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）

FIJI

COUNTRY REPORT

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

29th June-12th July, 2014

Tokyo, Japan.

Department of Water & Sewerage

* The Department of Water and Sewerage under the Ministry of Works, Transport and Utilities was commercialized into the Water Authority of Fiji in January, 2010. The purpose of the reform is to develop the capacity to manage water resources in Fiji to a condition where the present and future challenges to water resources and water use can be met. The Water Authority of Fiji has taken the responsibility for constructing, maintaining and operating the urban water supply and sanitation.

* The responsibility for design and construction of rural water supply scheme still lies with the Department of Water & Sewerage and the Mineral Resources Department. Technical expertise is provided by both departments in the case of surface water schemes and drilling of bores

Cont.

* Responsibilities
  * Strategic advice, technical advice, research co-ordination, design and advice on projects and activities related to rural water supplies and sewerage services.
  * Policy, administrative, regulatory service to Government, Statutory Authorities, the Private Sector and the public at large. This includes the enhancement and facilitation of an effective, efficient and sustainable water and sanitation within the country.
  * The Department is a branch of the Central government under the Ministry of Works, Transport and Public Utilities.

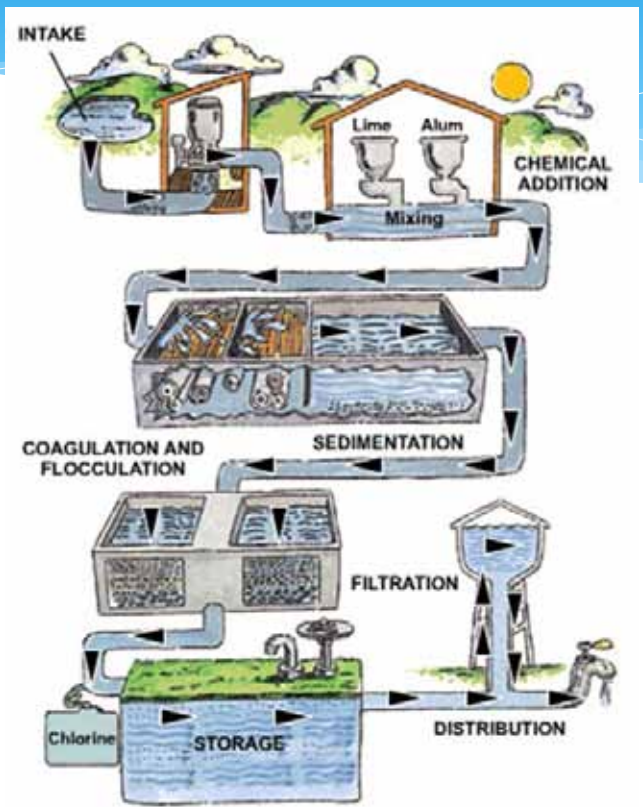
Water Resources

* Geographical Background
  * Fiji consists of 332 islands of which 110 are inhabited, with a land mass of 18,333 sq.km. The two largest islands, Viti Levu and Vanua Levu have majority of the total population of islands of about 900,000

* Precipitation
  * The wet season from November to April is also the season of tropical cyclones. Fiji experiences average annual precipitation ranging from 1500mm on smaller islands to over 4000mm on the larger islands.

Management of Water Quality

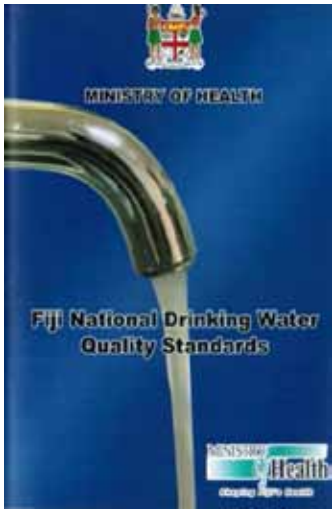
TREATMENT PROCESS
TREATMENT PLANT



Cont.

* Surface water is used as the main source of supply for the all major towns on the larger, high islands of Fiji, as well as for industries and irrigation. Some small low lying islands rely exclusively on ground water and may or may not use rainwater.

* The National Water Quality Laboratory (NWQL) is under the Water Authority of Fiji and they carry out water quality tests monthly subject to the new Fiji National Drinking Water Standards.



Reduction of Non-Revenue Water

* Background
  * In water supply systems in Fiji, NRW varies from 40% to 65% of water production. To give some appreciation of the issue, giving that the Suva Regional Water Supply produce 150,000 m^3 everyday or 55 million m^3 a year and with 40% of leaks, this brings to and annual loss of 21.9 million m^3 representing the yearly consumption of about 600,000 people.

* The amount of Unaccounted for Water (UfW) is an indication of how well a water system is operated and maintained and has sure direct impact on possible revenue.

Cont.

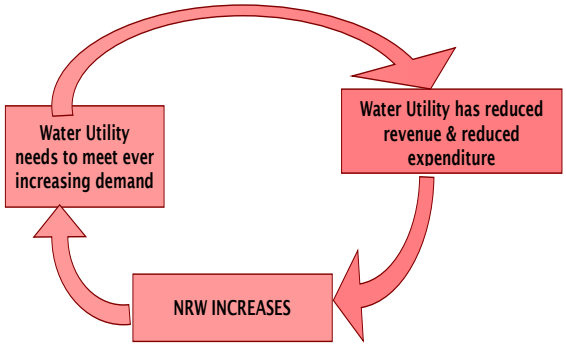
* At present the target is to reduce or repair the leaks as demand is affecting the source supply and treatment plants and pump stations run overtime.

* Critical need is to establish a standard leak detection program that can be monitored and is continuous.

* Significant gains in efficiency and therefore in cost recovery can be made by reducing levels of UFW to internationally or regionally accepted norms.

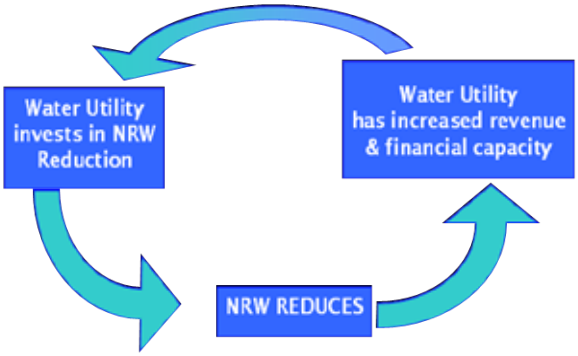
Vicious NRW Cycle

* The Water Authority of Fiji as of 1st January 2010 is responsible for the operation and maintenance of urban and peri-urban water supply and sewerage infrastructure. The company operates on a commercial basis which involves revenue collection to cater for all operational, maintenance, renovation and capital costs.



Virtuous NRW Cycle

* Commercial losses are NRW losses in the Authority's revenue. Currently the authority may be seen operating in the Vicious Cycle and with the correct implementation of this plan the Authority will be able to locate itself in the Virtuous Cycle.



Water Supply Service Standards

- The national main objectives for the capital works program state that the "Ministry is committed to support and promote economic growth and improvements to social services through the provision of adequate Water Supply and Sewerage Infrastructure" and "Provision of a reliable and adequate water supply to villages and settlements will also continue under the Rural Programme."

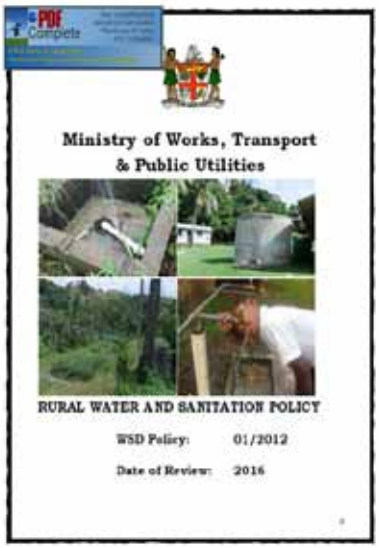
Cont.

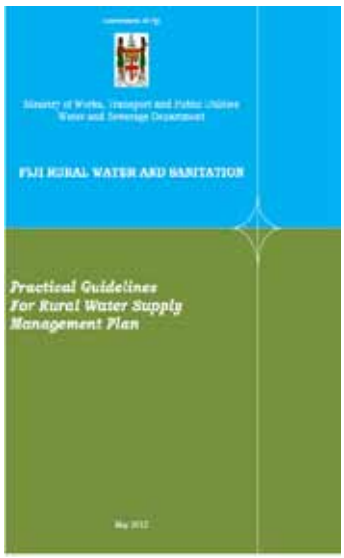
* In addition to the Capital Works aspects of the program, there is a stated objective that "the Operation and Maintenance of Water Supply and Sewerage in respect of the government owned facilities will continue, with an added emphasis given to improve the services through increased operational efficiency and to improve the maintenance matters through proper planned maintenance programs."

* The authority's customer relations are being designed to be more informative and complaints are accepted 24/7.

Management of Water Supply Services on a Self-Supporting Basis

The Rural Water & Sanitation Policy was approved by Cabinet for implementation in 2012. This policy provides a common framework and platform for all the relevant stakeholders in the water resources and sanitation sector to work together for the optimum utilization of water resources to benefit Fiji, in particular the rural communities.





Cont.

* The RWSP aims to achieve four key basic fundamental building blocks for efficient and sustainable water resources in Fiji. They are:
  * Strengthen the capacity for water and sanitation planning and engineering through the effective implementation of appropriate policies and management plans in the rural areas.
  * Adopt management framework that is structured and efficient.
  * Enhance water supply quality and sustainability through effective collaboration with relevant stakeholders, and
  * Increase access to affordable, reliable and high quality clean drinking water

Major recent Achievement in Improvement of Water Supply

* The Water Authority of Fiji (WAF) is a public water utility service provider, responsible for operations and maintenance of all Fiji's urban, peri-urban and rural water supply and sewerage infrastructures.

* The company operates on a commercial basis, which implies revenue collection to cater for all operational, maintenance, renovation and capital costs but under the ambit of Public Enterprise .

Cont.

* The regulatory ,compliance and monitoring remains with the Department of Water & Sewerage of the Ministry of Works, Transport and Public Utilities.

* The Water Authority of Fiji operated and maintains 32 public water supply schemes nationwide comprising of 25 water treatment plants, over 110 service reservoirs and over 2,200km of reticulation system

For Better Management of Water Supply Services
Course（A）

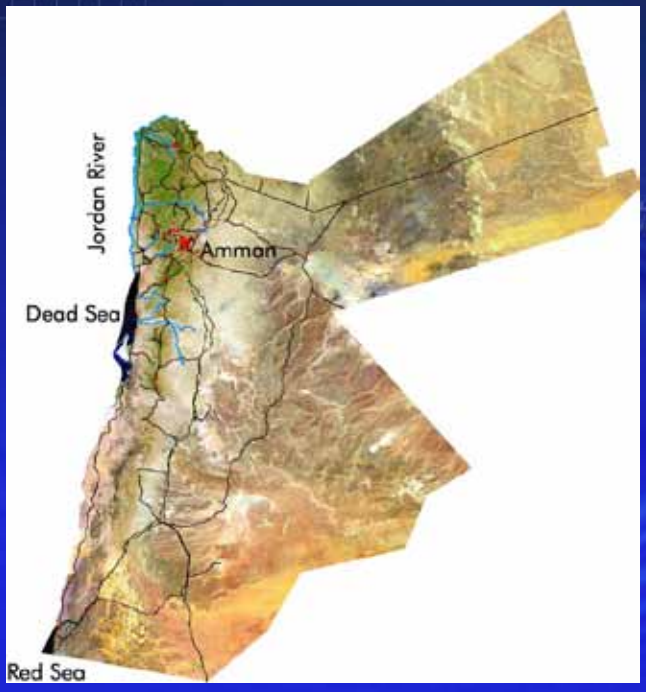
JORDAN

Hashemite Kingdom of Jordan

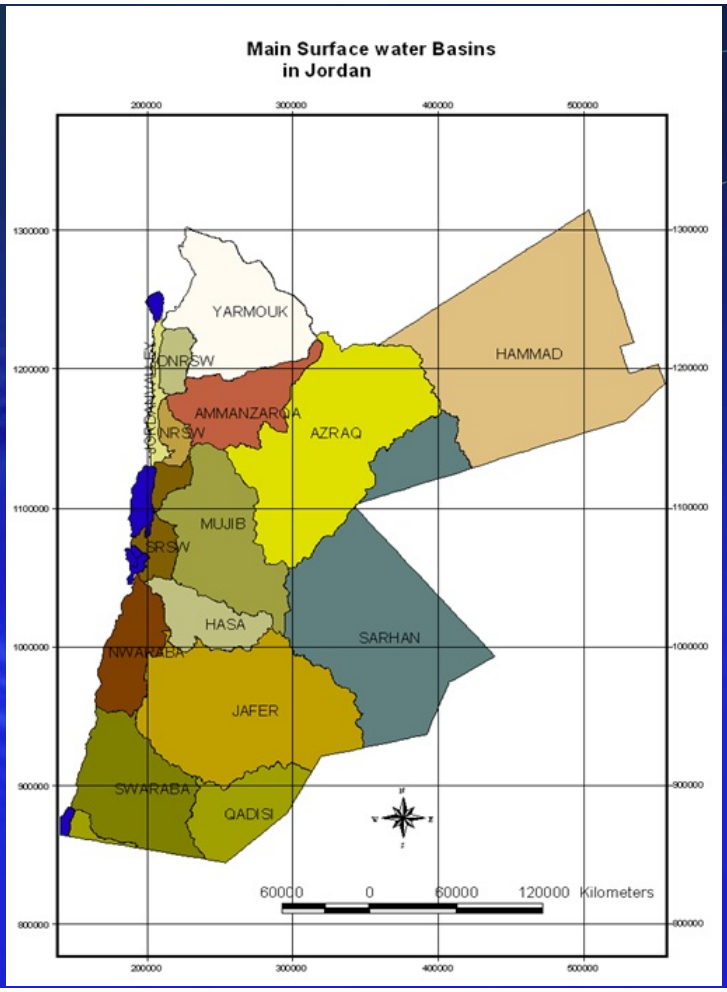
Ministry of Water and Irrigation

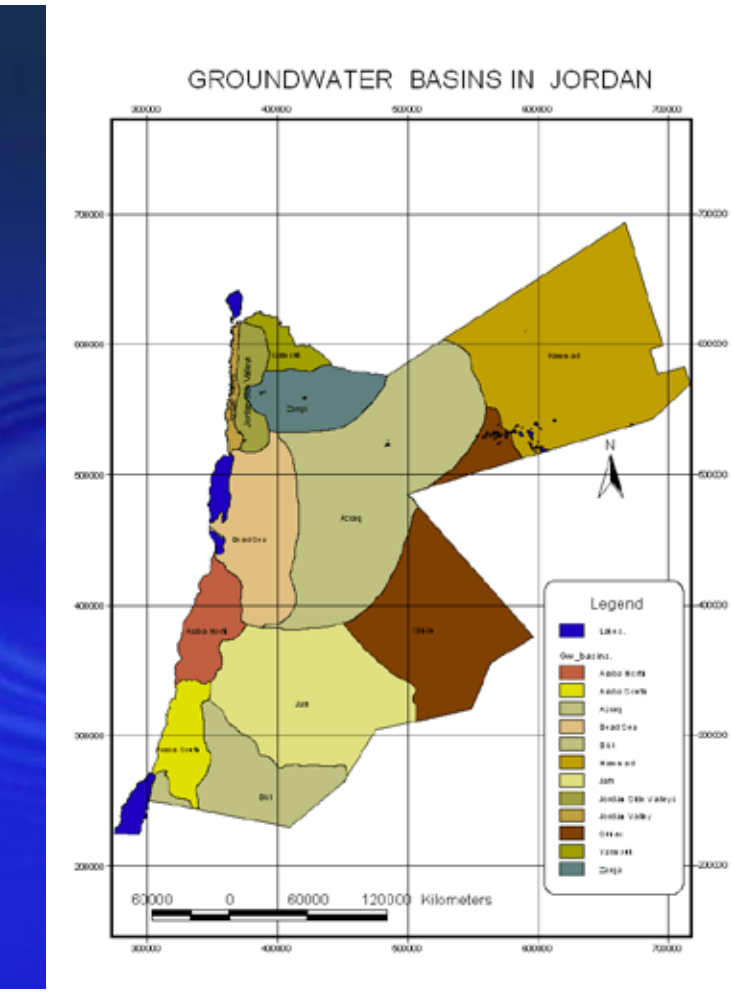
Water Resources Management in Jordan

General Information about Jordan



- The Hashemite Kingdom of Jordan covers a land area of about 90,000 km².
- Population 6.4 million in 2012.
- Average household size 5 (person).
- 98% of the Jordanian population is connected to water supply systems, while 64% is connected to central sewage systems.
- Jordan is divided into 15 surface water basins and 12 ground water basins, some of which extend to neighboring countries.


Main Surface water Basins
in Jordan
YARMOUK
JORDAN VALLEY
NRSW
AMMANZARQA
NRSW
AZRAQ
HAMMAD
MUJIB
SRSW
HASA
NWARABA
SARHAN
JAFER
SWARABA
QADISI
60000 0 60000 120000 Kilometers


GROUNDWATER BASINS IN JORDAN
N
Legend
60000 0 60000 120000 Kilometers

Introduction

- Jordan views the water sector as the highest priorities forming the backbone of integrated social and economic development

- Water scarcity is the single most important natural constraint to Jordan's economic growth and development

Introduction

The population increase exceeded the natural growth rates due to the sudden influx of refugees and displaced persons.

Population (will continue to grow from about 6.4 million in 2012 to around 8.5 million by 2025.)

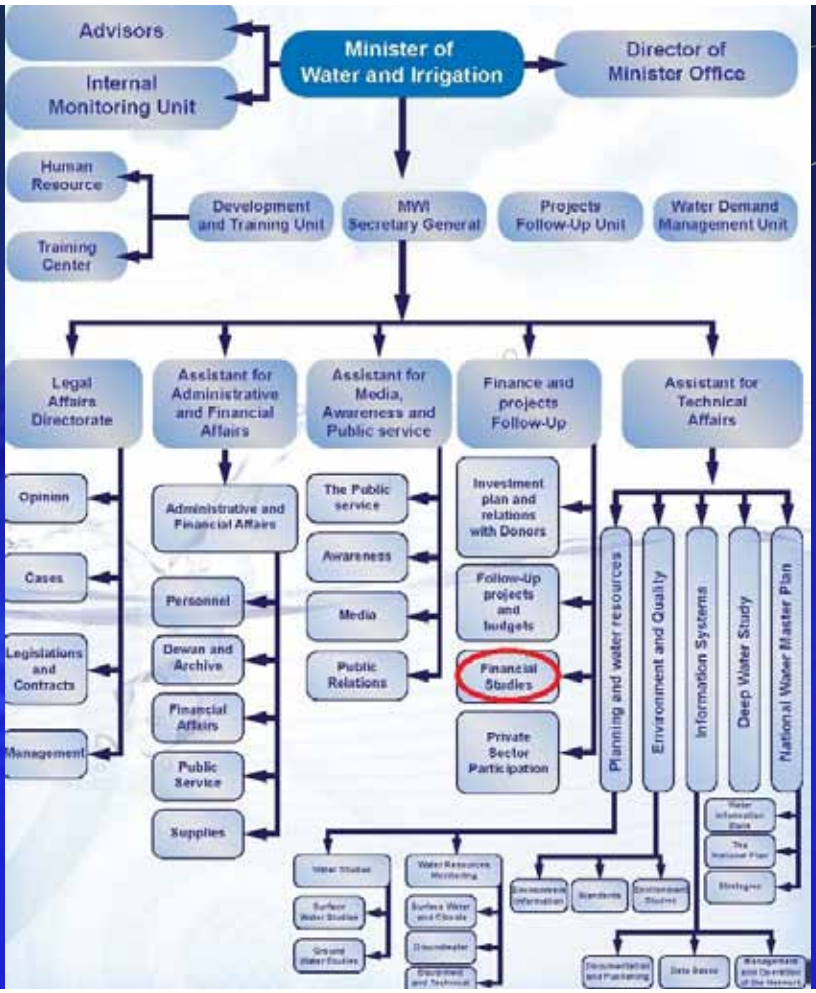
The Government has responded to the challenges facing the Water Sector by issuing the "Water Strategy for life " (2008 – 2022) and the "Water action plan" (2011 - 2013).

Legal Framework

Ministry of Water and Irrigation (MWI)

Water Authority of Jordan (WAJ)

Jordan Valley Authority (JVA)



Ministry of water and irrigation (MWI)

The mission of the Organization:

- Development and protection of water resources.
- Updating information systems.
- Legislations and regulations relevant to the water sector.
- Developing strategies and programs pertaining to the implementation of water policies.
- Securing funding necessary for water projects.
- Following-up implementation of projects.
- Maintaining the rights of Jordan shared water resources.
- Updating plans and projects of the institutional development.
- Training.
- Public awareness and water demand management as well.

Population & Growth Rate Estimation, 1999 - 2013

Year	Estimated Population in (000)	Estimated Growth Rate
1999	4,738	2.5
2000	4,857	2.5
2001	4,978	2.5
2002	5,098	2.4
2003	5,230	2.6
2004	5,350	2.3
2005	5,473	2.3
2006	5,600	2.3
2007	5,723	2.2
2008	5,850	2.2
2009	5,980	2.2
2010	6,113	2.2
2011	6,249	2.2
2012	6,388	2.2
2013	6.53	2.2

Department of Statistics \ Population Statistics Division

Components of the Water Crisis in Jordan

- Limited Renewable Water Resources
- Widening gap between supply and demand
- High Population Growth
- Needed capital cost
- Efficiency of Service Delivery
- Cost Recovery & Affordability

Production, Supply & Demand

Water Resources

• Seasonal rainfall is the main source of water from year to year, with most falls between the months of October and May (Annual average ≈ 8200 MCM). Its annual variability affects rain fed agriculture, ranges, livestock, groundwater recharge and surface water storage. Scarcity and variability of rainfall is due to the arid to semi-arid climate of the country.

Annual Rainfall Volume (MCM/yr)(1937-1938 To 2011-2012

Rainfall Volume MCM/year	Projected Year	Rainfall Volume MCM/year	Projected Year
9979	38/1937	9476	75/1974
10904	39/1938	7556	76/1975
10908	40/1939	6070	77/1976
8320	41/1940	5886	78/1977
9793	42/1941	5912	79/1978
10926	43/1942	10873	80/1979
8943	44/1943	8466	81/1980
13403	45/1944	5590	82/1981
7982	46/1945	9204	83/1982
4802	47/1946	5407	84/1983
6980	48/1947	7189	85/1984
9668	49/1948	5791	86/1985
10237	50/1949	7650	87/1986
5521	51/1950	12262	88/1987
11627	52/1951	10205	89/1988
8675	53/1952	7609	90/1989
8504	54/1953	8379	91/1990
6725	55/1954	10429	92/1991
8553	56/1955	5898	93/1992
9879	57/1956	8440	94/1993
4855	58/1957	8524	95/1994
6386	59/1958	6046	96/1995
3915	60/1959	8746	97/1996
8496	61/1960	9110	98/1997
7495	62/1961	2973	99/1998
5497	63/1962	3651	2000/1999
11679	64/1963	7375	2001/2000
10857	65/1964	7545	2002/2001
6936	66/1965	9708	2003/2002
17797	67/1966	6951	2004/2003
8421	68/1967	9304	2005/2004
8542	69/1968	6258	2006/2005
8534	70/1969	7683	2007/2006
10006	71/1970	5194	2008/2007
11563	72/1971	6379	2009/2008
4536	73/1972	8728	2009/2010
11896	74/1973	6477	2010/2011
		5943	2011/2012

Long Term Average Rainfall (8195 MCM)

Production, Supply & Demand

Water Resources

- The average annual renewable fresh water resources that can be safely exploited in Jordan amount to (≈ 800 MCM), of which 50% is renewable & nonrenewable groundwater, with the rest being made up by surface water resources(≈505 MCM).

- Treated waste water is also considered a valuable resource. Some 110 MCM (90% of treated effluent in Jordan is currently reused in agriculture). This will reach some 205 MCM year 2020.

Production, Supply &Demand

Water Uses

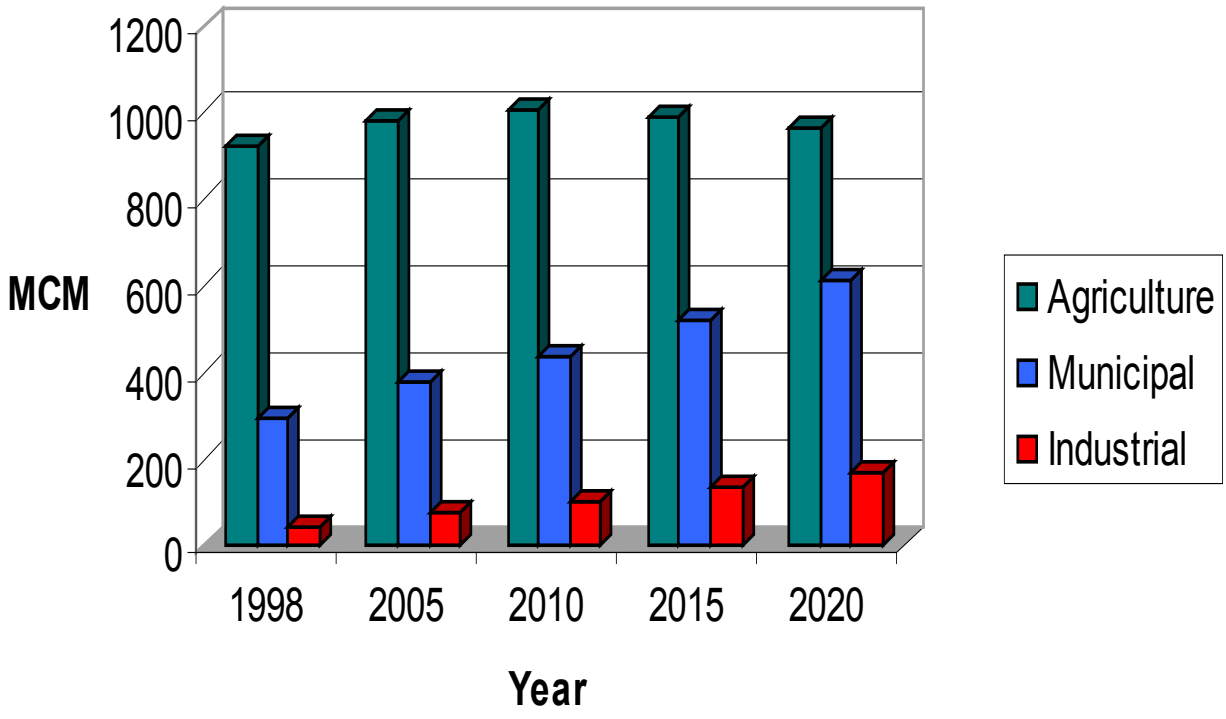
- In 1946 the available water resources was ≈ 3600 M^3 per capita per year, and went down to ≈ 150M^3 in 2009 due to unexpected increase in population. This is far below the international poverty line of ≈ 500 M^3/year.
- Average per capita share for MENA countries ≈ 1250 MCM, & worldwide ≈ 7700 MCM.
- About 60% (12% from treated waste water) of the water is used for agriculture, while only 35% is used for municipal purposes and 5% for industrial uses.

Production, Supply & Demand

Water Demand

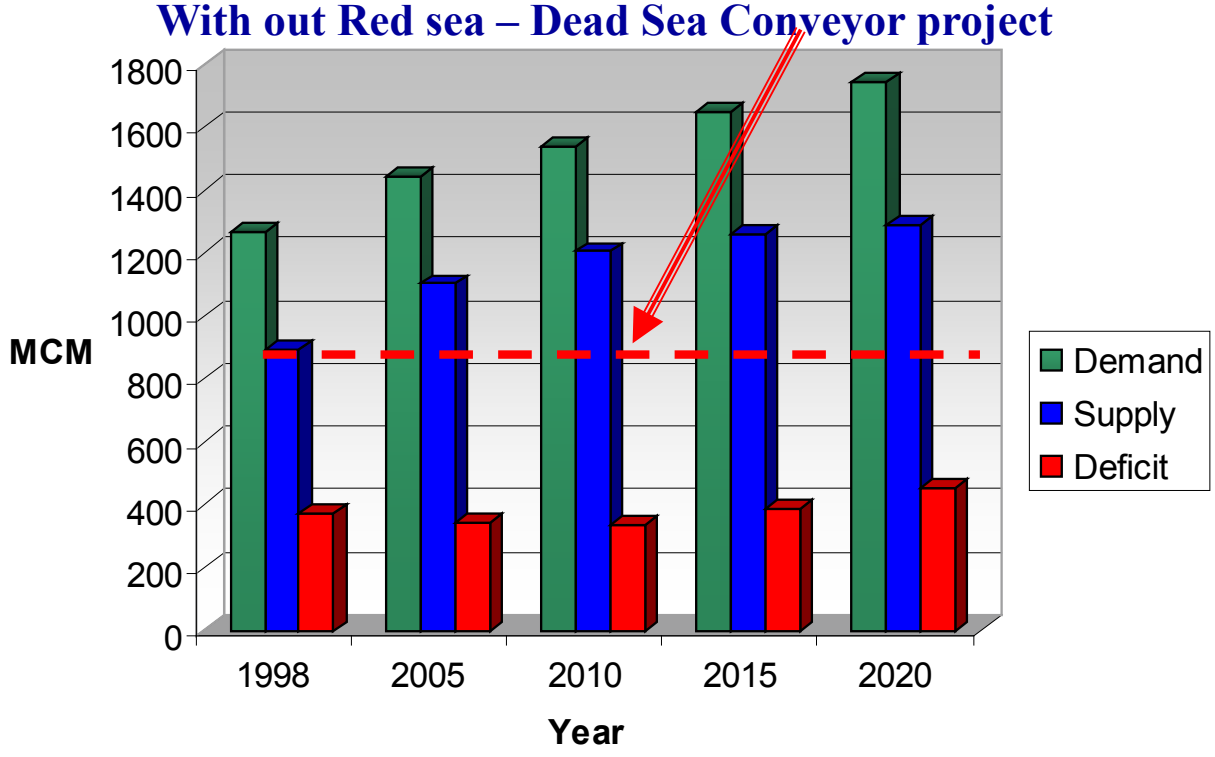
- The total water demand in 2009 for all sectors is (1300) MCM, and it is expected that the demand will increase to reach (1500) MCM by year 2015 and by 2020 will be around (1700) MCM, with increase in demand being mostly contributed by municipal and industrial uses.

Water Demand By Sector

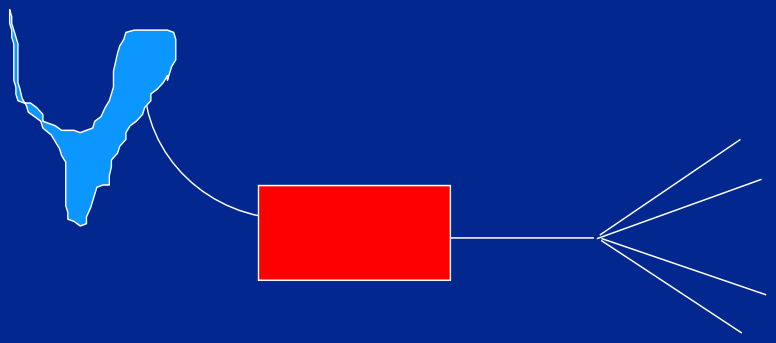


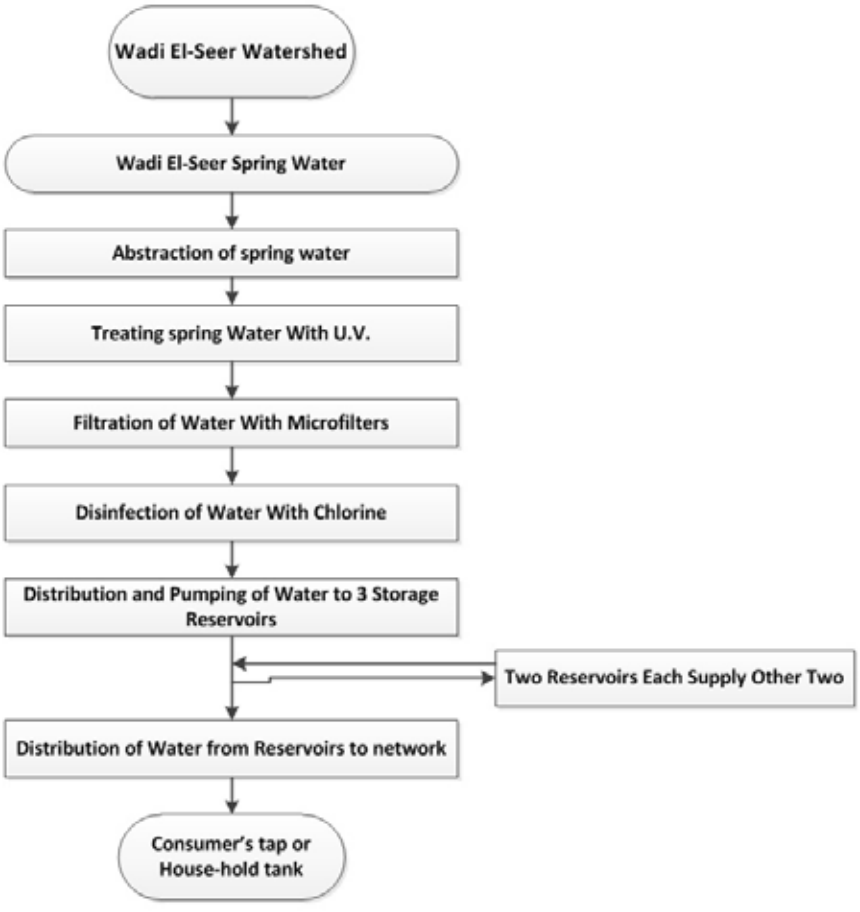
Total Demand, Resources & Deficit

With out Red sea – Dead Sea Conveyor project



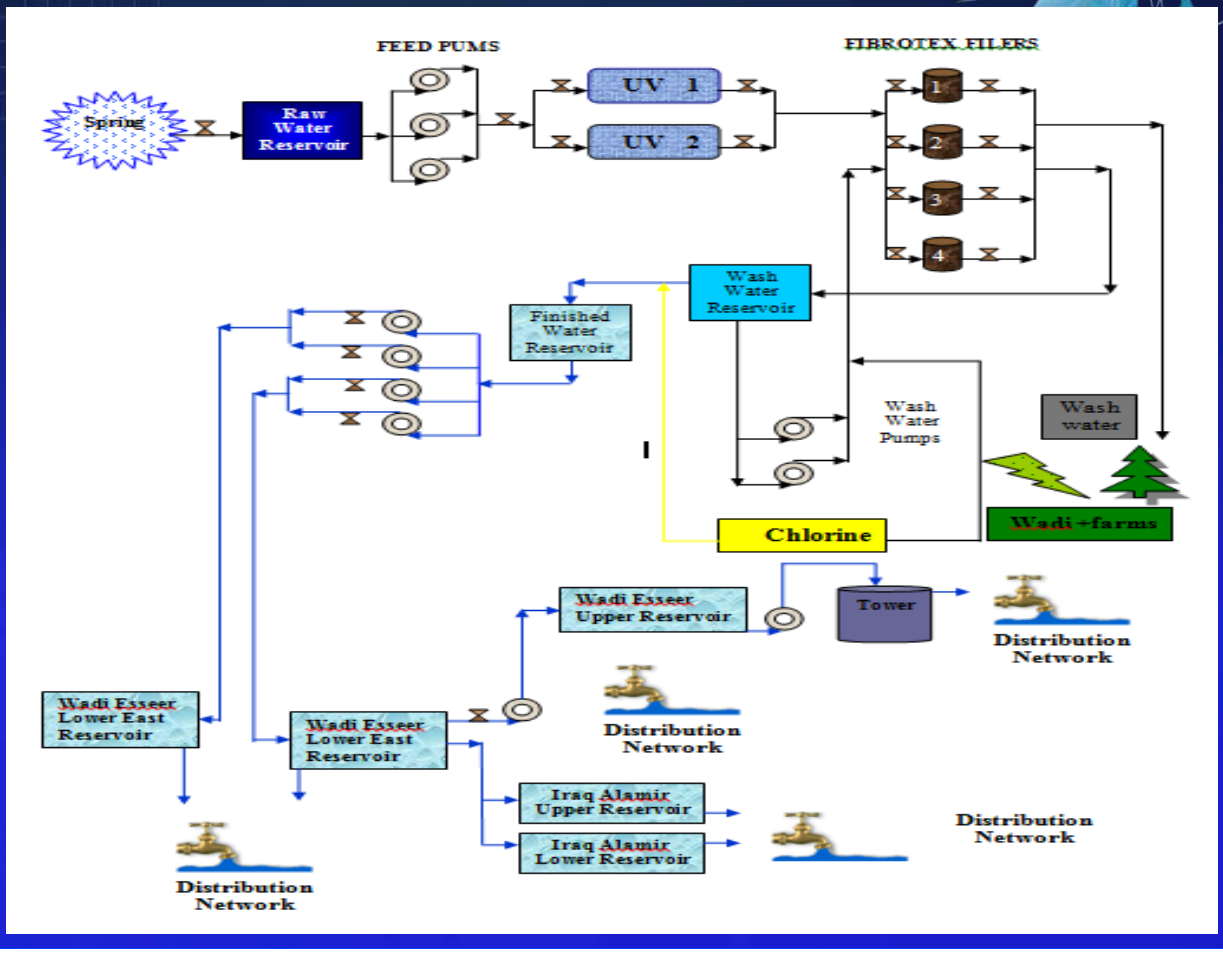
Wadi El-Seer Water Safety Plan





Wadi El-Seer water supply system

- Water safety plan for Wadi El-Seer water supply system covers all aspects from catchment up to the consumer's taps. It includes the source of water, Wadi El-Seer spring and its watershed, Wadi El-Seer treatment plant, distribution system and storage reservoirs, and Wadi El-Seer household storage tanks that are supplied only from Wadi El-Seer Treatment Plant. *Water is life.*
- A Water Safety Plan (WSP) is the most effective way of ensuring that a water supplies safe for human consumption and that it meets the health based standards and other regulatory requirements. It is based on a comprehensive risk assessment and risk management approach that covers all the water supply chain from the catchment to the consumer and ensuring that it complies with the Jordanian drinking water standard JS 286/2008. at the customer tap.
- The primary objectives of a water safety plan in protecting human health and ensuring good water supply practices by minimizing contamination of source waters, reduction or removal of contamination through appropriate treatment processes and the prevention of contamination in the distribution network and the domestic distribution system. These objectives are applicable to all water supply chains, irrespective of their size or complexity.



Improvement Plan

Strategic Planning for the sector

A- Reduce unaccounted for water

- Rehabilitation of water network
- Enhance the performance of irrigation network
- Improve technical and administration
- Limit un-planned expansion of networks

B- Reduce Water Consumption:

. Public Awareness and reuse of treated water

.Upgrade irrigation systems

. Adjust Cropping pattern

Strategic Planning for the sector

C- Secure new water resources:

Traditional Sources

- Disi Water
- Dams and Ditches
- Investigation wells(Discover new wells)

Non Traditional Sources

- Desalination of brackish water
- Desalination of Sea water
- Import water

Strategic Planning for the sector

D- Measure on the National level

- **Regulate population growth**
- **Organize land use**
- **preservation of groundwater**
- **water uses policies**

Strategic Planning for the sector

Action Plan consists of 6 major items namely:

1. Institutional and Legal Issues.
2. Agricultural Water Use.
3. Cost Recovery.
4. Private Sector Participation.
5. Information Systems.
6. Adaptation of International Conventions

The Way Forward

IN THE SHORT TERM

- Implementation of agreements for the sale of recycled Water for industries.
- Increase water tariff to ensure recovery of O&M Costs
- Increase the existing irrigation Water Tariffs
- Encourage Irrigation Advisory Services
- Continued development of centralised Water Information System including the use of advanced technologies.
- Ensure Compatibility of data and information systems.

The Way Forward

IN THE LONG TERM

- Full development of SW & GW (Economic feasibility, social and environmental considerations)
- Continuous Development of marginal water.
- Gradual reduction of mining of renewable GW (By 2020)
- Achieve Highest Possible efficiency (Conveyance, distribution, application and use, including Water & WW systems performance)
- WW management and reuse to achieve public health standards
  Improve Industrial waste water monitoring
- Periodical review of institutional arrangements & restructuring
  To match changing needs
- Regular update of legislation whenever necessary

The Way Forward

IN THE LONG TERM

- Enhance Stakeholders' participation
- Expansion of Private Sector Role
- Recovery of O&M cost to become a standard practice.

A Vision for the Future

- Private sector active partners
- Institutions restructured, integrated water management
- Wastewater fully reclaimed for economic uses
- Strong environmental regulation
- Water pricing closer to economic cost
- Sustainable groundwater use
- Regional Cooperation

THANK YOU

Hope to see you soon in Jordan

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

KENYA

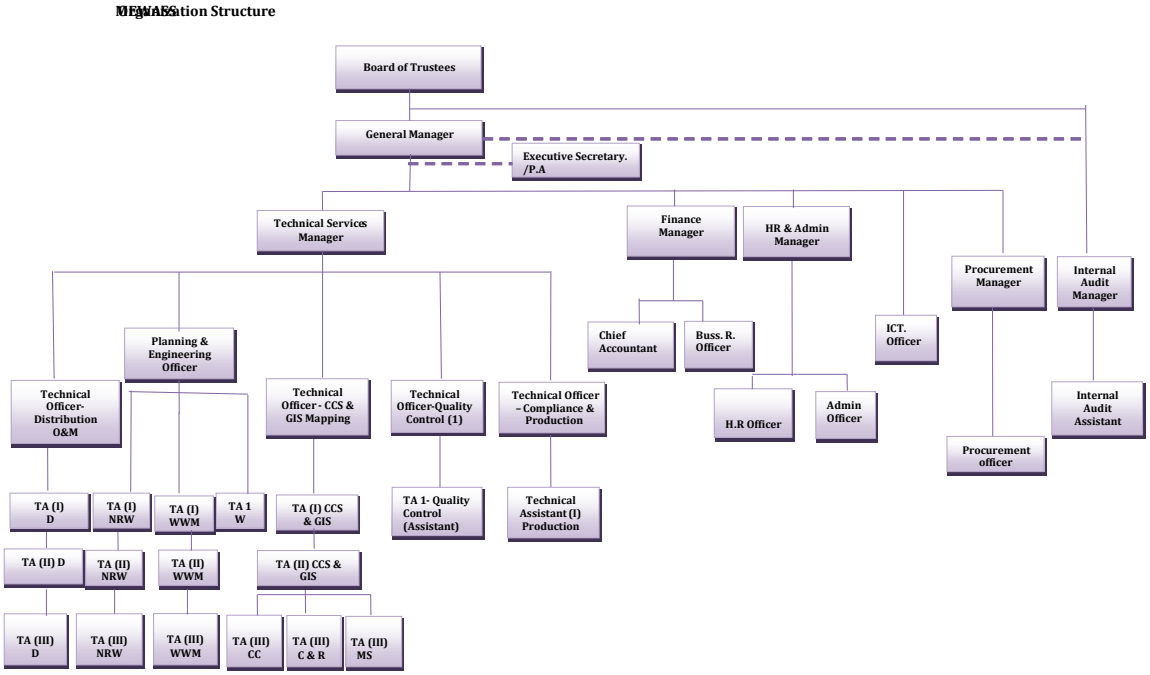
Country Report
(KENYA)

Meru Water and Sewerage Services
(MEWASS)

Mewasss

- Established in the year 2001.
- A Body corporate ,Cap 164, laws of Kenya- TRUST.
- Started operations July 2002 – Meru town and environs.
- Agent to County gvnt / water services board.
- Self sustaining over the period (o&m)
- Major challenge – investment in major capital works.

Mewass organ. structure



Service MEWASS provides

-Object: To address the 'right to water,' and 'water as a basic need'.

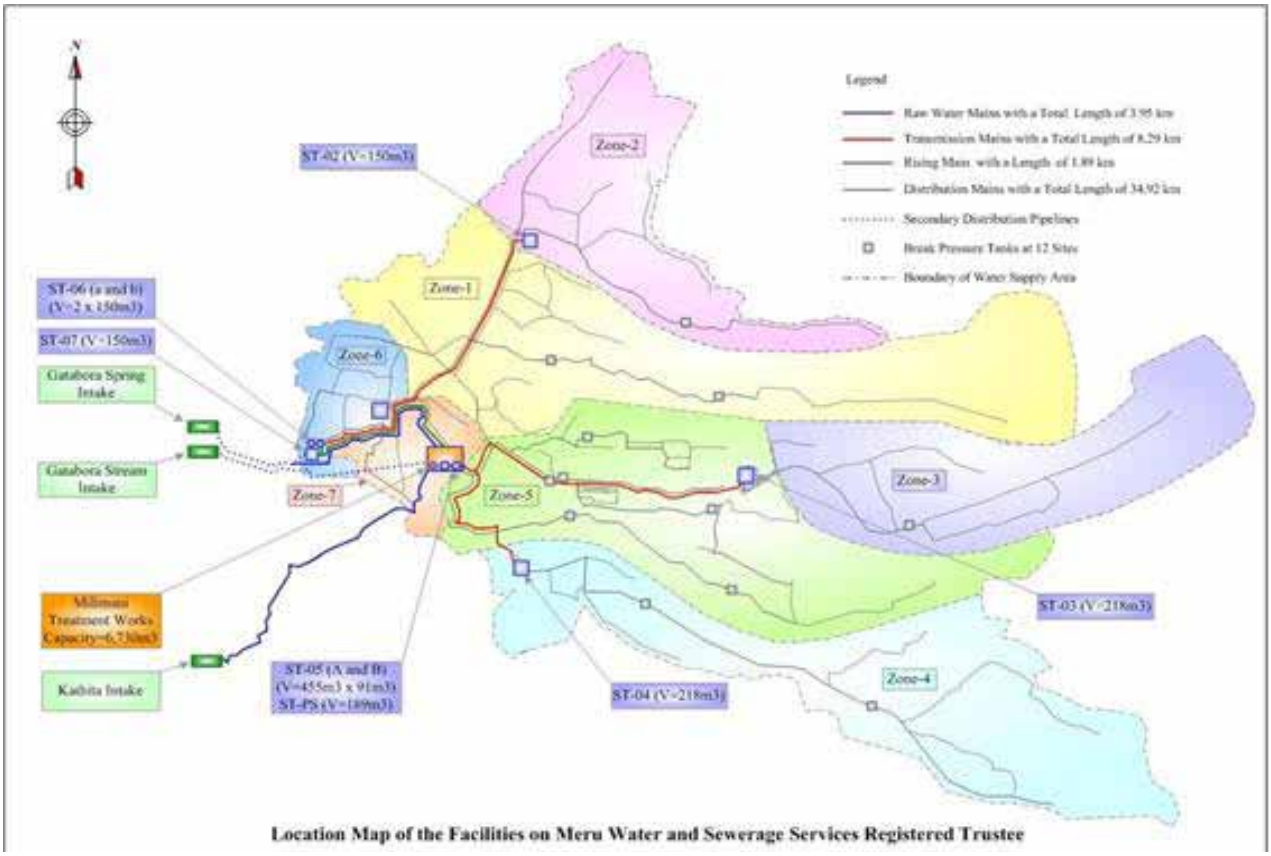
" through Economical provision of safe and quality water supply services".

-Agency: Local / County Government.

-Overall responsibility: Administration and Management of water supply services.

Location of Meru County

Facilities location map



Location Map of the Facilities on Meru Water and Sewerage Services Registered Trustee

Production flow - chart

- **Intake ⇨ Treatment plant ⇨Clear water tank**

⇩

Customers tap ⇦ Distribution system

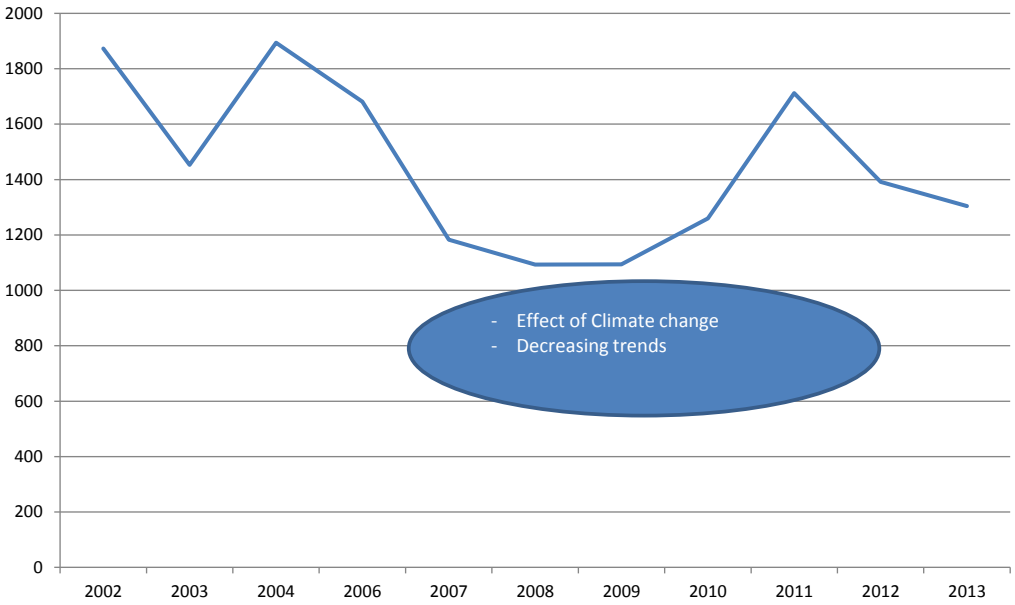
water Resources

- **Total Forest – 5.6% (2012)**
- **Residential – 16.5% (2012)**
- **Arable land – 30% (70% -asal)**
- **The Per capita available water is about 650 m3/year. Future projections show that by 2025, per capita water availability will drop to 235m3 as a result of population growth.**

Annual precipitation

YEAR	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	TOTAL
2002	58.2	1.2	274	532	91.6	0	0	0	39.6	388	249	239	**1873**
2003	14.7	0	67.4	392	96.2	0	15.1	15.1	18.2	298	423	113	**1453**
2004	63.7	65.1	12.2	782	60.3	0	8.5	0	2.5	320	419	160	**1894**
2005	.....Data not Available.....												
2006	60.2	30	16.9	377	70.8	0	0	50.4	60.5	330	457	230	**1682**
2007	107	13.5	110	179	66.7	35	14.1	30.1	9.8	304	220	94.6	**1183**
2008	86.7	0	65.2	274	11.7	0	0	0	8.5	389	226	32.2	**1093**
2009	142	26.9	50.1	145	97.2	0	0	0	0	321	195	117	**1094**
2010	123	90	235	282	40.6	0	29.1	10.6	0	143	298	9.7	**1260**
2011	13.6	0	52.2	294	94.7	25.8	1.8	0	31.7	510	495	193	**1712**
2012	0	51.1	9.5	103	218	25.2	18.2	22.9	12.8	281	362	289	**1392**
2013	71	6.7	165	494	20.7	3.1	0	0	2	46.8	437	57.6	**1305**

Precipitation:
Total rainfall (mm)- (2002- 2013) 10yrs



water resources and their situations

- **-Water from rivers and springs (surface water)**
- **- Highly contaminated due to pollution**
- **provide 6000m3/d**

Others sources

- **Ground water**
- **Rain water harvesting (roof & dams)**

Policy and Regulations

- **Policy:** Supply water of <u>good quality</u> and in sufficient quantities;
- to meet the various needs including poverty alleviation while ensuring
- safe disposal of waste water and environmental protection.
- -**Regulations:** Under Water Act 2002, the issuance of licenses is carried out by the Water Services Regulatory Board (WASREB).

Water rates and bill collection system

- **Graduated volumetric categorized into blocks**
- **0-6m3 – pro-poor category (basic need).**

- **Billed monthly**
- **Collection efficiency of 95%**

Water quality management

- Water treatment processes.
- Parameter testing at production and distribution some points.
- External analysis.
- Surveillance by regulatory bodies

Guideline Values for Raw water	
Coliform organism (Number/100ml)	Recommended treatment
0-50	Bacterial quality requiring disinfection only
50-5000 people	Bacterial quality requiring full treatment (coagulation, sedimentation, filtration and disinfection only)
5000-50000 people	Heavy pollution requiring extensive treatment
Greater than 50000 people	Very heavy pollution unacceptable as a source unless no alternative exists. Special treatment needed.

Current monitoring system / plan of safety

- Daily tests (2hrs interval)- ph, Turbidity, Temperature, Residue chlorine, etc
- Weekly – Bacteriological and customer taps
- Monthly – external analysis (chemical and bacteriological)
- Quarterly- surveillance- by KEBs (independent national standards body)
- Monthly, quarterly and annual report to Regulator (WASREB)
-

Laboratory situations in terms of qualified staff and facilities

- Limited space in the lab. (old and small room)
- Laboratory not adequately equipped
- Major tests (heavy metal) done externally
- Staff (some)qualified but lack necessary exposure.

Water Safety (*) Plans or similar efforts

- **Not in a structured manner**
- **Routine monitoring without fall back plan**
- **Risks management options not documented**
- **No fall back actions in case of emergency occurrence**

Current water supply services

- **About 68,000 served against 118,000 population (49.7%)**
- **100% have access 24 hour**
- **Directly drink from supply taps**
- **NRW = 26%**

- **Responsibility area = (112 Km^2)**

Cont.

- Area served: (**63 Km^2**)
- Water abstracted from river / springs
- Treatment: convectional treatment process.
- Production capacity: (**6,000m^3 / day**)
- Length distrib. **(289km**)
- Storage capacity: (**9,400m^3)**
- Total no. connect. : (**10,473)**
- Duration of supply**: 24hr**

Cont.

- Active connections: (**8,697)**
- Con. Length: (**6.0m**)
- Water produced: (**2.254,189** million m^3 / year)
- Water metered: (**1.623,734** million m^3 / year)
- Water pressure: **60m**
- Pipe bursts**: 10,851** / year
- No. tests residual chlorine: (**5,124** /year)

Cont.

- Tests done: (**5,724** / year)
- Tests passed**: (5,723** / year)

- Staff:
- ✓**Permanent staff with contract**
- ✓**casual-time /contract part staff**
- ✓**casual-time /wages part**

staffing

Corporate Services	Water Supply	Other non water supply	TOTAL
(Management,	(O&M, Customer	(e.g. wastewater,	
Admin, Finance,	Services, Support	environment	
Technical, etc.)	Services, etc)	services)	
6	62	7	75

Training

- Staff no trained: (42)
- No. of days: (82)
- Training budget: (2% of O&M)

Customer service

- Customers conn. in the year: (902)
- Customer complaints: (1231)
- ✓**in person**
- ✓**by telephone**
- ✓**by email**
- ✓**by letter**

Others:

- **by short text message (sms)**

Customer views

- ✓**from customer interactions (letters, telephone**
-
- ✓**by responding to customer complaints**
-
- ✓**from customer surveys, questionnaires, etc**
-
- ✓**by market research**
-

Cost of a connection

Domestickshs	Non Domestic	Bulk water sales	AVERAGE of all
(Households)	(Industrial,		categories
	commercial,		
	Institutional, other)		
USD 80.5	USD195.4	USD 80.5	USD 80.5

Fixed charge / month

Domestic	Non Domestic	Bulk water sales	AVERAGE of all Categories
(Households)	(Industrial, commercial, Institutional, other)		
USD 2.9	USD 2.9	USD 2.9	USD 2.9

Water tariff

Tariff		Domestic		Non Domestic			Bulk water sales		
Block	From	To	Cost/m^3	From	To	Cost/m^3	From	To	Cost/m^3
1.	0	6	USD 0.38	0	6	USD 0.38	0	6	USD 0.38
2.	7	20	USD 0.57	7	20	USD 0.57	7	20	USD 0.57
3.**	21	above	USD 1.2	21	above	USD 1.2	21	above	USD 1.2

Private Sector Investment

- **Water Resource development:**

  -private boreholes (households and bulky water supply)

  - Private and institutional water supplies

  - Community water projects
- **Institutional water supply have complete treatment system (KeMU)**
- **Community gated estate – buys bulk water or own treatment and distribution system.(K-Re, Runda- Nairobi)**
- **Current water supply model is based on private sector business principles hence limited space. However large scale supply will favour that arrangement**
- **Bill collection is privatized and very soon we shall close counters at our office.**
- **Leakage repairs are basically a handled at technical sections and would be tricky given its an operational issue.**

Involvement of national government

- **Water rates: Are approved by a regulator who is an agent of national government. Basically to eliminate monitor unjustified costs in tariffs.**
- **Personal employment: monitors number of employees per 1000 connections, although this is demand driven.**
- **O&M budgeting: Entirely Mewass preserve.**
- **Capital works: Mewass has no capacity to finance major capital investments (asset development) and this is vested onto the national and county governments**

current situation of Privatization

- **Infancy stage, PPP Act. 2013 not fully operational as was recently enacted**
- **Public awareness and sensitization in progress**

State Owned Company

- **Socially responsible commercialization**
- **Quasi- government service providers**
-

Other water sources

- **Direct from rivers / springs**
- **Private hand dug wells / boreholes**
- **Rain water harvesting (dams ,pans, roof and rock catchments,)**
-

Future direction of Privatization

- **Bright given the legal framework through PPP Act 2013**
- **Government to profile the poor and marginalized and strategize on how best for them a to access water services**

Tall buildings

- **Ensure water reaches the ground floor, and the owner provides lifting /pumping mechanism to upper floors.**

Sewerage status

- **11500/118000 = 9.7%**
- **Current treatment plant is overloaded / stretched**
- **The sewerage staff deals with issues related to sewerage**
- **Have fairly adequate tools and equipment**
- **Personnel have capacity/ skills gaps**
-

Future plan

- **Shifting of current treatment site to a new site**
- **Expansion of sewer treatment plant through construction of a new complete system.**
- **Undertake all effluent tests at the sewer plant**

Solid waste disposal

- **A dumpsite exist where solid waste dropped daily**
- **Environmental concerns do exist – poorly managed**

(2) Future plan

- **Incinerators to manage solid waste**

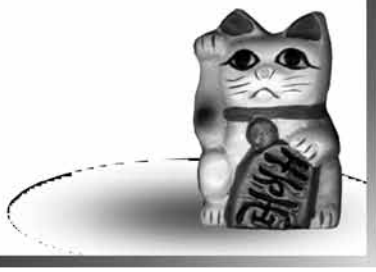
Water Supply Administration
For Better Management of Water Supply Services
Course（A）

MOROCCO

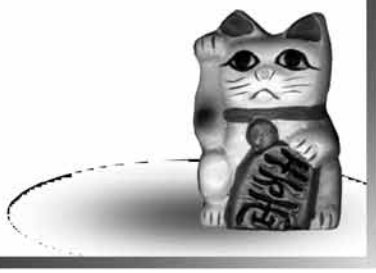
Water Supply Administration for Better Management of Water Supply Services

Country Report

Country: Kingdom of Morocco
Organization: National Office of Electricity and Drinking Water / Water Branch(ONEE/WB)



ORGANIZATIONAL PROFILE



General Country profile : Background

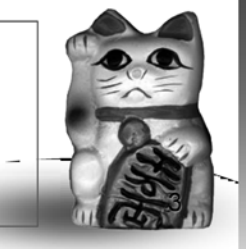
- The Kingdom of Morocco is a country in the Maghreb region of North Africa. Geographically, Morocco is characterized by a rugged mountainous interior and large portions of desert.
- The climate is Mediterranean in the North and in some mountains (West of Atlas), which becomes more extreme towards the interior regions. The terrain is such that the coastal plains are rich and accordingly, they comprise the backbone for agriculture, especially in the North. The climate changes when moving east of the Atlas mountains due to the barrier, or shelter, effect of the mountain system, becoming very dry and extremely warm during the long summer, especially on the lowlands and on the valleys facing the Sahara.

Whole Country:

Area : 710 000 km²

Population : 33 million Habitants

Coverage Water Supply: 96 % (100 % in urban areas et 92 % in rural areas)



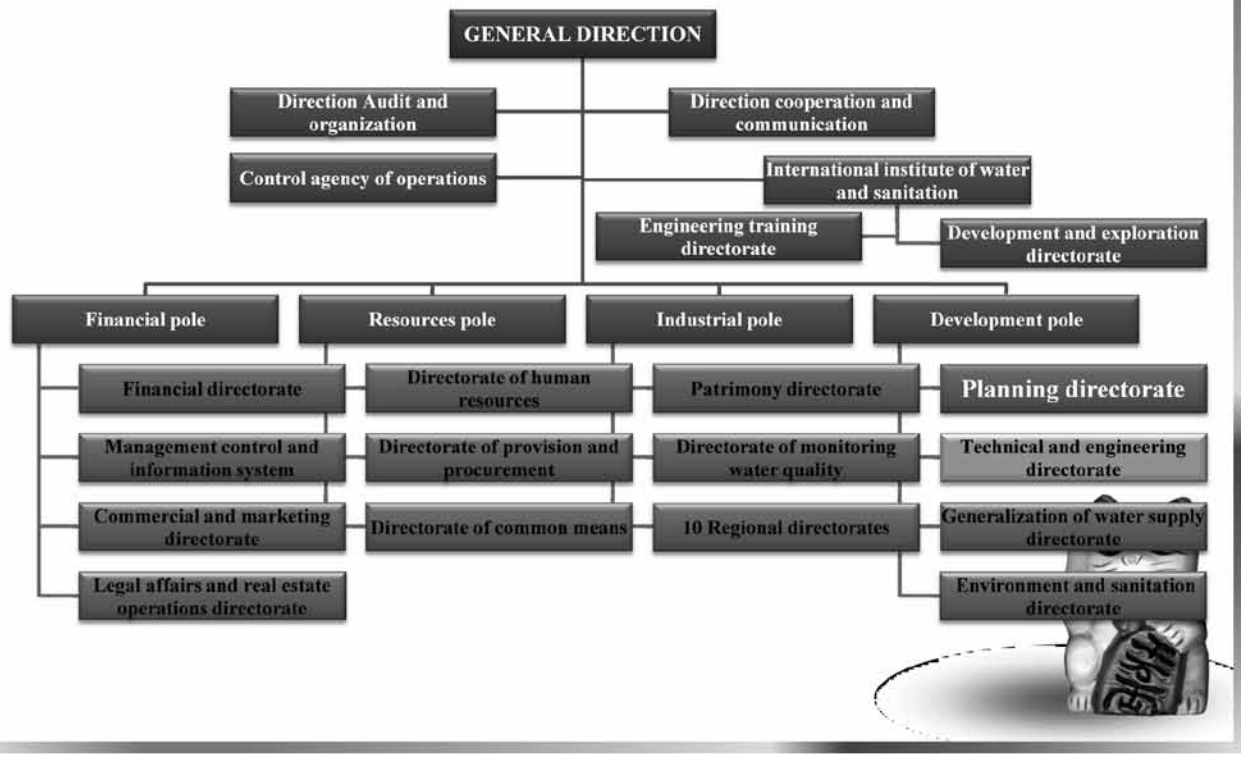
National office of Electricity and Drinking Water / Water Branch (ONEE/WB)

- ❑ Public company
- ❑ ONEP (actually ONEE/WB) has been Founded in 1972
- ❑ Civil status
- ❑ Financial autonomy

Mission of ONEE/Water Branch:

1. Planning for water supply throughout Morocco
2. Production of drinking water
3. Distribution of drinking water for the benefit of local collectivity
4. Sanitation management for the benefit of local collectivity

Organizational chart of ONEE/WB



My Mission

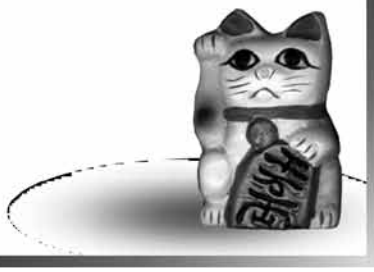
ONEE/WB policy is done within the framework of a strategic vision based on the three following axis:

- Sustaining, reinforcement and securing of existing potable water infrastructure,
- Generalisation of potable water access to all the population of the kingdom, in accordance with « The Right to Water » principle.
- Active Intervention in the liquid sanitation sector.

My mission in the organization is to realize feasibility studies of major water supply projects in order to identify the different solutions and determine the optimal solution. My actual job to achieve the mission is to:

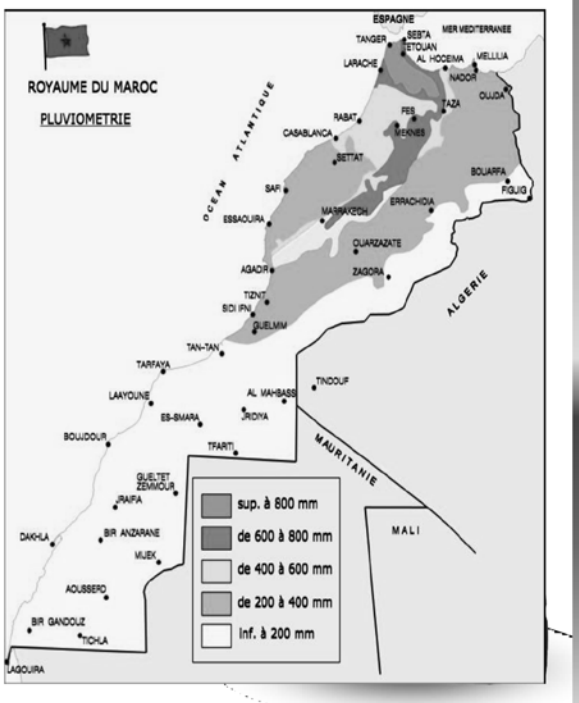
- Realize feasibility studies and master plan for major projects;
- Attend the Regional Directorates in the complex feasibility studies;
- Participate in the evaluation of projects for inclusion in the urban investment program;

CURRENT SITUATION OF WATER RESOURCES IN MOROCCO



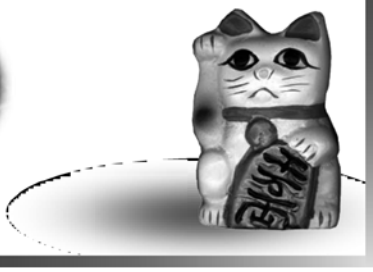
MOROCCO GEOGRAPHICAL BACKGROUND

- Topography of Morocco is quite varied. The interior of Morocco is largely mountainous, while the outskirts are made up of costal plains. It is in these coastal plain areas in the north that the soil is rich and most precipitation falls;
- While Morocco does not have any major rivers, coastal streams provide an important source of water used for irrigation; Morocco's three mountain ranges the High Atlas, the Middle Atlas and the Anti-Atlas are commonly referred to as the Atlas;
- The southern part of the country, south of the Atlas Mountains, is home to the Sahara Desert. While temperatures in other parts of Morocco are relatively pleasant, temperatures in the Sahara region can be extremely high.

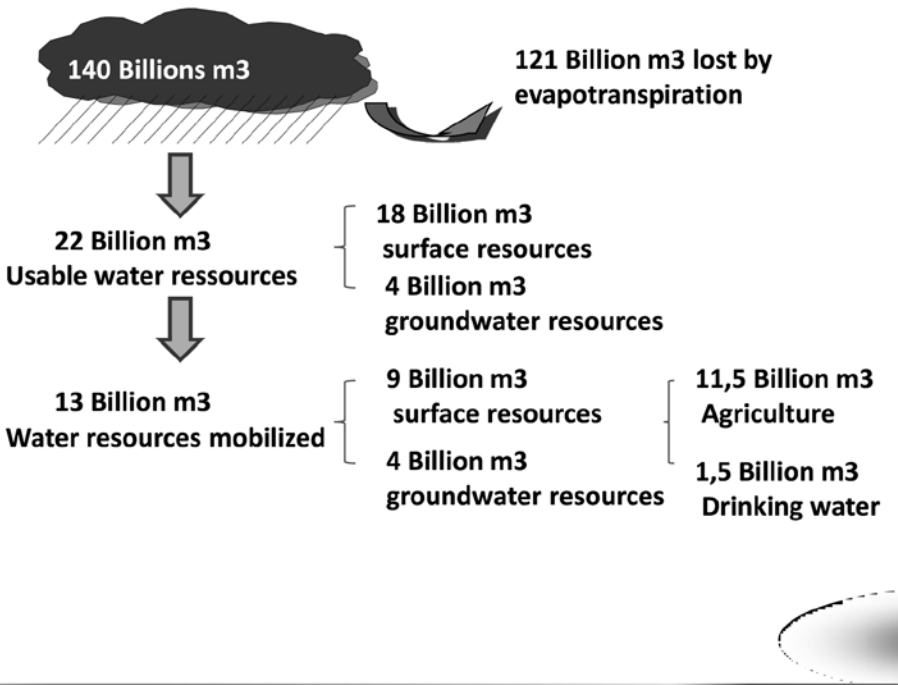


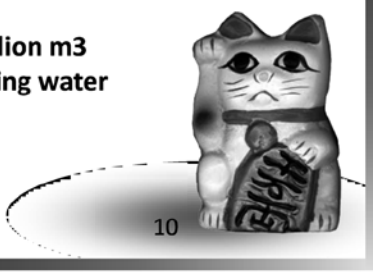
AVAILABLE WATER RESOURCES

Morocco has about 22 billion cubic meter of conventional renewable water resources per year equivalent to 730 cubic meter/capita/year. Before taking into account drought years of the 1990s and 2000s total renewable water resources were estimated to be much higher at around 29 billion cubic meters. However, only up to 20 billion cubic meter per year can be economically captured (mobilizable *resources*), including 16 billion m3 of surface water and 4 billion m3 of groundwater. Morocco has about 130 dams of various sizes with a total storage capacity of 17.5 billion de m3. It was estimated that in 2004 about 13.5 billion m3 were withdrawn or about 67% of available resources. 83% of withdrawals were for agriculture and 17% for municipal and industrial uses.



AVAILABLE WATER RESOURCES





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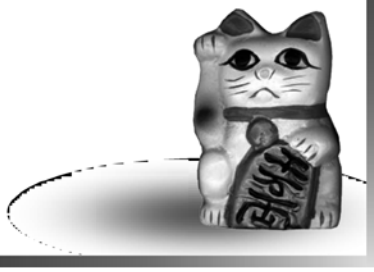
DESALINATION

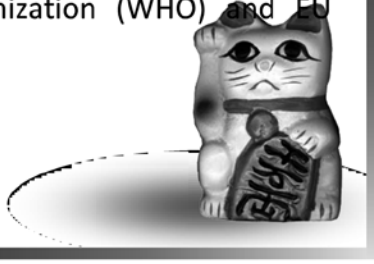
- For the last decades, desalination has been a solution to water shortages in the southern region of Morocco (Laayoune, Boujdour, Akhefnir,..) . Morocco has access to sea-water along a coastline of more than 3,500 km.
- ONEE/WB started its desalination experience in 1975 in Tarfaya city through the setting up of an Electrodialyse plant for brackish water.
- Morocco is increasingly looking towards seawater desalination as a source to supply its increasing water needs for drinking, industry and mining. The Department of Water has commissioned a study on desalination due to be completed by the end of 2009. Specific projects are planning (Agadir, Tarfaya, Laayoune, Dakhla, Houceima..).



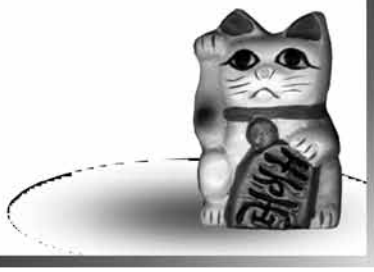
POLICY AND REGULATIONS IN MOROCCO

The water sector is governed by the following:

- Moroccan law 10/95 on the water,
- Order No.1277-01 (2002) laying down quality standards for water used for drinking water production,
- The standard Moroccan No. 03.7.001 on water quality for human consumption nears 2006,
- Moroccan standard No. 03.7.002 on control and monitoring networks of public water supply.
- The regulations governing the quality of drinking water (used by ONEE/WB), largely inspired by the Guidelines of the World Health Organization (WHO) and EU directives for the quality of drinking water.

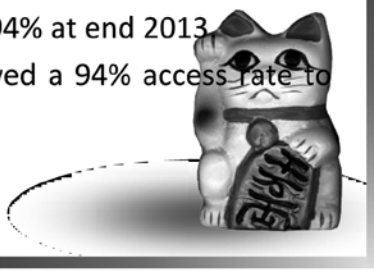


CURRENT SITUATION OF WATER SUPPLY SERVICES



Water supply services

- Water supply in Morocco is provided by a wide array of utilities. They range from private companies in the largest city, Casablanca, the capital, Rabat, and two other cities, to public municipal utilities in 12 other cities, as well as Office National Electricity and Drinking Water (ONEE). The latter is in charge of bulk water supply to the aforementioned utilities, water distribution in about 623 (2012) small towns, as well as sewerage and wastewater treatment in 87 (2012) of these towns,
- **Recent achievement of ONEE/WB**
- Investments by the ONEE/WB in the area of drinking water during the period 2001-2013 amounted to over 29 billion dirhams to achieve the following objectives:
  - Enhancing production: Reaching a production capacity of 56 m3 / s at the end of 2013
  - Improved connection rate in urban areas has reached 94% at end 2013.
  - Generalization of the ASP in rural areas, which achieved a 94% access rate to the end of 2013.



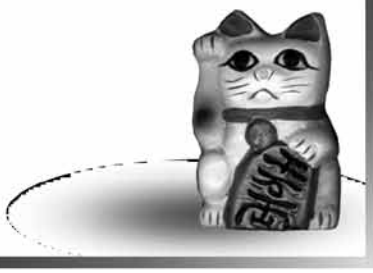
The production of ONEE is about 1022 Million m3 in 2013 :

66%

33%

1%

CURRENT SITUATION OF WATER RATES AND BILL COLLECTION SYSTEM

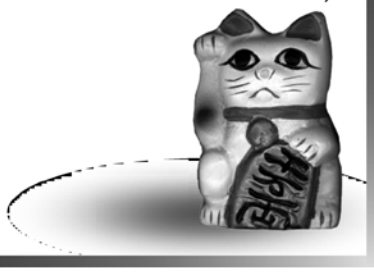


THE WATER RATES SYSTEM

In Morocco, all billing, both the production and distribution, are counting on the basis of volume delivered. In large cities; ONEE/WB invoice drinking water to distributors at a price said to production; Distributors (ONEE/WB and others) charge their customers according to a tariff-based user called for distribution;

The principles of water rates system are:

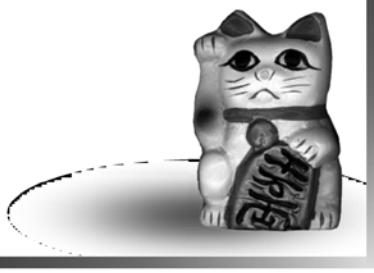
- The tariff must provide sector organizations, the financial resources necessary for the operation and development of their infrastructure,
- Pricing should allow low-income households access to a sanitary manner judged necessary and consumption at a rate compatible with their income
- The tariff is set by reference to the economic cost of development: allows the user to feel the scarcity of water and bring to and prevent waste and conserve resources, it ensures economic efficiency,



THE BILL COLLECTION SYSTEM

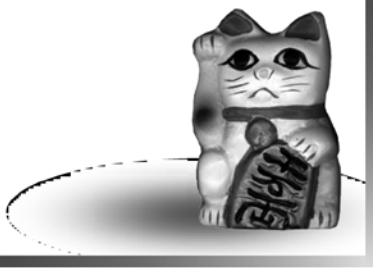
The tariff system of water supply was built around:

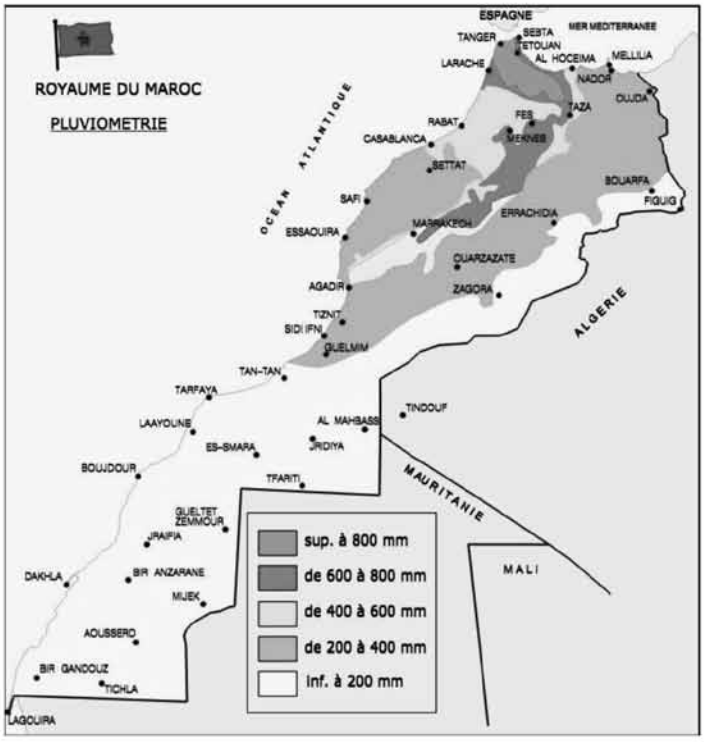
- Differential pricing between production and distribution for large cities, and a single tariff for small centers run by ONEE/WB
- Differential pricing between cities, to reflect the relative scarcity of the resource and the disparity in costs of production and distribution,
- Differential pricing by customer class.
- Distribution tariffs recognize three types of uses: domestic, industrial and preferred.

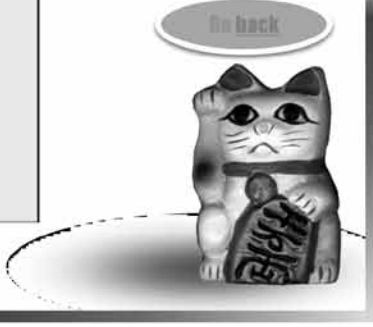


MAJOR PROBLEMS

- Water resources in Morocco are limited and irregular in time and space. Furthermore, the water resources undergo a deterioration of their quality by the various pollutant emissions, such as domestic and industrial wastewater. On the other hand, these resources are increasingly scarce due to a continued growth in demand.
- Water losses in the distribution networks of drinking water.
- Climate and hydrological context of Morocco characterized by irregular rainfall and a succession of droughts;
- Overexploitation of groundwater is reflected by a significant reduction in water supplies, the drying up of sources and / or a significant deterioration in the quality of water by seawater intrusion.







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

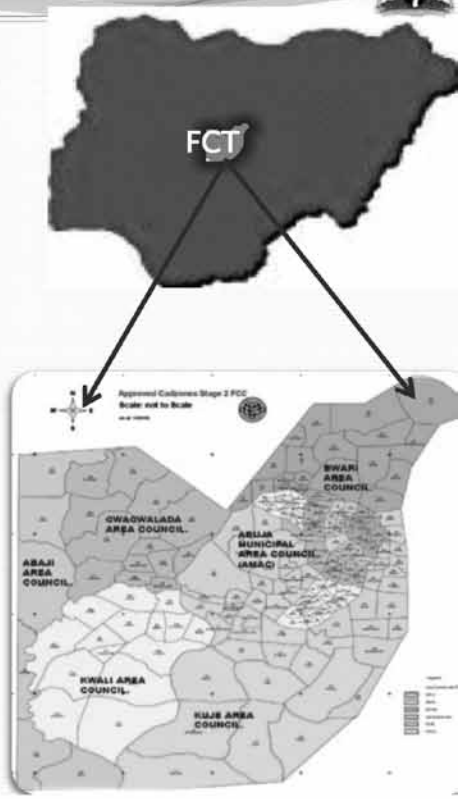
NIGERIA

Water Supply Administration Management in the Federal Capital Territory of Nigeria

Admin and Supply 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**

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

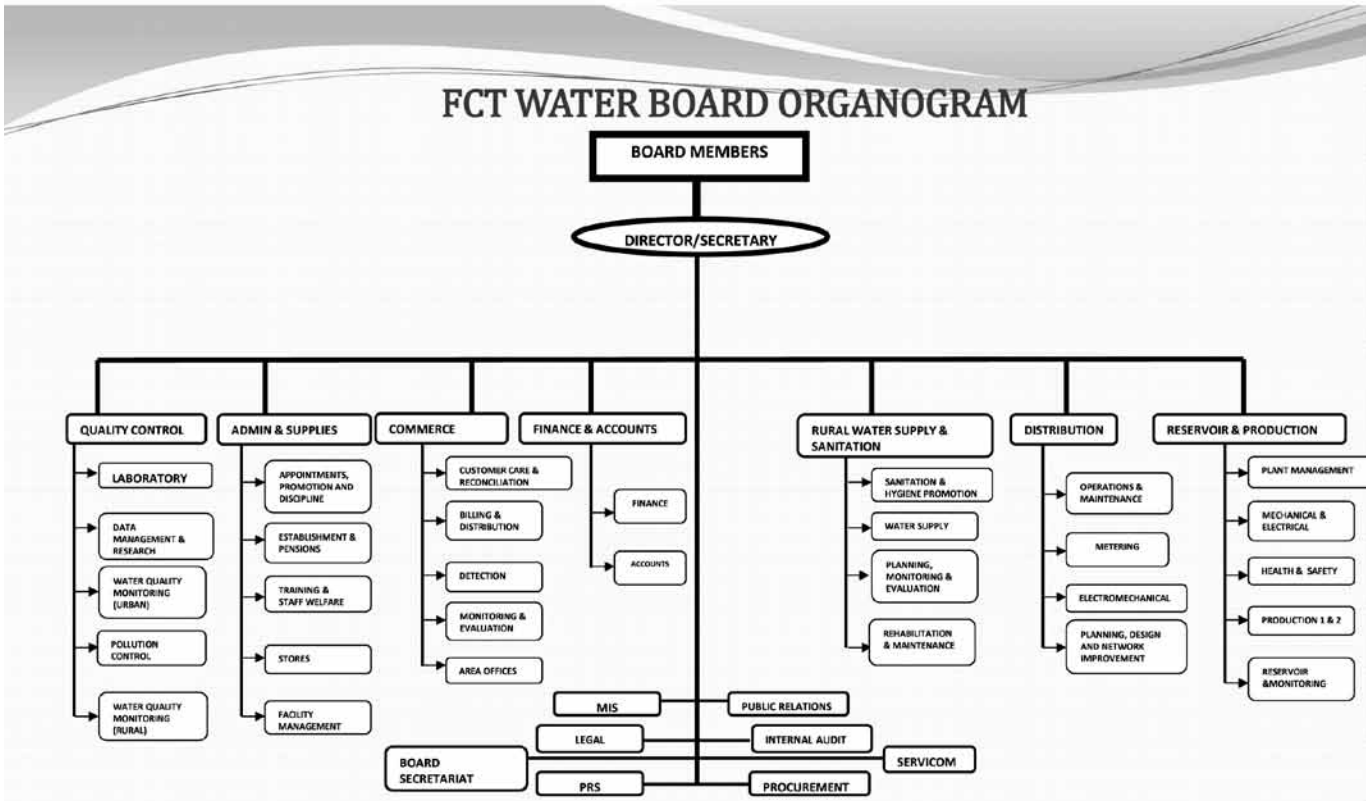
Vision & Mission

- ***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.**



My Responsibilities

- My office(HOD, Admin & Supply) serves as a major support Department in the administration and management of the Board for the realisation of the mandate of the Organisation.
- Our Functions include:
  - Sourcing and Recruitment of Human resources
  - Training and capacity building and human resource Development
  - Human capital performance, monitoring and evaluation
  - Welfare, Pension and Benefits
  - General administration of the Organisation
  - Procurement and supply of equipment and facilities
  - Maintenance of Facilities
  - Multilateral & Donor Relations

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) have just been completed and commissioned with the capacity to give additional 10,000m3/hr each
- 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 Quality Control Laboratory 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.

Parameter's	Utako	Wuye	Gr/Lada	Tank 3	K/Nyonya	Msitama	Kubwa	L/Camp	Jabi	Bwari	WHO STD	NSDWQ
pH	6.95	6.88	5.9	6.73	6.90	6.87	5.75	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	27.97	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	95.2	75.72	83.95	82.47	87.08	83.00	91.25	77.67	79.20	82.22	1250	-
TDS	40.75	34.6	41.89	39.07	40.17	44.50	40.17	36	37.71	35.88	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	51.01	33.58	31.08	32.19	47.51	55.95	46.85	30	250	250
Total Alkalinity	39.50	32	46.67	32.43	34.58	32.00	33.36	38	34	31.75	100	-
Total Hardness	70.50	30.8	58.79	37.57	41.18	60.33	45.92	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 (100million cubic metre)
  - Final Phase
    - Gurara Water Transfer Scheme (850million cubic metre)
- 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 which represents 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).

Major landmarks and prospects

- As stated earlier, two new treatment plants was commissioned in April, this year
- The new treatment plants {Phases 3 & 4} has double capacity of the previously existing one

- There is great prospect in the reduction of non-revenue water with the assistance of JICA with a grant assistance of about $9.6m project expected to commence in October, 2014
- There is yet another project worth almost $10m by JICA on safe solar Energy that should be able to tremendously assist the electricity challenges of our operations at the Lower Usuma Dam

Expectations from the Course

- Modern trends in Water Administration and management
- Solution to depletion .
- Control and management of waste / sludge disposal
- Proper control and monitoring of activities upstream
- Solution to issues of non revenue water
- Capacity building, skills and technology for leak detection, maintenance of pipelines and on how to monitor pressure of flowing water along pipeline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Water Supply Administration
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SOLOMON ISLANDS

COUNTRY REPORT

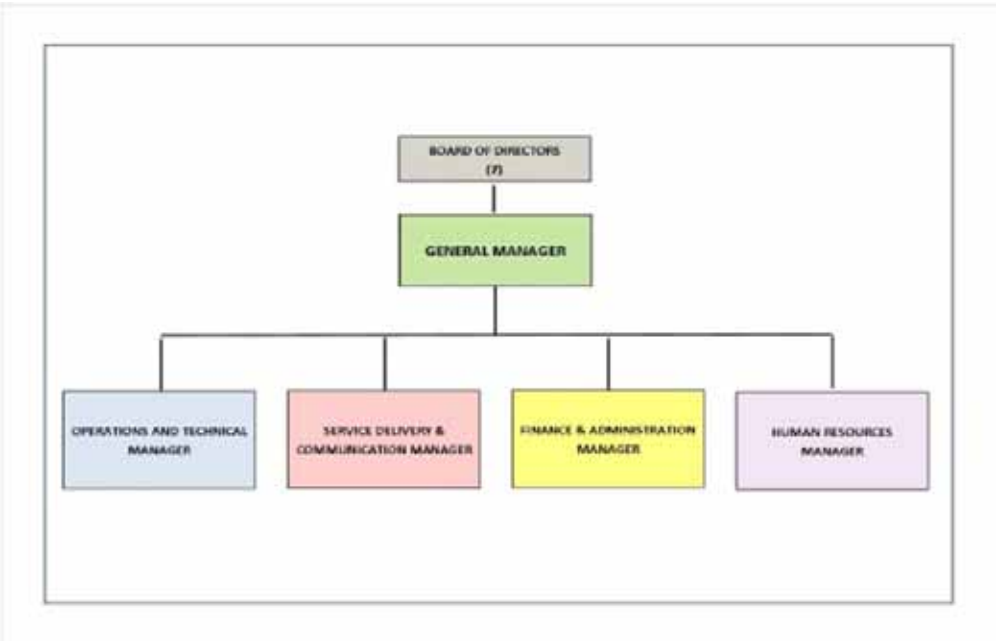
WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES.

ORGANIZATION: Solomon water (SIWA)
COUNTRY: Solomon Islands

COMPANY PROFILE/STRUCTURE

- Established in 1994 under the SIWA Act.
- It is a State Own Enterprise
  - The main mission is to provide safe and secure drinking water to urban population and also to provide wastewater systems.

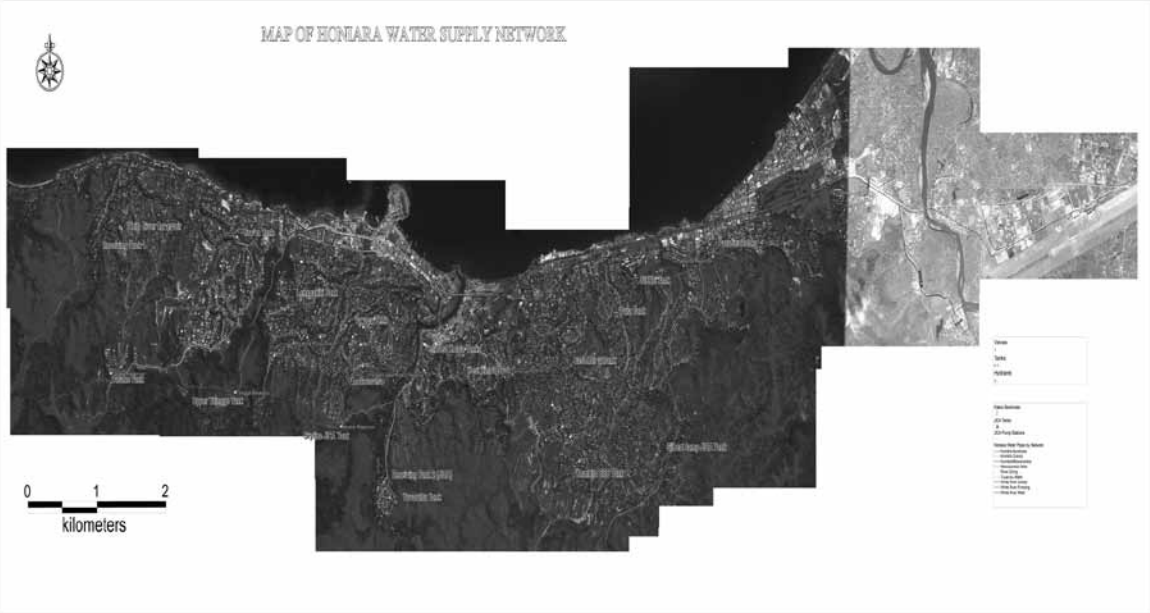
Company structure



Water System / City

- Water supply system
  - Honiara water supply system
- Location- Honiara City
- Population of 64,000 people
- Boundary of 22 sq.km

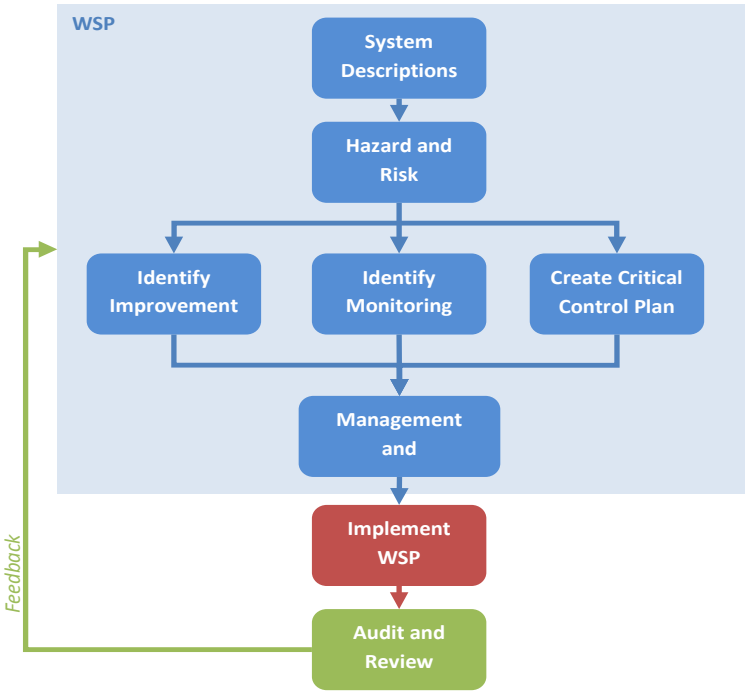
Honiara water supply systems



Water quality management

- Based on the water safety Plan
- Water safety plan
  - comprehensive risk assessment and management tool
- Key objectives
  - Prevent the contamination of source waters;
  - Ensure adequate treatment of water to reduce or remove contaminants; and
  - Prevent re-contamination during storage, distribution and handling

Structure of WSP



Constrains of WSP

- WSP has some constrains
  - Not able to be fully implemented due budget limitations
  - Limited staff
- Other problems in water quality
  - High cost chlorine usage
  - Lack of water treatment plant

Non-Revenue water reduction

- Average water Production for Honiara last year is 8, 577,500,000 cubic meter (8557.5Meglitres)
- NRW = 52% RW= 42%
- Measures taken:
  - Setup NRW Team
  - Trial 15 pilot sites (test for leakages) on-going

Water Tariff

Water Tariff: Adjustment effective 1st January 2013					
Reflecting Quarterly Electricity Price adjustment and Gazetted Tariff Increase					
CONSUMER CATERGORY I - DOMESTIC					
MONTHLY WATER CONSUMPTION IN KILOLITRES (kl):-					
CONSUMPTION	CURRENT TARRIFF		REVISED TARIFF		
	WATER	WATER & WASTEWATER	WATER	WATER & WASTEWATER	WASTE WATER ($/kl)
	($/kl)	($/kl)	($/kl)	($/kl)	
0 to 15 kl	$ 4.84	$ 7.26	$ 6.03	$ 9.04	$3.01
15 to 30 kl	$ 7.34	$ 11.01	$ 8.86	$ 13.27	$4.43
Greater than 30 kl	$ 8.59	$ 12.89	$ 10.26	$ 15.40	$5.13
Note: Consumers under this category are related generally to Domestic customers in Residential areas/zones, consuming relatively small amount of water as compared to those under Category II.					

Water Tariff

CONSUMER CATERGORY II - COMMERICAL					
MONTHLY WATER CONSUMPTION IN KILOLITRES (kl):-					
CONSUMPTION	CURRENT TARRIFF		REVISED TARIFF		
	WATER	WATER & WASTEWATER	WATER	WATER & WASTEWATER	WASTE WATER ($/kl)
	($/kl)	($/kl)	($/kl)	($/kl)	
0 to 30 kl	$ 19.85	$ 29.78	$ 22.99	$ 34.49	$11.49
30 to 60 kl	$ 22.35	$ 33.53	$ 25.82	$ 38.72	$12.91
Greater than 60 kl	$ 24.86	$ 37.28	$ 28.65	$ 42.96	$14.32

Water Supply Service Standards/Performance Indicator

- **The water supply service standards we have in Honiara is ensuring;**
- **a safe, clean and reliable water supply**
- **to improve water quality and the water mains network**
- **to clean and treat your wastewater and return it safely to the rivers and the sea**
- **a simple, accurate water meter service**
- **to respond to your billing enquiries efficiently**
- **to be there when you need us**
- **to deliver the levels of service set by our regulators**

However, there can be limitations and setbacks to some of the services we provide. The main performance indicator that we have is that ensuring the water supply time for the population in city is **24 hours supply time daily** for all areas within the city boundary. Also we ensure that **quality of water** that we supply is within the **WHO guideline**.

Management of water supply service on a self-supporting basis

The management of water supply services on a self-supporting basis is through;

- **Policy formulation and sector co-ordination**
  - Formulation of policy by the government on the company (Solomon Water) can operated
- **Regulation**
  - Regulations are needed to give guidance on how the company and its employees.
- **Asset management**
- **Service Provision**
- **Solomon water board (SIWA Board)**
- **Civil society**

Major recent achievement in improvement of water supply services/management

2013	INDICATORS	2014
18	Staff/1,000 connection	17
23,500,000	Production capacity m^3 /d	32,000,000
77% compliance	Water quality	WHO guideline 88% compliance
70%	Coverage area	80%
15-20 hours	Supply duration	20-24hours
1-10bar	Supply pressure	1-13bar
7900	Number of connection	8500
52%	NRW	48%
80%	Collection ratio	90%
160	Staff number	170

- Major recent improvements are;
- Improved Production capacity
- The capacity of the human resources
- Installation of new pumps at our main source
- The JICA PROJECT which help to boost production capacity
- Supply duration is 22 hours - 24 hours

- Thank you for Listening

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

SOUTH SUDAN

Water Supply Administration for Better Management of Water Supply Services

Country: Southern Sudan
Organization: Ministry of Physical Infrastructure and Rural Development

General Country profile:Background

- Republic of South Sudan is the youngest country in the world.
- The country got independent on 09-07-2011.
- Situated in the North eastern part of Africa
- The country is divided into ten states.
- Climate is equatorial with high humidity and lots of rainfall (April to November).
- Temperatures are moderate but vary depending on the season

Country Detail

- Whole Country:
- Area : 619, 745 km^2
- Population : 8.26 million (2008)
- Coverage Water Supply: %
- Selected Water Supply System/City:
- Service Area : km^2
- Population Served:

Mission

Organization:

- Provision of safe drinking water and improved sanitation services to the people of Southern Sudan

Individual:

- To lead development of water policies, strategies, regulations and standards

My job:

- To co-ordinate external support
- To ensure coordinated development and management of water resources

Management

- **Current Situation**

➢ Guided by the water policy whose formulation started in 2005 and approved in 2007

❖ **Challenges**

- ➢ Inadequate sector institutional arrangements
- ➢ Limited human resources and week organizational capacity
- ➢ Absence of industry regulator

Water supply service standards /Performance Indicators

❁ Current Situation

➢ No water supply standards
➢ No regulatory frame work
➢ Political instability

❖ Major Problems

➢ Free provision of service
➢ Lack of water treatment
➢ Inadequate security due to in fighting
➢ No access to serviced areas due to floods in rain season

Major recent achievement in improvement of water supply services/management

- **Achievements**

- Sunk a number of wells for the rural community
- Educated communities on treatment of water at household level by providing (Chlorine and Pur)

Expectation for the Japanese private companies & Water Supply Utilities

- Knowledge on water treatment methods
- Learn about new technologies
- New management skills in water supply administration

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

SUDAN

Location of Elobied city

My Organization profile:

Organization name: State Water Corporation.

The work of field : drinking water service .

Type of my organization: is national government.

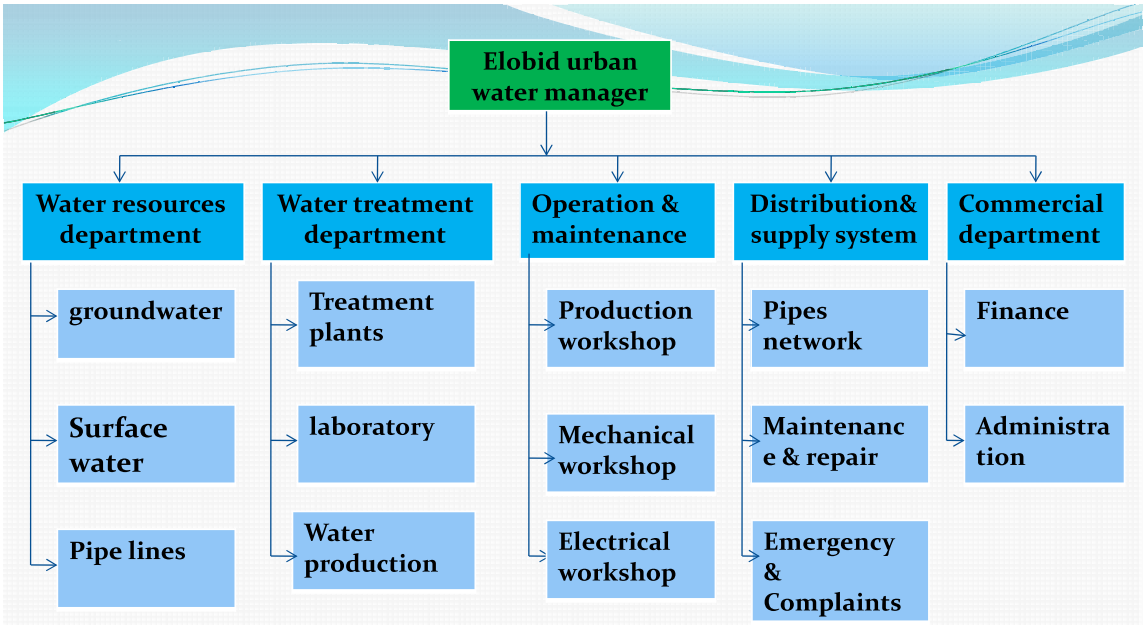
My official position: in Elobied city

Area : 186 km2

Population : 500 thousand Habitants

Coverage Water Supply: 52%

Service Area : 96.72 km2



Elobied Urban Water Organization Chart

Description of Flow chart (from intake through all process to tab): for surface resources in my organization :

Elobied south surface resource of water is about **31km** far away from Elobied, storage water there about **11.4** million m3 of water in dams and haffirs located in Alain and khor bagara.There is a pumps station at Alain to transmission raw water to half Alain booster station by three main lines is about **9km** away from Alain.Two lines of them is out of life.

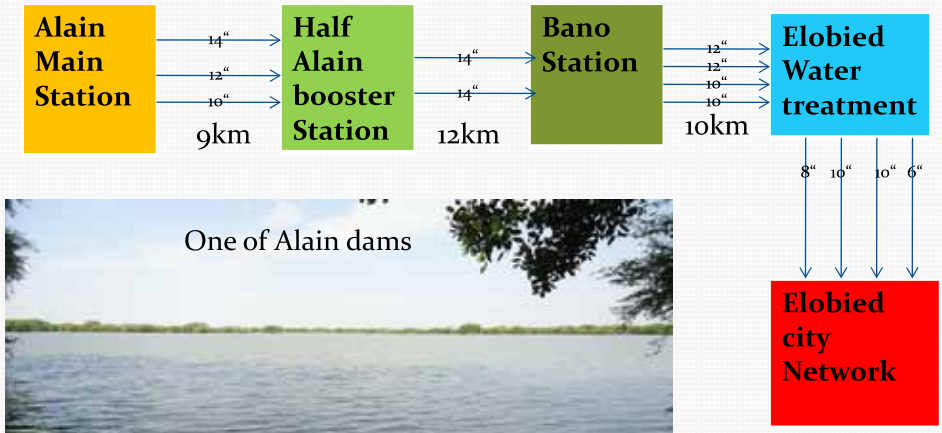
From Half Alain booster transport raw water to Bano booster station is about 12km away from Half Alain.

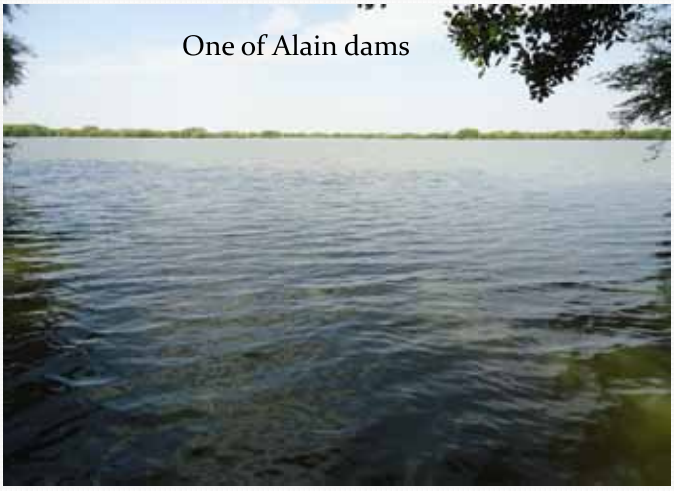
There is one haffir in bano the capacity about **1**million m3, from bano to Elobied water treatment. The average of raw water transport by this system (8000-12000) m3/D.

Elobied water treatment is rapid sand filter the capacity is about 12000m3/D. there is laboratory to check water from standard tests. The clean water storage in reservoirs and add dosage of chlorine and pumped by high lift pumps to Elobied network to the consumers through the taps.

Elobied water treatment plant

Flow chart (from intake through all process to tab) for surface resources in my organization





The current situation of Water resources in my organization:

-The geographical of water resources water content of:

- surface water collected in Haffirs/dams in South direction.
- Groundwater in the North direction.

The average annual rainfalls vary from around **100**mm in North to more than **400**mm in the South.

there is two types of water resources:

- Surface water collection the total storage is about **12.4** million m3 it's about 31km far away from Elobied water treatment.
- Groundwater there is a field of wells about **52**km away from Elobied water distribution stations.

the intake water volume:

#	Volume of water m3/one day	Volume of water m3/one month	Average
Surface water	8000-12000	240000 - 300000	44.5%
Groundwater	13200-144000	396000 - 432000	45.5%

The type of water resources for future:

–Water from White Nile River is about 300km away from Elobied.

The current situation of policy and regulations in your country:

- According to the water resources act of 1995 water in Sudan is a government property and the people have the right to use it under Government laws and regulations.
- Ministry of irrigation and water resources is responsible for national water resources and the **wali** is responsible for state waters.
- According to the local Government act of 2003 the **mahalias** have the right to set the local regulations covering licensing, withdrawal rates and establishment of technical committees.

- According to the constitutional decree No.1155 issued in October 1992 the national water corporation is responsible of planning and implementation of national water projects while SWC(s) are responsible for operation and maintenance of their state water resources.
- North kordofan State water corporation and according to its mandate of 2002 is responsible for water resources development and use irrespective whether the water is a state or national property.

Current situation of water rates and bill collection system:

- Water rates in my state depend on strategy of the governmental policy and the total cost of the 1m3 according to situation of water resources and the method of treatment.
-The bill collection system depend on distribution of bill every end of the month in location of consumption, and pay of water consumer through the month, if do not pay the bill, the water services stop from customer.

The current Situation of water quality management:

Elobied depends partially on surface water transmitted from El-ain and partially on ground water transmitted from Bara basin. Surface water is subject to evaporation (**5-10**mm/D),infiltration, as well as surface contamination, and in general they don't provide safe drinking water.

For groundwater they do full analysis every season for parameters:mentioned as NO2, NO3, T.D.S, PH. For the surface water, daily do the partial test: PH, Turbidity, Residual chlorine, and do analysis every season.


JICA EQUIPMENT

Drinking water is collected from unsafe surface sources and may contaminate at the source or at during storage. Strategy for reduce waterborne diseases, to apply modern methods and functioning laboratory and qualified staff.


JICA EQUIPMENT

The laboratory is good functioned and supported from JICA and the staff is qualified. No water safety plan but I need to focus on it.

The current Situation of water supply services:

1 -population to service by water is 52% and not to be serviced is 48%.

2-proportion of consumers with 24 hours supply is about 13%, and the average number of hours per day of water availability to most people is 4 hours.

3- The distribution water use for potable water directly from tabs.

4- The Non revenue water is about 45%of water distribution.

The current Situation of Private sector participation in my country:

1-There is no private sector participate in urban water services or investment in field of drinking water. but there is weak entrance in bill collection but it failed to be continuous.

2- The current situation of involvement of national government in water supply services only in development program budget of the government for all services in all state.

Others :

1- if citizen cannot get sufficient water from public water supply system, how they get water actually?.

They get water actually from private wells around Elobied city.

2-the way of assuring secure water for the largest building.

The assuring secure water for the largest building from private wells around Elobied city also.

3- Sewage system concerned:

Future plan

4- Maintenance situation of solid waste disposal:

Future plan

The biggest problems in my organization:

1- the simple fact of most water service problems is poor management of NRW.

2- water resources and quality.

3-Equipments and devices.

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

TAJIKISTAN

Water Supply Administration for Better Management of Water Supply Services

Country Report

State Unitary Communal Enterprise «Khujandvodokanal»

Head office

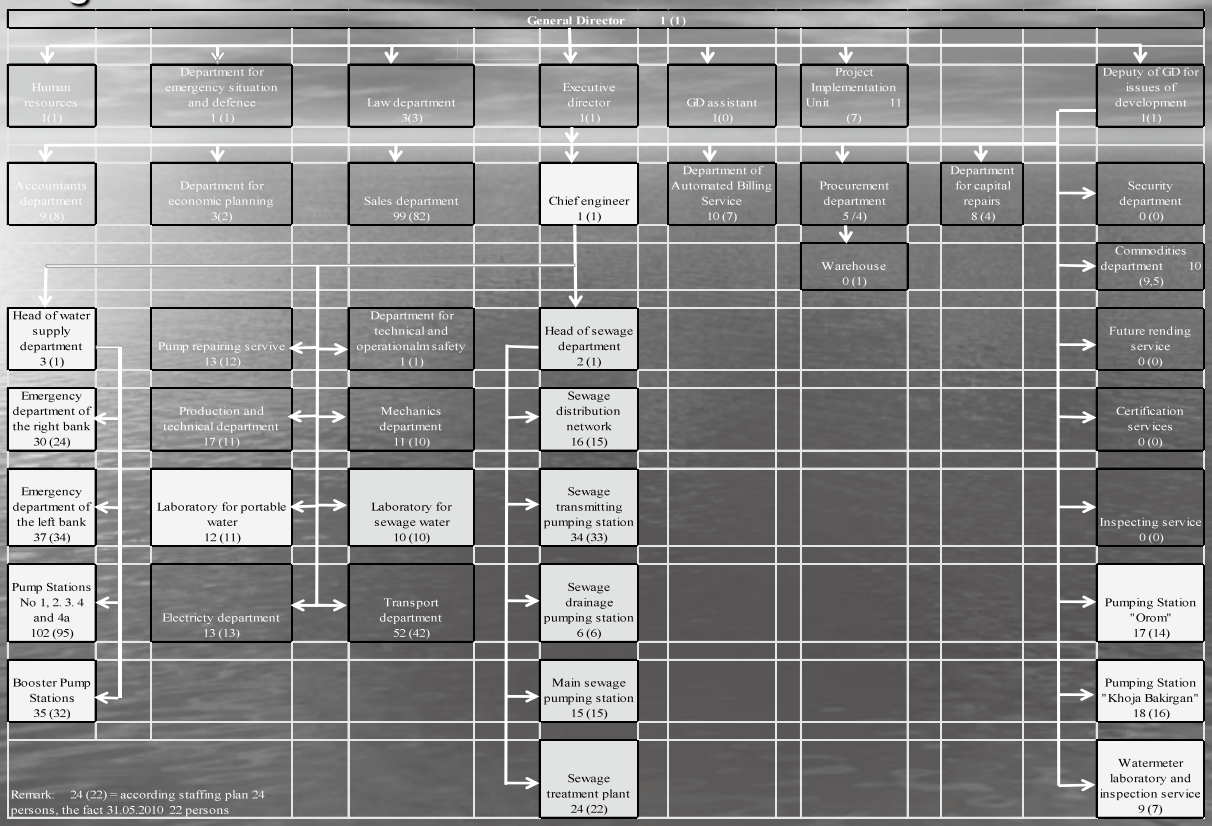
State Unitary Communal Enterprise «Khujandvodokanal»

State Unitary Communal Enterprise Khujandvodokanal is municipal organization which provides water supply and sewerage services to population, budget organizations and commercial entities in the Khujand city.

My official position is a Management Specialist and Economic Affairs in administration.

My own job is the development and implementation of forms of management reports to improve the water supply system.

Organizational structure



General Country profile:Background

The Republic of Tajikistan is located in the south-eastern part of Central Asia. The area of the country is 143,100 km2. Tajikistan is a mountainous country: 93% of its area is mountains. Tajikistan has huge reserves of fresh water.

Whole Country: Tajikistan

Area: 143100 km2

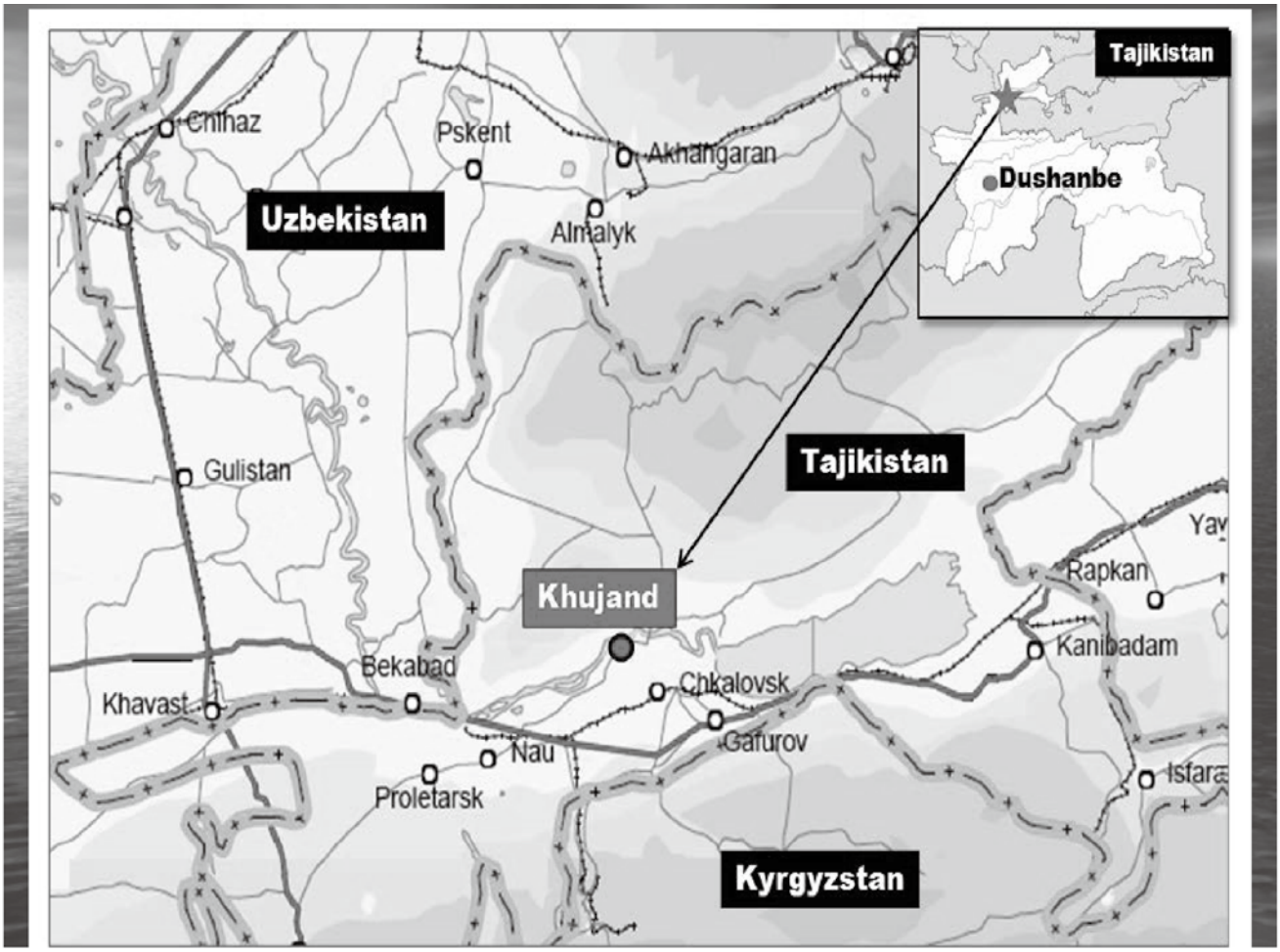
Population : 8 million habitants

Coverage Water Supply: 48 %

Selected Water Supply System/City: Khujand

Service Area : 50 km2

Population Served: 160 thousand



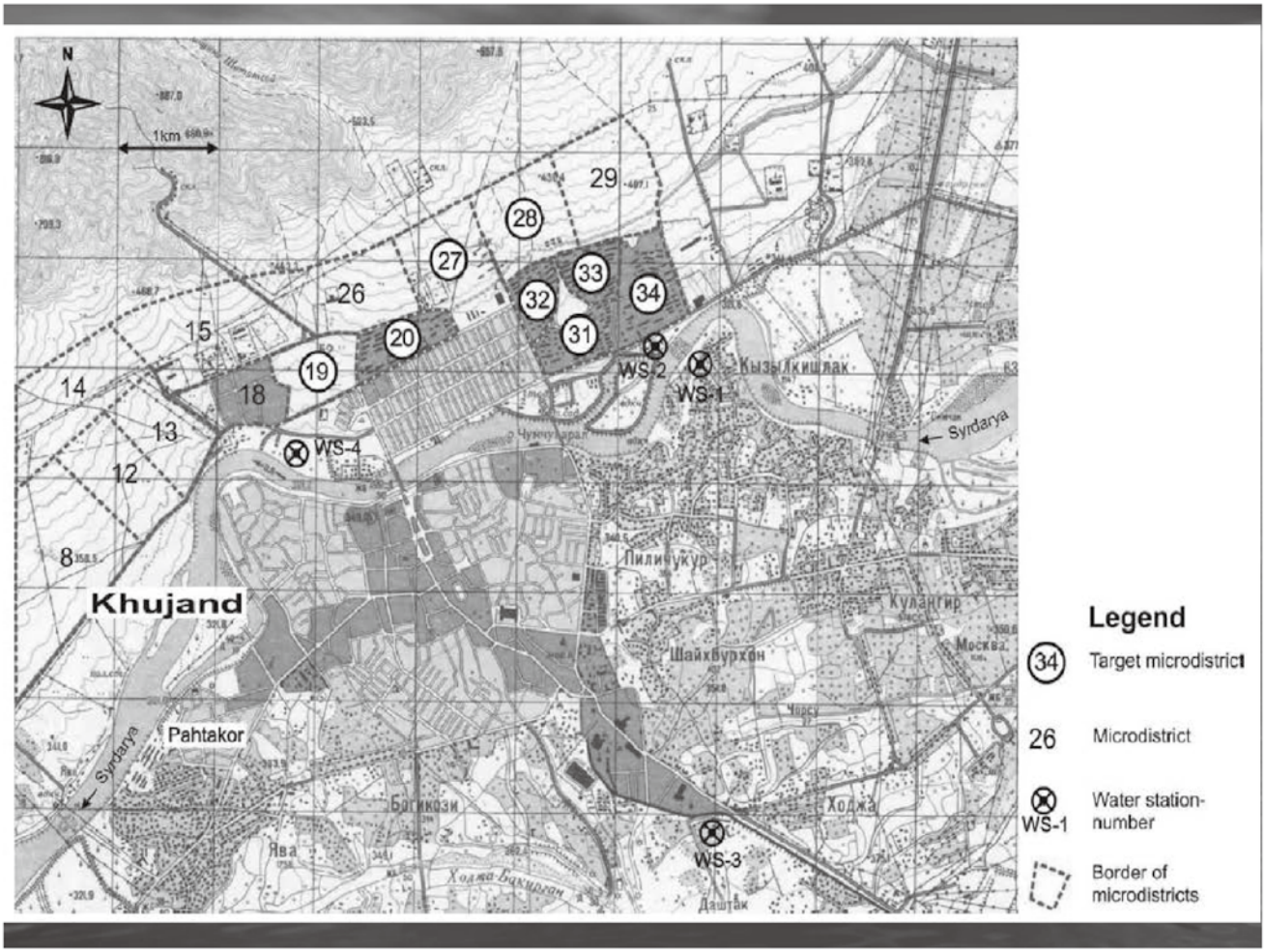
The City of Khujand is located in the northern part of the Republic of Tajikistan.

It is situated on the Syr Darya River at the entrance of the Fergana Valley and is close to the borders of both Uzbekistan and Kyrgyzstan.

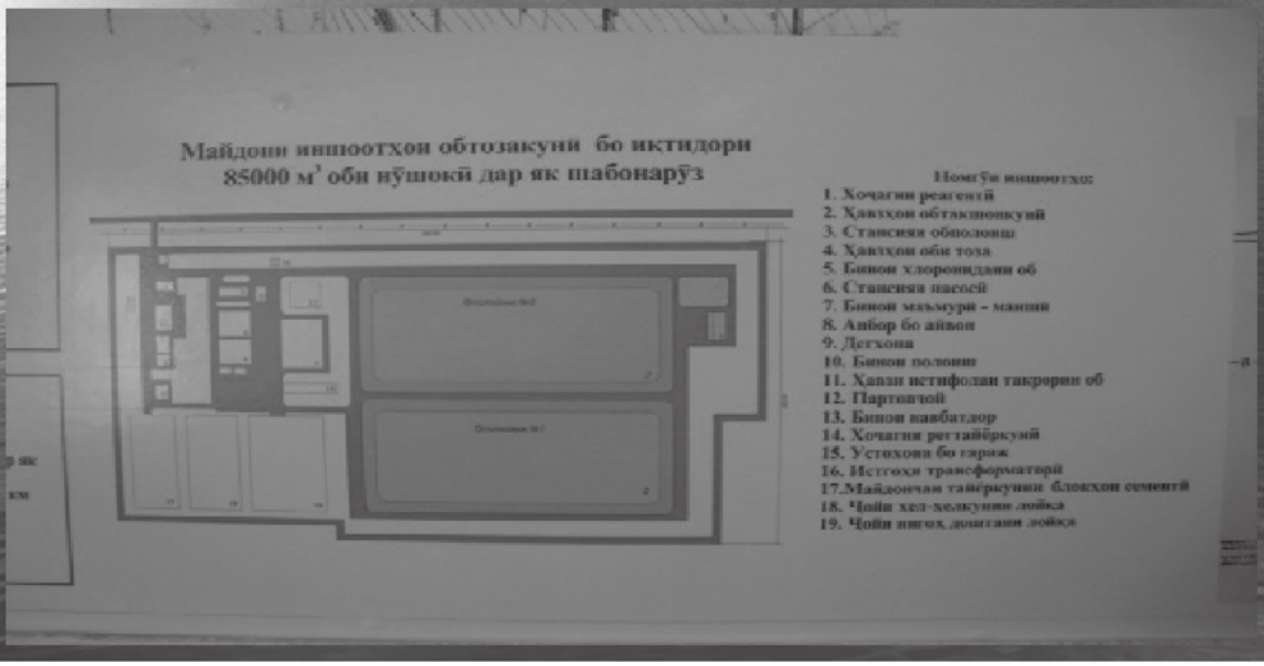
"Khujandvodokanal" obtains its water from boreholes located along the river bank and in isolated locations within the city. The Khujandvodokanal operates four water supply pump stations, three of which are located along the Syr Darya River, while one is located in the south of the city. The pump stations 1 – 4 were constructed in 1939, 1960, 1965 and 1974 respectively. Depth of the wells ranges from 70 to 150 meters. There are more than 80 boreholes in 4 pump stations. Boreholes are in poor condition.

Chorine dosing system should be modernists.

Reservoirs should be update.



The Tajikistan Government is undertaking the development of a surface and groundwater resource in Khoji Bakirgan to supplement the water supply to the city as well as the Bobojon Gafurov region. In accordance with this program in 2011 year was built a pipeline from the mountain river Hodge Bakirgan and water treatment plant to clean up 85,000 m ³ of water per day.



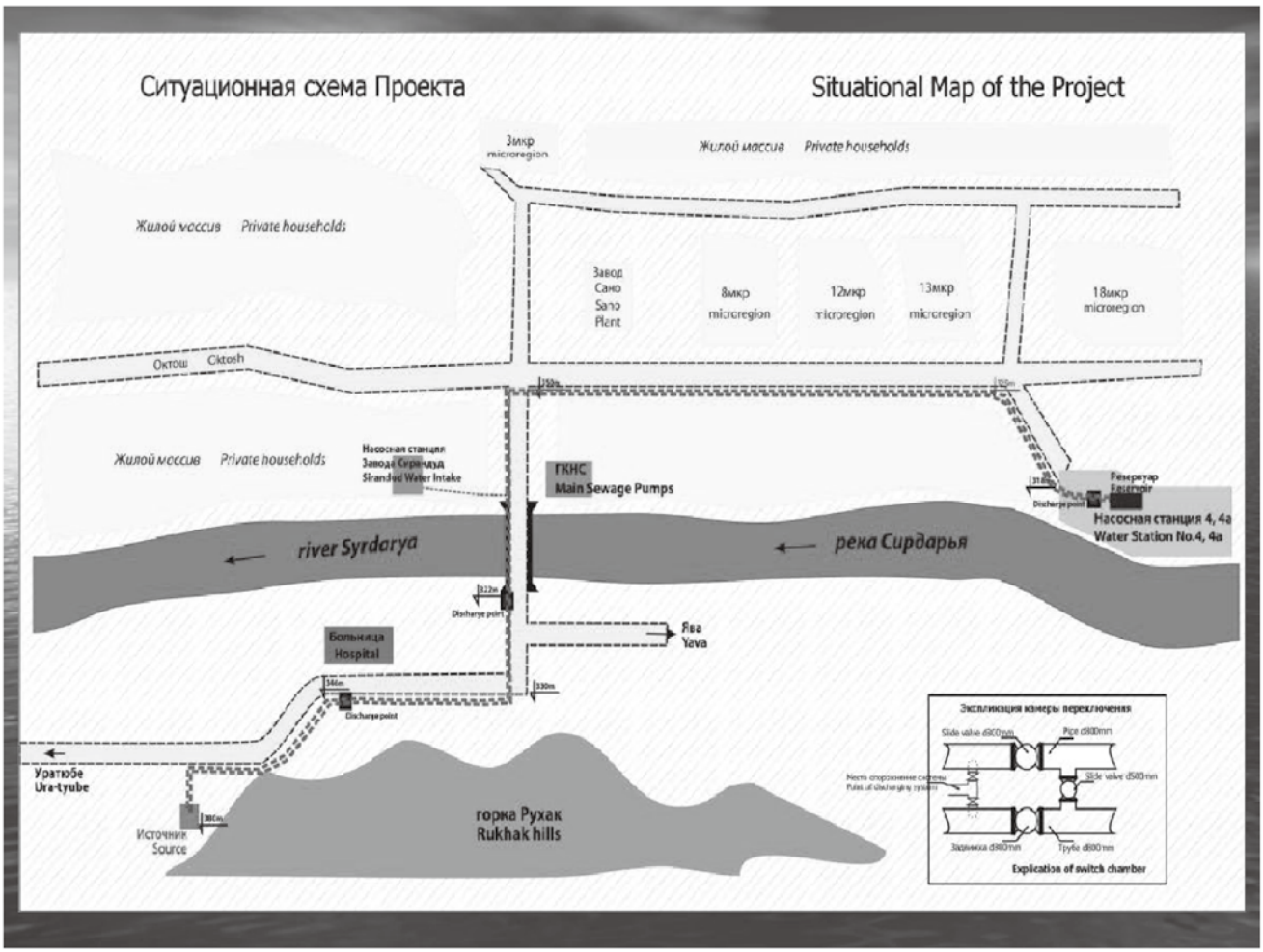
Khujand right bank watersupply Project
PROJECT DESCRIPTION

The Project foreseen transmission of potable water from “Dehmay spring into water intake No. 4 of Khujand city.

The Dehmay source situated at 12 km from the Khujand and its water confirms with the national standards.

The capacity of the source is 125 280 m3 per days. The some of this volume is using for irrigation and the left is flowing in to the Syrdarya River.

The Project foreseen transmission the 72 000 m3 of the water per day, which will not flu into the irrigational activities.



Tariff politics and pricing of services of State Unitary Communal Enterprise Khujandvodokanal

The problems of tariffing are questions of coverage ofcharges of organizati ons and also investment component ofdevelopment, profitability and their adequate functioning. Allthese problems reflected an enterprise in the effe ctive tariffpolitics, oriented to the full cover of expenses and on the presence of facilities necessary for investments and risk of investors in further development.
Tariff politics of enterprise, accepted for the achievement of aims :
To financial stability (compensations complete expenses),
to ecological stability (lowered consumption of water)
social defence.

The order of consideration pricing

Develops the project of suggestion of calculation.
Concordance by State Committee of natural monopoly of RT.
Notification of consumers through mass medias.

The company operates an automated accounting system and collect payments.

The system is programmed on the basis of the existing rules of water use and tariffs. Consists of 2 servers archiving data, the server all information operations in real time. PAX - mobile equipment for accrual and payment reception. Payment for services performed in real time through payment terminals.

Management of water supply service on a self-supporting basis

Currently Khujandvodokanal is now self-supporting structure, where a key element of management is responsible for various activities. Chief Engineer, who is responsible for technical issues, and 16 managers of structural units are subordinated to the Executive Director.

Khujandvodokanal will adhere to the following policies in its operations:

• Cost recovery and sustainability

To raise its tariffs to a level that at all times covers all operating and maintenance costs, and capital costs from new and renovation investments as well as repayments and interests of loans.

• Metering, billing and collection

To increase metering to cover all the customer of KWC account for 100 % of all water consumption, including households by 2015. Collection rate to reach 98 %.

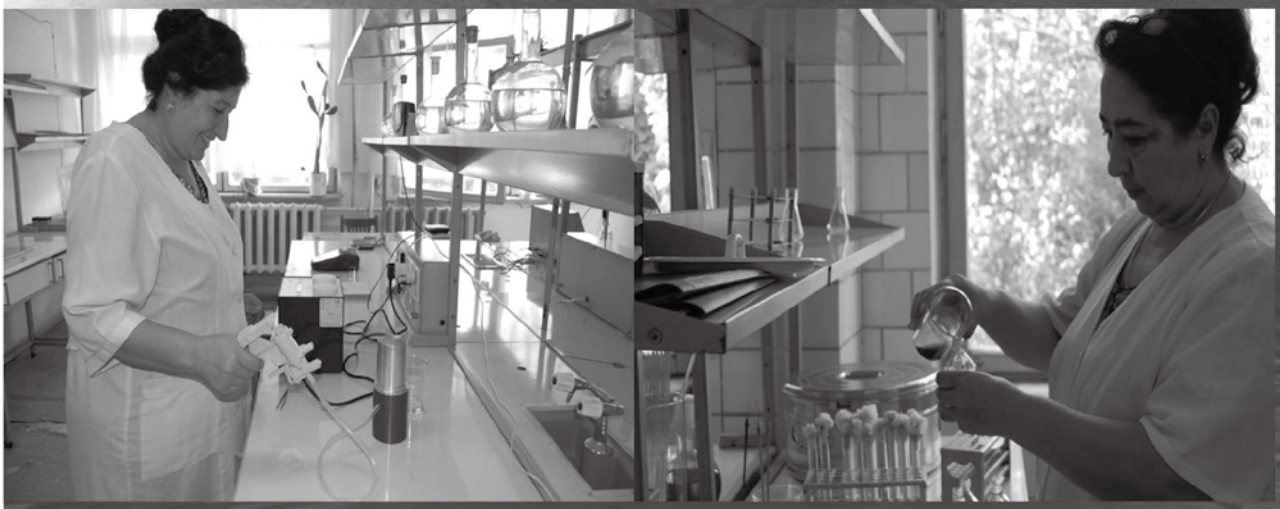
Monitoring system

In the company operates a safe water supply system which includes:

- chlorination
- hourly determination of chlorine
- militarized security of pumping stations
- control of reservoirs from the Sanitary Organization
- sanitary zone around the pump stations
- video surveillance

Management of water quality

Khujandvodokanal maintains an active water quality monitoring program. The company operates accredited laboratory drinking water and wastewater laboratory. Laboratory fully equipped with the equipment and chemical reagents provided. The laboratory employs qualified professionals with extensive experience.



Drinking water quality

Drinking water hardness according to the standard norms of -7 mg eq / liter. Based on the reports of laboratory analysis of drinking water on the left bank and right-bank part of the city is given the following results.

In the left-bank site where consumers are supplied primarily by surface water from the source Hodge Bakirgan drinking water hardness is -6 mg eq / liter.

In the right-side section where consumers are supplied with water from underground wells pumping stations drinking water hardness is 14-17 mg eq / liter.

Water supply services

Proportion of the population served by drinking water is 90% of total.

The average number of hours per day of water availability to most people is 20-22 hours.

Consumers use water directly after distribution.

Non-revenue water

System input volume	Authorized consumption	Revenue water	Billed authorized consumption	9450564 m^3 /year (59%)
		Non Revenue Water (NRW)	Unbilled authorized consumption (ex. fire fighting, cleaning)	1280000 m^3 /year (8%)
	Water losses		**Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)**	1120000 m^3 /year (7%)
			Real losses (Leakage)	4160000 m^3 /year (26%)

Private sector participation and privatization

State Unitary Communal Enterprise Khujandvodokanal provides,coveres and services all the city area and there is no private water supply. Khujandvodokanal is a monopolist in water supply.

In Republic of Tajikistan all water supply companies are state owned companies. There is no privatization of water supply companies.

Other

The customers of our company have access to portable water but some of them use wells for watering of gardens.

Khujandvodokanal have only one water supply system for all facilities and some of big factories have their own wells.

During the implementation of the second phase of the project were rehabilitated six sewage pumping stations and in the third phase, we have plans to rebuild the sewage treatment plant and sewerage networks.

Problems

In Company among the most significant problems are:

- water loss
- water quality
- poor technical condition of existing wells

Thank you for your attention!!!

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

MACEDONIA


Republic of Macedonia
Water Supply Administration for Better Management
of Water Supply Services
REPUBLIC OF MACEDONIA
GOCE GEORGIEV
8 March, 2014


Macedonia
Goce Georgiev
Position: Communal inspector
Organization: Local government

OUTLINES ABOUT the MUNICIPALITY of VINICA

Vinica (Macedonian: Виница) is a municipality in eastern part of Republic of Macedonia	**334 km²**
Citizens	**19,938**
Middle altitude above sea level	**390-450 m**
Households	**4,985**
Public Utilities	**Public Company ”Solidarnost”-Vinica**

General Country profile

Whole Country: Macedonia

Area : 25.713 km²

Population : 2.000.000 Habitants

Coverage Water Supply: 85 %

Selected Water Supply System/City: Vinica

Service Area : **443 km²** size of utility’s present service area **240** km²

Population **19.380** Served: **13.836**

My Mission

- Mission of my organization

  Municipality is a community of residents of a certain area, established by law which by its authorities and public services organized allows performing the responsibilities prescribed by law. The jurisdiction of the municipality is a set of issues of public interest, and the municipality has the right to exercise on their own territory and is responsible for their implementation.

- My mission in the organization

  My department for communal inspection and supervision performed an inspection of public utilities, legal entities and individuals, Inspection and supervision of the drinking water supply, transport of technological water, Inspection and supervision of the maintenance of sewerage system and waste water treatment and inspection of emergency, to protect the life and health of citizens and property.

- My actual job to achieve the mission is

  Inspection and supervision of public utilities, inspection and supervision of legal entities and individuals, inspection of the drinking water supply, transport of technological water.

5

1. Management of water quality

- Currently, the services operation and maintenance of water supply are primarily provided by the public utilities.
- Replacement of old water pipes with new once.
- Internal and independent monitoring system for drinking water quality .
- Improvement of water safety with modern methods .

6

2. Reduction of non-revenue water1

- Constitution of Non-revenue Water

System input volume	Authorized consumption	Revenue water	Billed authorized consumption	900.000m^3 /year (60 %)
		Non Revenue Water (NRW)	Unbilled authorized consumption (ex. fire fighting, cleaning)	375.000 m^3 /year (25 %)
	Water losses		**Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)**	150.000 m^3 /year (10 %)
			Real losses (Leakage)	75.000 m^3 /year (5%)

2. Reduction of non-revenue water2

- The current situation is unsustainable
- Only 60% from 1,5 mil m^3 per year are billed from authorized consumption,
- The other 40% is loss from any reason,
- Current action are insufficient effective.

8

3. Water Tariff

- Household s paying 29,91den or 0,66$,
- Water consumption in households in the Municipality of Vinica is 658.098 m^3 per year
- Non domestic 51,15den or 1,14$,
- Water consumption (non domestic) in the Municipality of Vinica is 183.026 m^3 per year,
- Average of all categories 40.107 m^3 per year.

9

Water supply service standards /Performance Indicators

- **Number of customers who received intermittent supply (0 connections)**
- **Typical duration of supply (planned and unplanned supply interruptions): (0 hours / day)**
- **Typical mains water pressure in your pipe network: (65 meters)**
- **Required number of tests of treated water for residual chlorine: (260 / year)**
- **Number of tests of treated water for residual chlorine carried out:(260 / year)**
- **Number of tests of treated water for residual chlorine passed: (260 / year)**

Management of water supply service on a self-supporting basis

- The service operation and maintenance of water supply are primarily provided by the public utilities.
- There is only one water supplier in municipality of Vinica.
- Staff in the company:

Corporate services : 14 person,

Water supply: 28 person,

Environment services : 66 person,

Total 108 Person,

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

2005	INDICATORS	2013
12	Staff/1,000 connections	2
2,300	Production capacity m3/d	3,000
MKD standard	Water quality	MKD standard
80%	Coverage area	85%
24hr/d	Supply duration	24hr/d
3.2 bar	Supply pressure	3.8 bars
3,251	Number of connections	4,341
45%	NRW	40%
70%	Collection ratio	75%
83	Staff number	108

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

- New authorized connections are made
- Replacement of pipes
- Installing of new customer meters

Expectation for the Japanese private companies & Water Supply Utilities

- management, and operation and maintenance in Japan, in particular, water quality control,
- measures against non-revenue water and water supply standards,
- maintenance of water supply facilities,
- procurement of equipment and materials for water supply,
- water law in Japan,
- inspection and supervision of the drinking water supply.


ВИ БЛАГОДАРАМ НА ВНИМАНИЕТО
Thank you all for your attention
ご清聴ありがとうございました
http://www.opstinavinica.gov.mk

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

VANUATU

Water Supply Administration for Better Management

of Water Supply Services

Japan 29th June 2014 – 11th July 2014

Vanuatu Country Report

Konnichiwa

1983 – 1988 - Civil Engineer for McConnell Dowel in Fiji
1990 – 2001 - Civil Engineer for Vanuatu Government
2001 – 2003 - General Manager – Ifira General Services
2003 – 2005 – General Manager Go – Eden
2005 – 2006 – Procurement Agent Contracts Administrator – MCC/MCA fund (Vanuatu)
2006 – 2007 - Sales & Marketing Manager - British Petroleum SWP (Vanuatu)
2007 – 2009 – Terminal Manager – British Petroleum (Vanuatu)
2009 – 2011 – General Manager Infrastructure – Airport Vanuatu Limited
2011 – 2012 - Project Engineer (liaison) – Public Works Department
2012 – 2013 – Deputy Director – Public Works Department

Effective implementation of PWD responsibility under the Government Priorities
All /tenders and Contracts are compliant with all laws and regulation
Good Co-operation of PWD Annual Work Plans
Reporting on Project and Operations of PWD
Liaison with Stakeholders, Donors, private sector partners, and the urban communities

Demographic & Organization

Whole Country:

Area : 14,760 km²

Population : 261,544 Habitants

Coverage Water Supply: 35 % of total population

Selected Water Supply System/City:

Service Area : 1480 km²

Population Served: 91,879 thousand (Port Vila78,879 , Luganville 13,000)

Age structure **0-14 years:** 37.9% (male 50,548/female 48,477)
15-24 years: 19.7% (male 25,685/female 25,900)
25-54 years: 34% (male 43,552/female 45,273)
55-64 years: 4.9% (male 6,493/female 6,289)
65 years and over: 3.6% (male 4,817/female 4,531) (2013 est.)

- Water supply falls under several authorities in Vanuatu.
- The Department of Rural Water Supply within the Ministry of Lands and Natural Resources has responsibility for rural water supply – No legislation

- Public Works Department:

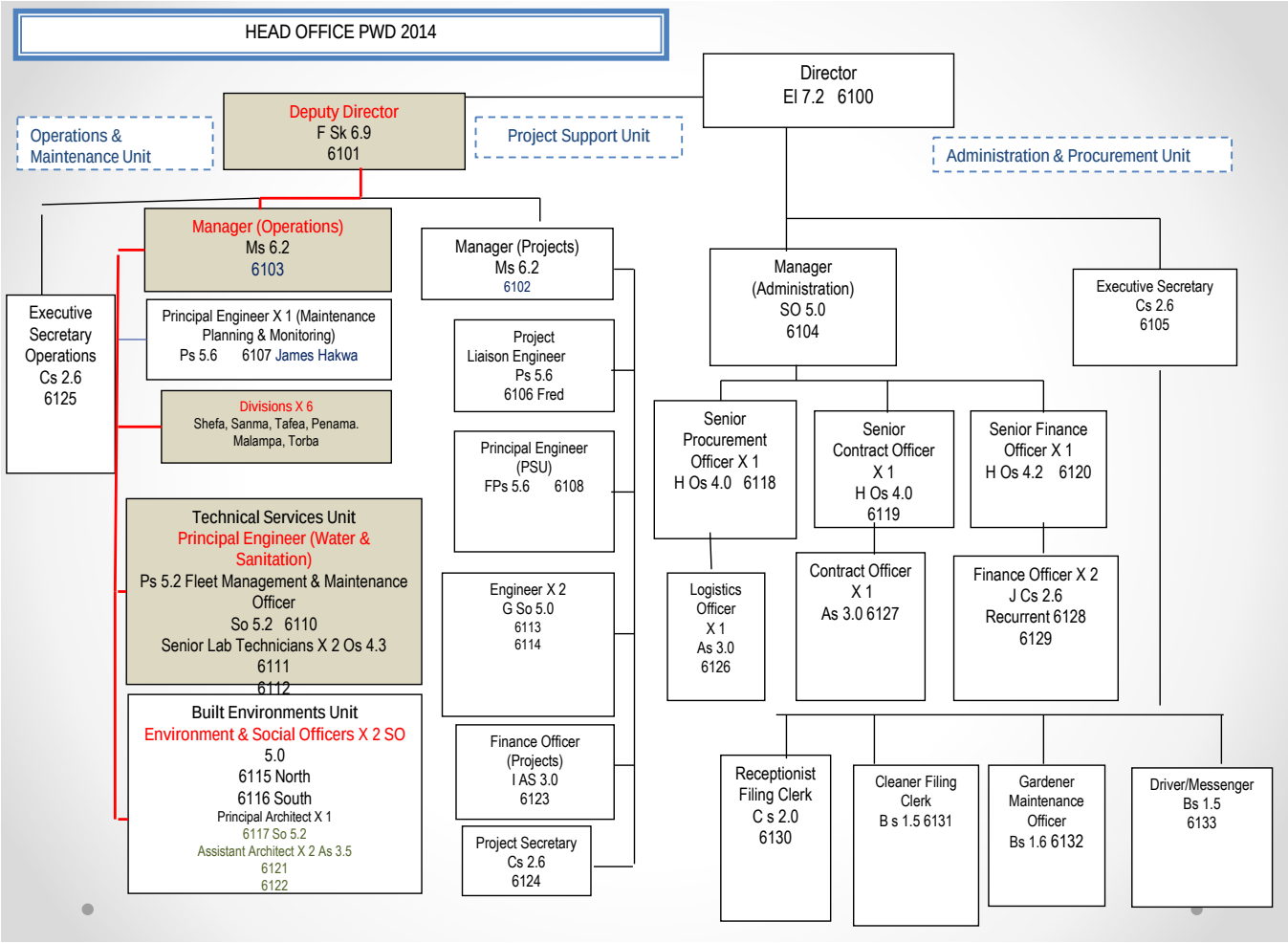
  Public Works Department [PWD] established under the Ministry of Infrastructure and Public Utilities [MIPU]
  To management, develop and maintain;

  - The Water Supply Act [CAP 24] mandates the Minister responsible to water supply and the Director of Public Works Department (PWD) to carry out this essential service to the nation of Vanuatu

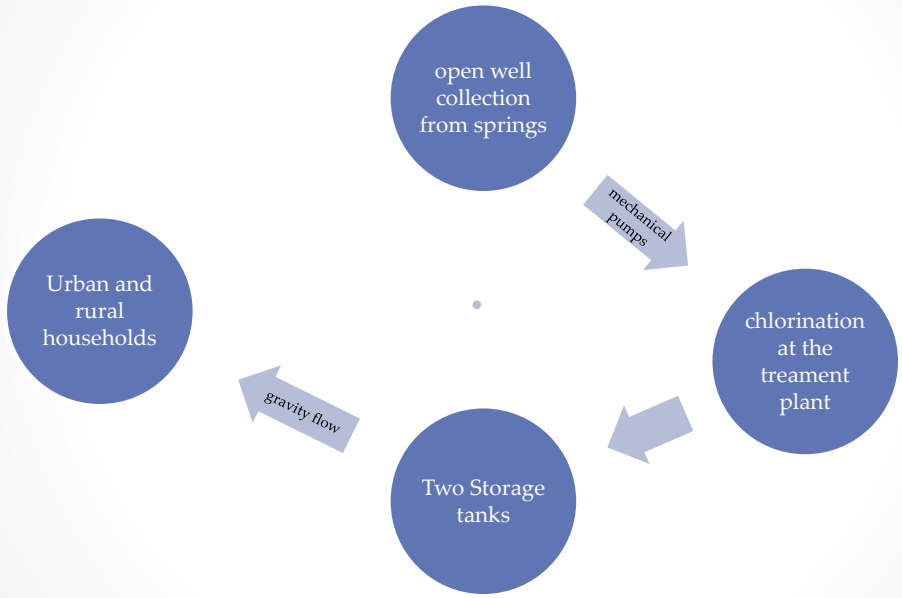
- UNELCO (Private)

  Concession contract to manage Port Vila Urban water supply service

  Concession contract -



Representative Water Supply System



Water Resources

- Geology
- Vanuatu is in the heart of Melanesia, with Papua New Guinea and Solomon Islands to the north, Fiji to the east and New Caledonia to the southeast. The Vanuatu Archipelago is a Y-shaped 1,300km (808 miles) and long chain of four main islands and 79 smaller islands, of which 68 are inhabited. The islands themselves are mostly mountains of volcanic origin (several of the islands still have active volcanoes) with narrow coastal plains and have a combined area of 12,200 sq km (7,581 miles) and a combined coastline length of 2,528km (1,571 miles). The Ambrym and Lopevi volcanoes are permanently active and highly dangerous. Lopevi was extinct for many years but became active 50 years ago. Further to the south, on the island of Tanna, is Yasur, cited as the most accessible active volcano in the world and a major tourist attraction. Geophysical activity is under constant monitoring by the French scientific organisation, IRD (Institut de Recherche pour le Development). Most of the islands are densely forested and mountainous with narrow bands of cultivated land along the coasts

- Ground Water & Surface Water
  - Most islands in Vanuatu are typically limestone. Most springs are coming from the lime stones.
  - Urban area groundwater is the main source, rural areas wells, springs and rivers.
  - Rivers and creeks are quite common on larger islands with seasonal flow and are often quite close to the villages. These carry water from inland springs to the coastal area where 80% of the population are residing.
  - 90% of water sources are in local forest mostly owned by indigenous customary owners . 10% of water sources are situated in developed land such as agriculture and farm land.
- Intake Water Volume
  - Daily average of 2,300 cubic meters
  - Average per one year: 847,000 cubic meters
- Future Water Resources type
  - Borehole [ground water] and salt water desalination along coastal communities in low lying islands (sea water level rise)
- Climate
  - Precipitation per year
  - Average rain fall varies from 4000mm in the Northern islands to 1500mm in the Southern islands
  - Two season – extended Dry Season from April to December.

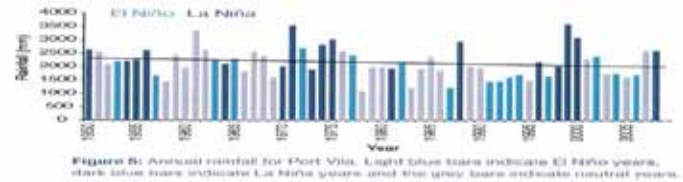


Figure 8: Annual rainfall for Port Vila. Light blue bars indicate El Niño years, dark blue bars indicate La Niña years and the grey bars indicate neutral years.

  - *Source: International Climate Change Adaptation*

Policy & Regulations

- Policy
  - Water Supply to be Managed by one Department
    - The water supply current is administered by two departments; PWD in urban areas and Geology and mines in rural areas. It has been inefficient due to lack of coordination and collaboration with strain on each budget and resources.
  - Water delivery systems needs a clear structure for the management of water supply services
    - To improve service delivery to the population both in urban and rural areas.
  - Partnerships
    - Provincial authorities and communities to help manage local water resources.
- Legislation
  - Review of current Water Supply Act legislation
    - Water supply to be looked after by the Ministry of Lands
    - Define a proper and clear structure to cater for water delivery and management
  - Review of current Water Resources Management Act
    - Ownerships
    - Buffer Zones
    - Formalization of National Water Advisory Committee
    - Drinking water quality standards monitoring and enforcement.

Water Tariff

- Water tariff
- Billing System
  - PWD raises invoices
  - Payment of invoices and receipting through Vanuatu Government cashier in the Department of Finance

The Utilities Regulatory Authority was established on 11 February 2008 under the *Utilities Regulatory Authority Act No 11 of 2007* (the URA Act). The URA Act established the Authority as an independent economic regulator for pricing, access, standards and monitoring of concession agreements. The regulated services defined in the URA Act are the supply of electricity and water services.

The Authority provides continued and expanded support to the Vanuatu Government's microeconomic reform program. This program was designed to improve the efficiency and competitiveness of Vanuatu's economy through the reform of the electricity and water sectors.

The Government perceived the establishment of an independent regulatory body as necessary to ensure that the benefits of the industry restructuring and concession arrangements were passed on to all residential, commercial and industrial customers.

The primary objective of the Authority is to improve access to electricity and water services and to protect the long-term interests of Vanuatu's consumers with regards to the price, quality and reliability of electricity and water services.

Water Quality Management

- Water Source Management.
  - Current Water Resource Management Act has been effective in Vanuatu over 10 years.
    - It provides for the proper management and conservation of Vanuatu's natural water resources by regulating the use and works that can be done including the establishment of committees to help overlook the management of the water resources.
- Standards
  - Water Resources Management Act [CAP 2002]
    - The Minister responsible to set the water standards and appropriate performance indicators.
  - Vanuatu National Drinking Water Quality Standards (Draft)
    - Assist Vanuatu to meet the World Health Organization's Millennium Development Goals and Vanuatu's Priority Action Agenda.
    - Drafted in June 2012
    - Drafted in consultation with World Health Organization (WHO)
    - Consistent with the WHO *Guidelines for Drinking Water Quality*
  - Vanuatu National Drinking Water Quality Service Standard Category
    - Covers treated [Urban] and untreated [Rural] drinking water
    - Treated & Untreated Drinking Water Quality Standard is further categorized into the following
      - Biological drinking water quality standards
      - Physical drinking water quality standards
      - Chemical drinking water quality standards

Management of water quality

- Designing a Drinking Water Quality Monitoring Programme
  - The PWD is the service provider responsible to ensure that all water produce are within safe limits.
- **PWD currently runs out of chemicals due to lack of funding;**

- Keeping your Drinking Water Safe:
  - The PWD is to ensure that regular water quality treatment is carried out in the provinces and sampling sent to Port Vila for testing.
- **PWD seldoms carries out testing:**
- **1) lack of budget to carry out regular sampling and testing**
- **2) Staff not strictly following procedures**
- **3) UNELCO – performs and complies within the requirements of the concession contracts**
- Water Laboratory
  - Government - Water Testing Laboratory within the Department of Geology & Mines & Hydrology under the Ministry of Lands & Natural Resources.
  - Private – UNELCO

- Utilities Regulatory Authority [URA]
  - Audits water quality tests and reports publically on findings with necessary recommendation to compliance.

Water Supply Services

- Aged Infrastructure
  - The infrastructure is old and needing replacement.
    - Mostly are cast iron pipes
    - Electrical Water pumps in the two urban area and diesel pumps in Provincial centres.
- Human Resources
  - High percentage of retiring personnel
  - PSC recruitment is lengthy as there is lack of qualified candidates to select from.
- Budget
  - PWD water supply & Rural water supply- No budget appropriated by parliament.
  - PWD water supply- Road maintenance fund is used to fund water activities.
  - Rural water supply – other funds allocated within its annual finance.
  - UNELCO – privately funded.
- Water Service to Customers
  - UNELCO – Port Vila : water is supplied 24 hours / 7days a week
  - PWD water supply – Luganville : water is supplied 24 hours / 7 days a week
  - PWD water supply – Provincial centres: water is supplied on average of 3 hours / 7 days per week

2. Reduction of non-revenue water1

- Constitution of Non-revenue Water

System input volume	Authorized consumption	Revenue water	Billed authorized consumption	847,000 m^3 /year (58.0 %)
		Non Revenue Water (NRW)	Unbilled authorized consumption (ex. fire fighting, cleaning)	9,200 m^3 /year (1.08 %)
	Water losses		**Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)**	300 m^3 /year (0.03 %)
			Real losses (Leakage)	603,867 m^3 /year (40.89 %)

- Enforcement on illegal connections;
  - Illegal connection is undetected due to lack of appropriate tools and mechanism within the network to detect leakages.
  - Insufficient human resources derived from inappropriate organization structure.
- Leakage Repairs;
  - The major contributor to the high non revenue water is from leakages along the reticulation main trunks & joints and local connections such meters. Currently leakages are attended to the availability of funds made available from PWD's other maintenance funds. There is no water budget from the Parliamentary budget appropriation.

Private Sector Participation

- Concession Contract – Port Vila
  - UNELCO French owned private utility contracted by the Vanuatu Government on 13th December 1993 to manage and operate the water supply on Port Vila.
  - Total area of 1,455 sq. km with a population of 78,723 (2009 census)
- URA established under the Ministry of Infrastructure and Public Utilities regulates the water tariff and quality.
  - Assisting the Vanuatu government to review the concession contract as per the requirement of the contract.

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

- Government Owned
  - Water budget appropriated by parliament is a must.
  - Restructuring is required (investigate various models)
  - Reduction on Non Revenue Water (NRW) to be undertaken as soon as possible
  - Review of policy and legislation in progress.
- UNELCO
  - Review of existing contract.
  - To evaluate contract performances and investigate benefits of competitive bidding for other areas
- Sewage System
  - There are no sewage system in Vanuatu other than constructed septic tanks. This covers 100% of urban population and for rural compost systems are used.
  - Each private owners are responsible to the management and maintenance of the septic systems. This is expected to continue with sewage treatment to be developed under the current Port Vila Urban Development Project

Major Issues

- Political Interferences
  - The number of staffs turnover was high and transfers to other PWD division contributed to the in-efficiency of the water supply services
- Staffs
  - Un-trained operational staffs
  - Unqualified water management staffs
- In-sufficient Funding
  - Lack of incentives to collect revenue
  - Absent of water budget allocation
  - Lack of appropriate water billing and debt recovery mechanism

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

ZAMBIA

Water Supply Administration for Better Management of Water Supply Services

Country: Zambia
Organization: Kafubu Water and Sewerage Co. Ltd

1

General Country profile:Background

- My country is situated in the Southern part of Africa bordering with eight other countries. The country got independent in 1964 and was under British colonial rule before then. The population is mainly concentrated in the capital, Lusaka and the Copperbelt province. The country is divided into ten provinces. Zambia has a number of rivers lakes and water falls that provide source for water and generation of electricity. The climate is tropical i.e humid, wet or dry and has two seasons : rainy sesson and dry season (winter and summer)

Whole Country:

Area : 752, 614 km^2

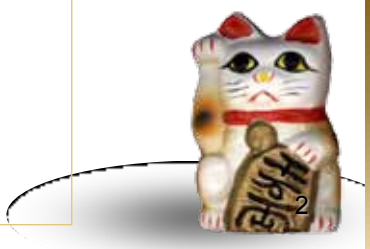
Population : 14.08million Habitants

Coverage Water Supply: %

Selected Water Supply System/City:

Service Area : km^2

Population Served: 326,950 thousand



2

My Mission

- Mission of my organization is: To provide efficient and high quality water and sewerage services within the company's prescribed operational areas on a sustainable commercial basis
- My mission in the organization is: To plan, direct and control the technical functions of the company in order to ensure efficient and effective delivery of water and sewerage services
- My actual job to achieve the mission is: to formulate and implement operational policies, strategies/systems and work plans for the engineering function and ensure effective maintenance systems that assure high plant availabilities ….

3

1. Management of water quality

- Current Situation
  - Water quality analysis is carried out region by region based on the guidelines by our local standards bureau (ZABS).

    For each parameter (pH. Turb.colur.Res.Chl, Tot. coli, E.coli etc) a minimum number of samples are analysed
- **Major problems**
  - Source of raw water
  - State of infrastructure
  - Encroachment of water course

4

1. Management of water quality (cont'd)

- **Current Actions**
  - Alternative sources of raw water
  - Rehabilitation of infrastructure
  - Stakeholder engagements
- **Achievements**
- Improved quality of effluent into raw water course

5

2. Reduction of non-revenue water1

- Constitution of Non-revenue Water

System input volume 63,463,766	Authorized consumption 31,207,685	Revenue water 30,496,985	Billed authorized consumption 30,496,985	xx m^3 /year (48.05 %)
		Non Revenue Water (NRW) 32,966,781	Unbilled authorized consumption (ex. fire fighting, cleaning) 710,700	xx m^3 /year (1.12%)
	Water losses 32,256,081		**Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies) 565,750**	xx m^3 /year (0.89%)
			Real losses (Leakage) 30,752,234	xx m^3 /year (48.46 %)

2. Reduction of non-revenue water2

- **Current Situation**

- NRW for the whole company is estimated at 50%
- Most infrastructure is in state of disrepair
- Production plants and major networks not metered
- Multiple network leaks

- **Major Problems**

- Aged infrastructure vis-à-vis pipe network
- Lack of resources
- Major customer (Govt) not paying on time
- Supply area not zoned

7

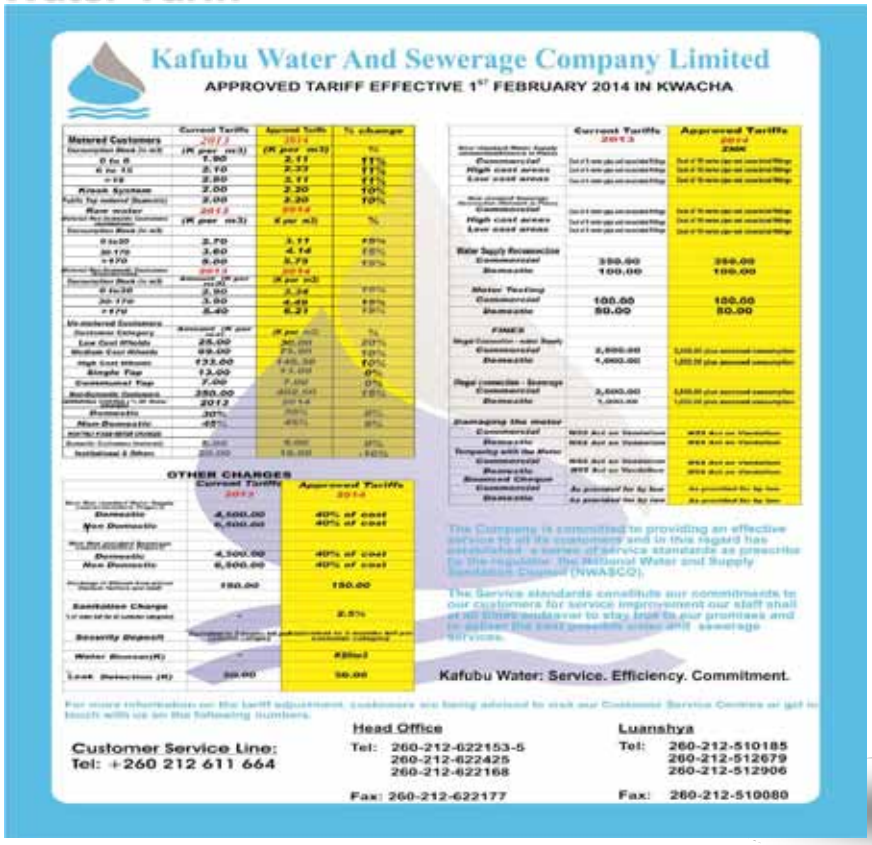
2. Reduction of non-revenue water2 (Cont'd)

- **Current Actions**

- Metering of Customers
- Zoning of supply areas
- Repair/Overhaul of networks
- Installation of Pressure regulation points
- Installation of air valves
- Installation of pre-paid meters in govt. institutions

- **Achievements**
- Increased supply hours
- Reduced transmission/commercial losses

3. Water Tariff



Kafubu Water And Sewerage Company Limited

APPROVED TARIFF EFFECTIVE 1ST FEBRUARY 2014 IN KWACHA

Kafubu Water: Service. Efficiency. Commitment.

Customer Service Line:
Tel: +260 212 611 664

Head Office
Tel: 260-212-622153-5
260-212-622425
260-212-622168
Fax: 260-212-622177

Luanshya
Tel: 260-212-510185
260-212-512679
260-212-512906
Fax: 260-212-510080

4. Water supply service standards /Performance Indicators

- **Current Situation**

- Standards for water supply have been agreed and set by the regulators (NWASCO)
- These standards are from area to area
- Not fully complied with in some areas

- **Major Problems**

- Poor state of the distribution network
- Unstable power supply
- Lack of standby facilities
- Unreliable/inefficient pumping equipment
- No planned maintenance systems

Water supply service standards /Performance Indicators (Cont'd)

- **Current Actions**

- Repair of distribution networks
- Overhaul of standby facilities
- Replacement/upgrading of pumping equipment
- Power supply alternatives
- Re introduction of planned maintenance systems

Water supply service standards /Performance Indicators (Cont'd)

- **Achievements**

- Increased supply hours
- Increased Coverage
- Improved Reliability

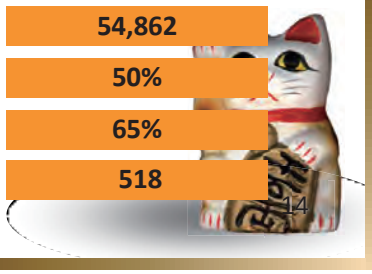
5. Management of water supply service on a self-supporting basis

- Our company has embarked on a “re-engineering” programme aimed to improve service delivery.
- Among issues to be handled are:

- Procurement of meters
- Coverage of new areas
- Re-orientation of company operations
- Control/Reduction in O & M costs
- Rehabilitation of sewage infrastructure
- Recruitment of qualified staff

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

2005	INDICATORS	2012
17	Staff/1,000 connections	12
165,000	Production capacity m3/d	211,666
ZABS/WHO	Water quality	ZABS /WHO
50%	Coverage area	79%
12hr/d	Supply duration	18hr/d
0.2 bar	Supply pressure	2.5 bars
32,650	Number of connections	54,862
72%	NRW	50%
50%	Collection ratio	65%
800	Staff number	518



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

- Despite a number of challenges still existing in our organisation, a number of achievements have been made in the recent past to improve water supply services/management

- Rehabilitation of the water treatment plant at Kafubu WTP
- Rehabilitation/replacement of pipeline from reservoirs
- Rehabilitation of sewage treatment plants
- Metering of parts of the low cost areas
- Procurement of special reconnection/disconnection fixtures
- Pump house upgrades

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

- Knowledge transfer on how they have managed to improve water supply services from the administration and management perspective
- Measures taken on water safety
- Modern ways of plant, equipment and networks maintenance
- Methods of pressure management and interventions to reduce frequent networks failures due to design or operational inadequacies