Reservoir to L'Unite Reservoir	(110)---- 3.66
Rehabilitation Works from Pierrefonds to Old Bosquet Reservoir	(42)---- 1.4
Water Supply to Jinfei (Ex-Tianli) Complex at Riche Terre	(109)---- 3.63
Construction of Pipelines for Camp Fouquereaux and Alma	(306)---- 10.2
Pumping Main from River la Foret to Mont Blanc Treatment Plant	(32.7)---- 1.09

Major Recent Achievement in Improvement of Water Supply Services/Management

Water Quality laboratory

Potable Water		
Chemical Analysis	No. Of Samples Collected	12681
	Compliance to Standards	98.97 %
Bacteriological analysis	No. Of Samples Collected	1430
	Compliance to Standards	89.3
Residual Chlorine Test	No. Of Samples Collected	2559
	Compliance to Standards	96.87

Problems identified

- High water loss in transmission pipelines almost throughout the Island
- Inadequate water storage capacity
- Increasing algae growth in surface water sources.
- 24 hour service cannot be assured.
- Low quality of pipe materials
- High turnover of technically qualified personnel
- Lack of training in water related fields.
- Low size of pipelines in certain areas.
- Sensitive issue for Government to increase tariffs if population do not see improved service

Priority Problem to be addressed

Reduction of Non Revenue Water through

- Pipe Replacement Programme
- Replace inaccurate meters
- Harnessing new water sources

Expectation for the Japanese Private Companies & water Supply Utilities

- Learning from the Japanese experience on water management, protection of water resources, leakage detection and reduction of non revenue water.
- Strategies to deal with water supply during water stressed situations (water scarcity)
- Implementation of appropriate water treatment processes to deal with new challenges- algae growth in reservoirs, increased use of fertilisers in reservoir catchment areas, etc

Thank You

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Course（A）

Kenya

COUNTRY REPORT

1. Brief description of Narok Water and Sewerage Company.

Kenya

Name: Narok Water & Sewerage Services Company.

Role:

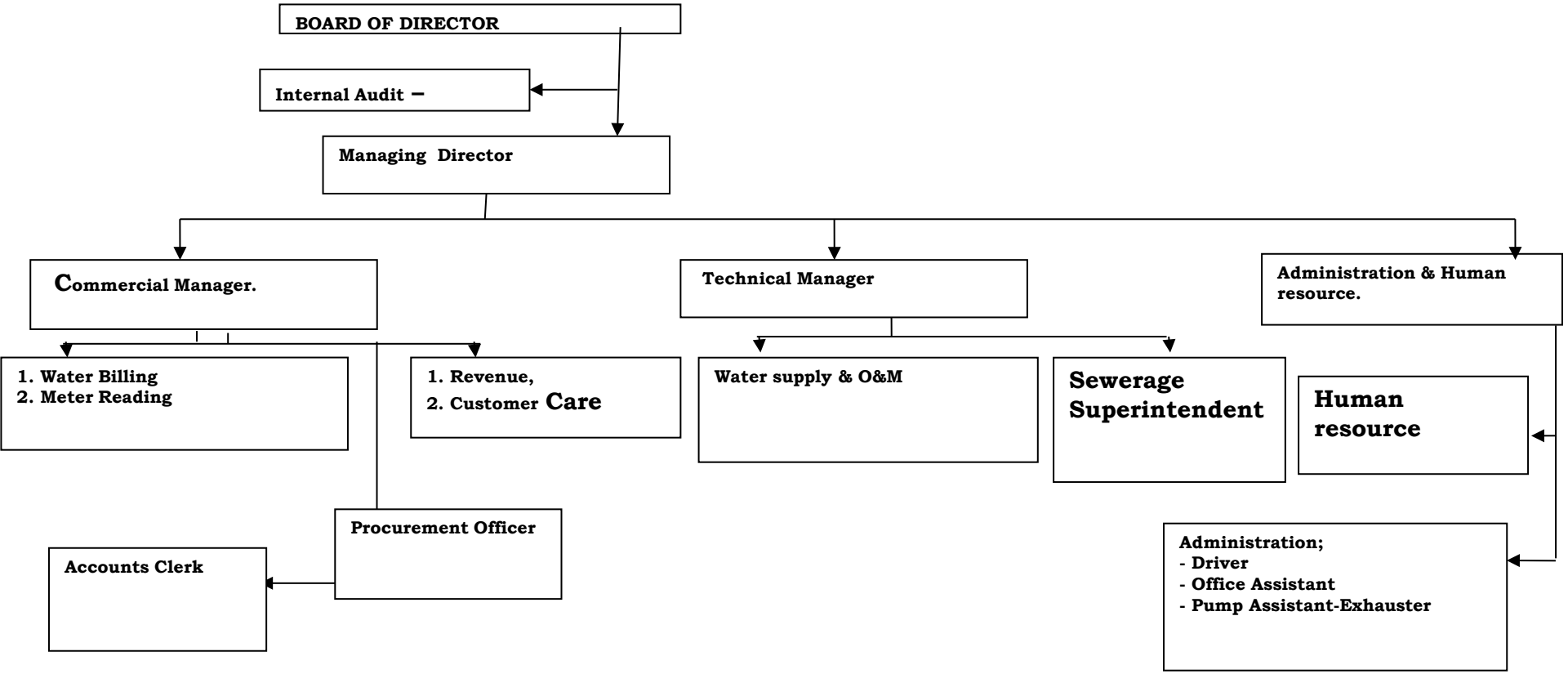
The company is charge with the responsibility of providing portable water and sewerage services to the residence of Narok town and it's environs.

The company is a limited liability company own by the town council of Narok and Rift Valley Water Services Board.

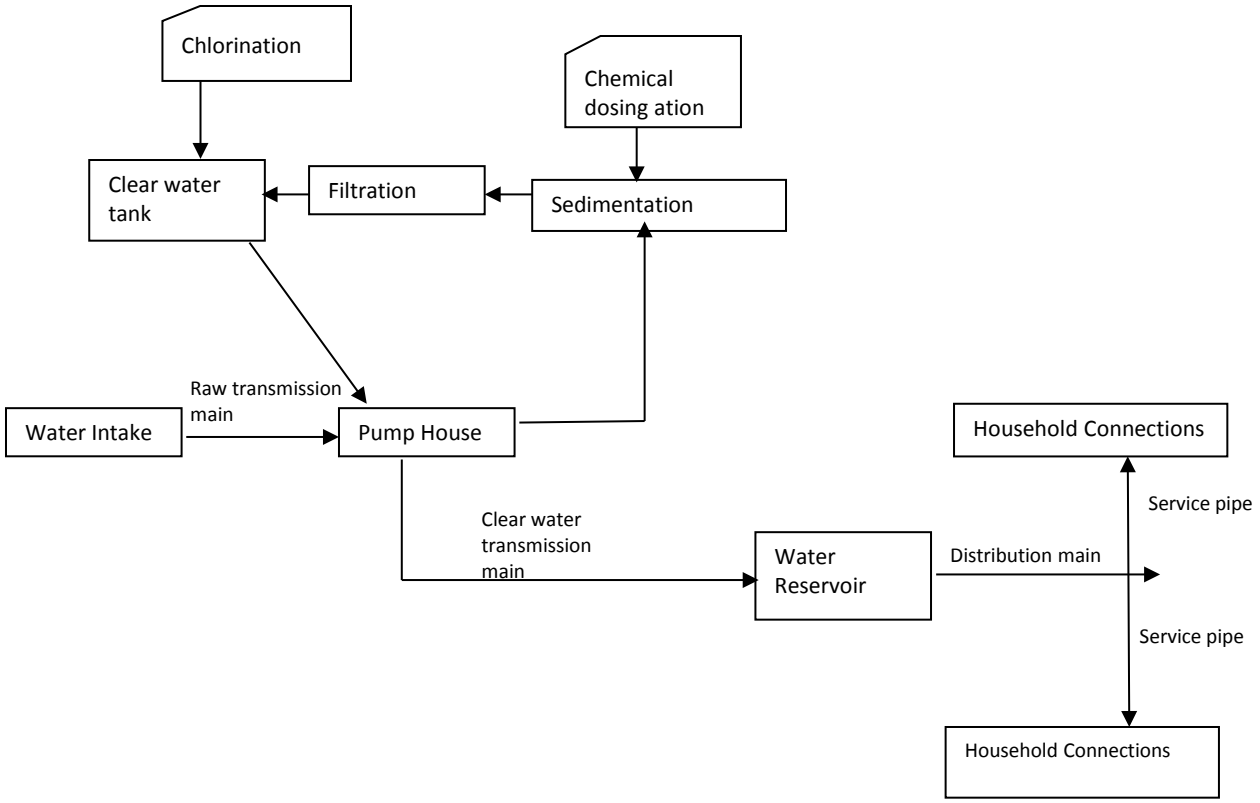
Currently am serving as the Managing Director of the company.

Attached is organization chart.

Organization chart



2. Flow chart from intake to water tap.



3. Current situation f water resources in the organization.

3.1 geographical background.

The forest cover within the company area of jurisdiction is around 20%. Residential land is approximately 10%. the rest is occupied by farmlands. (mainly crop farming and livestock keeping)

3.2 the precipitation per month.

Narok town experience two raining seasons per year. The long rains occurring in March, April and May and the “short rains” in October and November.

Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
85.19	80.86	97.94	134.3	92.73	33.2	18.8	21.93	26.79	30.28	73.2	74.1

3.3 Available Water Resources.

Enkare Narok River is the main source of water for company. This is a perennial river with a monthly variation of discharges (m^3/sec)

	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
Mean monthly discharge	0.109	0.047	0.061	0.23	0.193	0.122	0.257	0.315	0.288	0.241	0.115	0.122

3.4 Intake Water Volume

Daily intake water volume 2000m^3

Annual intake water volume 730,000m^3

3.5 WATER SOURCE OF THE FUTURE

Due to quality of underground water the water resources of the future will be surface water (Enkare Narok river). There is high concentration of floride and the yield from existing bore hole is below 15m3

4. POLICY AND REGULATORY ENVIRONMENT

The Ministry of Environment, Water and Natural Resources is responsible for policy direction within the country .It set the general policy direction for the whole water sector. The Water Services Regulatory Board is charge with the responsibility of regulating the water services sector. It approves tariffs, monitor quality and service standards. Water Resources management authority manages waters sources i.e rivers, lakes and and underground water.

5. WATER RATE AND BILL

5.1 Water Rate System

The company is applying water tariff approved by the Water Services Regulatory Board in March 2013. The tariff is derived in way to cover the cost of production. The current rate is approximate One USD per m^3.the tarriff is progressive and increase with consumption to 1.5 USD per m^3.

5.2 Bill Collection System.

The company operates an automated billing system.

Billing is done on a monthly basis on the that is 4^{th} week of the month. Customer are allowed two weeks to make payment and disconnection is done on the third week of the month.

6. WATER QUALITY

6.1. Water Source Management.

The main source of water for the company is Enkare Narok river. This river originated from Mau forest which is once of the main water tower for the country. The government has taken steps to conserve this catchment by prohibiting human settlement within the forest. A long the river, the Enkare Narok Resource Users Association under the Water Resources

Management Authority ensure that farmers and pastoralist adopt and apply better agricultural techniques so as not to contaminate the river. The company is member of the WRUA and actively participate in its activities.

6.2 Drinking Water Quality Standard

SL.NO	Substance or characteristics	Unit	Drinking water	Bottled drinking water	Methods of test
1	Colour	True colour units	15	15	Ks 05 -459
2	Taste and colour		Shall not be offensive to consumers	Shall not be offensive to consumers	Ks 05 -459
3	Suspended matter		Nil	Nil	KS 05 -459
4	Turbidity	NTU, max	5	1	KS 05 -459
5	Total dissolved solids	Mg/1, max	1,500	1,500	KS 05 -459
6	Hardness as $CaCo_3$	Mg/1,max	500	500	KS 05 -459
7	Aluminum as A_1	Mg/1,max	0.1	`0.1	KS 05 -459
8	Chloride as CL	Mg/1,max	250	250	KS 05 -459
9	Copper as Cu	Mg/1,max	0.1	0.1	KS 05 -459
10	Iron as Fe	Mg/1,max	0.3	0.3	KS 05 -459
11	Manganese as Mn	Mg/1,max	0.1	0.1	KS 05 -459
12	Sodium as Na	Mg/1,max	200	200	KS 05 -459
13	Sulphate as SO_4	Mg/1,max	400	400	KS 05 -459
14	Zinc as Zn	Mg/1,max	5	5	KS 05 -459
15	PH		6.5 to 8.5	6.5 to 8.5	KS 05 -459
16	Magnesium as Mg	Mg/1,max	100	100	KS 05 -459
17	Chlorine concentration	Mg/1	0.2 + 0.5	Nil	KS 05 -459
18	Calcium as Ca	Mg/1,max	250	250	KS 05 -459
19	Ammonia (N)	Mg/1,max	0.5	0.5	KS 05 -459
20	Fluoride as F*	Mg/1,max	1.5	1.5	KS 05 -459
21	Arsenic as As	Mg/1,max	0.05	0.05	KS 05 -459
22	Cadmium as Cd	Mg/1,max	0.005	0.005	KS 05 -459
23	Lead as Pb	Mg/1,max	0.05	0.05	KS 05 -459
24	Mercury (total Hg)	Mg/1,max	0.001	0.001	KS 05 -459
25	Selenium as Se	Mg/1,max	0.01	0.01	KS 05 -459
26	Chromium as Cr	Mg/1max	0.05	0.05	KS 05 -459
27	Cyanide as CN	Mg/1,max	0.01	0.01	KS 05 -459
28	Phenolic substances	Mg/1,max	0.002	0.002	KS 05 -459
29	Barium as Ba	Mg1/,max	10.	1.0	KS 05 -459
30	Nitrate as NO_3	Mg1/,max	10	10	KS 05 -459

6.3 drinking water quality monitoring system.

To ensure the quality of water supplied to our consumer is good we carry out analysis of raw and treated water. The company measure the turbidity of both treated and raw water to determine the amount of chemicals to be used for treatment.

Other test are the PH, temperature and residual chlorine .

Rift Valley Water Services Board conduct routine monitoring of water quality on quarterly basis this involves both the bacteriological and chemical tests. Other organization that conducts monitoring are the public health department and Kenya Bureau of Standard.

6.4 the company laboratory is not well

equipped to carry out all the necessary test. It’s manned by one laboratory technologist. The facilities can only be used for testing the basic test i.e. PH, turbidity, temperature and Residual chlorine

6.5 The Technical Manager and Water

Superintendants discuss with the water treatment plan staff on weekly basis on the quality report and take the necessary corrective caution. They discuss internal reports as well as the reports produce by other institutions.

7.1 Narok Water and Sewerage Company is in charge with the responsibility of supply portable water to Narok town and its environs. The population of Narok is about 43,500 people. Due to old infrastructure dating back to 1940's the company is able to serve about 15000 people. Current production is 1700m^3/per day against a demand of almost 5000m^3.

The company operates a rationing programme and about 5000 consumers have water on a 24hr basis. This are consumers in estates near the District Hospital and Maasai Mara University. The average hours of service is 8hrs.

From the treatment works, water is pumped directly to consumers this is because the company does not have enough storage facilities. The main cause being investment in water infrastructure has been in tandem with the rapid expansion of the town. NRW currently stands at 46%.

8. PRIVATE SECTOR PARTICIPATION

Private sector participation in the water sector is still at the infancy stage. This is because the sector has not been efficient in its operation.

The reforms in the water sector that were started in 2002 were mainly aimed at commercialization of the water operation. The formation of water utility companies has enable the sector to meet its cost of operation and attract investments mainly in the form of loans for infrastructure development. A number of N.G.Os and development partners (donor agencies) has been actively participating in capacity building for water sector institutions.

Currently the government through Water Services Regulatory Board approves regulated water tariffs, ensure compliance with water quality standards and approves water service providers.

The government through Water Service Board carry out capital investments (infrastructure development)

9. PRIVATIZATION

9.1 current situation

Privatization in the water sector is not well developed. this is due to enabling legislation. The Government has formed aprivatization commission to into possible areas of collaboration with the private sector. The Ministry of Environment, Water and Natural Resources has developed a concept paper on the possible area where private, public partnership may be viable.

9.2 Possible Type of Privatization

-BOT & concession for new facilities and takeover of the existing or newly constructed water services facility.

- Management contract: for Non Revenue Management, internal operation, enhancing operational effectiveness
- Lease contact for entire water facility or stand alone component e.g. water production, treatment, distribution e.t.c.

10. OTHER SOURCES OF WATER

- Little Narok Water Supply
- Rain water catchment
- Raw water from the river

10.2 due to the rationing schedule, most of the large consumers have large storage facilities.

- Plastic water tank.
- Underground masonry tanks of between $10m^3$ to $50m^3$

10.3 Narok town currently does not have a convectional sewerage system,. The residents rely on improved pit latrine and septic tanks.

The company offer exhausters services and which are dispensed in the town council drying beds.

The company has developed a concept paper on sewerage system and currently looking for potential donors/ e.g. from government or development partners to assist.

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Serbia

Water Supply Administration for Better Management of Water Supply Services

Country Report

Country: **Serbia**

Organization profile

Organization: National government

Ministry of Agriculture, Forestry and Water Management-Directorate for Water

Responsibilities:

- Water management policy
- Multipurpose water usage
- Water regime
- Protection from water
- Water protection measures
- International cooperation
- Other activities according to the Law on Water

Position: **Senior Advisor in Subdivision for administrative and analytical activities and standards in the field of water management**

Department for the Legal, Financial and Administrative Affairs

Department for administrative and analytical tasks and standards in the field of water

Group for strategic planning and management and international co-operation in the field of water

Directorate for Water

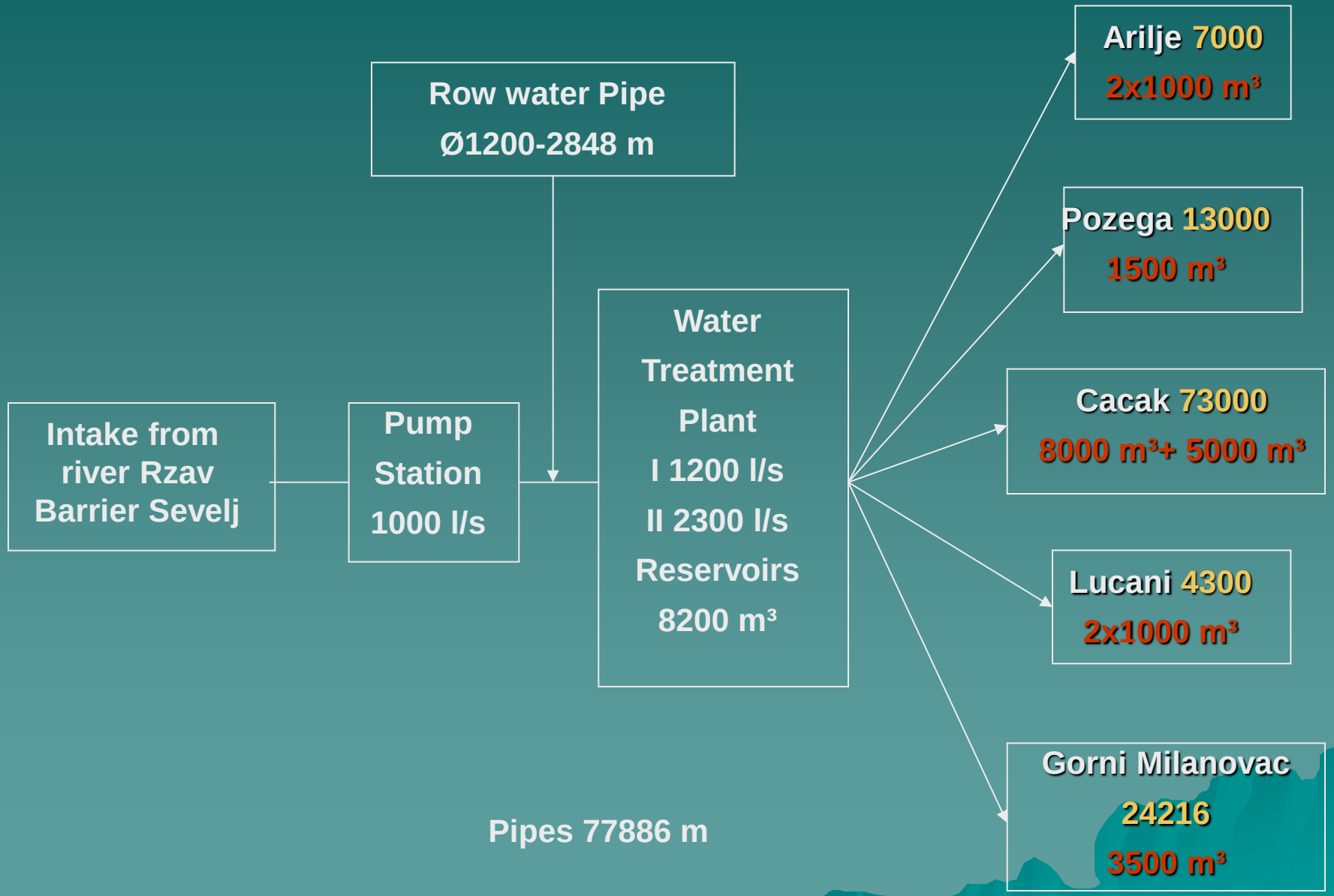
Group for water use and protection of water from pollution

Group for protection from the harmful effects of water

Department of Water Inspectorate

Regional System Rzav

City-inhabitants-reservoir



Water resources

- Geographical background-division of land (ha):
  - forest: 2.220.328
  - urban areas: 221.321
  - arable land:2.016.576
  - pastures:154.724
  - Surface water: 84.021
- Average precipitation (437 precipitation stations):
  - 730 mm/year (from 600 in lower regions -1000mm/year in higher regions)
  - the most: May-July, at least: January-March,
  - max/day 220mm, max/year 1885 mm
- Water resources: ground water and surface water

Policy and regulations

Ministries responsible for certain aspects:

- Ministry of Agriculture, Forestry and Water Management
- Ministry of Regional Development and Local Self-Government
- Ministry of Health
- Ministry of Construction and Urbanism
- Ministry of Energy, Development and Environmental Protection
- Ministry of Natural Resources, Mining and Spatial Planning
- Ministry of Finance and Economy

Regulations:

- The Water Low
- The Low on Assets Owned by the Republic of Serbia
- Law on Communal Activities
- The Water Master Plan
- The Local Self-Governance Low
- The Concession Low
- The Planning and Construction Low
- The Low on Public Companies and Public Interest Activities

Process of legal harmonization with the European Union regulations

Water rate system and the bill collection system

Ministry of Agriculture, Forestry and Water Management (Low on Water)-the water asset fee

- water extracted from surface water or groundwater for drinking, irrigation, process, municipal, and/or other purposes
- abstracts and/or distributes water by means of a regional or multipurpose water system
- water extracted for drinking water supply by means of a public water supply system
  - companies and other legal entities 421,6 dinars/m3 (0,4€)
  - citizens 218,2 dinars/m3 (0,2€)

Local authorities (Law on Communal Activities-Ministry of Construction and Urbanism)-tariffs

- drinking water that is distributed to the public water system (unified collection and different tariffs)
  - companies and other legal entities 0,8-1€/m3
  - citizens average 0,3-0,35€/m3

Current situation of water quality management

Water Source Management

- Regulated by the Water Low
- Water enactments:
  - water criteria, procedure for the preparation of technical documentation for construction or reconstruction
  - water approval establishes that the technical documentation has been prepared in conformity with issued water criteria
  - Water permit defines the method, conditions, and extent of water use

Regulations

- Directive EU for drinking water 98/83 EC
- Rule on limit values for priority substances and priority hazardous substances in surface waters and the deadlines for the achievement thereof
- Rule on limit values for pollutants in surface waters and the deadlines for the achievement thereof
- Rule on limit values for pollutants in surface waters, groundwaters and sediment
- Regulation on Hygienic Quality of Drinking Water
- Rule on Sanitary protection zones of water sources for drinking water supply

Monitoring system

- Annual program of monitoring of water status
- Annual program for Continuous measurement of water quantity and testing of water quality for water bodies from which more than 100 m3/day can be abstracted for the supply of drinking water and/or water for sanitary and hygienic needs in the future

Measurement and testing

- National organization responsible for hydro-meteorological affairs
- Legal entity authorized by the Ministry (certificate of accreditation)

Water Supply Services
- Private Sector Participation -Privatization

Water supply services

- Population: 7 186 862
- Population served by the utilities: 77% (with 24 hours supply of potable water)
- Non ravenue water (NRW): 30% (through leaks and theft or metering inaccuracies)

Private sector participation and privatization

- No private sector investments or any kind of participation
  - Local governments form the PUC and exercise management rights over them
  - the PUC are not owners the property they use, and neither are their founders - cities and municipalities
  - Owner of all assets used by PUC is state
- Strategy for restructuring the local PUC
- Strategy for transformation the local PUC

The ordinary activities of PUC

(Law on Communal Activities)

- Water purification and distribution of water
- Purification and drainage of rainwater and wastewater
- Production and distribution of steam and hot water
- Transportation of passengers in public transport
- Maintaining cleanliness in towns and villages in the municipality
- Organization and maintenance of parks, greenways and recreational areas
- Maintenance of streets, roads and other public areas in cities and other neighborhoods and public lighting
- Maintaining landfills
- Organization and maintenance of cemeteries

National government involvement:

- Financing
  - the preparation of a water balance, monitoring of the availability of water resources and measures for ensuring efficient use and protection
  - preparation of groundwater balances by resource
  - water quality testing and investigations at the water source
  - protection of the sources of water supply;
  - the erection and reconstruction of publicly-owned water constructions for regional water supply systems and municipal water supply systems (water abstraction facilities, drinking water treatment plants, principal water mains and their appurtenances
- Reference price of water
  - establish a methodology for the calculation of the price charged for the supply of drinking water by means of a public water supply system
  - stipulate criteria for the determination of the reference price of water;
  - set the reference price of water.

Other

- Alternative water supply
  - private wells for individual supplying and as secure water for large buildings
- Sewage systems in Serbia
  - Population connected to the sewerage system : 46%
  - 26 WWTP (8 WWTP meet the criteria)
  - To extend sewerage system to 65% by 2019
  - Implementation of Council Directive 91/271/EEC
- Solid waste disposal
  - Illegal dumping (about 4 481) and several landfills
  - Plan: transfer stations for waste and regional landfills

Problems

- Funding limitations: for construction, operation and maintenance
- Inappropriate institutional framework: divided and often unclear responsibilities
- Inadequate cost-recovery framework: consequence of the economic and legal framework situation

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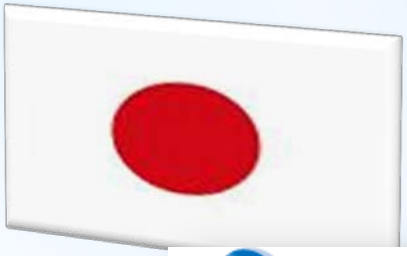
Ethiopia

* Addis Abeba water and sewerage authority (AAWSA)



JICA Japan International Cooperation Agency

Ethiopia

Country report

*Water supply administration for better management of water supply services (A) J13-00774

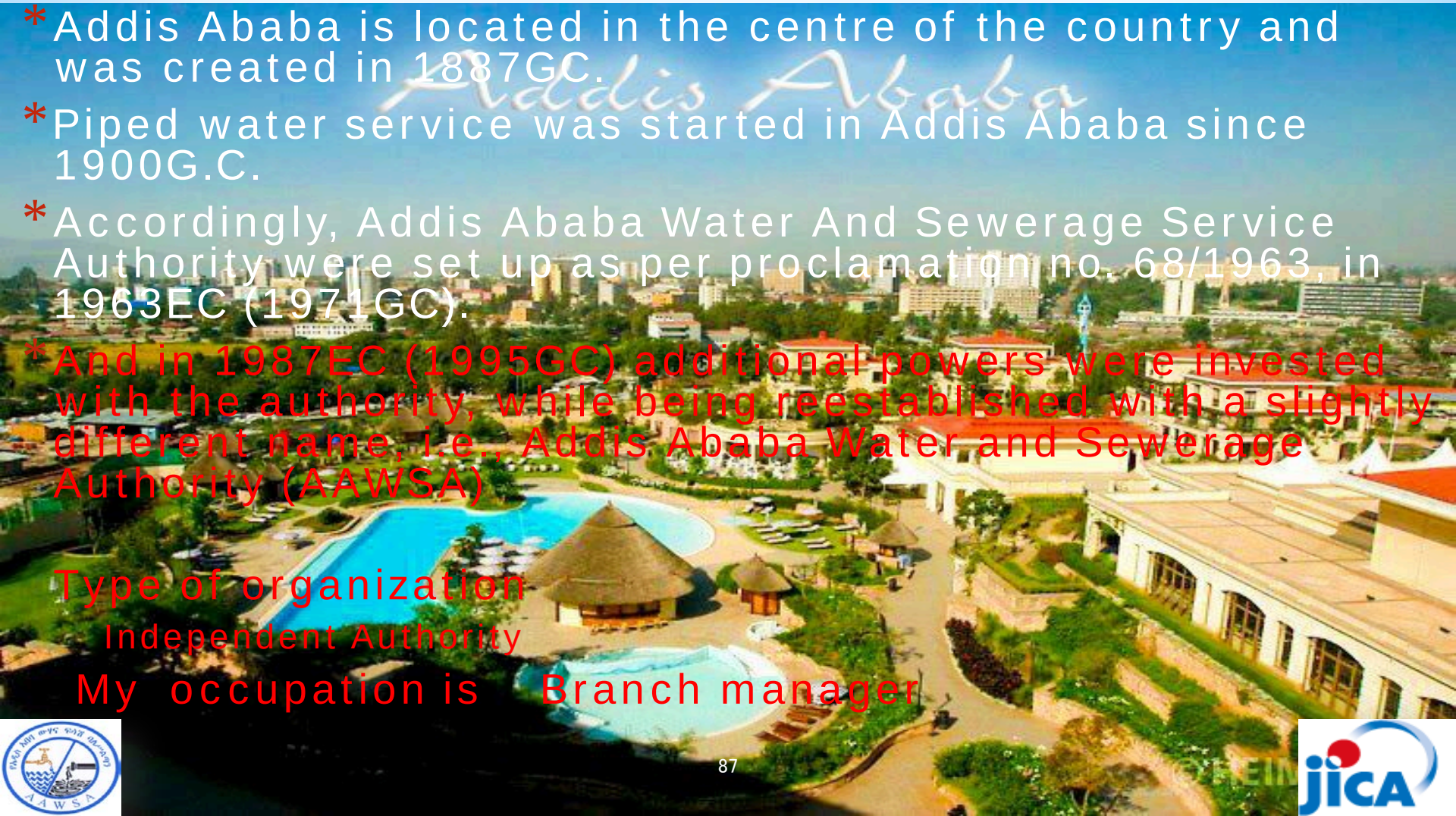
Basic Information

- ✓ Ethiopia is situated in East Africa
- ✓ Total area-**1.1million sq.km**
- ✓ **Capital City Addis Ababa**
- ✓ **9 States 2 city administration**
- ✓ Total no of Cities **116** out of these 22 are large cities
- ✓ Ethiopia's topographical diversity encompasses high and rugged mountains, flat-topped plateaus, and deep gorges with rivers and rolling plains with altitudes ranging from 110 m below sea level to over 4,600 m above sea
- ✓ Lake Tana in the north is the source of the Blue Nile
- ✓ Total Population **-84.3 million**
- ✓ Estimated coverage population with water supply - **68.5%(54.8 mil)**
- ✓ Estimated coverage population with sanitation - **56%(44.8 mil)**
- ✓ Average Annual Rainfall **-848mm**
- ✓ Has atropical monsoon climate with wide topographical-induced variation. And have three climate zones;
  - ✓ Cool zones
  - ✓ Temprate zones
  - ✓ Hot low lands

Language-Amharic(official),Oromo, Tigrigna , & o

MAP OF ETHIOPIA

*ORGANIZATIONAL FRAMEWORK



* Addis Ababa is located in the centre of the country and was created in 1887GC.
* Piped water service was started in Addis Ababa since 1900G.C.
* Accordingly, Addis Ababa Water And Sewerage Service Authority were set up as per proclamation no. 68/1963, in 1963EC (1971GC).
* And in 1987EC (1995GC) additional powers were invested with the authority, while being reestablished with a slightly different name, i.e., Addis Ababa Water and Sewerage Authority (AAWSA)

Type of organization

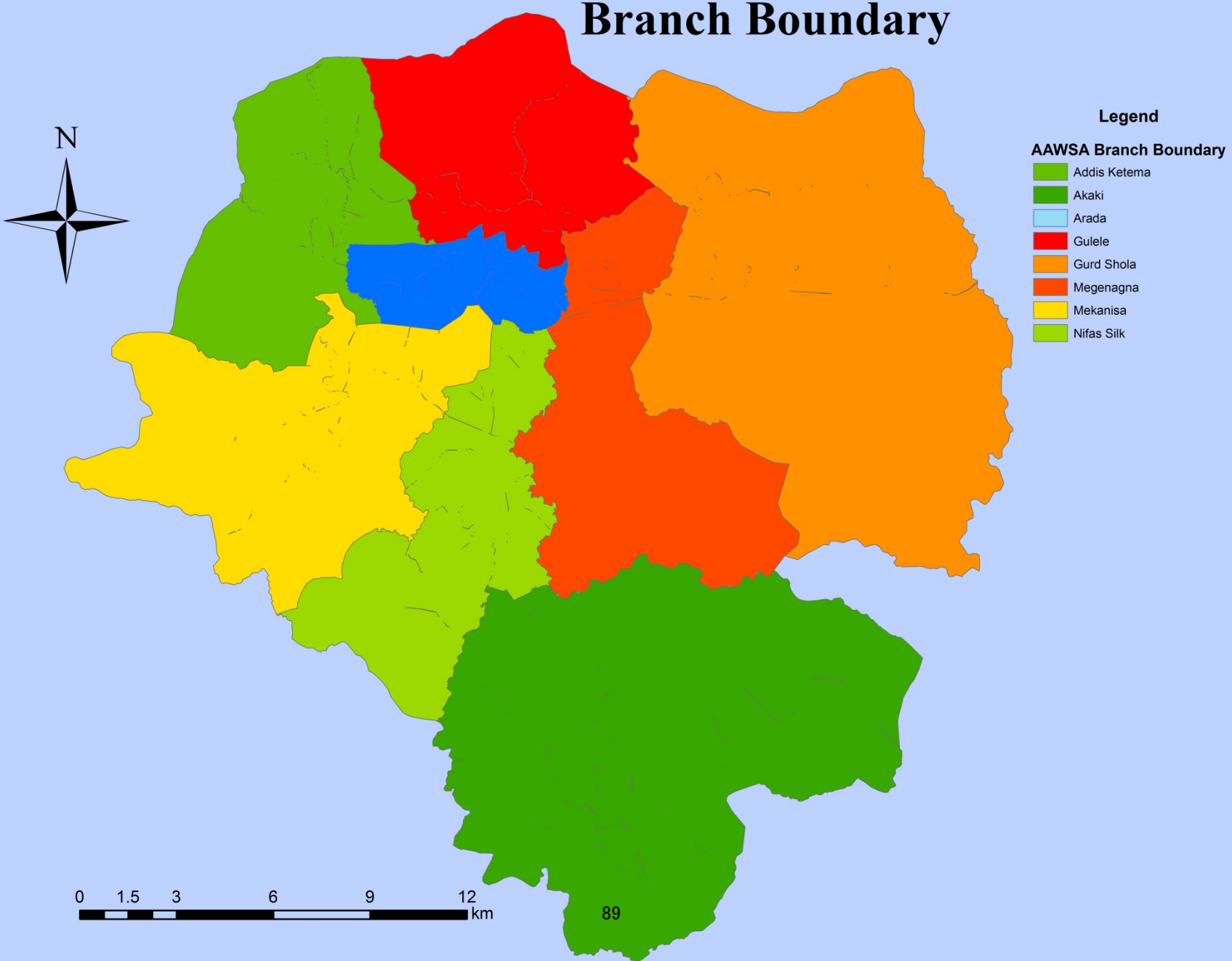
Independent Authority

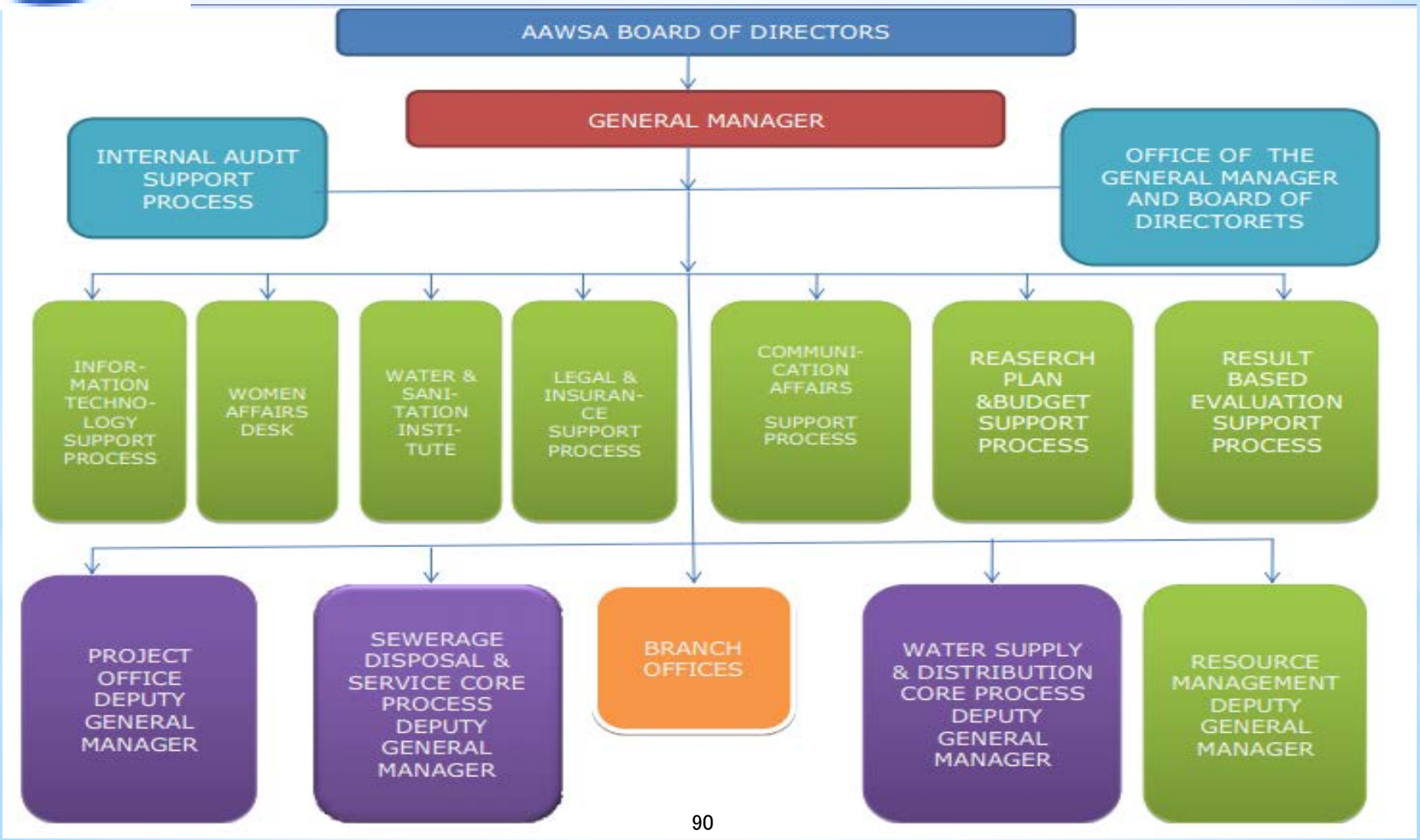
My occupation is Branch manager

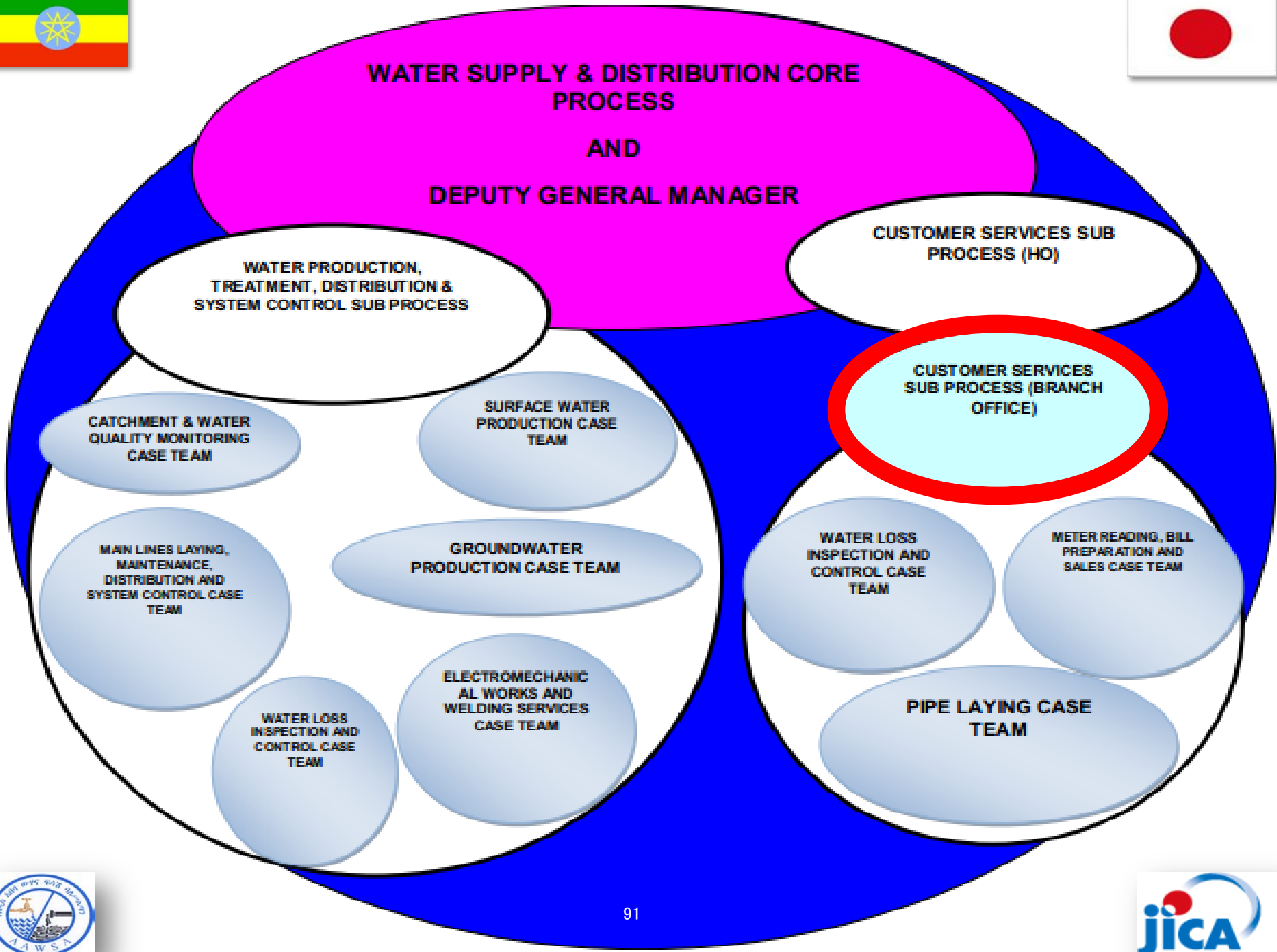
*Introduction

- The organization is government organization established by the city government responsible for distribution of water, collecting bill and disposal of west water
- Since 2010 the organization enter into business process reengineering focusing on the vision mission and objective of the organization
- In 2011 the organizational business plan is also done by consultant firm

Addis Ababa Water & Sewerage Authority
Branch Boundary




AAWSA BOARD OF DIRECTORS
GENERAL MANAGER
INTERNAL AUDIT SUPPORT PROCESS
OFFICE OF THE GENERAL MANAGER AND BOARD OF DIRECTORETS
INFOR-MATION TECHNO-LOGY SUPPORT PROCESS
WOMEN AFFAIRS DESK
WATER & SANI-TATION INSTI-TUTE
LEGAL & INSURAN-CE SUPPORT PROCESS
COMMUNI-CATION AFFAIRS SUPPORT PROCESS
REASERCH PLAN &BUDGET SUPPORT PROCESS
RESULT BASED EVALUATION SUPPORT PROCESS
PROJECT OFFICE DEPUTY GENERAL MANAGER
SEWERAGE DISPOSAL & SERVICE CORE PROCESS DEPUTY GENERAL MANAGER
BRANCH OFFICES
WATER SUPPLY & DISTRIBUTION CORE PROCESS DEPUTY GENERAL MANAGER
RESOURCE MANAGEMENT DEPUTY GENERAL MANAGER


WATER SUPPLY & DISTRIBUTION CORE PROCESS
AND
DEPUTY GENERAL MANAGER
WATER PRODUCTION, TREATMENT, DISTRIBUTION & SYSTEM CONTROL SUB PROCESS
CUSTOMER SERVICES SUB PROCESS (HO)
CUSTOMER SERVICES SUB PROCESS (BRANCH OFFICE)
CATCHMENT & WATER QUALITY MONITORING CASE TEAM
SURFACE WATER PRODUCTION CASE TEAM
MAIN LINES LAYING, MAINTENANCE, DISTRIBUTION AND SYSTEM CONTROL CASE TEAM
GROUNDWATER PRODUCTION CASE TEAM
WATER LOSS INSPECTION AND CONTROL CASE TEAM
ELECTROMECHANICAL WORKS AND WELDING SERVICES CASE TEAM
WATER LOSS INSPECTION AND CONTROL CASE TEAM
METER READING, BILL PREPARATION AND SALES CASE TEAM
PIPE LAYING CASE TEAM

* Water sources and distribution line

- The total amount of annual water supply **136,500,000m^3**
- Maximum daily water supply demand **460,000 m^3/day**
- Average water supply demand **322,000 m^3/day**
- Estimated total production volume **374,000 m^3/day**

Number of treatment plant **3**

Figure 6 Legedadi & Gefersa Water Treatment plant

al capacity of treatment plants **195,000 m^3/day**

AAWSA Water Supply

Dam III

Dire
700
600
Legedadi
1400
Gefersa
400

Legend

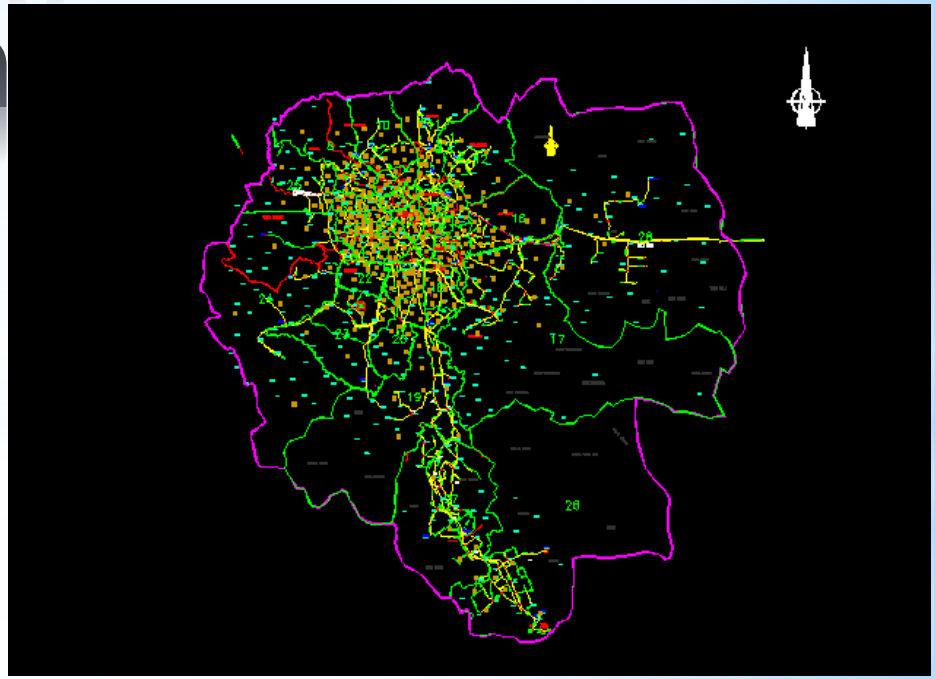
Distribution Pipes
- Length = **2837km**
- Pipe size **50mm - 400mm**
- Materials **UPVC, GS, HDPE, DCI, ISOP, Steel & JISP**

0 1,6253,250 6,500 9,750 13,000 Meters

*Distribution system

- A total of 60 Reservoirs & Pumping Stations exist.
  - At 24 d/f sites.
  - 41Reservoirs &19mainP.St.
- Reservoir Capacities Rang
  - 30 – 10,000M^3
  - NW15 Pressure Zone
  - TOTALWNW=3,700km

* Fucher plan to strengething distribution



- Increaseing daily water production from 374,000m^3/d to 420,000m3/d

- Drilling of 56 deep wells of depth reaching 600m or more to produce 90,000m^3/d.
- Rehabilitation of Legdadi treatment plant to increase the capacity by 30,000 m^3/d.

*The water rate

Table Current Tariff rates of AAWSA

Type	Category	Consumption m3	Rate (ETB/m3)	Charge of solid waste management	Charge for maintenance	Remark
Public tabs	No band	>0	1.75	5%	1%	Flat rate
Domestic	1st band	0 – 7 m3	1.75	20%	1%	Domestic customers are treated in a progressive tariff system
	2nd band	8 – 20 m3	3.80	20%	1%	
	3rd band	21 – 40 m3	4.75	20%	1%	
	4th band	41 – 100 m3	5.95	20%	1%	
	5th band	101 – 300 m3	7.45	20%	1%	
	6th band	301 – 500 m3	9.30	20%	1%	
	7th band	> 500 m3	11.60	20%	1%	
Non Domestic	1st band	0 – 7 m3	1.75	42%	1%	Non Domestic customers shall pay the amount in the band they are grouped for their consumption.
	2nd band	8 – 20 m3	3.80	42%	1%	
	3rd band	21 – 40 m3	4.75	42%	1%	
	4th band	41 – 100 m3	5.95	42%	1%	
	5th band	101 – 300 m3	7.45	42%	1%	
	6th band	301 – 500 m3	9.30	42%	1%	
	7th band	> 500 m3	11.60	42%	1%	

*Water quality management

- All the three catchments are conserved by participating the surrounding community there a need for more effort to be done for this activity with the high industrial development in the city and the surrounding area
- At all treatment areas and dams the water is treated following international standards
- The organization have its Owen independent laboratory for water quality
- It is checked every day before it is sent to the distribution system
- Every day samples are taken from all representative areas of the city to assure the quality up to individual customer

*Water quality management

- The challenge with the system is that the distribution lines are old and there is a linkage as well as no constant supply and pressure which could Couse water contamination
- The NRW project is held by the office to come over this problem

Water Quality

	Raw water	Tap Water (Treated water)
Turbidity (degree)	300-1600 (NTU)	< 1NTU
Color (degree)	1500-4000 (TCU)	< 5TCU
pH	7.4 - 7.8	7.4 - 7.8
Hardness (ppm)	34	34
Iron (ppm)	0.2-0.4	< 0.01
Manganese (ppm)	0.033	0.008
Nitrate Nitrogen (ppm)	0.004	0.004
Others Phosphate (ppm)	0.15	0.15
Sulfate (ppm)	0.2	0.2

*Water supply service

- The water supply service is the challenging activity in the city
- ✓ The topography of the city challenging the distribution
- ✓ The shortage of water in proportion to the population
- ✓ Long time service of the distribution line in the city

Arigatô Gozaimasu

THANKS!

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Amesegnalew

Photo

movie

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Afghanistan

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Zambia

Water Supply Administration for Better Management of Water Supply Services

1. Country: Zambia

2. Position: Senior Engineer – Water and Sanitation

3. Organization: Department of Housing and Infrastructure Development – Ministry of Local Government and Housing

Zambia's profile: Background

- **Water service provision**

There are three forms of water service provision in urban areas in Zambia: Commercial Utilities, Local Authorities and Private Schemes. In 2012 there were 11 Commercial Utilities which were formed between 1988 and 2010. They are owned by the Local Authorities and provide water services to more than 80% of the urban population with access to improved water supply. The size of the utilities ranges from 3,500 to more than 78,000 connections as their capacities differ considerably. There are 7 Private Schemes that are run by commercial entities whose core business is not water supply that supply water to their employees for free. In rural areas, district councils are in charge of water supply with the assistance of provincial support teams.

Whole Country:

Area : 752,618 km^2

Population: 14,310,000Habitants

Coverage Water Supply: 72.4% (81.8 % National Urban Water Coverage & 63% National Rural Water Coverage)

Selected Water Supply System/City: Lusaka Water and Sewerage Company – Lusaka City

Service Area : 360 km^2

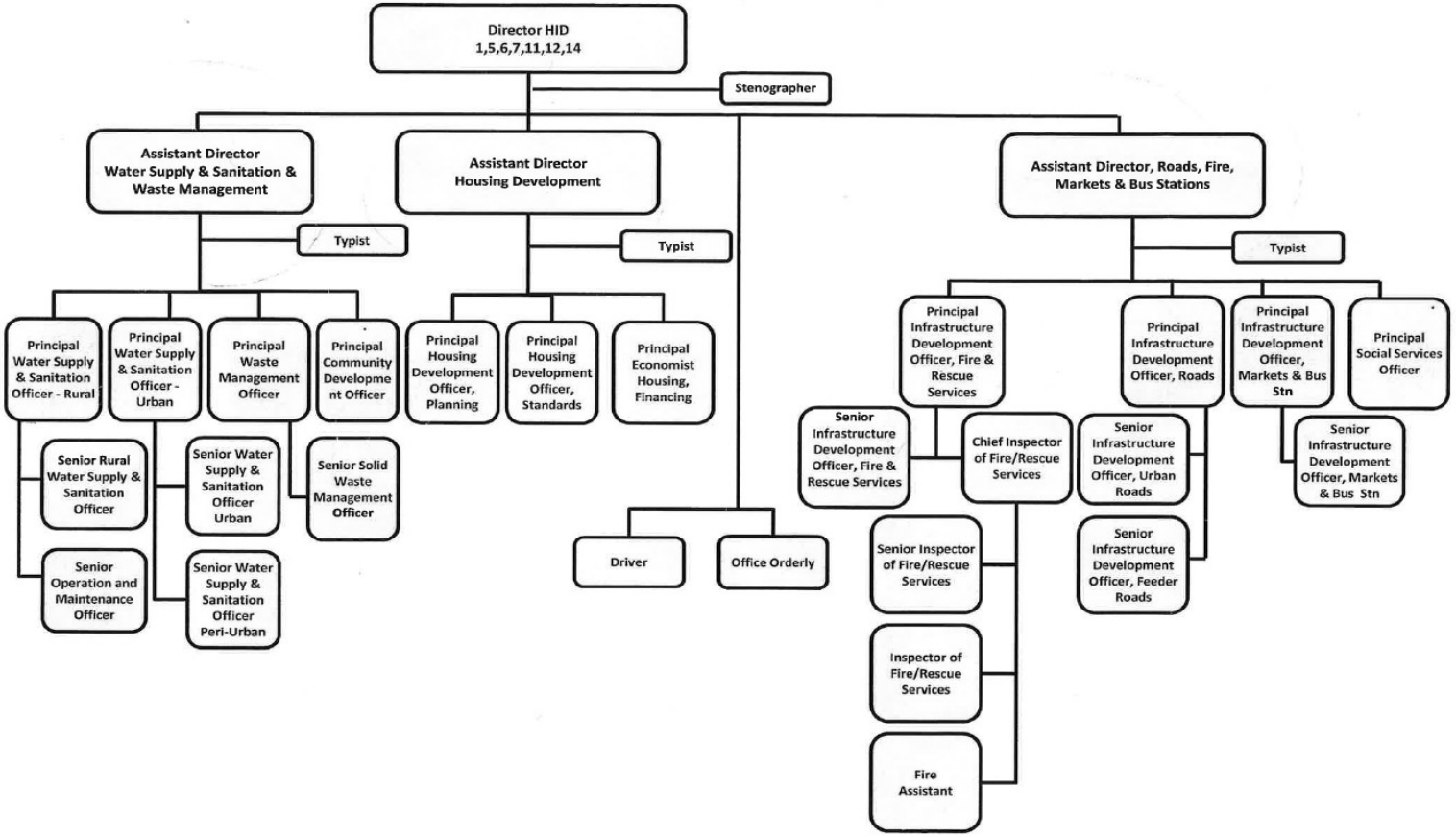
Population Served: 2.1 million

Mission

- Mission of my organization is to promote a decentralised and democratic local government system and facilitate the provision of efficient and effective delivery of quality housing, infrastructure and social services by local authorities and other stakeholders for sustainable development.
- My mission in the organization is to apply my skills and knowledge in order to facilitate the efficient and effective delivery of water supply and sanitation services to all Zambians through local authorities and other stakeholders for sustainable and economic development.
- My actual job to achieve the mission is to prepare annual work plans for the urban water supply and sanitation section as guides to activities to be undertaken during the year, to facilitate the building of capacity in Local Authorities to prepare project proposals for possible capital funding; to facilitate the development of sustainable urban and rural water supply, sanitation and waste disposal systems; to promote the establishment of linkages between Local Authorities and Co-operating partners; to participate in the selection of Contractors and Consultants; and to provide technical advice on to Local Authorities on management of projects.

Organizational Chart

DEPARTMENT OF HOUSING AND INFRASTRUCTURE DEVELOPMENT (DHID)



1. Management of water quality

1-1 **Challenges of Water Quality**

Contaminated water source, failure to adequately treat the water, inadequate water treatment facilities, vandalism of water and sanitation infrastructure and sheer laxity to comply are among the major problems for Lusaka and other cities.

There are also dangers of Groundwater Pollution in certain peri-urban areas of Lusaka. These challenges usually pose a health and environmental hazard.

1-2 **Actions against the problems**

Capacity building and training is being undertaken on how to best manage the quality of water; this includes pollution prevention of both ground and surface water.

Government is revising the water policy so that the WSS programmes for both Urban and Rural are implemented effectively, and this will ensure water quality.

The National Water Supply and Sanitation Council, NWASCO (economic regulator) is implementing guidelines, ensuring that all water providers meet required standards for water supply and sanitation including WHO guidelines.

1-3 **Monitoring System and Plan to ensure water quality and safety**

Responsibilities in the water sector are clearly separated between the Ministry of Local Government and Housing (policy), National Water Supply and Sanitation Council (economic regulation) and local government as well as commercial utilities owned by local government (service provision in urban areas).

The Ministry of Local Government and Housing is in charge of sector policies. Within the Ministry the Department of Housing and Infrastructure Development (DHID) is responsible for water supply and sanitation infrastructure, planning and resource mobilization. DHID established a specific Rural Water Supply and Sanitation Unit (RWSSU) in 2003 and shortly thereafter also a unit for Urban Water Supply and Sanitation (UWSSU).

Economic regulation of water supply and sanitation services is the task of the National Water Supply and Sanitation Council (NWASCO) which oversees tariff adjustments, minimum service levels, financial projection and investment planning and corporate governance.

2. Reduction of non-revenue water1

- Constitution of Non-revenue Water – Lusaka Water and Sewerage Company 2012

System input volume	Authorized consumption	Revenue water	Billed authorized consumption	40,383,285 m^3 /year (51.2 %)
		Non Revenue Water (NRW)	Unbilled authorized consumption (ex. fire fighting, cleaning)	499,685 m^3 /year (0.6 %)
	Water losses		**Apparent losses (Unauthorized consumption (i.e. Illegal use, Customer metering inaccuracies)**	11,399,680 m^3 /year (14.5 %)
			Real losses (Leakage)	26,540,245 m^3 /year (33.7 %)

2. Reduction of non-revenue water2

2-1 **Challenges**

LWSC has identified Non Revenue Water (NRW) as one of its biggest challenges with water losses still averaging above 45%. The utility has experienced physical and commercial losses, and also inaccuracies in measurements as below:

Aged infrastructure; Rampant vandalism; Excessive Network Pressure;

Unidentified underground leakages; Delays in repairing Pipe failures;

Tank over-flows and spillages; Meter under-registration; Meter Reading Errors

Un-authorized Consumption; Data handling and accounting errors.

2-2 **Action taken**

To reduce NRW, LWSC is undertaking the following:

Increasing property metering and institute appropriate Meter management which include the consistent meter performance monitoring for timely meter replacements and to improve meter reading practices and data handling for reduced human errors by way of using hand held units or Automatic Meter Reading (AMR).

LWSC is also going to consistently monitor high consuming properties for accuracy in billing and undertake a thorough database cleanup in the 14 DMAs to ensure that all properties receiving water supply get billed for the service.

2-3 **Achievement**

Though NRW has not reduced much, achievements made are that the number of connections has increased leading to a higher number of customers paying revenue, but more metering should be done.

Besides, the number of supply hours per day have increased from 17 to at least 20, however, this varies from place to place.

3. Water supply service standards /Performance Indicators

3-1 **Challenges of water supply service standards**

A large number of unmetered customers is among the challenges affecting the standards of water supply service for the Lusaka water utility and others .

Other challenges are a low rate of cost recovery despite tariff increases in urban areas; limited capacity in the sector and insufficient progress in increasing access to sanitation.

A high level of Non Revenue Water in urban areas; a high rate of non-functioning rural water systems; and insufficient investment levels despite substantial foreign aid are other major challenges.

Also, wastewater treatment plants regularly do not achieve effluent standards. Capacities of plants like the Manchinchi in Lusaka have been out-grown by the population. Stabilization ponds such as in Kaunda Square in Lusaka city are in a deplorable state and pose a serious environmental hazard.

3-2 **Actions against the problems**

Consultancy services are being done on how to reduce Non Revenue Water.

Government and its Cooperating Partners have pumped funds in the water utilities to construct and rehabilitate water infrastructure, but much more needs to be done.

Metering of customers, including Government institutions, hospitals, universities and colleges, etc. is also being undertaken.

3-3 **Monitoring by Performance Indicators**

Coverage of the Service area - % of the population served with drinking water. Drinking water quality – No. of tests carried out and tests results within the national standards for drinking water. Service Hours – Water supply hours per day and hours to attend to customers per week. Billing for services – Billing, meter reading sequences, conditions for payment of bills by the customer. Pressure in the network and Minimum Flow Rate at the Customer Point for Water Supply – Minimum flow rate of 7 litres/min required at customer connection. Etc.

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

4-1 **Challenges of Lusaka Water and Sewerage Company supporting itself in management of water supply**

All CUs including Lusaka Water and Sewerage Company inherited dilapidated and inadequate infrastructure from Local Authorities. To compound this, the rate of urbanisation and population growth has not been matched by the rate of infrastructure development specifically for water supply and sanitation thereby impacting negatively on service delivery. Further, inadequate co-ordination in developmental planning has resulted in the allocation of plots without first providing the necessary services such as roads, water and sewerage reticulation systems. This has contributed to indiscriminate drilling of boreholes by individuals and companies thereby depleting underground water.

Erratic payment of bills by consumers especially the Government remains a huge sectorial challenge impacting the financial viability of the Commercial Utilities. Also, frequent power outages experienced in the country have negatively affected operations in reducing quantities of water produced and distributed resulting in low revenues generated and decreased consumer confidence in service delivery vis-à-vis reduced hours of supply.

4-2 **Current actions against the problem**

There has been Government investment and external support from Cooperating Partners to address the challenges though investment towards sanitation projects has been particularly negligible. The Ministry of Local Government and Housing has developed guidelines for water supply while a sanitation guideline is in draft. There is also need to further enforce the provision of the Act for Commercial Utilities to be consulted by Local Authorities in development planning. The regulator, NWASCO has been engaging stakeholders to promote payment of bills for Water Supply and Sanitation services but this needs to be a continuous process. CUs and NWASCO are lobbying Government and the power supply company to secure dedicated power to treatment plants for stable water supply.

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

Lusaka Water and Sewerage Company

2009/2010	INDICATORS	2011/2012
11	Staff/1,000 connections	11
260,904	Production capacity m3/d	269,863
WHO Guidelines	Water quality	WHO Guidelines
70.2%	Coverage area	81.8%
17hr/d	Supply duration	20hr/d
N/A	Supply pressure	N/A
73,240	Number of connections	78,394
48%	NRW	44%
80%	Collection ratio	84%
777	Staff number	826

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

- The water sector has evolved with 11 water utility companies providing water supply services though several utilities need adequate financial and technical support for them to become viable.
- Reforms have been done, and the water policy is being revised so as to effectively provide water supply and sanitation to all Zambians and achieve the MDGs by 2015 and vision 2030.
- The quality of water has improved and the number of water supply hours have increased due to investment in infrastructure by GRZ and its Cooperating Partners like JICA, World Bank, ADB, DANIDA and others.
- To strengthen consumer participation in WSS issues, NWASCO instituted a roving consumer forum to be held in each province so as to sensitise the public on their rights and obligations with regards to water supply and sanitation provision and service level guarantees.
- In line with the National Water Policy, Water and Sewerage tariffs have been increasing gradually in order to enable commercial water utilities move towards full cost recovery.

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

- As the Ministry, we expect Japanese private companies and Water Supply Utilities to partner with the Zambian Commercial Water Utilities and help them in building capacity, as well as assisting them on matters of project and financial management.
- We also expect Japanese companies and utilities to assist in providing consultancy services in water supply and sanitation, including project designing, monitoring, evaluation and assessment.
- Also expected is participation in the water supply contracts through partnership with the Zambian water utilities as this will not only help build capacity, but also provide a role model for the utilities to follow when executing their projects.
- Any other assistance available that can make especially Zambian water utilities that are limping sustain their operations and achieve their goals of becoming world class water utilities in providing water supply and sanitation are expected and welcome.

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

Sierra Leone

SIERRA LEONE

COUNTRY REPORT ON WATER

COUNTRY REPORT

CONTENTS

- ORGANIZATIONAL PROFILE
- FLOW CHART OF WATER SUPPLY SYSTEM
- POLICY AND REGULATION
- MANAGEMENT OF WATER QUALITY
- REDUCTION OF NON REVENUE WATER
- WATER SUPPLY SERVICE STANDARDS
- MANAGEMENT OF WATER SUPPLY SERVIVE ON A SELF-SUPPORTING BASIS
- MAJOR RECENT ACHIEVEMENT IN IMPROVEMENT OF WATER SUPPLY SERVICES / MANAGEMENT

ORGANIZATIONAL PROFILE

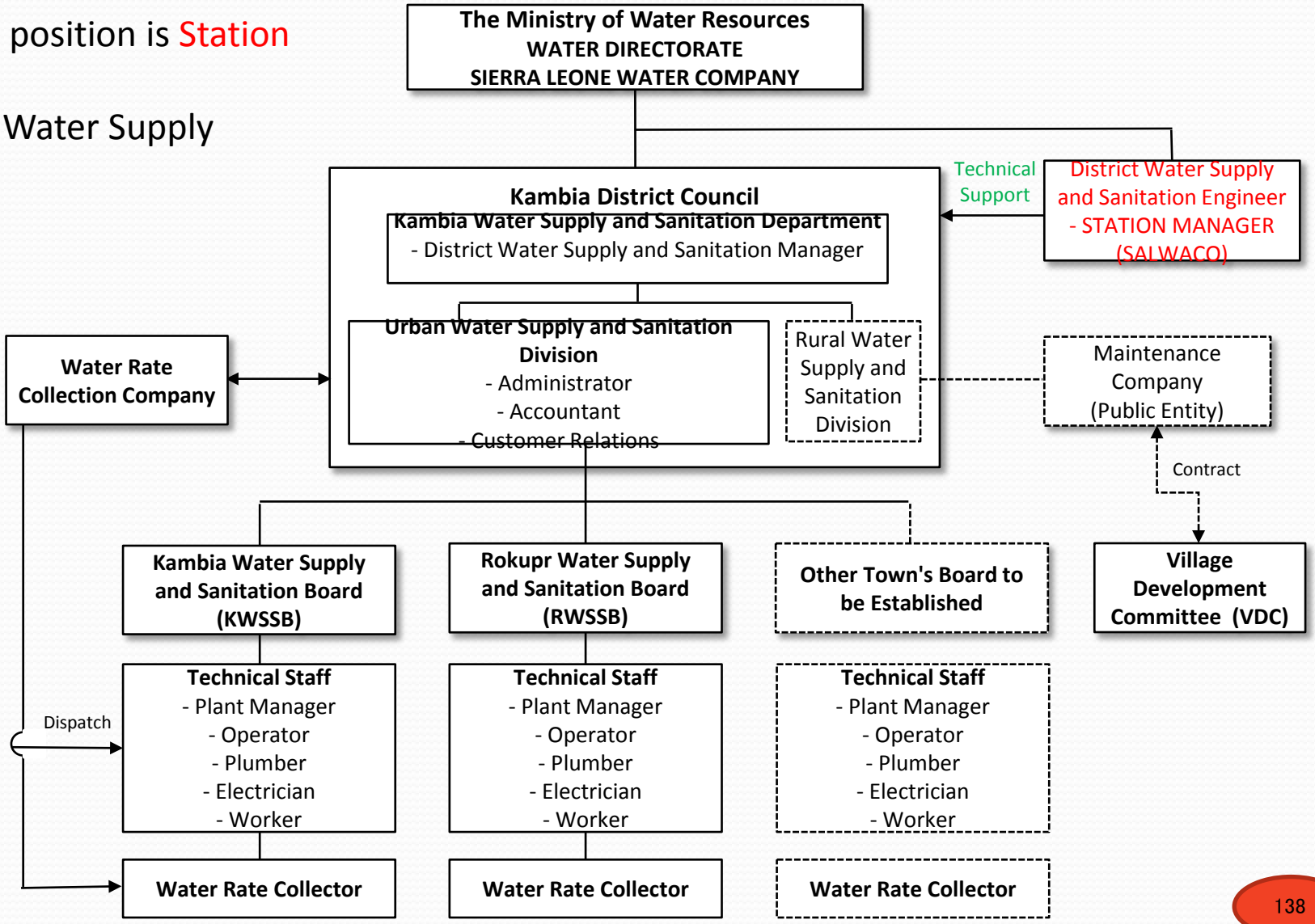
The official name of the organization is the Sierra Leone Water Company

The Sierra Leone Water Company (SALWACO) was established by an Act of Parliament in 2001 to develop and operate in each of the following specified areas (Lungi, Makeni, Koidu, Bo, Kenema), satisfactory water services at reasonable cost and on a self-supporting basis without adversely affecting the environment.

It has power to control water abstraction and pollution in the catchments from which it takes water for its supply area.

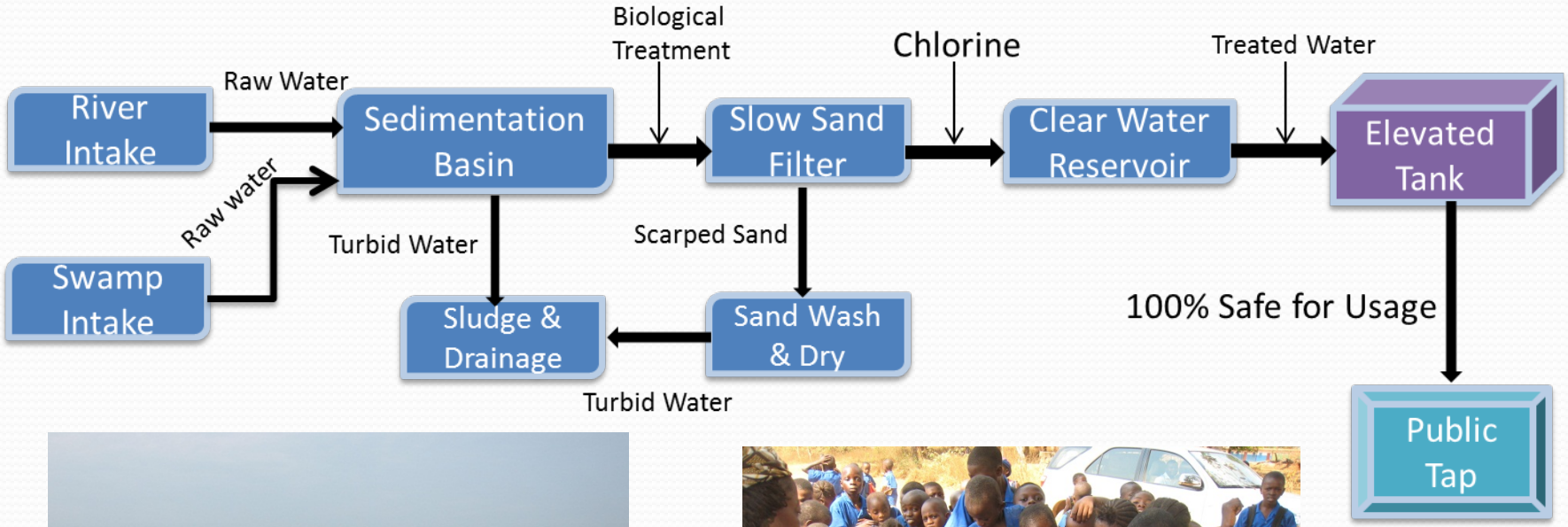
KAMBIA WATER SUPPLY STATION CHAT

My official position is Station Manager of Kambia Water Supply System



FLOW CHART OF WATER SUPPLY IN SIERRA LEONE

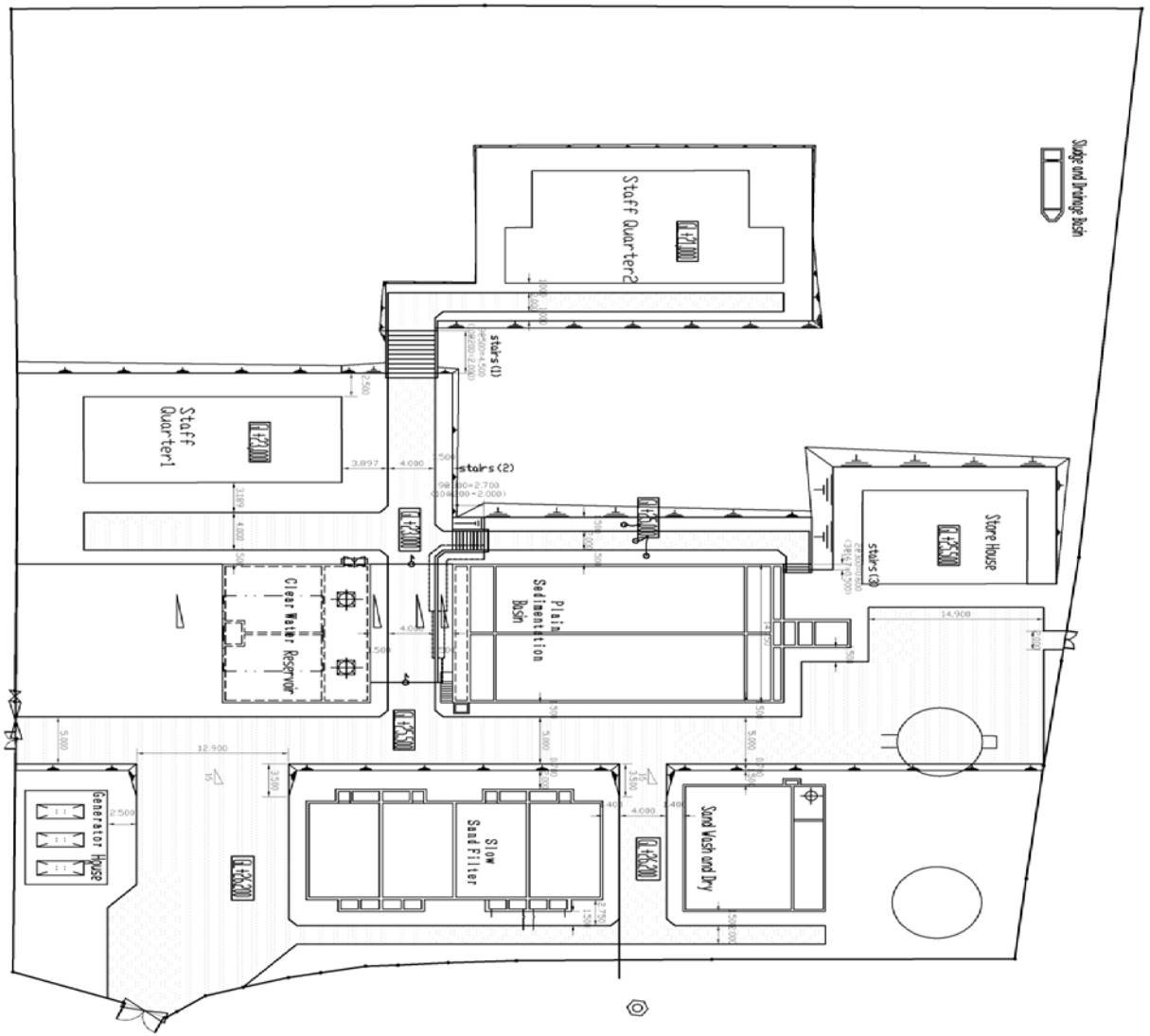
Kambia water supply system



KAMBIA WATER TREATMENT PLANT

Safe Drinking Water for Children

THE GENERAL TREATMENT WORKS



LAYOUT OF KAMBIA WATER TREATMENT PLANT

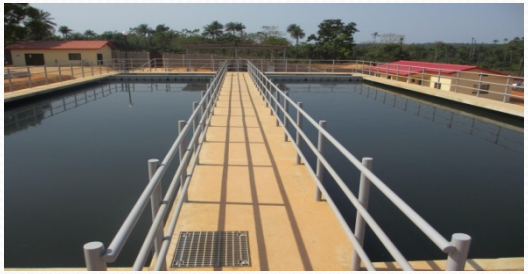
PICTURES OF THE KAMBIA WATER SUPPLY SYSTEM

River

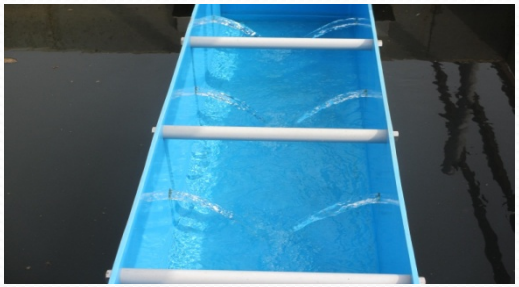
Swamp Intake with pump house

Receiving Well with Valves

Weir Plate set to check Flow of Water



Plain Sedimentation Basins



Effluent trough used to collect water

Filtration Process

Chemical Dosing Unit

Elevated Tank

Public Taps

THE CURRENT SITUATION OF POLCY AND REGULATION

The water supply sector in Sierra Leone has been until recently been characterized by the absence of a clear water policy.

Despite the abundant water resources, access to safe drinking water is very limited.

The deficiencies are now been address with the development of a number of planning and policy initiatives.

The key initiative is the NWSP 2010

The aim of the NWSP is to improve the integrated and cross sectional approaches to water management and development. Which will help to improve the financing, management, and delivery of sustainable water services in Sierra Leone and to enable whole rural and urban communities to adopt safe hygiene and sanitation practices and consume safe water.

THE CURRENT SITUATION OF POLCY AND REGULATION Cont…

WHAT ARE THE POLICY OBJECTIVES

- To develop a comprehensive framework for management of water resources.
- To improve the provision of safe water supplies and sanitation facilities through a coordinated approach.
- To address cross sectional interest in water resources through integrated and participatory approaches.
- To ensure stakeholders participation in the management of water resources.
- To put in place implementation strategies for sustainable development and management of water resources.

AREAS ADDRESSEDBY POLICY

- Water Resource Management
- Urban Water Supply and Sewerage
- Rural Water Supply
- Hygiene and Sanitation
- Institutional, Legal and Regulatory Framework

WHAT NEEDS TO BE DONE

- Effective Water Resources Management means
- Improvement of Urban Water Supply and Sewerage means
- Improved Rural Water Supply means
- Improved Hygiene and Sanitation means
- An effective Institution, Legal and Regulatory Framework means

LEGISLATIONS

- The Guma Valley Water Act (1961)
- The Water (Control and Supply) Act (1963) that lead to the formation of the Water Supply Division (WSD)
- The Sierra Leone Water Company Act (2001)
- The Environmental Protection Act (2000)
- Local Government Act (2004)
- Public Health Act 1996 and the 2004 Addendum

MANAGEMENT OF WATER QUALITY

The most important demand of Water in S/L is for domestic use

Absolute pure water is rarely Found although the surface water in S/L is of good quality

GoSL have set certain standards

- Responsibility of National water laboratory to check and analyze water
- Testing the physical, chemical, biological, radiological agents that has the potential to cause harm.

CURRENT SITUATION AND MAJOR CHALLANGES IN SIERRA LEONE

- Lack of comprehensive knowledge of the surface water and groundwater potential
- Lack of up to date information on water quality
- No legislation on water quality monitoring
- Dilapidated and non-functional water quality laboratory
- Serious health risks from water related diseases

MANAGEMENT OF WATER QUALITY CONT…

ACTIONS TO HELP IMPROVE WATER QUALITY IN SIERRA LEONE

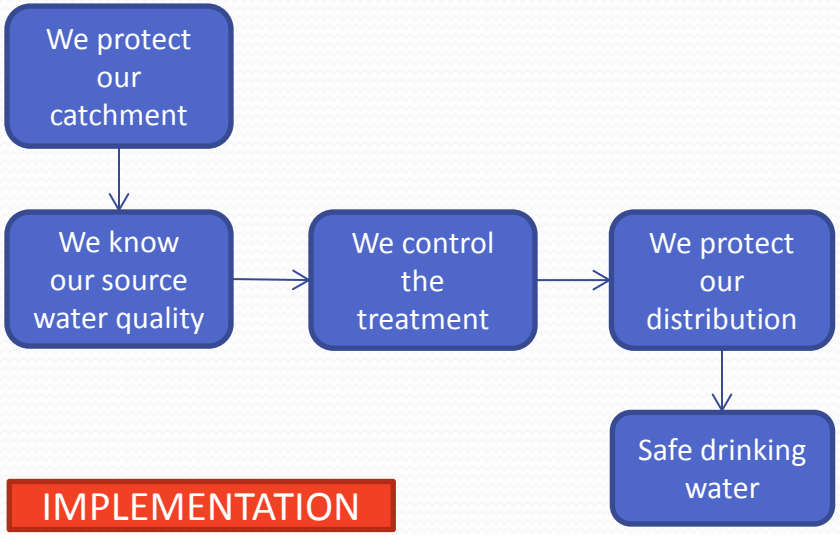
- The formation of the Ministry of Water Resources
- The establishment of Water Directorate and the enactment of the National Water policy that will promote good water quality measures
- Ongoing scientific study on ground water mapping and surface water
- The rehabilitation of the National Water Quality Laboratory

ACHIEVEMENTS

- National Water Quality Laboratory is testing the quality of all water supply systems in Sierra Leone and a data base is prepared that will be periodically updated
- There is continuous surveillance on public health assessment and the safety and acceptability of drinking water supplies
- Effective treatment for some unprotected hand dug wells as a way to help combat the outbreak of cholera

MANAGEMENT OF WATER QUALITY CONT…

At SALWACO water safety plans involves System assessment, effective operational monitoring and management plans



IMPLEMENTATION

- Effective chlorination
- Resources and source protection
- Collecting and evaluating available data
- Forestry protection Act 1999

PLAN OF SAFETY OF SUPPLIED DRINKING WATER BY SALWACO

- Preventing pollution and contamination of our source water
- Treatment of water to remove or reduce contamination that could be present to the extent necessary to meet the water quality standards
- Prevention of re-contamination during storage, distribution and handling of drinking water
- Application of the multiple barrier approach

PICTURES SHOWING THE CURRENT SITUATION ON MANAGEMENT OF WATER QUALITY

Collection of water sample for testing

Testing of water quality without lab

Testing the physical properties

Testing of water quality without lab

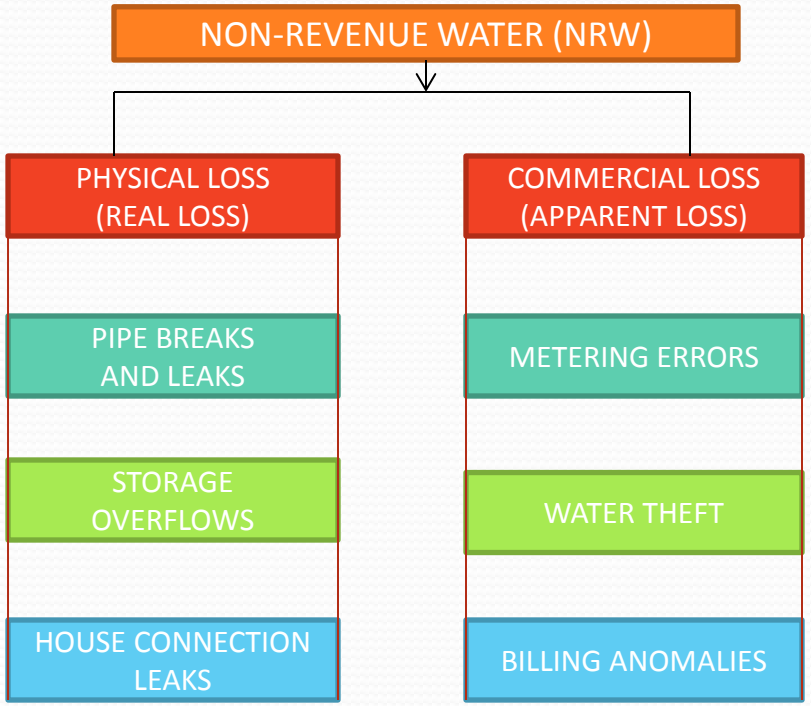
REDUCTION OF NON-REVENUE WATER

NON-REVENUE WATER: Is the considerable difference between the amount of water treated and put into distribution system and the amount of water billed to consumers

CURRENT SITUATION AND MAJOR CHALLENGES/PROBLEMS

- About 46% of the treated water in Sierra Leone is unbilled and 40% of our old systems leak considerably
- Several unauthorized connection by utilities
- Lack of knowledge of the magnitude of the problems
- Lack of capacity of utility staffs in various profession
- Lack of the management focus to handle NRW
- Lack of the enabling environment and incentives

COMPONENTS OF NON-REVENUE WATER IN SIERRA LEONE



REDUCTION OF NON-REVENUE WATER CONT…

CURRENT ACTIONS AGAINST THE PROBLEMS

- Effective leakage reduction activities
- Preparation of consumer data base system to aid better accountability, marketing and customer orientation
- Current ongoing consumer survey and registration
- Discouraging illegal connections which promote fairness
- Capacity building for staffs so as to reduce NRW
- Private sector investment with performance-based contract

ARCHIEVEMENTS

- Increase knowledge about the distribution systems
- Reduction of property damage for utilities
- Reduction in water loss
- Reduced risk of contamination
- More stabilized water pressure throughout some distribution systems
- Small financial gains from water sales

WATER SUPPLY SERVICE STANDARDS

The people of Sierra Leone are entitled to a guaranteed minimum Water service standards as laid by the Government of Sierra Leone

The provision of water supply is shared Between GVWC, SALWACO and Local Councils

The water supply systems are in poor conditions and inadequate to meet growing demand

MAJOR CHALLENGES/PROBLEMS

- Insufficient water production by utilities
- Old and inadequate distribution systems
- Lack of sufficient financial resources
- Lack of competition between service providers and natural monopoly exist in the sector
- Unrealistically low tariff and high operating cost
- Lack of adequate trained personnel
- Poor quality of service (water quality, continuity of supply and service pressure)

WATER SUPPLY SERVICE STANDARDS CONT…

CURRENT ACTIONS AGAINST THE PROBLEMS

- The formation of the Ministry of Water Resources
- Increase in Government investment in the water sector
- Rehabilitation and reconstruction of existing water supply facilities in the country
- Increase in capacity building programs for both technical and administrative staff
- Benchmarking for utilities and all actors in the sector

MONITORING BY PERFORMANCE INDICATORS (PI)

- Increase in number of people with access to adequate potable water supply from 46% in 2005 to 49% in 2009
- Percentage reduction in unaccounted for water
- Cost recovery in water supply services
- Quality of water supplied by utilities
- Continuity of water supply
- Time spent by women and children in collecting water

PICTURES SHOWING SOME PROBLEMS IN SIERRA LEONE AMONG WATER UTILITIES

Severe water leakage (NRW)

Damaged pipes in distribution networks

People fetching water from street taps

Women & children suffering for water

MANAGEMENT OF WATER SUPPLY SERVICE ON A SELF-SUPPORTING BASIS

The situation in Sierra Leone is serious as all utilities are unable to operate their facilities on a cost recovery basis leading to water crisis in the capital city, district head quarter towns and villages.

CURRENT SITUATION AND MAJOR CHALLENGES/PROBLEMS

- Lack of better water supply facilities in the country leading to huge number of the population without water
- Water utilities largely depends on the Government and external donor support
- Limited financial support to utilities by the Government
- Capacity limitations amongst existing sector institutions and utilities
- Devolution to Councils with limited capacities and with no program for capacity development for the sector at the various level
- Dwindling external resources and weak returns on investment in the water sector

MANAGEMENT OF WATER SUPPLY SERVICE ON A SELF-SUPPORTING BASIS CONT…

CURRENT ACTIONS AGAINST THE PROBLEM

- Rehabilitation and expansion of the existing Degremont facilities
- Use of alternative low cost technologies (gravity fed systems, slow sand filtration systems, boreholes and hand dug wells)
- Ongoing tariff studies and setting up of a cost recovery tariff system
- Massive awareness raising campaigns to create reforms requiring adequate fees for sustainability of the facilities
- Recommendation toward privatizations
- Enactment of a new water law which create a legislative framework for all those in the sector
- Undertake extensive capacity building for sector institutions

MAJOR RECENT ACHIEVEMENT IN IMPROVEMENT OF WATER SUPPLY SERVICES

- The establishment of rural water supply system for Kambia Town under Japanese Grant-Aid
- The rehabilitation and reconstruction of existing water supply facilities that were damaged during the war
- Strengthening institutional capacity and encouragement of private sector participation in developing a sector policy and action plans
- Policy, legislative and institutional measures are now in place
- High sensitization to increase community awareness, public participation and increase knowledge of water resources
- Massive support and financial assistance in developing new systems from Japan International Cooperation Agency, World Bank, African Development Bank, Asian Development Bank, Department for International Development and the Islamic Development Bank etc.

END OF PRESENTATION

Thank you for your attention

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

Nigeria (1)

Water Supply Administration for Better Management of Water Supply Services (A)

Country Report

Presented

By

Chief Admin. officer/ Head of Planning, Research & Statistics. FCT Water Board, Abuja, Nigeria

Fact Sheet

Location: Federal Capital Territory of Nigeria, Western Africa
Constituencies: 6 Area Councils
Total Area: 8,000 sq km (FCC 250 sq km)
Population: 2.5 million (Approx)
Literacy: 70%
Natural Resources: Coal, columbite, Tantalite, Granite, Precious Stones, Gem Stones
Climate: Dust haze, cold & dryness
Weather: Rainy & Dry seasons with brief harmattan;
Geographic Features: Lush vegetation and rich soil, Rivers, Hills, Mountains & Forest.
FCT GDP at around US$5 billion (*National Bureau of Statistics*)
Creation: 1976, Became official Capital on12th Dec. 1991

Special Features

Abuja's landscape is characterized by two renowned rock formations the Zuma rock and the Aso Rock. The Zuma rock is called the gate way to Abuja as the FCT begins at its base. The Aso rock is located at the head of Abuja city.

Zuma Rock

Aso Rock

Social Features

- The city has several parks and green areas, the largest being the Millennium Park.
- Several Magnificent buildings:
- The National Mosque
- Federal Secretariat Complex
- National Christian Centre
- The NNPC Towers
- The Abuja international Conference Centre,
- The African Hall, Eagle square, Abuja Stadium
- The National Assembly Complex etc

THE FEDERAL CAPITAL TERRITORY (FCT) WATER BOARD

ORGANIZATIONAL PROFILE

Background

- Statutory Provider of potable water in the FCT (Government owned Utility)
- Established in Oct., 1989. Previously existed as a part of the Engineering Department of the FCDA.

Responsibilities(Mandate)

- Manage & maintain all water works
- Ensure adequate provision of water supply of the right quality & at equitable rates
- Conduct research for the purpose of our functions &
- Submit reports of such to the Honourable Minister to aid policy formulations

Vision & Mission

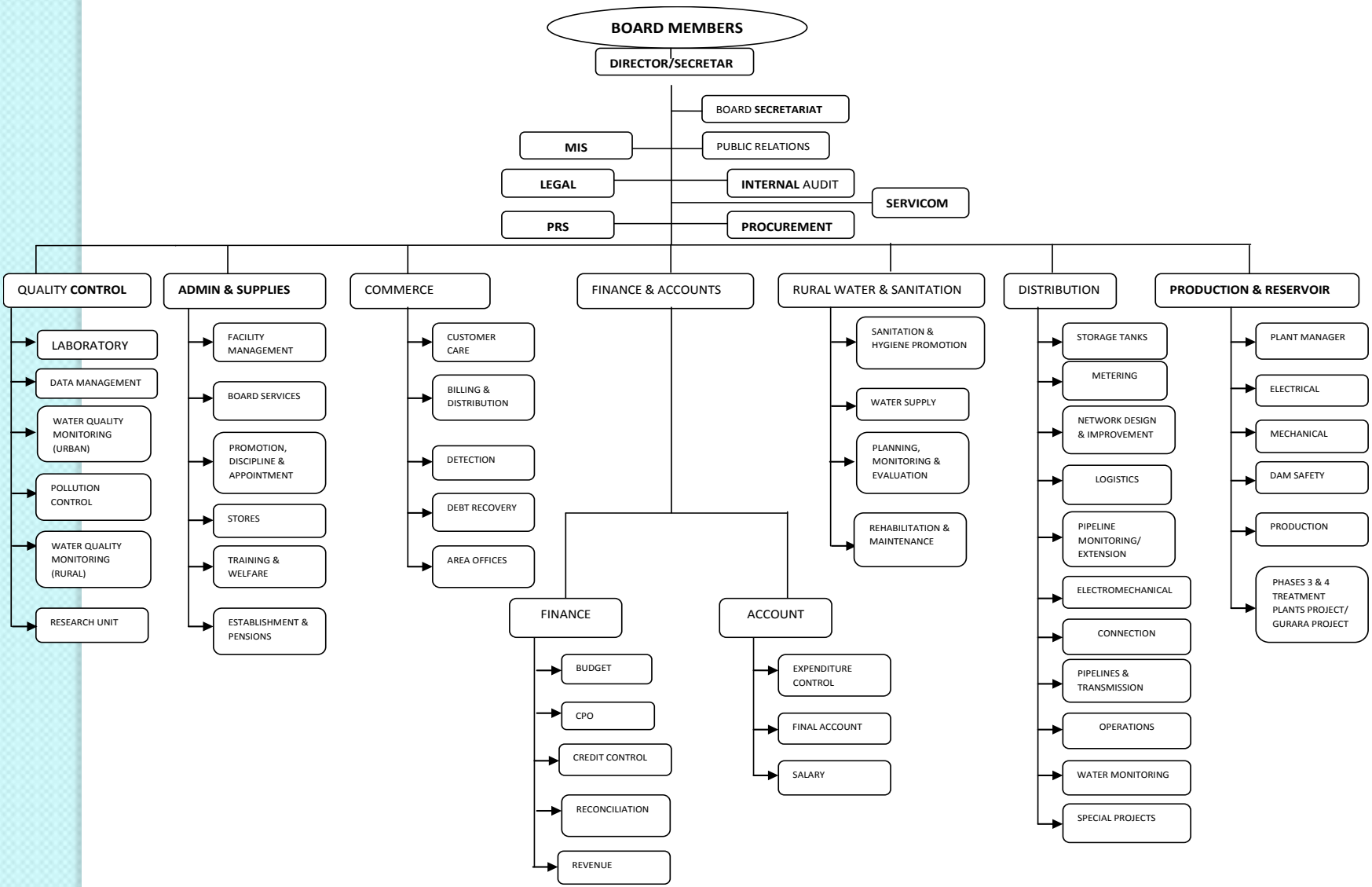
- ***Vision:***

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

- ***Mission:***

  To provide the residents of the Federal Capital Territory with ***Potable*** water using the **Best of Industry Technology** and a **Highly Skilled Workforce** for **Exceptional Services.**

Organogram


BOARD MEMBERS
DIRECTOR/SECRETAR
BOARD SECRETARIAT
MIS
PUBLIC RELATIONS
LEGAL
INTERNAL AUDIT
SERVICOM
PRS
PROCUREMENT
QUALITY CONTROL
ADMIN & SUPPLIES
COMMERCE
FINANCE & ACCOUNTS
RURAL WATER & SANITATION
DISTRIBUTION
PRODUCTION & RESERVOIR
LABORATORY
DATA MANAGEMENT
WATER QUALITY MONITORING (URBAN)
POLLUTION CONTROL
WATER QUALITY MONITORING (RURAL)
RESEARCH UNIT
FACILITY MANAGEMENT
BOARD SERVICES
PROMOTION, DISCIPLINE & APPOINTMENT
STORES
TRAINING & WELFARE
ESTABLISHMENT & PENSIONS
CUSTOMER CARE
BILLING & DISTRIBUTION
DETECTION
DEBT RECOVERY
AREA OFFICES
FINANCE
ACCOUNT
BUDGET
CPO
CREDIT CONTROL
RECONCILIATION
REVENUE
EXPENDITURE CONTROL
FINAL ACCOUNT
SALARY
SANITATION & HYGIENE PROMOTION
WATER SUPPLY
PLANNING, MONITORING & EVALUATION
REHABILITATION & MAINTENANCE
STORAGE TANKS
METERING
NETWORK DESIGN & IMPROVEMENT
LOGISTICS
PIPELINE MONITORING/ EXTENSION
ELECTROMECHANICAL
CONNECTION
PIPELINES & TRANSMISSION
OPERATIONS
WATER MONITORING
SPECIAL PROJECTS
PLANT MANAGER
ELECTRICAL
MECHANICAL
DAM SAFETY
PRODUCTION
PHASES 3 & 4 TREATMENT PLANTS PROJECT/ GURARA PROJECT

Operations

- Raw Water supply is provided from the Usuma Dam which has a storage capacity of 100,000,000m3 augmented by the New Gurara Dam which has a total capacity of 850,000,000m3
- Water treatment takes place at two prototype plants that each have the capacity of treating 5000 m3 water per hour. Two more Plants (3rd & 4th) are on the way (97% completed). Will give additional 20,000m3/hr
- Treated water is transported by gravity to various storage tanks from where it is distributed to various parts of the City .

Management of Water Quality

- 1.1. **Current Situation**
- Water quality is monitored from the catchment at Lower Usuma Dam through every stage of the treatment process, along the distribution network up to the consumer end point.
- The water storage tanks are periodically washed and disinfected
- Quality is based on Nigerian Standards for Drinking Water Quality (**NSDWQ**) and World Health Organization (**WHO**) guidelines

Management of Water Quality

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

Human activity around Catchment Area

Monitoring System

- Water Quality is monitored from the treatment plant to the point of consumption all over the territory . (Urban & Rural)
- Analysis of water samples from none Water Board sources are also done at a fee.

Parameters	Utako	Wuye	G/Lada	Tank 3	K/Nyanya	Maitama	Kubwa	L/Camp	Jabi	Bwari	WHO STD	NSDWQ
pH	6.95	6.88	6.9	6.73	6.90	6.87	6.76	6.62	6.87	6.88	6.5-8.5	6.5-8.5
Temperature	28	28.6	27.94	27.25	27.49	28	27.87	28.5	28.29	27.57	30	Ambient
Salinity	0.0	0.0	0.03	0.0	0.1	0.02	0.0	0.0	0.0	0.0	-	-
Conductivity	86.2	75.72	83.95	82.47	87.08	83.00	81.25	77.62	79.20	82.22	1250	-
TDS	40.75	34.6	41.89	39.07	40.17	44.50	40.17	36	37.71	36.88	1500	500
Turbidity	0.49	1.56	0.80	0.77	6.85	0.81	1.33	1.122	0.724	0.77	5.0	5.0
Res chlorine	0.39	0.17	0.08	0.44	0.17	0.14	0.51	0.442	0.29	0.035	0.2	-
Chloride ion	60.35	27.83	61.01	33.58	31.08	32.19	47.61	55.95	46.85	30	250	250
Total Alkalinity	39.50	32	46.67	32.43	34.58	32.00	33.98	38	34	31.75	100	-
Total Hardness	70.50	30.8	58.78	37.57	41.18	60.33	45.82	48.40	41.43	34.25	500	150
Manganese	-	0.4	-	-	-	-	-	-	-	-	0.5	0.2
Iron	-	0.105	-	-	-	-	-	-	-	-	0.3	0.3
Bacteriological												
MPN	<2.2	<2.2	>16.0	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	16.0	0	NIL
Coliform	-VE	-VE	+VE	-VE	-VE	-VE	-VE	-VE	-VE	+VE	-VE	-VE
E.Coli	-VE	-VE	+VE	-VE	-VE	-VE	-VE	-VE	-VE	-VE	-VE	-VE

Non –Revenue Water

- Realistic water balance for the FCT Water Board is presently not possible due to paucity of data following near absence of metering at the treatment plants, trunk lines, storage tanks and Zonal Metering (bulk meters or district metering).
- Presently estimated at 30%
- Plans are underway to install bulk meters at TPs, Trunk Lines, Storage Tanks and Districts

Water Supply Service Standard

- **Infrastructure:**

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

- Raw Water Source
  - Initial Phase
    - LUD (100mcm)
  - Final Phase
    - Gurara Water Transfer Scheme (850mcm)
- Water Treatment Plants
  - 12 WTP of 5,000m³ capacity each
    - 1-Nr to provide for Phases I of FCC
    - 2-Nr to provide for Phase III
    - 3-Nr to provide for Phase III
    - 6-Nr to provide for Final Phases (Phase IV)
- Transportation and Storage
  - About 29km 1500mm – 1000mm DI pipe to Tanks 3 & 4 (24,000m³ each), for Phase I
  - About 39km 1500mm – 1000mm DI pipe to Tanks 2 & 5(45,000m³ and 40,000m³ respectively), for Phase II
  - 2 lines of Combined lengths of 62km to Tanks 1 & 6 (40,000m³ each, originally 30,000m³ and 40,000m³), for Phase III
- 3 lines to feed Tanks 7, 8, 9 and 10 (40,000m³, 45,000m³, 45,000m³ and 24,000m³), for the Fourth and Final Phases

Current Status on the Implementation of the Abuja Water Master Plan

Description	Remarks
Construction of Reinforced Concrete Reservoir Tanks 2, 3, 4 and 5 to serve phases I and II of the city including associated risers mains (1000mm-1500mmø Pipes)	Tanks 2, 3 and 4 have been Completed and Commissioned while tank 5 is completed but not commissioned.
Construction of Reinforced Concrete Reservoir Tanks 1and 6	33% Completion
Design of the City's reticulation mains for phases 1,2 and 3 (6 loops)	Completed.
Construction of FCC Reticulation Mains for phase I (Loops 3 & 4)	Completed.

Water Supply Service Standard

- **Service Delivery:**
  - The Federal Government has instituted a **Service Performance Contract** with all Ministries (coordinated by The National Planning Commission) designed to monitor and benchmark performance at service delivery.
  - The Federal Ministry of Water Resources in Collaboration with the World Bank also administers the IBNET Toolkit to all Water Agencies. Another performance measuring process.

Service Level

- FCC = 24hrs
- Satellite Towns = Rationing
- Rural Areas = Boreholes

Management of Water Supply Service

- Major Challenges
  - Infrastructure(Inadequate treatment plants)
  - Non revenue water
  - Technology
  - Skills
  - Low Revenue Collection
  - Heavy depletion of raw water in dry season
  - Drain of waste (household and industrial) into the reservoir during the raining season
  - Monitoring of activities upstream (fishing and farming).
  - .

Expectations from the Course

- Solution to depletion
- Control and management of waste
- Proper monitoring of activities upstream
- Construction of more treatment plants
- Solution to issues of non revenue water
- Knowledge, skills and technology for leak detection, maintence of pipelines and on how to monitor pressure of flowing water along pipeline

Thank You

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

Nigeria (2)

JICA
TRAINING AND DIALOGUE PROGRAMS WATER SUPPLY ADMINISTARTION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES
LEADERS TRAINING (NO. J13-00774)
LAGOS WATER CORPORATION (LWC) COUNTRY REPORT

SUBMITTED BY
ASSISTANT GENERAL MANAGER (QUALITY ASSURANCE)
LAGOS STATE WATER CORPORATION
IJORA, LAGOS
29TH APRIL 2013


NIGER
Niamey
Zinder
CHAD
Tschad-see
Komadugu Yobe
Niger
Sokoto
Katsina
Jigawa
Zamfara
Kano
Yobe
Borno
Maiduguri
BURKINA FASO
Kebbi
Kano
BENIN
Kaduna
Kaduna
Bauchi
Gombe
Niger
Adamawa
Garoua
CHAD
Abuja
1
Plateau
Kwara
Benue
Oyo
Nassarawa
Taraba
Ibadan
Osun
Ekiti
Kogi
Benue
Ogun
Ondo
Lagos
Edo
3
Ebonyi
Port Nov
Lagos
Benin-Stadt
(Benin City)
2
Niger
Abia
Cross River
CAMEROON
Delta
Imo
Atlantic
Ocean
Rivers
4
Bayelsa
Port Harcourt
1. Federal Capital
2. Anambra
3. Enugu
4. Akwa Ibom
Capital City
National Border
State Border
0
100
200
km
4°
8°
12°


Ikorodu
Agbowa
Epe
Ikeja
LAGOS
Surulere
Mushin
Lagos
Badagry
Lagos Island
Bight of Benin

1. MANAGEMENT OF WATER QUALITY

1-1 Current Situation

- Water produced usually aesthetically and organoleptically acceptable
- However, often problems of low pH, low residual chlorine and presence of iron
- Fouling of water in distribution network

Challenges/Problems

- Tertiary connections passed through drains
- Manual dosing of chemicals due to non-functional dosing pumps causing inadequate chemical treatment
- Scarce operational funds to wash over-head tanks , surface tanks, sedimentation tanks and recharge filters when necessary

1.2 Current actions against the problem

- Rehabilitation of the water-works to improve sedimentation and clarification processes
- Use of dosing pumps to dose chlorine at the two major waterworks
- Plan to purchase new dosing pumps
- Proposal to reduce distance between dosing pump and dosing points for effective chemical treatment
- Proposal to implement a secondary disinfection system within the distribution network

Achievements

- Able to achieve sufficient free chlorine in water produced at the two major waterworks and within the network in the immediate vicinity of the water works by using dosing pumps to pump chlorine

1-3 Monitoring system/plan of safety of supply

- LWC has an in-house monitoring team to monitor the quality of source waters and water in the distribution system

Challenges

- Scarce funds to purchase standard laboratory equipment and reagent for determining level of water quality indicators
- Effective and regular monitoring has been affected by limited financial resources

1-4 Implementation of Water Safety Plan (WSP)

- LWC has not begun an institutionalized, conscientious focus on the implementation of the WSP.
- However some aspects of the WSP are performed as routine e.g.
- Routine quality control of water during production
- Occasional health risk assessments in the distribution network during monitoring
- Occasional water quality tests (limited parameters) on our surface waters
- Occasional sampling of water from the customers taps

2. Reduction of non-revenue water

2-1 Current status

- Total non-revenue water is about 60%
- About 3% of which is lost during production
- About 40% of which is lost within the distribution network
- The rest is unaccounted for water revenue not collected through non performance of commercial department due to numerous challenges

Challenges

- Inefficient production plants ; especially clarification, de- sludging and backwashing processes
- Inefficient means of determining production figures and quantity of water sent into distribution system
- Insufficient manpower , technology and tools to identify and fix leakages as and when necessary
- Flat billing system is still in use in most parts of the state. Which is inefficient in the collection of accruable revenue

2-2 Current actions against the problems

- Phased introduction of nodal meters and household meters
- Introduction of a phone hotline for the general public to notify LWC of leakages
- On – going rehabilitation of water plants to improve the efficiency of treatment processes and minimize water loss during production
- Establishment of a taskforce to monitor vandalization of pipes and water theft
- Enactment of a law establishing a Water Court to attend to issues of vandilazation and water theft
- Setting up of a Water Intelligence unit to track water consumption and losses

3. Water supply service standards

3-1 Current situation and major challenges

- There is about 44% coverage of LWC pipe-borne water in the state
- Dependent on unreliable power supply from the national grid and diesel powered generating sets. Hence water supply is not constant
- Water does not always reach the consumer at the stipulated national standard for drinking water quality

Challenges

- Epileptic power supply from the national grid
- Limited funds to procure diesel to power generators
- High cost of running independent power plants (IPP) for the major water works
- Limited funds to procure tools and vehicles to monitor, identify and fix leakages on time
- Lack of adequate infrastructure (production plants and distribution pipes) due to limited funds
- High population growth and influx into Lagos producing stress on the facilities which are ageing and not replaced fast enough to keep up with population growth due to limited finance

3-2 Actions against problems

- Provision of 12.15 MW IPP to abstract and process 90% of water produced in the state to ensure constant water production
- Establishment of the Lagos State Water Regulatory Commission to monitor and ensure the quality and reliability of our service
- Working on a Public-Private-Partnership (PPP) plan to provide treatment plants, transmission mains and network to increase coverage to blighted areas
- In the process of drawing-up a workable PPP plan in form of management contracts for the existing water works to improve service delivery

3-3 Performance indicators (PI)

LWC has key performance indicators (KPI) that measure performance of all aspects of our water supply management processes

The following are some of our KPI's

- ✓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
- ✓Volume of water sludge disposed

4. Management of water supply service on a self supporting basis

4-1 Current situation

- Even though LWC operates using internally generated revenue and subsidies from the state government, there is still insufficient financial resources to run the facilities optimally, maintain facilities and expand infrastructure and coverage

Challenges

- Limited financial resources
- Low cost recovery due to low billing efficiency
- Flat billing
- Insufficient capacity building

4-2 Actions against problems

- Effort to increase financial base to fund operations these include; metering of all properties
- Effort to increase tariff
- Effort to increase efficiency of use of resources
- Working on PPP management contract for existing water works which will improve quality of service and eventually increase revenue and promote self sustaining operations

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

- The operation of a 12.15 MW IPP to power the abstraction and production of water at 2 major waterworks improved level of service from 12.6% to 57.2%
- Ongoing network expansion in 2 major areas in the metropolis has increased coverage
- Ongoing rehabilitation and construction of new waterworks has improved access to safe water
- The recent launching of a water supply master plan for the state providing information on the present status and future plans for the development and improvement of water supply to the state for the interested private investor to buy-into for service improvement

Expectations

- Captivity Building
- Construction of Sampling Points
- Provision of Gas Chromatograph
- Data Management
- Technical Support

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

South Sudan (1)

THE REPUBLIC SOUTH SUDAN (RoSS)

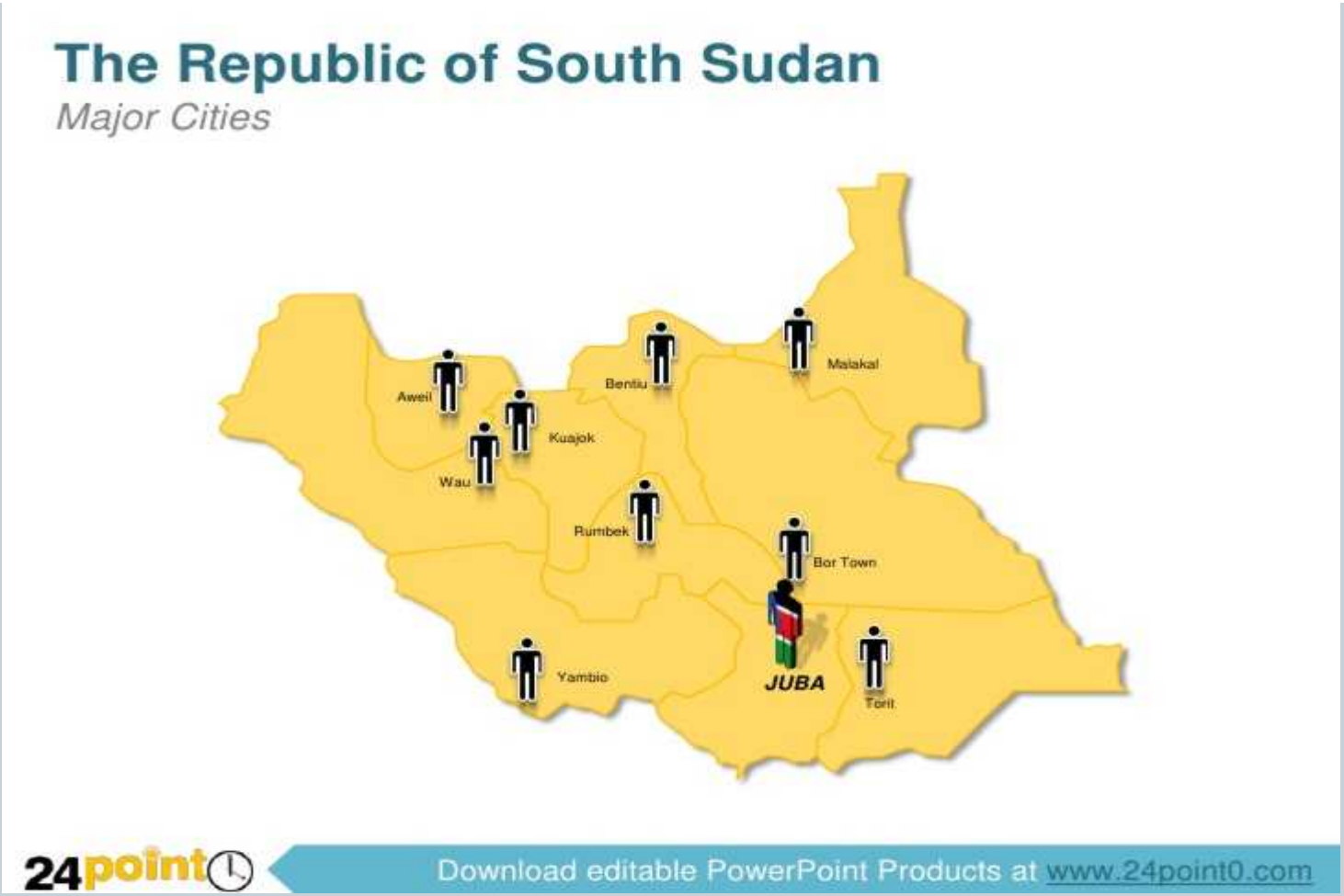
SECTION I

THE Geopolitically

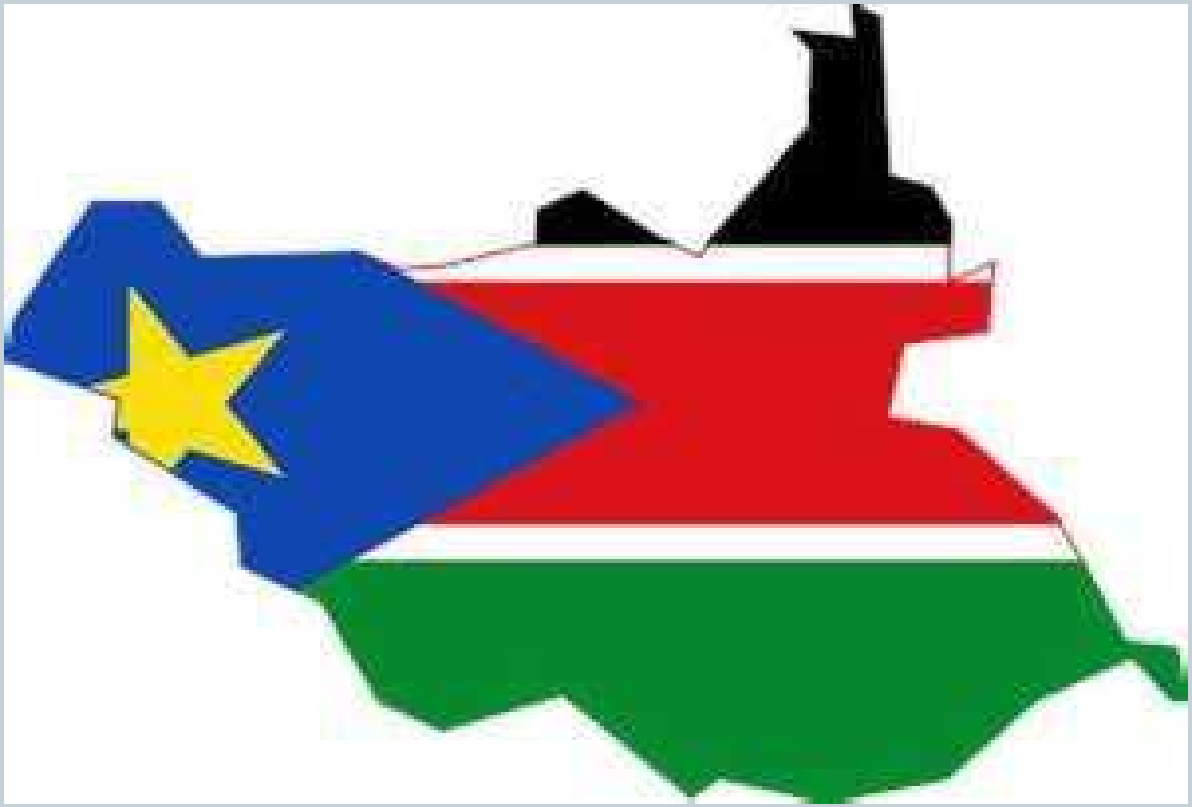
REPUBLIC OF SOUTH SUDAN

LOCATION OF SOUTH SUDAN

MAP


The Republic of South Sudan
Major Cities
Aweil
Kuajok
Wau
Bentiu
Malakal
Rumbek
Bor Town
JUBA
Yambio
Torit
24point
Download editable PowerPoint Products at www.24point0.com

MAP OF THE REPUBLIC OF SOUTH SUDAN IN FLAG



- Location:
  - South Sudan is located at the east of central Africa north east of Zaire, North of Uganda and north west of Kenya and so.....
- Area covered:
  - 644,329 Km2
- Estimated population of Republic of South Sudan:
  - 9.1 Million people
- Climate:
  - Tropical rainforest.
- Vegetation:
  - Equatorial forestry, Grassland regions

Natural Resources

- Petroleum(Black gold)
- Cement
- Iron Ore
- Copper
- Zinc
- Gold
- Silver
- Mica

Animal Resources:

Wild life.

- Buffalo, Lion, Elephant, Giraffe, Antelope.& some others

Domestic Animals

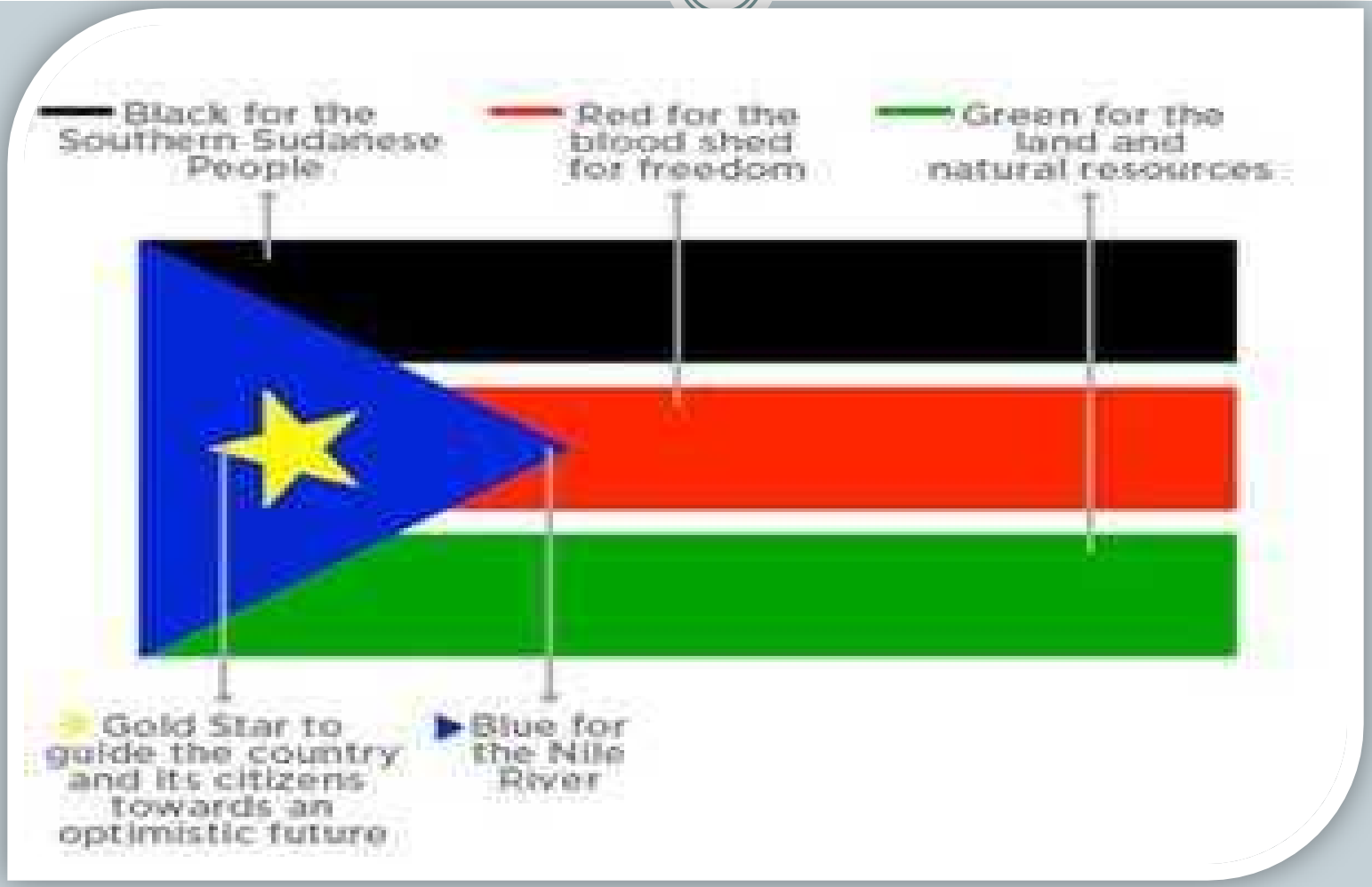
- (Cattle) Caws, goats, sheep.

THE NATIONAL REMARKS

- **Independence Day-9 July 2011**

- South Sudan officially raised its flag.
- Declaration of independence.
- Recognition of sovereignty
- General Silva Kiir Mayardit; the first president of the RoSS.

- Flag color Definitions;



- The President of the Republic of south Sudan

SECTION II

SOUTH SUDAN URBAN WATER CORPORATION (SSUWC)

URBAN WATER CORPORATION HEADQUARTERS (HQs)

Two Flags -The Republic and of the Corporation

OVERVIEW

- ✓ Established in 2007
  - The administration of SSUWC -Annexed to the ministry of water resources.
  - Managed by an appointed Managing Director and assisted by a deputy.

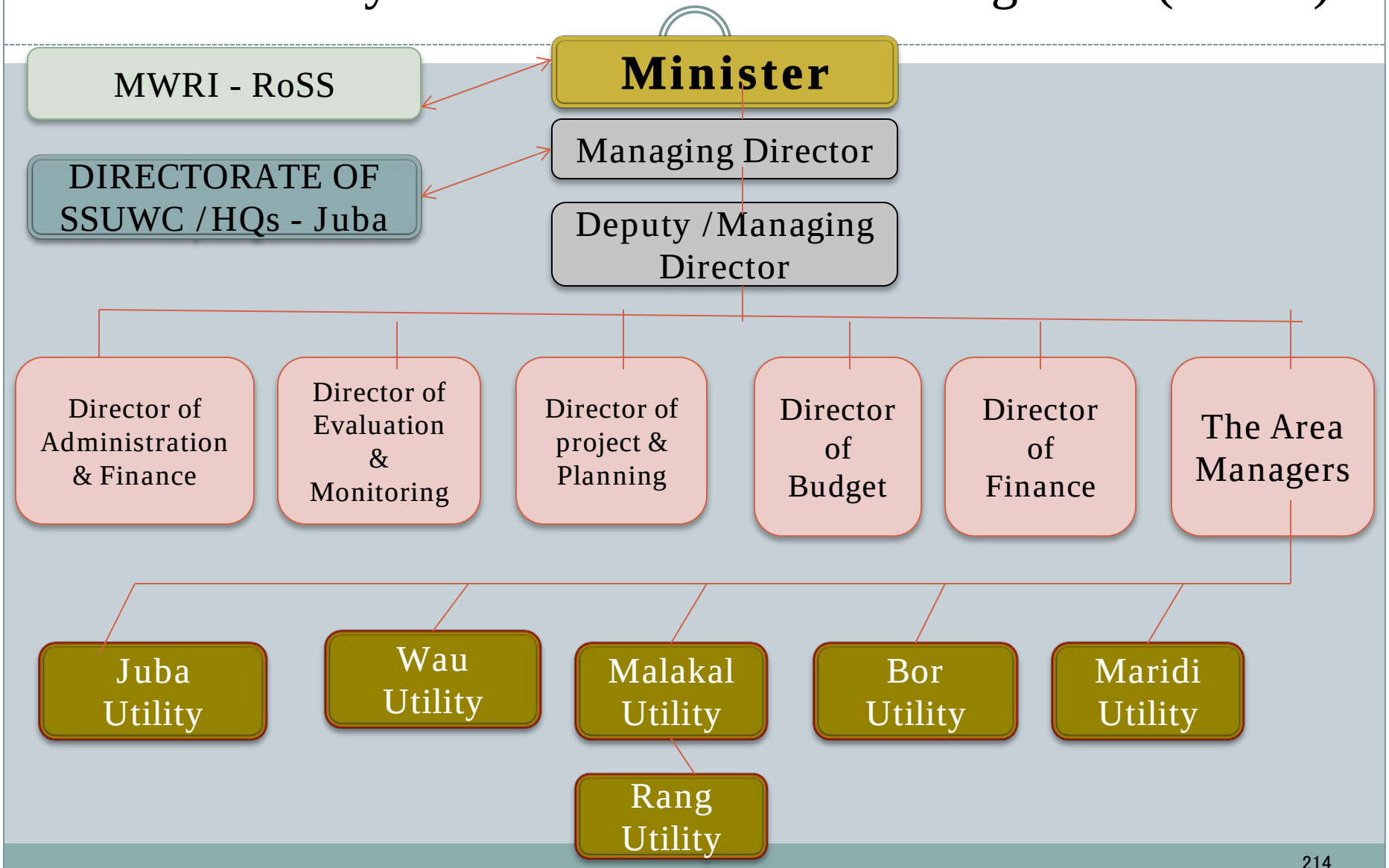
- ✓ Responsibility.
  - undertakes the responsibility of providing clean water in all the urban towns of the Republic at Headquarter level.

Structure of Headquarter

1. Managing Director-Top most officer
2. Deputy Managing director-second in hierarchy.
3. Directorates headed by senior Managers followed by the Area Managers.

- ✓ Projects and planning.
- ✓ Evaluation and Monitoring
- ✓ Administration and finance
- ✓ Finances department
- ✓ Budget Department
- ✓ Area Managers of various utilities

- **THE ORGANIZATIONAL CHART OF SSUWC -HQs**
- The Ministry of Water resources & Irrigation.(ROSS)



Responsibilities of Headquarter

- plans, implements and develops facilities.
- Recruits.
- Supervises, coordinates, and.
- Monitoring and evaluating the performance in the HQs & state levels.
- Lobbies for funds.
- Answerable to the Ministry of Water Resources & Irrigation-(MWR&I) of Republic of South Sudan.

STATES or AREAS.

- Headed by an area Manager, Deputy then directors;

- ✓ E.g. Director for purification carries operation and maintenance (OM) task.

- ✓ Director of accounts, Collects and remits revenue in to the accounts of the central Ministry of Finance.

- ✓ Director of distribution/transmission – maintains and repairs leaks, networks,..

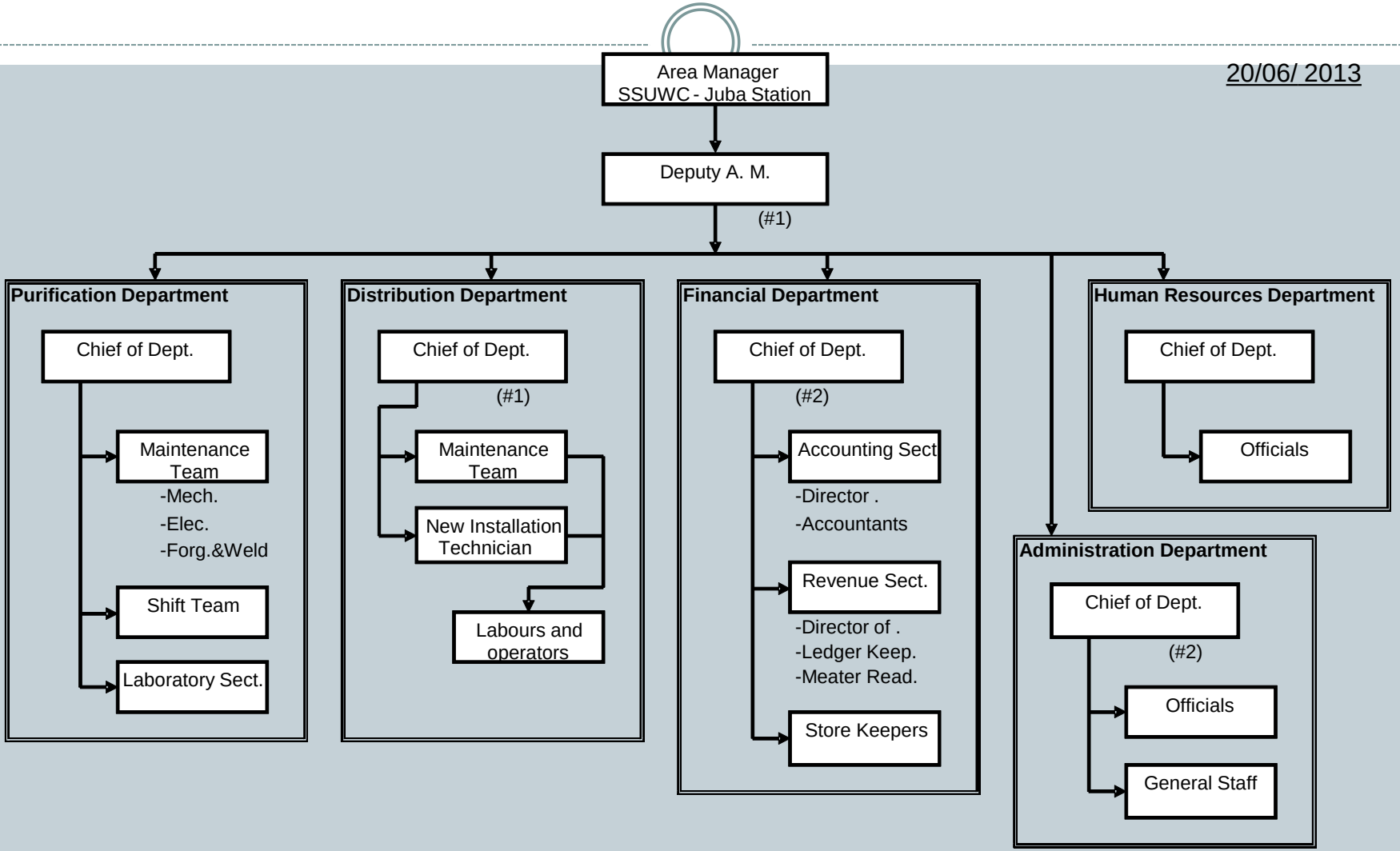
Note: All the state managers report to the Headquarters

AVAILABLE UTILITIES

1. Central Equatoria state - (1) one station
   - Juba station – (Total CUs. 3,781)
2. Western Bahr El-Ghazal - (1) one station
   - Wau
3. Upper Nile - (2) two stations
   - Malakal
   - Renk
4. Jong lei -(1) one station
   - Bor
5. Western Equatoria State – (1) one station
   - Maridi

ORGANIZATION OF SSUWC JUBA STATION

20/06/ 2013



(Note) #1) Deputy Area Manager also holds post of Chief of Distribution Dept.

#2) Department of Accounts have two sections: Finance Department & Revenue Department holding the grade

Total Staff Number: 164

(Source) SSUWC (CES) Juba

VISION

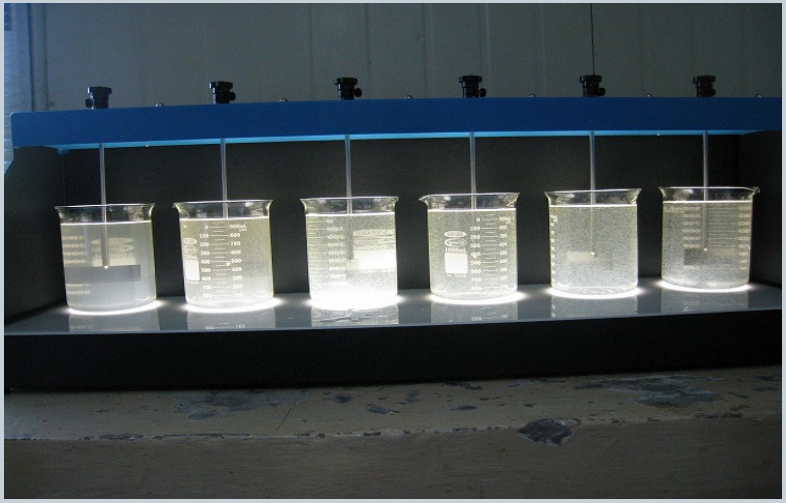
- One of the fast growing utility in supply of clean and safe drinking water in South Sudan;

MISSION

- Sufficient coverage of safe water with affordable tariff, for satisfaction of customers and effective service cost recovery

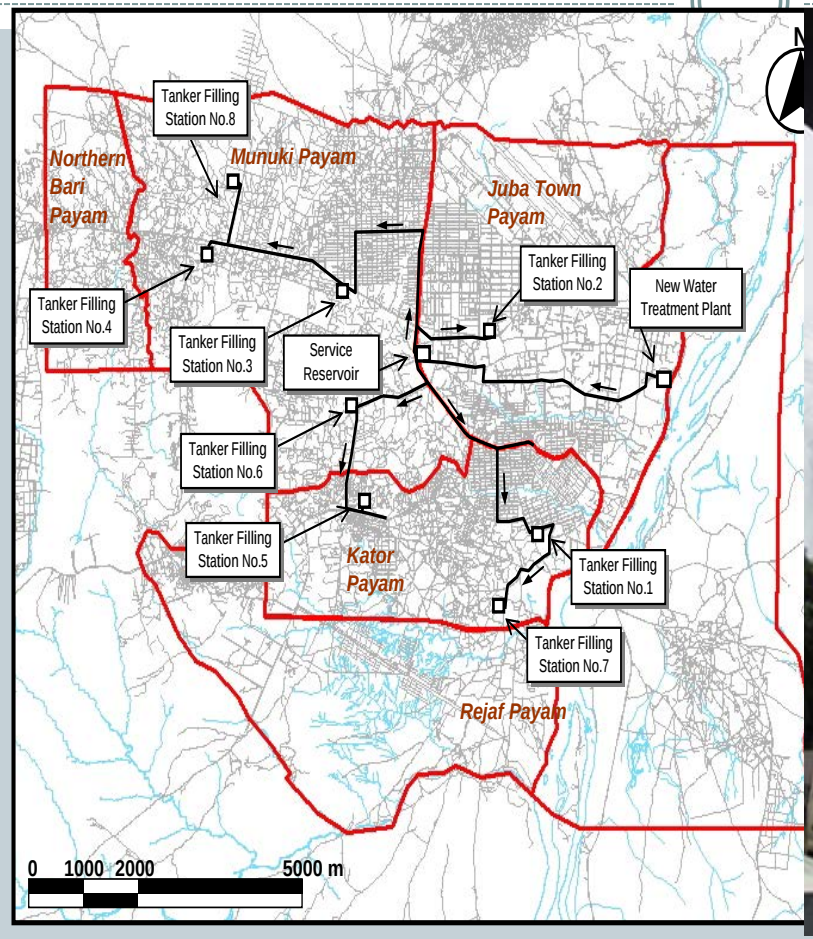
WTP intake

Front view of the Juba treatment



- ✓ Injection Ratio of Alum sulfate at present: 100L/hours (Approx.. 30mg/L)
- ✓ Injection Ratio of chlorine at present: 24L/hours (Approx.. 3mg/L)

JICA-Assisted Study and Projects



GPS - zoning map. Introduced by JICA

Backwashing tank.

JICA-ASSISTED STUDY AND PROJECTS

- **Juba Urban Water Supply and Capacity Development Study in the Southern Sudan (2008- 2009)**
  - **Master plan for 2025, feasibility study for 2015**
- **The Project for Management Capacity Enhancement of Southern Sudan Urban Water Cooperation in Southern Sudan (2010-2013)**
- **Improvement of Water System in Juba in the Southern Sudan (2010-2014)**

- **Arigato gozaimasu!**

- **MAY God Bless you;**
  - **JICA**
  - **And all those who loves to transmit their knowledge to the needy for enhancement and development of the nation**

- **SSUWC – JUBA**

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

South Sudan (2)

INTRODUCTION OF SOUTH SUDAN URBAN WATER CORPORATION

BASED ON THE LOGOS BELOW, IT CAN BE EASILY IDENTIFIED

The Ministry of Water Resources and Irrigation (RSS)

Japan International cooperation Agency (JICA)

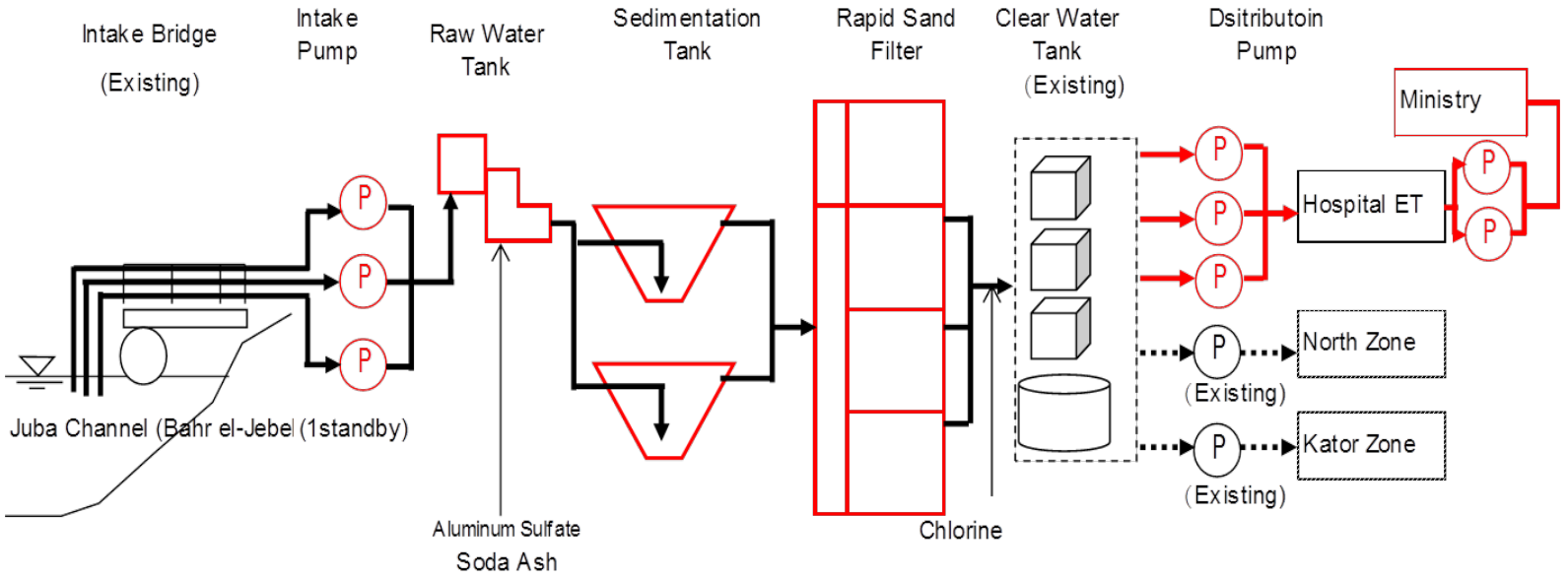
South Sudan Urban Water Corporation (SSUWC) - Juba

1. PURIFICATION PROCESS

- Juba Plant was designed & constructed by SPENCON using MDTF through the Ministry of Finance, and economic development - the only capacity of 7,200 m3/day.
- Purification Process wasn't lectured enough by SPENCON
- Only operation method was communicated to staffs of Juba Station
- Clear treated water is produced mostly so far

2. WATER FLOW CHART

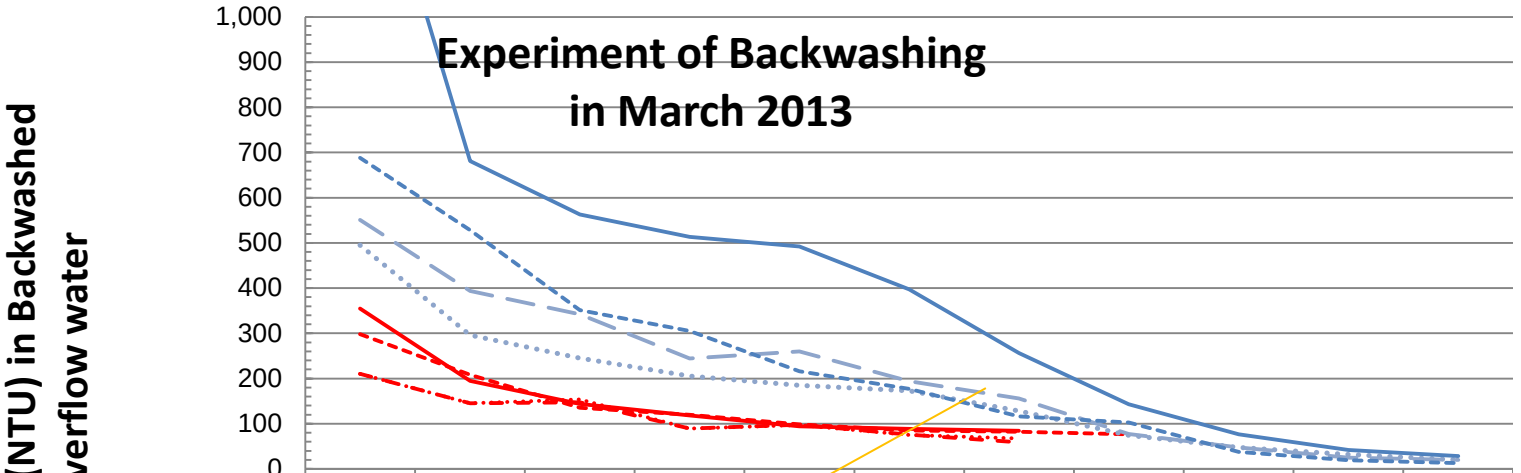
(RED LINE SHOWS NEWLY CONSTRUCTED PLANT)



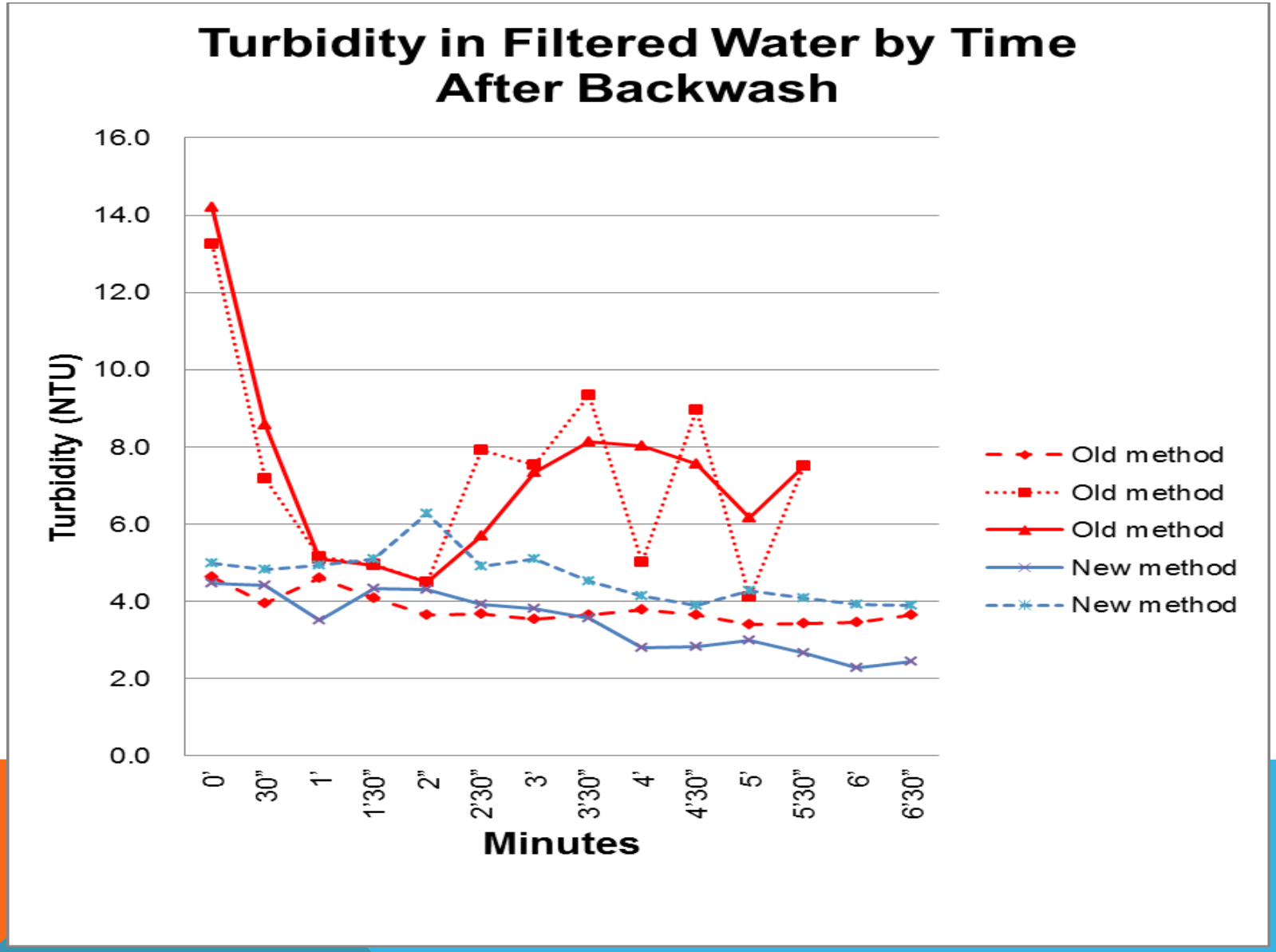
3. WATER QUALITY MANAGEMENT PLAN

> FILTER BACKWASH TEST

> TURBIDITY IN BACKWASHING FLOW WATER



	0’	30”	1’	1’30”	2”	2’30”	4’	6'	8'	10'	12'
Old method	298	208	135	120	98.5	85.3	82	76.5			
Old method	355	195	144	118	94.4	88.8	84				
Old method	210	145	154	89	97	75	67				
Old method	210	145	147	89	98	76	59				
New method	495.0	296.0	245.0	205.0	185.0	173.0	128.0	74.5	47.1	31.8	19.9
New method	1492	681	563	513	492	397	256	143	76.7	41.6	28.1
New method	551	394	342	244	260	194	156	77.3	47.2	24.9	19.6
New method	688	528	351	305	216	177	116	103	37.5	19.16	12.85


Turbidity in Filtered Water by Time After Backwash
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Turbidity (NTU)
0'
30"
1'
1'30"
2"
2'30"
3'
3'30"
4'
4'30"
5'
5'30"
6'
6'30"
Minutes
Old method
Old method
Old method
New method
New method

4. The management of water quality.

❖ **Current situation.**

Water Sampling	Ratio of actual sampling days to required total sampling days (%)	Weekly	43
		Monthly	56
	Ratio of actual samples to required total samples (%)	Weekly	19
		Monthly	42
Water Analysis	Ratio of actual analyzed samples to required total samples (%)	Weekly	19
		Monthly	42
Water Quality	Compliance ratio of turbidity at WTP (%)		79
	Compliance ratio of residual chlorine at WTP (%)		31

5. COAGULATION

- ✓ Aluminum Sulphate is used as the coagulant, roundabout channel run together raw water and alum
- ✓ There is no flocculation basin
- ✓ Soda ash is not used for coagulation
- ✓ Alum of around 300 kg is used a day
- ✓ Dosing rate: 40 mg/L (Alumina:6.8 mg/L)
- ✓ Turbidity of rainy season is higher than dry season

3. SEDIMENTATION TANK

- Raw water come through the sludge blanket to overflow into troughs of the sedimentation tank
- Flocks sometimes carry over into trough
- Regular sludge removal is done every 10 days
- Cleaning of Tank and trough is done twice a month, too many

6. RAPID SAND FILTER AND BACKWASH

- ✓ Sand Filter catches micro flock to make clean water
- ✓ Elevated tank is used for the backwash of Rapid Sand Filters

  Volume: 150 m3
- ✓ Backwash consists of air bubbling by blower and backwash water
- ✓ Air bubbling time is 5 minutes and backwash time is 10 minutes

Instructed by JICA Experts

BACKWASHING

- Proper backwash was instructed to staffs by JICA team several times
- Purification team should search for producing clearer drinking water

7. CHLORINATION

- Calcium Hypochlorite is used for chlorination
- Calcium Hypochlorite of 45 kg tank is used for every two days dosing rate: 2.4 mg/L (Free Cl2)
- Residual chlorine is often disappeared in clear water tanks and in distribution pipe line special during the rainy season.

❖ Current Achievement:

- ❖ Key performer indicators identifies revenue increase.
- ❖ Installation of bulk meter outlet in high consumption points by (JICA) the counter part. (e.g. Hotels.) etc.
- ❖ Replacement of 51 km old network . e.g. asbestos.
- ❖ Zoning of the supply area.
- ❖ Assessment of illegal connection/ theft, Routine inspection for update purpose.

❖ *Management Challenges/ Problem*

- ❖ Lack of alum transportation from abroad.
- ❖ Lack of availability of chlorination in the station.
- ❖ Austerity measure (Affects budget for materials. …)
- ❖ Un availability of materials in the market (e.g. 4” or 100m, fittings)

❖ *Current action against these problems*

- ❖ Leak repair strategies is done through the help of JICA.
- GIS system is introduced by JICA.
- Public relationship was established.
- ❖ The manual system for billing & Collection is improved

Major constraints:

Water rate system and billing collection currently, is not adequate due to the lack of constant power supply. We operates 12-15 hours/day and total water production reduced from 7,200 m3 to 5,208 m3 /day. And poor collection becomes

- **The water supply service:**
  - Total population % served 37%
  - Un served population 63%
  - Not 24 hrs. but 15 hrs. 33%
  - Portable water, safe & clean.
  - Estimated NRW 46 -50%.

- No private sector involved into the water works.
- There is warning for privatization, but still not yet implemented, and its type is not known. We are working on it

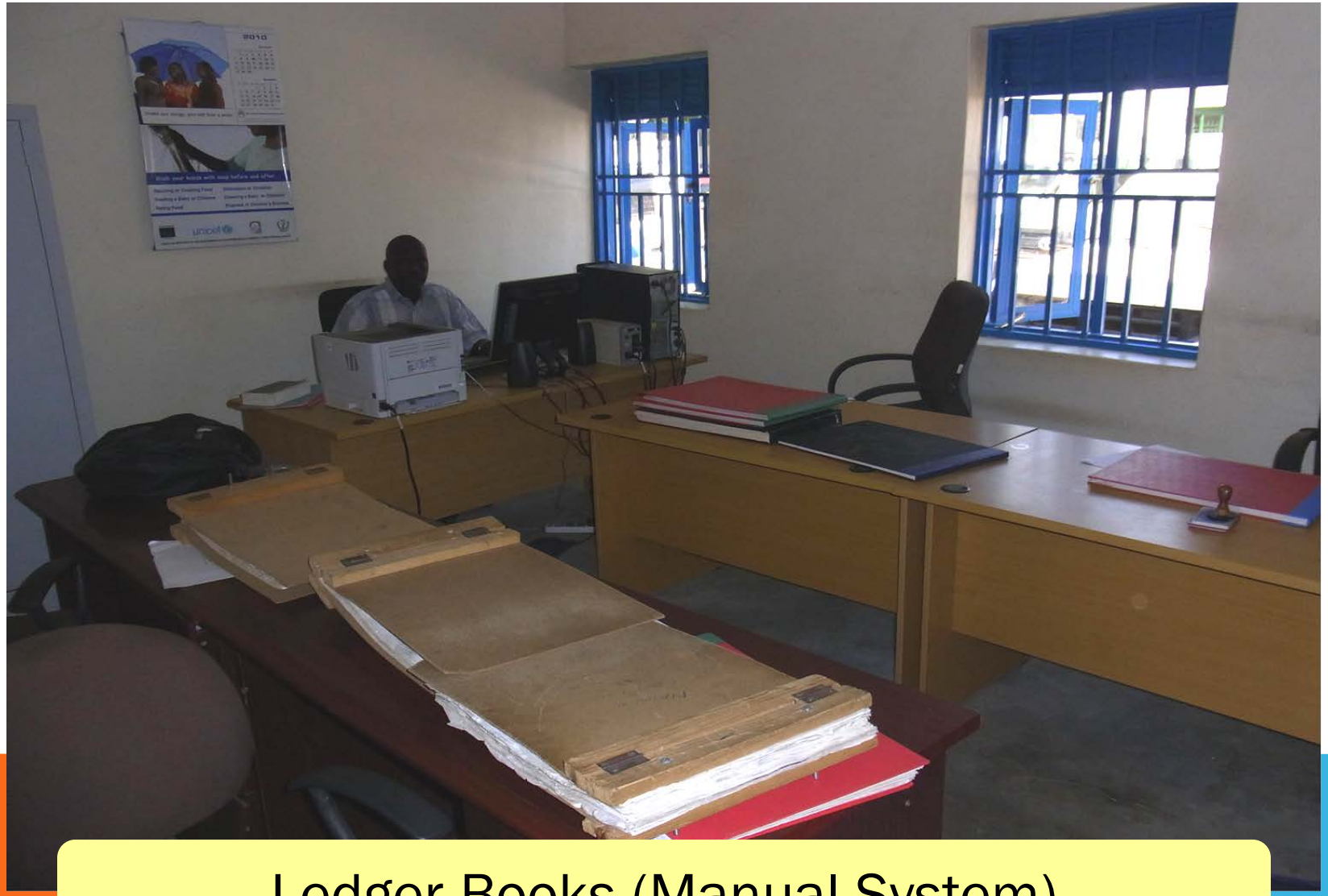
Other:

i. They take water from tanker direct from river Nile, they treat it local with water guard tablets

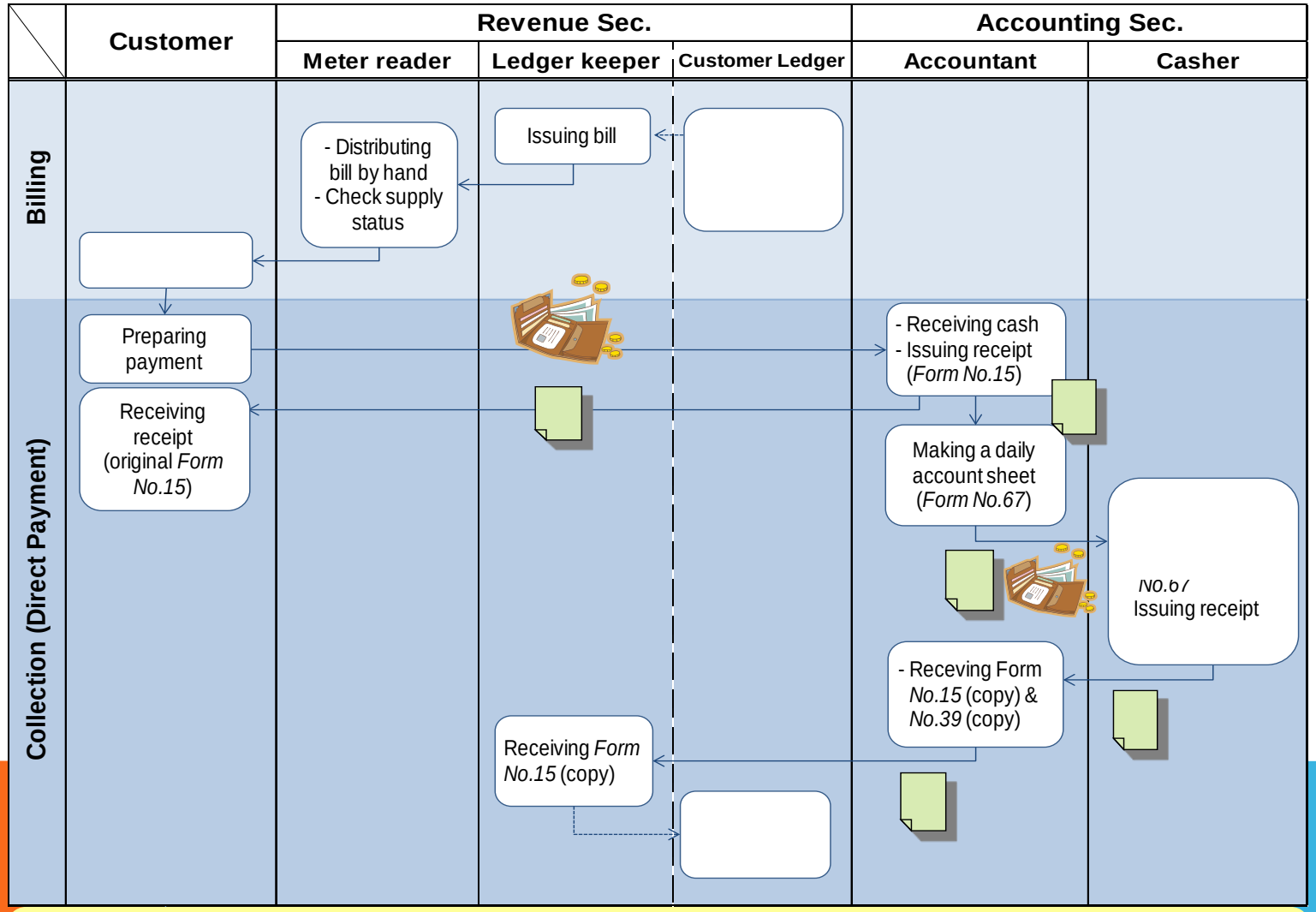
ii. Sewerage system not yet introduce, by the corporation but it is in our target of the future plan.

Water Sampling for daily water quality analysis

Focus Group Discussion on public taps stand



Ledger Books (Manual System)



Revenue Collection System

Arigato gozaimasu!

- Ag/Deputy Director of Commercial department Revenue Accounts
- SSUWC - Juba

出典：平成 25 年度 JICA 集団研修カントリーレポート

- 平成 25 年度 JICA 集団研修「水道管理行政（A）」

Japan International Corporation of Welfare Services (JICWELS) was established with the sanction of the Minister for Health, Labour and Welfare in July 1983 and implements international technical cooperation programmes with purpose of contributiing to the promotion of health and social welfare activities in the friendly nations.

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http://www.jicwels.or.jp

公益社団法人国際厚生事業団（JICWELS）は、国際的な保健・福祉分野の国際協力に貢献することを目的として、1983 年（昭和 58 年）7 月 7 日に厚生省（現厚生労働省）から社団法人の認可を受け設立されました。開発途上国の行政官研修や WHO フェローの受入れ、調査企画や研究開発並びに情報の交換及び広報活動など、海外諸国との国際交流活動を推進しています。

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