Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

BANGLADESH

Water Supply Administration for better Management of Water Supply Services (B)

Country Report

Mahmudul Hasan Katebi
Research Officer & Assistant Chief

Chittagong Water Supply and Sewerage Authority
Bangladesh

Bangladesh

General Information

A	The Geographical background	Chittagong is one of the second largest city in Bangladesh and is the country's biggest commerce and port city. The city is located at the eastern side of the Bangladesh faced to the Bay of Bengal. The center of the city is located near river mouth that is utilized as a part of harbor. In the north-west direction, hilly areas with the height of from 60m to 90m are distributed. In the eastern side of hilly areas, a flat plain is widely distributed and is bordered by the Karnaphuli River, the largest river in the south-eastern area of the Bangladesh. The Sangu River to the south of the city and the HaldaRiver , a branch of Karnaphuli River, flows from north-east to the south-east and joins the Karnaphuli River.
B	The Precipitation per One Year	2150 mm in Bangladesh
C	The type of Water Resource	The Karnaphuli River, the Halda River, Sangu River are the main water resource of the city. Besides these ,Kaptai Dam at the upper stream, which is the largest water reservoir capacity in the country
D	The Intake water volume	Surface water 90,000 m^3/day Ground water 1,20,000 m^3/day
E	The type of Water Resources for the future	TheKarnaphuli River, Halda River, Kaptai Dam and the Bay of Bengal are the water resources for the future.
F	The population ratio to be served and not to be served drinking water	The population of Chittagong City is about 3.0 million. But Chittagong WASA can supply drinking water about one third of the population.
G	Non revenue water (NRW)	15% to 20%
H	**Private sector participation**	We have no private sector Participation in water resource development, water treatment, water distribution.
I	Involvement of National government in water supply services	National government provides us full support

Service Area

Size of Utility area Responsibility	**212.00 sq. km**
Size of Utility present service area	**Near about 120.00 sq. km**
Population Utility's area of responsibility	**About 3.0 million in Chittagong City**
Population of Utility's present service area	**2.9 million (Rationing way) in Chittagong City .**
Population served by the utility with piped water supply	**2.9 million in Chittagong City .**
Number of towns served with piped water	**N/A**

Water Consumptions & Production

Volume of water produced by the utility	1,80,000 m^3/day or 65700,000 m^3/year
Volume of water bought in bulk from other utility.	N/A
Volume of water metered	519,03,000 m^3/year
Estimated un- metered consumption	137,97,000 m^3/year which is 26 % of metered consumption

5

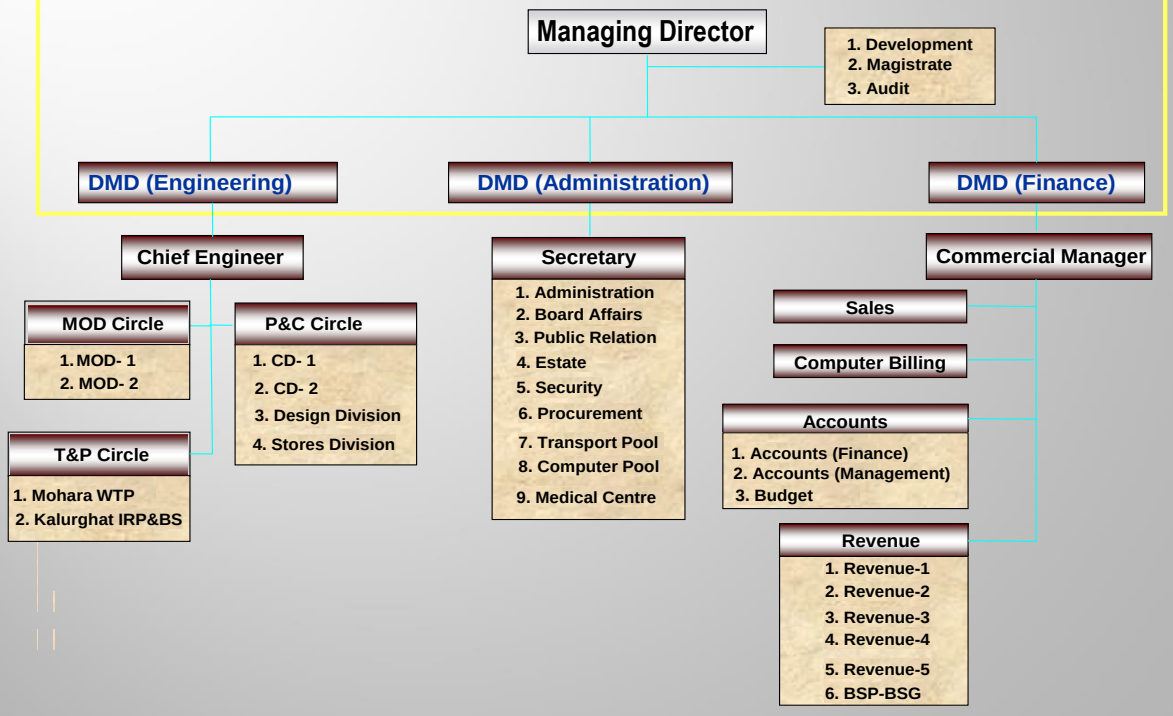
Water Supply System Performance

1 Number of customers who received intermittent supply	About 44,000 No's
2 Typical duration of supply (Planned and unplanned supply interruptions)	About 4.00 hours/day
3 Typical mains water pressure in your pipe network	55 meters
4 Number of water pipe breaks in the distribution network	2022 No's/year
5 Required number of tests of treated water for residual chlorine	75 No's/year
6 Required number of tests of treated water for residual chlorine carried out	8784 No's/year
7 Required number of tests of treated water for residual chlorine passed	8784 No's/year

6

STAFF

Present Organization Structure



7

Number of FTE' staff in the company

Corporate Services (Management, Admin, Finance, Technical etc.)	Water Supply (D& M , Customer Services , Support Services etc.)	Other non-water supply (e.g. waste water, drainage, environment services)	Total
220 No's	502 No's	---	722 No's

8

Customers

Number of new customers connected to water supply system during the year	**1579 No's/year (2014)**
Number of complains recorded during the year	2025 No's/year

9

CWASA Current Tariff

Types of Connection	Rate (TK/ m^3)
Domestic	7.25 Equivalent $ 0.09271 / m^3
Non-Domestic	20.53 Equivalent $ 0.2625 / m^3
Average of all categories	13.89 Equivalent $ 0.1776/ m^3

$ 1= TK. 78.20

10

Restructuring Tariff

- At Present, CWASA Tariff is very low. CWASA Board has power to increase only 5% per year. (For Adjusting Inflation)
- The Process of Establishing Water regulatory Commission is going on.
- The Commission will determine realistic tariff system by discussing with the Authorities and stakeholders.

11

Restructuring Tariff (Contd.)

- CWASA is also thinking of implementing the progressive tariff rate.

- After Completion of Karnaphuli Water Supply Project; the water supply will be improved. After that a realistic tariff system will be introduced on the basis of operating and maintenance cost , Repayment of loans and Interest and Profit of the organization.

12

Management of Water Quality

- At present CWASA has one and only surface WTP at Mohara, Capacity 90 MLD. For surface water salinity intrusion occurs on the time of draught at Halda Intake point of Mohara water Treatment Plant.
- Apart from Surface Water Treatment Plant, CWASA has 95 Deep tube weels to meet up the demand of water. High iron and chloride content present at ground water of Chittagong City

- Ground water is mixed with the surface water during salinity intrusion problem to reduce the chloride level of supplied water.
- The underground water which is highly contaminated is transferred to Kalurghat Iron Removal Plant to remove Iron .

13

- To supply safety drinking water, CWASA has a laboratory and appointed qualified man-powers. Before supply of drinking water, it tested its own laboratory.

- To supply safe drinking water, CWASA removed Iron from ground water in its Iron removal Plant.

- CWASA has taken a big project ''Karnaphuly Water Supply Project- Phase-2'' funded by JICA. Under this project, all of the deteriorated and old pipes will be changed.

- CWASA developed Citizen Charter.

14

Present Principal Functions and Roles of CWASA

- ❑ To provide water supply for uses as are required by the Act or any other written law dealing with the management of waste resources, water quality standards and the environment;
- ❑ To secure the continued supply of water for all lawful purposes by continuously treating the water and monitoring the quality of water supplied under the water Act.
- ❑ To develop and maintain water works and sanitation works
- ❑ To protect and maintain water sources
- ❑ To advise the Government in the formulation of policies and guidelines relating to potable water standards
- ❑ To plan and execute new projects for water and sanitation
- ❑ To educate and provide information to persons on public health aspects of water supply, water conservation, sanitation, and similar issues.

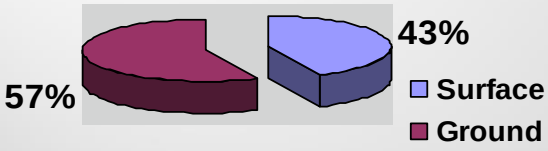
Present Principal Functions and Roles of CWASA (Contd.)

- ❑ To liaison with local government authorities on matters relating to water supply and sanitation and the preparation and execution of plans relating to the expansion thereof;
- ❑ To collect fees and levies including any regulatory levy for water supply and sanitation services supplied to consumers by the water authority
- ❑ To propose water tariffs.
- ❑ To provide amenities or facilities which the Authority considers necessary or desirable for persons making use of the services or the facilities provided by the Authority

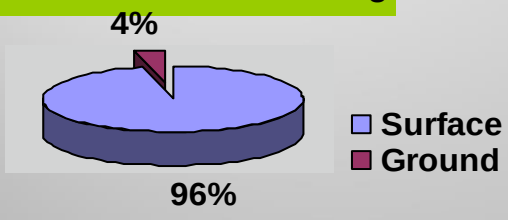
Production & Supply Facilities

Water source

Present water source Sharing



Future water source Sharing



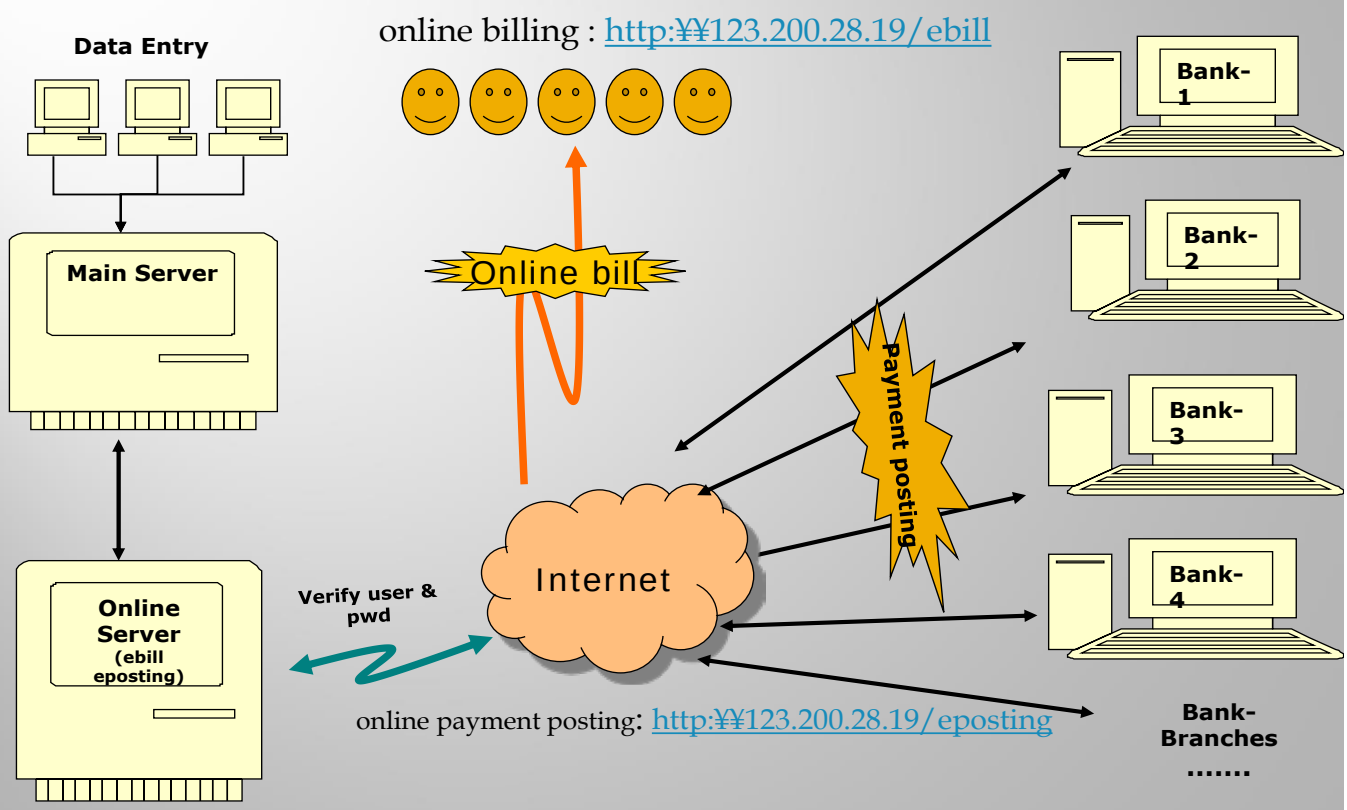
Chittagong Detailed Plan Area

17

Online Billing System

- Customers can check their Bills and Dues from the website. (www.ctg-wasa.org.bd)
- They also Download the bill from the Web and print the bill and Due list.

Online Payment Posting data by Bank-Branches through internet

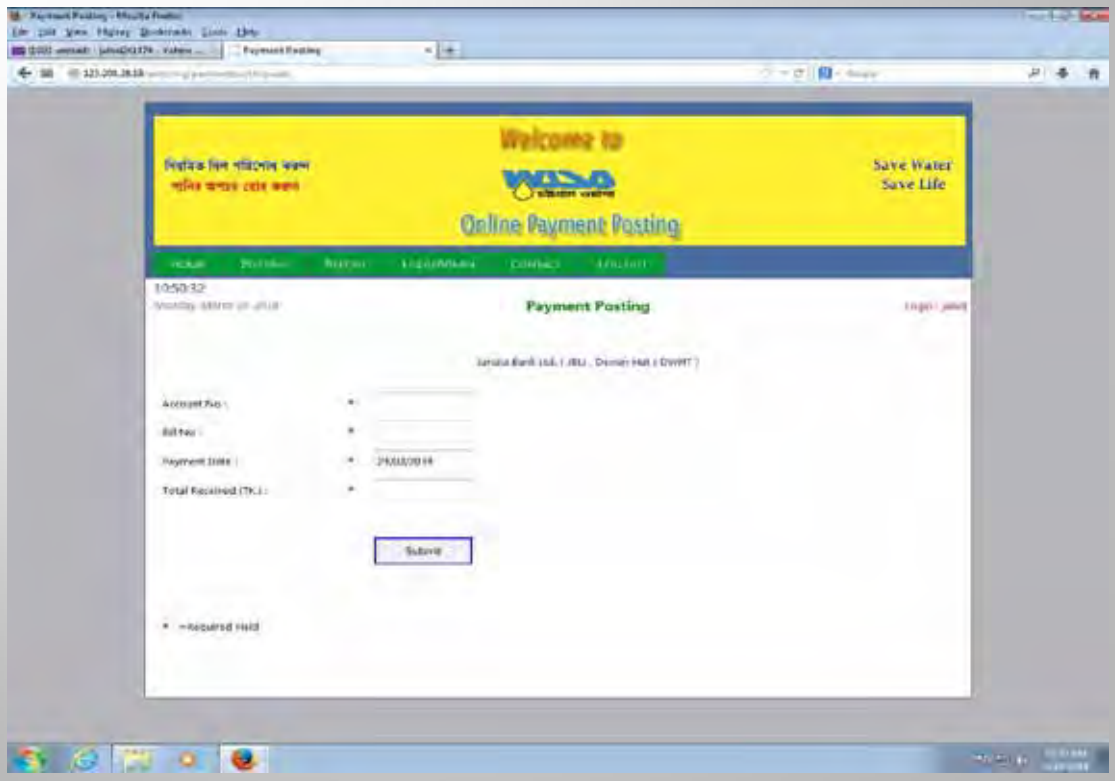


Online Payment Features

- Bank can post data through internet and print their daily statement
- Due bill is updated simultaneously at the time of posting
- Consumer can see the update in the online billing system which makes him /her satisfy and encourage to pay bill in time
- Accounts can see the financial update from the web site about collection posted by bank-branches through net

Daily Payment Posting

http:¥¥123.200.28.19/eposting



Daily Payment Statement

Details Report

Online Posting Data From 24/03/2014 To 24/03/2014

United Commercial Bank Ltd., Muradpur

Account	Account Name	Bill No	PayDate	Waterbill	Excise	Surchrage	Total	Remarks
041039	MR.MD YUNUS MEAH	A04140203417	24/03/2014	720.00	108.00	0.00	828.00	10.00
046158	DR.MD.DIDARUL AMIN	A04140202678	24/03/2014	986.00	148.00	0.00	1,134.00	10.00
045349	MR.MD.AKHTER HOSSAIN SOWDA	A04140204772	24/03/2014	85.00	13.00	0.00	98.00	0.00
045796	MR.MD.AKHTER HOSSAIN	A04140204786	24/03/2014	171.00	26.00	0.00	197.00	0.00
044555	MRS.MAHFUJA KHANOM	A04140204556	24/03/2014	223.00	33.00	0.00	256.00	0.00
046274	MR.MD.KHORSHED ALAM	A04140202054	24/03/2014	749.00	112.00	0.00	861.00	10.00
041018	ALHAJ MD.NURUL ALAM CHY	A04140206311	24/03/2014	90.00	14.00	0.00	104.00	0.00
047097	MD ABUL HASHEM	A04140202161	24/03/2014	184.00	28.00	0.00	212.00	0.00
045043	MR.MOHAMMAD RAHMAT ULLAH	A04140202101	24/03/2014	112.00	17.00	0.00	129.00	0.00
045347	MR.ABDUR RAZZAK	A04140202110	24/03/2014	131.00	20.00	0.00	151.00	0.00
040250	MRS.SHAHNEWAZ BEGUM	A04140206249	24/03/2014	6,407.00	961.00	0.00	7,368.00	10.00
045176	MR.MOHAMMAD ABDUL MANNAN	A04140202279	24/03/2014	269.00	40.00	0.00	309.00	0.00
042493	MR.TAJU MEAH	A04140204507	24/03/2014	204.00	31.00	0.00	235.00	0.00
042460	MR.ABU TAHER	A04140204505	24/03/2014	89.00	13.00	0.00	102.00	0.00
044875	MRS.RAZIA BEGUM	A04140203326	24/03/2014	1,379.00	207.00	0.00	1,586.00	10.00
044569	MR.SYED RIAJUDDIN AHMED	A04140202808	24/03/2014	134.00	20.00	0.00	154.00	0.00
Total Bill(s) : 16				**11,933**	**1,791**	**0**	**13,724**	**50**

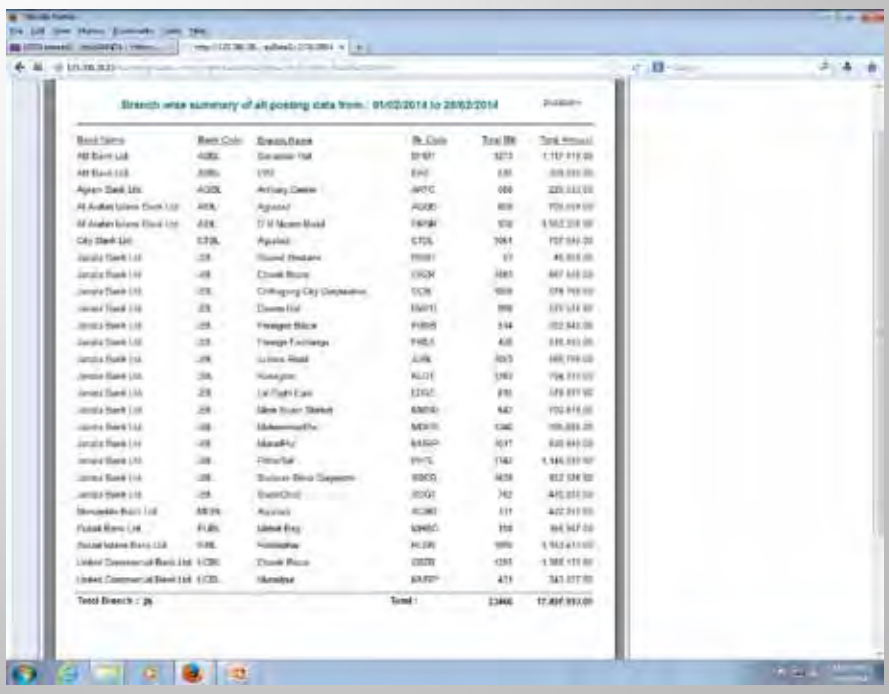
Summary : -

Water Bill	:	11,933.00
Surcharge	:	0.00
Vat	:	1,791.00
Total Collection	:	**13,724.00**
Less Vat (-)	:	1,791.00
Sub Total	:	**11,933.00**
Less Revenue Stamp (-)	:	50.00
Net credited to CWASA A/c 007613200000871	:	**11,883.00**

Signature of Cashier

Signature of Authorized officer & Seal

Monthly Payment Statement



Action Plan on Institutional Development and Reviewing tariff in collaboration with PANI -2 (Contd.)

- CWASA expands customer database and computerizes management of assets.

- CWASA will update GIS database and map to accommodate all water supply facilities and customers.

Strategy for review of water tariff level and structure after completion of Karnaphuli Water Supply Project (KWSP-1)

- CWASA's Current water tariff is very low
- The Production cost is much higher than the present tariff .
- After Completion of Karnaphuli Water Supply Project the service will be improved. After that a realistic tariff system will be introduced on the basis of operating and maintenance cost , Repayment of loans and Interest and Profit of the organization .
- Awareness campaign regarding the tariff system will be carried out under PANI-2 Project.

25

Scientific Waterworks System

Water Quality Inspection

Chittagong Water Supply & Sewerage Authority Water quality Management Plan

- **Water examination at the Tap**
- **Water Quality Examination at the Treatment Plant**
- **Water sources Quality Examination at the intake point (River)**

Water Quality is tested at 75 sites every month

26

Action Plan on Institutional Development and Reviewing tariff in collaboration with PANI -2

With Collaboration of PANI-2 CWASA will implement the Following tasks

- will Outline the organogram.
- will review the training policy, prepare and implement the yearly training policy.
- will develop and implement the HR and recruitment policy.
- will restructure long term debt plan.
- will plan and implement measures to increase revenue generation

27

Reduction of Non-Revenue Water

- Major challenges/Problems of Chittagong City are Leakages, Old Pipes, Pilferage, Illegal Connections.
- To overcome this challenges CWASA has taken following action;

a) Vigilance team, b) Regular maintenance, c) Mass media advertisement, d) School campaign e) Installed new pipes through KWSP-1 Project funded by JICA

- Following achievements are like as ,

a) Now NRW of CWASA are 15% to 20%.
b) Lower Customer complain .
c) Skilled man-power

28

Reduction of Non-Revenue Water (Cont.)

❑ Other Hand, CWASA Has been taken a project "Project for Advancing Non Revenue Water Reduction Initiative (PANI-2) " funded by JICA and CWASA are working together to reduce NRW.

❑Under Japanese Experts CWASA Engineers are doing on-job training on Leak detection , GIS Mapping and preparing Customer database.

❑Under the Project model Area is selected and survey work is carrying on .

29

Water Supply Service Standards

Chittagong city is the second largest city in Bangladesh. The present population of Chittagong city about 3.00 million. The demand of water is 500 MLD. But CWASA presently supplies 210 MLD. Main challenges of CWASA is to meet the gap of between demand and supply of water.

30

Water Supply Service Standards (Cont.)

- To meet up the demand of water, CWASA is implementing the following projects :

  a) Karnaphuly water supply project -143 MLD.
  b) Karnaphuly water supply project-2nd Phase – 143 MLD.
  c) Emergency water supply project -18MLD.
  d) Chittagong Water Supply Improvement & Sanitation Project. –90MLD.
  e) Institutional Improvement and Advancing NRW Reduction Initiative of CWASA(PANI-2)

31

Monitoring by Performance Indicators

- **CWASA Monitoring by the following Performance Indicators:**

  a) NRW-Non Revenue Water
  b) Revenue Collection efficiency
  c) Collection Period
  d) Functioning meter rate of installed meter
  e) Water quality sample
  f) Leakage occurrence
  g) Water supply coverage
  h) Average tariff.

32

Management of water supply service on a self-supporting basis

- Major challenges is to meet up of the gap between demand and supply of water .
- To overcome the challenges ,CWASA presently implementing above stated water supply projects.

33

Major recent achievement in Improvement of water supply services/management`

a)"Mohra & Kalurghat Plant Rehabilitation Project " has been completed recently financed by JDCF. The machineries of these plant has been modernized . So the plant are running smoothly.

b) Under TA Project funded by JICA " Institutional Improvement and Advancing NRW Reduction Initiative of PANI-2)", new meters installed, updated GIS.

34

Expectation for the Japanese private companies

- To implement those projects , Japanese private companies may supply materials, equipment, pipes, technique or technology to Bangladesh .
- CWASA is implementing four projects, upon them two big projects are funded by JICA. After completed these projects , CWASA needs more skilled and trained man-power to run the plants. So, CWASA need more training regarding Electro Mechanical as well as Management Training .

35

Thank You All

Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

CAMBODIA

Water Supply Administration for Better Management of Water Supply Services

Inception Report

Country : Cambodia

Name : Mr. Seak Pengkeang (Assist. to DG)

: Mr. Sok Hout (DD of Finance Department)

Organization: Siem Reap Water Supply Authority

1

Contents of Presentation

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

2

General Profile of Cambodia

Whole Country:

Area : 181, 035 km²

Provinces: 24 Provinces & 01Capital City

Cities: 26 cities

Population : 15,458,330

Urban Population: 3,064,301

Water Supply Connection Ratio: 81.28% of total urban population

Siem Reap Water Supply Authority(2014)

Service Area: Siem Reap City 472 km²
(12 Sangkats)

No. of HHs : 43,840

Population: 244,285

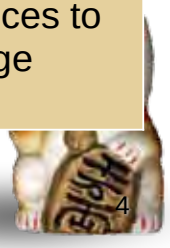
Number of Connections: 5,989

Population Served: 29,945

3

Mission and Actual Job to Achieve the Mission

My Organization Mission	My Mission in the Organization	Actual Job to Achieve the Mission
To produce, supply/distribute and expand clean water to people in Siem Reap City and the surrounding areas.	To promote better water supply services and to improve access of people to water supply services.	○ Improve operation and management of water supply service. ○ Speed up the implementation of international cooperation projects in order to expand water supply services to non-coverage areas.



4

1. Management of Water Quality-1/2

1.1 Current Situation and Major Challenges/Problems

- Water quality of SRWSA meets National Drinking Water Quality Standard (NDWQS) as well as WHO Standards.

Items	Unit	WHO	NDWQS	At WTP	End of Pipes
Turbidity	NTU	< 5	< 5	0.5	0.6
pH	mg/l	6.5-8.5	6.5-8.5	6.60	6.65
Fe	mg/l	0.1-0.3	0.3	0.099	0.1
Residual Cl_2	mg/l	< 5	0.2-0.5	0.32	0.3
Total Coliform	cfu/ml	0	0	0	0
E. Coli	cfu/ml	0	0	0	0

- There some incidents of red water from the tap caused by leakage or old pipe. However, after received the information, SRWSA did pipe cleaning immediately.
- Still lack of equipment for the water quality analysis.

5

1. Management of Water Quality -2/2

1.2 Monitoring System/Plan of Safety Supplied Drinking Water

- Establishing Standard Operation Procedure (SOP) to ensure proper and regular water quality check. In the SOP clearly defined:
  - ✓ Responsibilities of water quality analysis staff
  - ✓ Location of taking sample water for analysis
  - ✓ Method of taking the sample water
  - ✓ Numbers of samples and locations
  - ✓ Parameters to be analyzed
- Conduct regular water quality analysis: daily, quarterly, semester, and yearly at water treatment plant and biweekly at the end of pipe networks.

6

2. Reduction of Non-Revenue Water-1/3

Constitution of Non-revenue Water

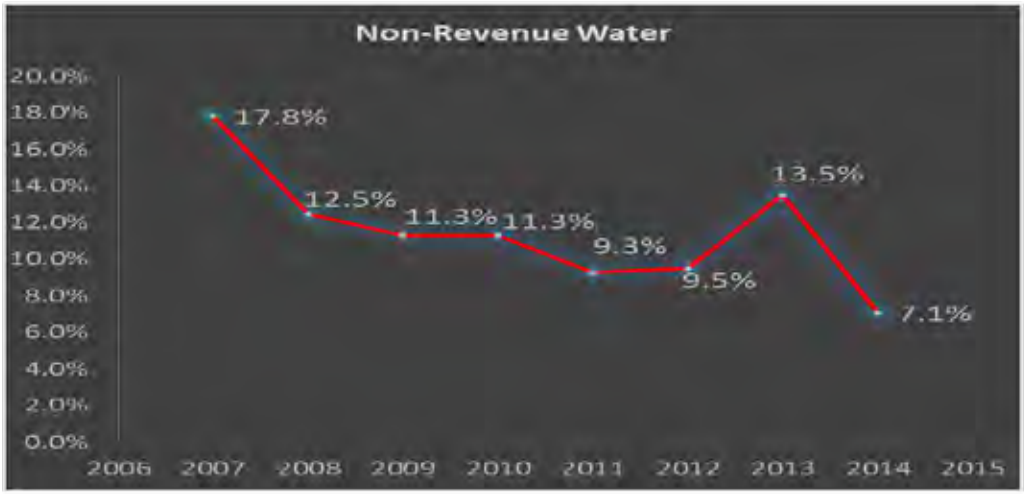
System input volume	Authorized consumption	Revenue water	Billed authorized consumption	4,094,273m^3/year (92.90%)
		Non Revenue Water (NRW)	Unbilled authorized consumption (ex. fire fighting, cleaning)	N/A m^3 /year (N/A %)
	Water losses		Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)	N/A m^3 /year (N/A %)
			Real losses (Leakage)	N/A m^3 /year (N/A %)

7

2. Reduction of non-revenue water-2/3

2.1 Current Situation and Major Challenges/Problems

- NRW reduction is one of the key priority of SRWSA. The NRW reduced from 17.8% in 2007 to 7.1% in 2014.



- The major challenges/problems for NRW reduction:
  - ✓Poor quality of pipes (about 40Km PVC pipes need to be replaced).
  - ✓Pipe damaged very often caused by other construction activities.
  - ✓Malfunctioning or non-working water meters & Leakage at water meters
  - ✓Zone meters were damaged
  - ✓Lack of site equipment for leakage repairs

8

2. Reduction of Non-Revenue Water-3/3

2.2 Current Action Against the Problems

- Established a team for repairing & leak detection
- Conducted survey for non-functioning &non-working water meters
- Repaired/replaced malfunctioning & non-working water meters
- Checked and strengthened monitoring of old water meters
- Replaced of PVC pipes
- Established SOP for (i) meter reading , bills distribution and collection and (ii) SOP for house connection installation.

2.3 Achievement

- The NRW decreased from 13.5% in 2013 to 7.1 % in 2014.
- Profits of SRWSA increased dramatically in 2014

9

3. Water Supply Service Standards/Performance Indicators -1/3

3.1 Current Situation and Major Challenges/Problems

- SRWSA has established its primary performance indicators and updated yearly. Non-revenue water, production rate, coverage ratio, billing ratio, operating ratio, number of staff/1000 connection are followed up closely.
  - ✓ NRW hasn't separated between unbilled authorized consumption, commercial losses, and real losses (leakage)
  - ✓ The coverage ratio haven't clearly calculated since the service area haven't clearly defined

10

3. Water Supply Service Standards/Performance Indicators -2/3

- The customer ledgers, asset ledgers and financial statement indicators have been established through the TCP required for proper management of necessary data to prepare medium/long term financial management plan.
  - ✓ The capacity to regularly update and manage customer ledgers and asset ledgers is required
  - ✓ The need of installation of a Comprehensive Business Management System
  - ✓ The financial statements need to be in line with Cambodian International Financial Reporting Standards(CIFRS).

11

3. Water Supply Service Standards/Performance Indicators-3/3

3-2 Current Action Against the Problem

- Improving data management and records
- Trying to define between unbilled authorized consumption, commercial loss and real loss(leakage)
- Defining new boundary of service area based on the actual growth of the city
- Updating customer ledgers and asset ledgers, installation of the Business Management System, and changing accounting system to CIFRS.

3-3 Monitoring by Indicator

- Regular monitoring and updating all indicators and comparing the achievement with the previous year performance indicators
- The customer ledgers and asset ledgers will properly and regularly updated and managed, and the new financial statements of CIFRS will be implemented.

12

4. Management of Water Supply Service on a Self-Supporting Basis-1/4

4.1 Current Situation and Major Challenges/Problems

- Capacity of water production is far behind the demand so the access to water supply service is quite low. There is an urgent need to increase production capacity.
- Water pressure is very low in some area and at pick hours
- Lack of proper maintenance of water supply facilities
- Poor quality pipes (PVC) remaining about 40km of total100 km which need to be replaced
- Lack of pipe records and correct network map
- Lack of budget for investments

13

13

4. Management of Water Supply Service on a Self-Supporting Basis-2/4

- Zone meter were damaged
- Complicated procedure for new connection and many applications haven't been responses
- Lack of water meter reading procedures
- Inappropriate assign numbers of meters reading staffs
- Lack of asset management and inventory control
- Organizational structure is not well arranged
- No budget and schedule for staff capacity building

14

14

4. Management of Water Supply Service on a Self Supporting Basis (3/4)

4-2 Current Action Against the Problems

- Modify water production facilities to increase the production capacity
- Created O&M team and SOP for the O&M
- Standardized the pipe materials and implemented pipes replacement
- Prepared as built-drawing and records
- Created leakage detection team and leakage repair as emergency (within 1h after receiving information)

15 15

4. Management of Water Supply Service on a Self Supporting Basis (4/4)

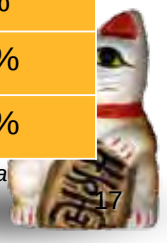
- Created specific office and SOP for house connection installation
- Revised application procedures for new connection
- Replaced of malfunctioning/non-working water meters and created SOP for meter reading, bills distribution and collection.
- Took strong measures to unpaid customers and illegal activities
- Reviewed and revised the real assets and inventory to the real stock.
- Conducted internal and external training to build staff's capacity
- Restructured the management
- Expanded new pipe networks

16 16

5. Major Recent Achievement in Improvement of Water Supply Services/Management

2007	Indicator	2014
9,000	Production capacity m3/d	14,500
NDWQS/WHO	Water quality	NDWQS/WHO
14%	Coverage area (%)	25%*
24	Supply duration (hr/day)	24
30	Supply pressure (m)	15
3,146	Number of connections	5,989
17.8%	NRW	7.1%
82.2%	Billing Ratio	92.9%
-	Collection ratio	99.56%
91.97%	Operating Ratio	57.01%

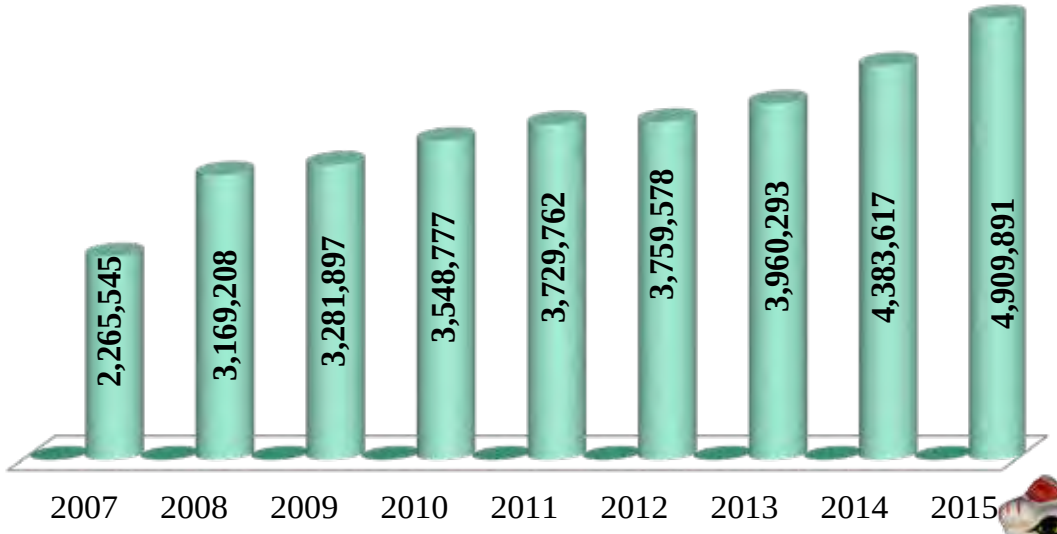
**25% calculated with the existing service areas and about 15% calculated with the future service area*



17

17

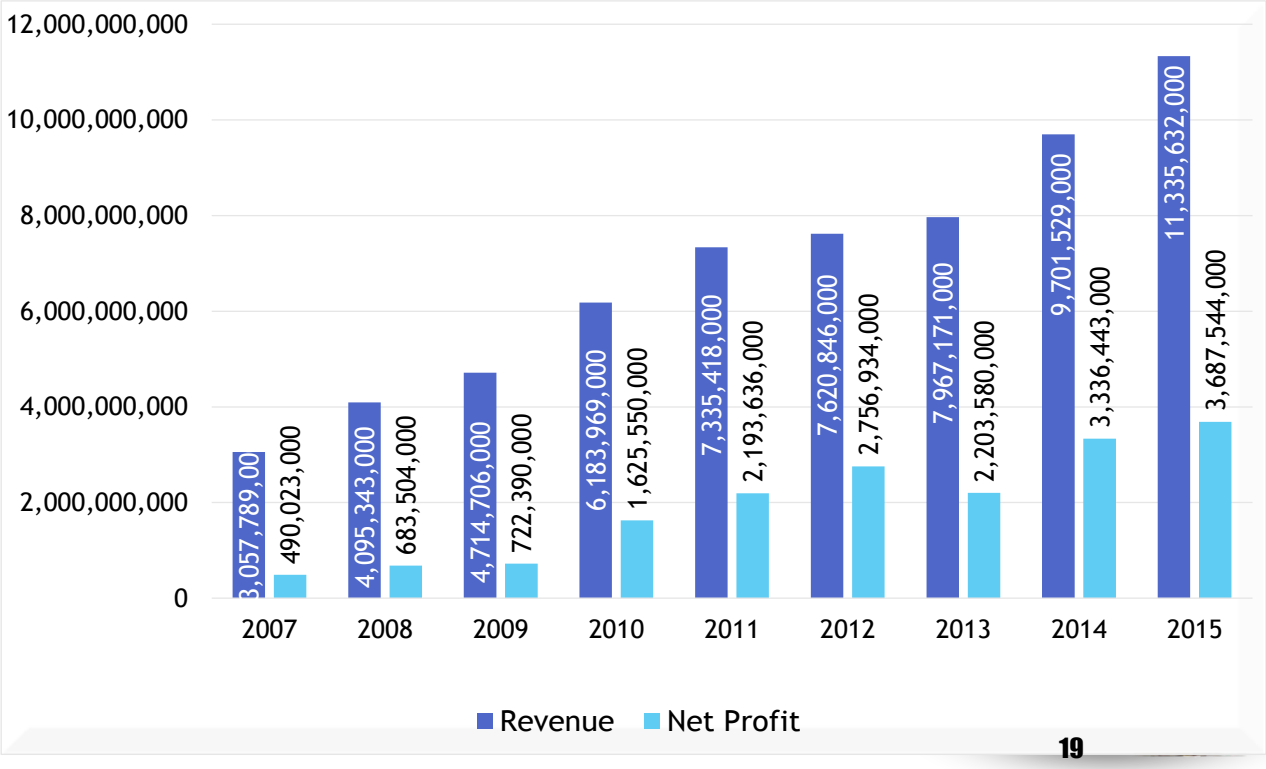
Water Production 2007-2015



18

18

Revenues and Net Profit (2007-2015) in Riels Currency (4000 R= USD 1)



19

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

- The Japanese companies may cooperate with the water supply utilities through the international cooperation project as Consultants and Contractors
- As resources for materials/equipment supplies, technology and technical supports.
- There is opportunities for Japanese Companies to invest in water supply system in some secondary cities and possible cooperation with the utility on O&M

20

Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

INDONESIA

WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES

Inception Report

1. Country : Indonesia
2. Name : Evi Trisiana Dewi
3. Position : Head of Lembang Service Area
4. Organization : Bandung Regency Water Supply Company (PDAM Tirta Raharja)

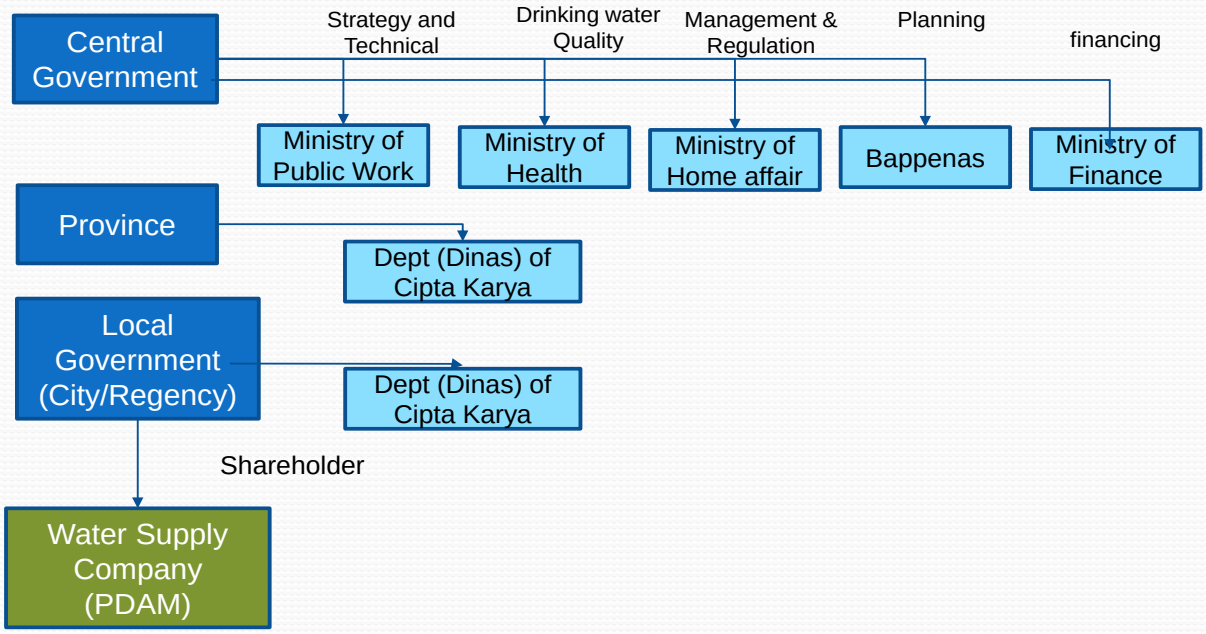
GENERAL BANDUNG REGENCY PROFILE

Area : 2.375 sq.km
Population : 6.133.251 habitants
Coverage Water Supply : 11%
Service Area : 760 sq km
Population served : 458 thousand

My Mission :

- Mission of my organization is to maintain sustainability bussiness, to provide well service with affordable tariff , to increase coverage services area and to create human resource who creative, innovative and smart work.
- My mission in the organization is to decrease non revenue water and to improve human resource quality management.
- My actual job to achieve the mission is collect data of network distribution, change old pipe phased and encourage my staff and share with my college about what I learn.

Who Manages Water in Indonesia?



The Condition of PDAM Tirta Raharja

- Production Capacity 846 l/s
- Water resources :
  - River 79%
  - Deep Wells 7%
  - Springs 14%
- Service coverage 18%
- House connection 79.503
- NRW 32%
- Total personnel 298 persons

PERFORMANCE INDICATORS

9 Company Commitments
(Key Performance Indicators 2015) :

1. Profit Level ≥ 5%
2. 93% billing efficiency
3. 24 hours-complaint handling
4. New installation completed within 3 days
5. Distribution Reliability 23,5 hours per day
6. Non Revenue Water ≤30%
7. Employee's productivity ratio: 223 million rupiahs/employee/year
8. Water Selling targets :16,8 million m3
9. House Connection target : 80.267 HC

Major recent achievement in improvement of water supply services/management (PART 1)

2004	INDICATOR	2014
7	Staff/1000 connection	4
49,161	Production capacity m3/d	70,032
None	Water quality	Health Min Reg
8.90	Coverage area	11.36
22 hr/d	Supply duration	23.5 hr/d
46,204	Number of connections	76,457
41	NRW	32
96%	Collection ratio	1
328	Staff number	323

Dengan Pelayanan Prima Menjadi PDAM Termaju dan Berdaya Saing

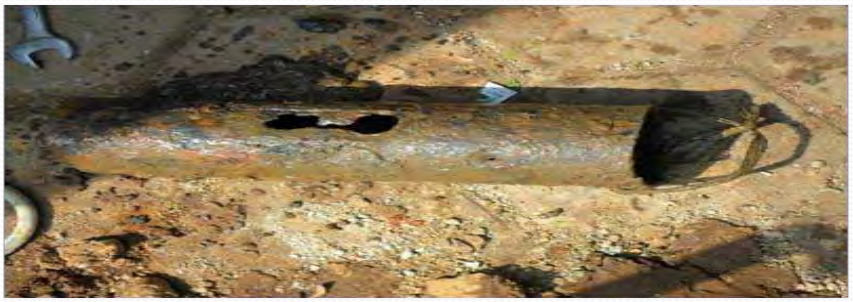
Constraints of Company

PDAM Tirta Raharja

1. Service 3 otonomous area and it is belonged by Bandung Regency
2. Availibility of raw water
3. Coverage service is not proporsional with resident growth rate
4. Awareness of community to use water
5. High water losses
6. Old pipe
7. Ilegal consumptions
8. Human resources

Current Problems

- There are many institutions regulate in water supply
- Decreasing of water resource quantity
- Decreasing of water quality
- High Non Revenue water



Current Actions of Reduction NRW Program

1. NRW Observation with DMA (District Meter Area) System;
2. Performance Water Meter Observation.

The Scope of Activities to make 2 (two) Zones DMA are :

1. Zone DMA Cingcin Permata Indah (CPI);
2. Zone DMA Banjaran.

Search for Leak Points

Current Problems of Reduction NRW Program

1. Limitations of Trained Workforce;
2. Limitation of Leak Detection Devices;
3. Limitation of Budgeting;
4. Technical Problem :
   a. Pipe Network Equipment :
      - valve
      - flowmeter
      - measuring instrument / Pressurre Controllers
   b. Infrastructure Problem :
      - Unavailable specially room for planting pipe
      - street consist of a concrete-lined
   c. Support Tools Work :
      - Jack Hammer
      - Concrete Cutting Tool
5. Legal Aspect (permission for digging)

PDAM Tirta Raharja

The Programs of PDAM

The programs wich we are doing and we are going to :

1. Increasing the production of water
2. Improvement of Water Quality due to Health Ministry regulation
3. Automation of Production
4. Reduction of NRW
   - Twinning with EMASESA, Spain.
   - Technical and non technical assistance
5. Completion Flow Meters
6. Piping Network Management
7. Customers Relation Handling
8. Integrated Information of Technology

Our Expectation for the Japanese Private Companies :

- Transfer knowledge and information technology in handling management of water quality, NRW, water supply service standards

- Give support tools work

Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

LAOS

Water Supply Administration for Better Management of Water Supply Services 8-21 November 2015, Japan

Inception Report

1. Country: Lao PDR

2. Name: Mr Phomma VEORAVANH
3. Position: Deputy Director General
4. Organization: Ministry of Public Works and Transport

1

Inception Report Presentation

Major recent achievement improvement of water supply services/management in Lao PDR

2

Background

- Lao PDR is a country located in South East Asia. It is a landlocked country that share borders with China to the North, Cambodia to the South, Vietnam to the East, Thailand to the West and Burma to the North-West.

- Lao PDR has a land area of 236,800 km^2. The Mekong River traverses the entire length of the country from North to South. Approximately 1,865 km of its total length of 4,000 km are within or along Lao PDR borders. Approximately 80 % of the land area is covered by mountains; the rest is plain area which is located along the Mekong River. High mountains are mainly in the North and North East, while the plateaus are in Xieng Khouang, Khammouane and Champasack provinces.

Whole Country:

Area : 236,800km^2

Population : Over 6.8 Million Pop

Coverage Water Supply country wide: 63 %

Vientiane Water Supply State Enterprise :

Service Area : 3,920 km^2

Population Served: 481,944 population

(67% Vientiane Capital)

(in total 738,371 Pop)

3

Background of Water Services in Laos

- Established in 1959 called Lao Central Nam Papa Company
- Became Nam Papa Lao (Lao Water Supply State Enterprise) in 1971
- By 1998, Nam Papa Lao has one branch in each province countrywide.
- In 1998, application of the National Assembly directives and the water supply sector is decentralized
  - Nam Papa Lao became NPNL and each branch a PNP.
  - Each PNP has its NP branches in district towns of their respective provinces.

Strategy on Water Supply and Sanitation to the year 2030

- Our vision is:

  "Safe, reliable and accessible water supply and sanitation for all"

- Our mission is:

  "Provide Customers with Sustained, Clean and Safe Piped Water at a Fair Price"

Strategy on Water Supply and Sanitation to the year 2030

- Overall Targets
  - Ensure that up to 67% of the total urban population has access to piped water supply by the year 2015, 80% by the year 2020 and 90% by the year 2030.
  - Ensure that up to 80% of the total urban population has access hygienic sanitary facilities by the year 2015, 90% by the year 2020 and 100% by the year 2030.

Mission in the organization is:

According to the Government of Lao PDR 1999 Prime Minister Decision No.37/PM on Management and Development of Water Supply and Wastewater Sector, the sector target is to provide 24-hour access to safe water for the 80% of urban population by 2020.

- 63% water supply coverage in urban area by 2013-2014
- 67% water supply coverage in urban area by 2015
- 80% water Supply coverage in urban area by 2020
- 90% by the year 2020 and 100% by the year 2030.

My actual job to achieve the mission is:

- To strengthen the better planning and management ability of nationwide water supply authorities.

Major recent achievement in improvement of water supply services/management in Lao PDR

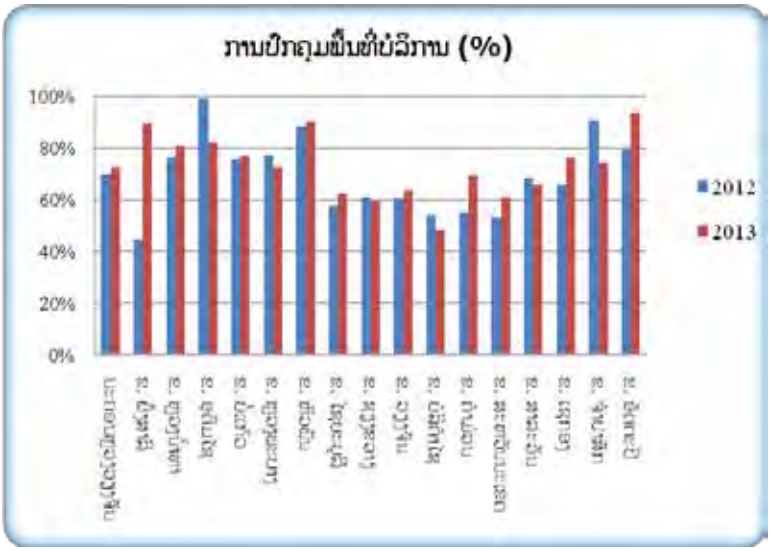


Figure 01: Service Coverage

Number of population received water service compared to total number of population in the service areas as determined in the permit agreement

2012 average (not weighted) = 69 %

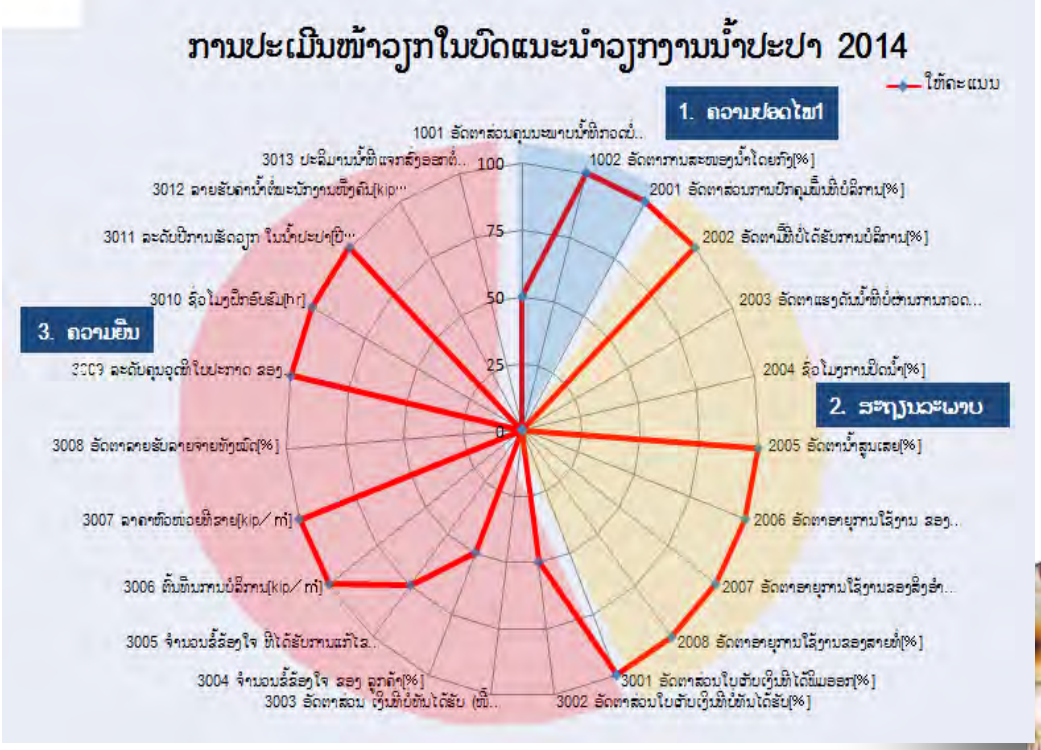
2013 average (not weighted) = 73 %

The analysis of the service coverage performance based on 2013 data, there were 11 WSSEs of Vientiane Capital, Phongsaly, Luangnamtha, Bokeo, Houaphanh, Xayaboury, Vientiane, Khammouane, Savannakhet, Xekong and Attapeu provinces that their service coverage was increased continuously both in the previous year and this year including 4 WSSEs of Phongsaly, Luangnamtha, Oudomxay and Attapeu provinces that their service coverage was higher than 80% they were also the provinces that could implement standard indicators on the service coverage and there were 2 WSSEs of Oudomxay and Champasak provinces that their service coverage was reduced to less than 15% compared to the previous year;

Source: Report from WASRO 2013, Page 5

8

Sample Performance Indicator of Vientiane Capital Water Supply State Enterprise Report 2014



Project Technical Cooperation Program 2012-2017 support by JICA, Japan

"The Capacity Development Project for Improvement of Management Ability of Water Supply Authorities".

Project Implemented: DHUP, WASRO, NPNL, KHM and LPB

2. Overall Goal:
The Overall Goal will be "The system for sustainable and stable development of the water supply sector in Lao PDR is strengthened".

3. Project Purpose:
"The System of strengthening the capacity for management of the water supply state enterprises (WSSEs) with mid-term and long-term views is established in Lao PDR".

Project Activities

1. Data necessary for long-term, mid-term and short-term corporate planning at each pilot WSSE is available on an ongoing basis
2. The pilot WSSEs are managed based on long-term, mid-term, and short-term Corporate Plans(CPs)(*1) through Plan-Do-Check-Action(PDCA) cycles
3. Monitoring of the Corporate Plan, including Performance Indicators (PIs), is strengthened
4. Technical guidelines on corporate planning is developed, utilizing the results of Output 1 to 3
5. A mechanism to disseminate techniques and knowledge relevant to the new technical guidelines to other WSSEs and private enterprises is developed, utilizing the results of Output 1 to 4

Currently Problem

Most of WSSEs hardly realize the full cost recovery management Due to the lacking of:

- Unavailability of data, information
- Lack of long-term view
- Insufficient corporate management
- Lack of investment capital

conclusion

- water is a magnificent nature resource, vital for maintaining the continuing existence of humans and the environment
- It has an important role in the nation's socio-economic development, this will allow the Lao government to achieve its goals and aspiration.
- Management of water supply requires the development of government and institutional capacity as well as financial resources.
- Organization concern and people should participate in protecting the water and water resources and contribute to the government's development on water supply.

Continue:

- Enhance Technical cooperation Program (Oversea and country wide)
- Training Program and exchange program
- Road Map on HRD long term plan
- Regulation
- Enhance R&D

INCEPTION REPORT

Vientiane Capital Water Supply State Enterprise (Nampapa Nakhoneloung)

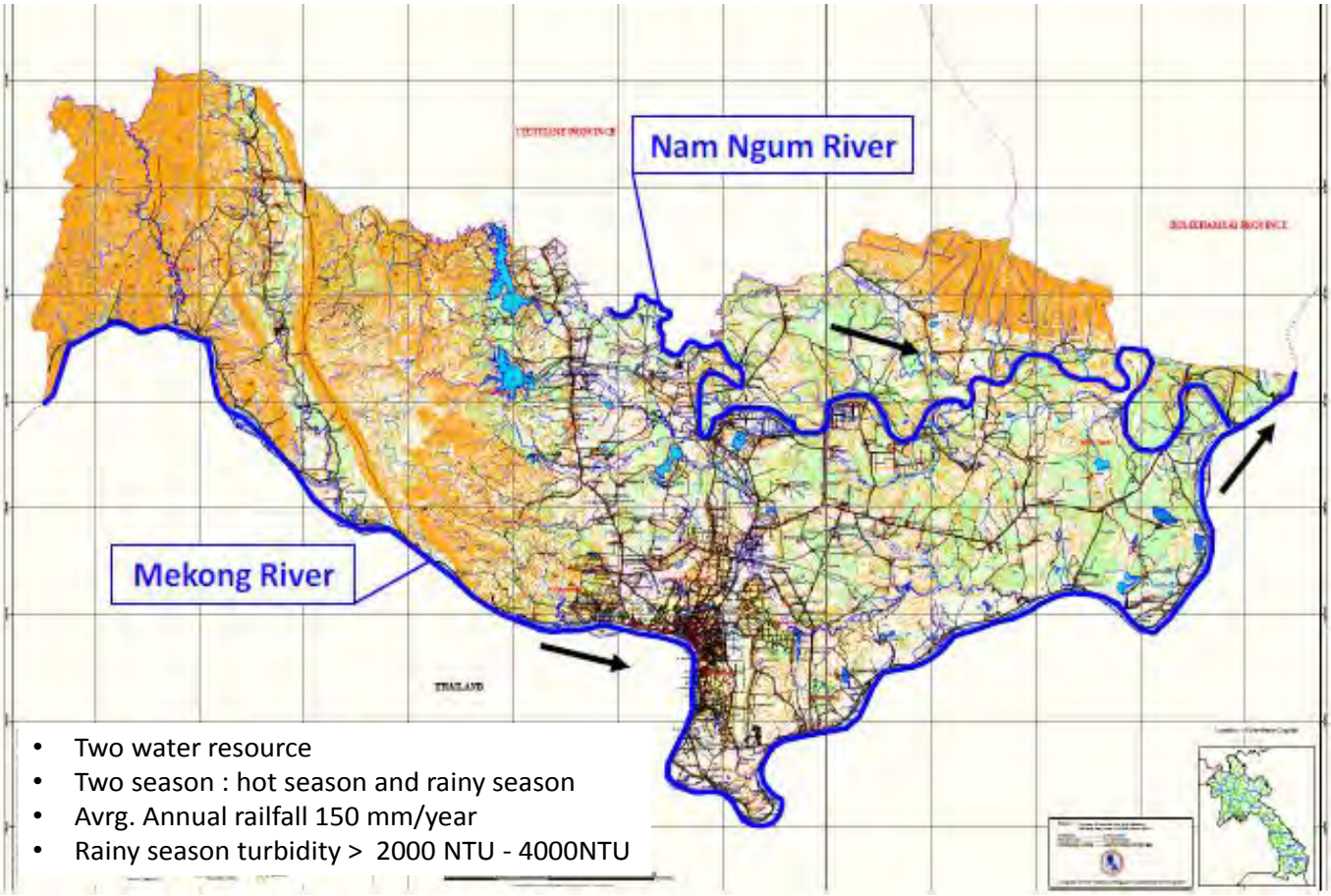
Prepared by:
Viengthouay Vannarath
Deputy General Manager

Water for the people "

General information in Vientiane Capital

- Vientiane capital is the Capital of LAO PDR, is situated in central part of the country with a total area of 3,920 square kilometer is covering about 1.7% of the country area.
-Vientiane Capital composes of 9 districts and 481 villages with a 823,605 inhabitants with density of 207 people per square kilometer.

General information in Vientiane Capital

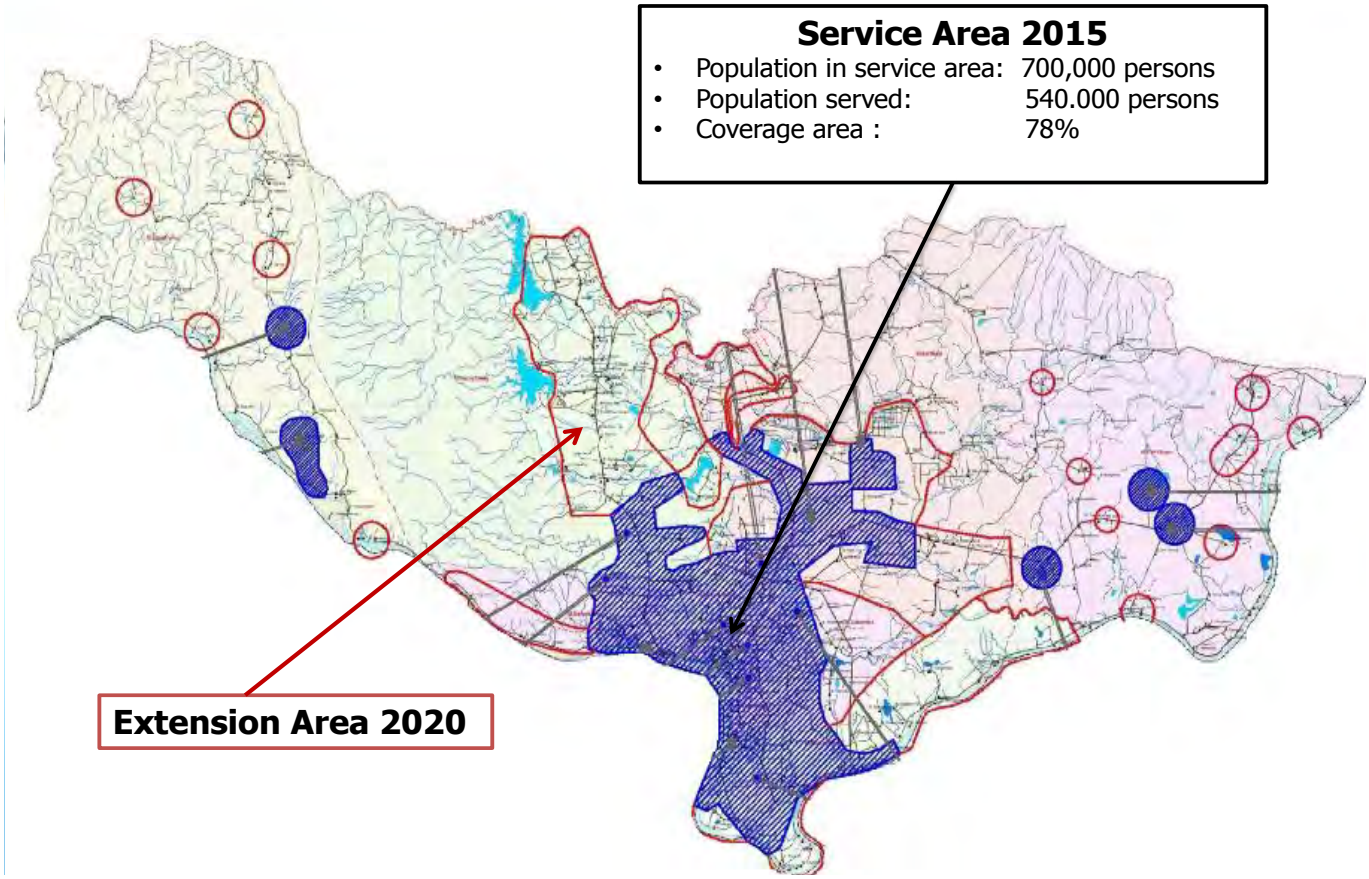


- Two water resource
- Two season : hot season and rainy season
- Avrg. Annual railfall 150 mm/year
- Rainy season turbidity > 2000 NTU - 4000NTU

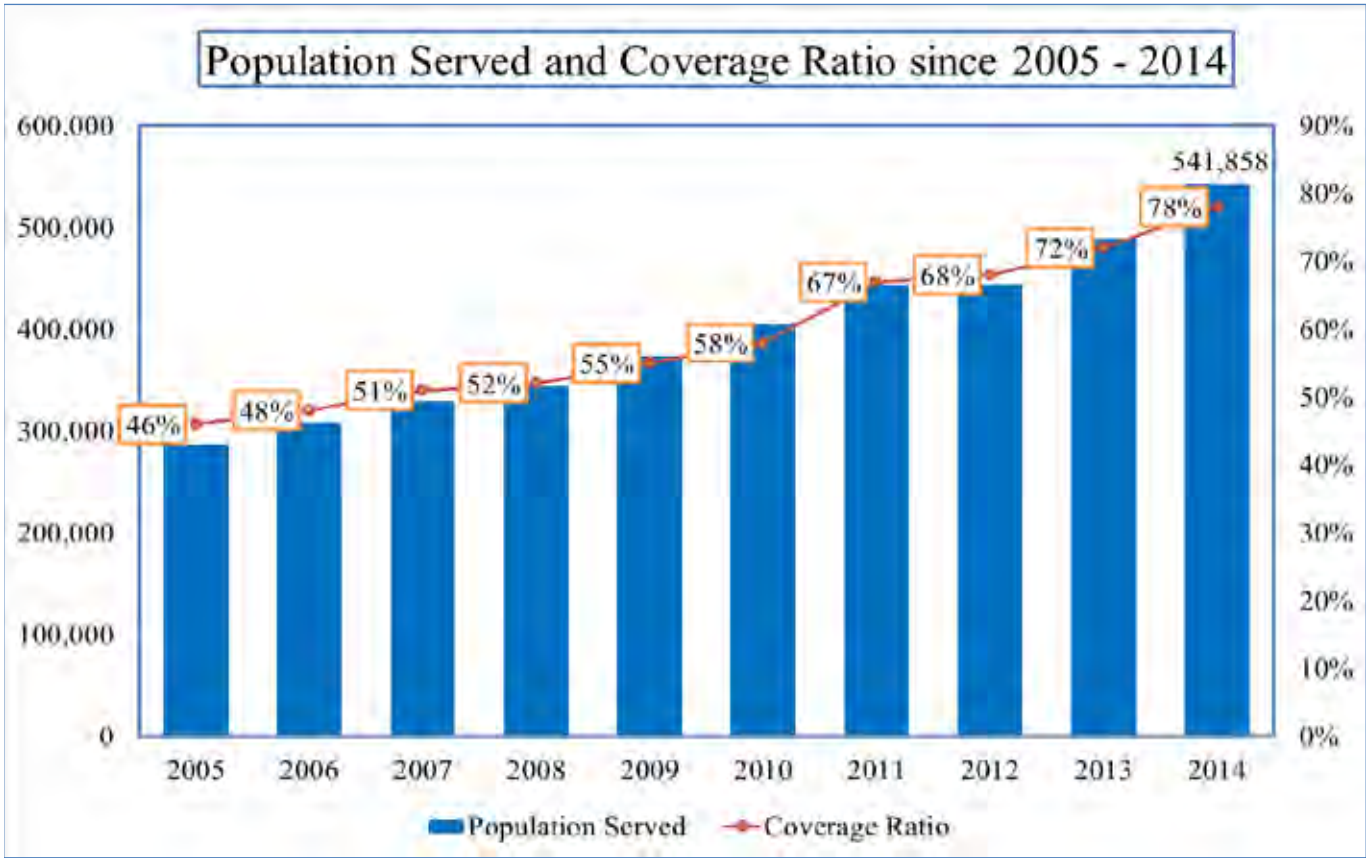
General information in Vientiane Capital

No.	Descriptions	Unit	Operated year 2013	Operated year 2014	Percentage
1	2	3	4	5	6=5/4
1	Population in service area	Person	673,642	692,645	103%
2	Population Served	Person	488,264	540,327	111%
3	coverage area	%	72	78	108%
4	Water Produced	m^3	71,682,520	70,840,135	99%
5	Water Sold	m^3	54,379,181	53,379,214	98%
6	Non-Revenue Water (NRW)	%	24.14	24.65	-
7	Income	LAK	111,402,398,167	115,018,247,134	103%
8	Expenditure	LAK	116,114,424,506	113,321,401,105	98%
9	Profit-Lose	LAK	-4,712,026,339	1,696,846,029	-
10	New water meter connected.	No.	9,079	7,043	78%
11	Meter Billed.	No.	96,288	102,959	107%
12	Length of Pipeline network	m	1,417,095	1,461,069	103%
13	Length of Pipe Expansion	m	124,958	67,823	54%
14	Pipe leaks repaired	Point	2,474	1,351	55%
15	Meter Replaced	No.	3,578	5,214	146%
16	A number of staff	Person	529	553	105%

General information in Vientiane Capital

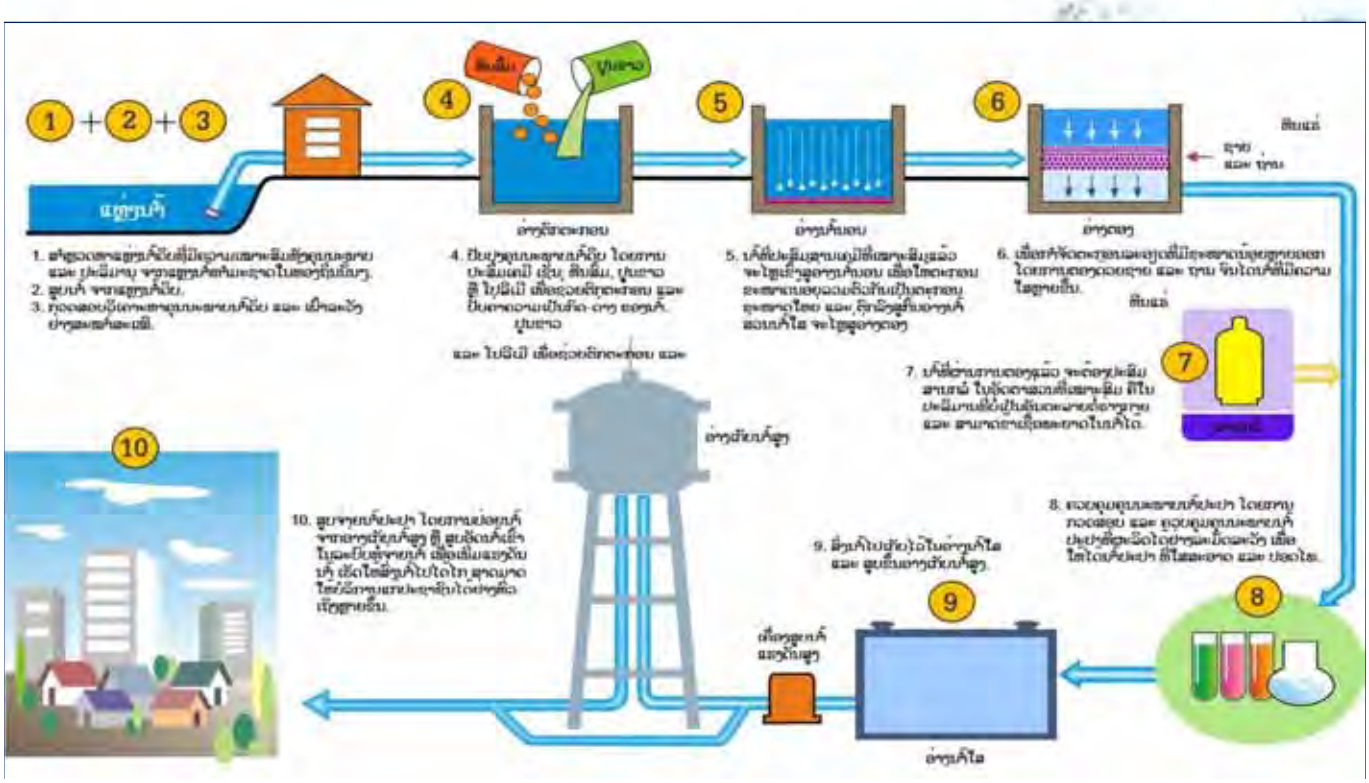


General information in Vientiane Capital

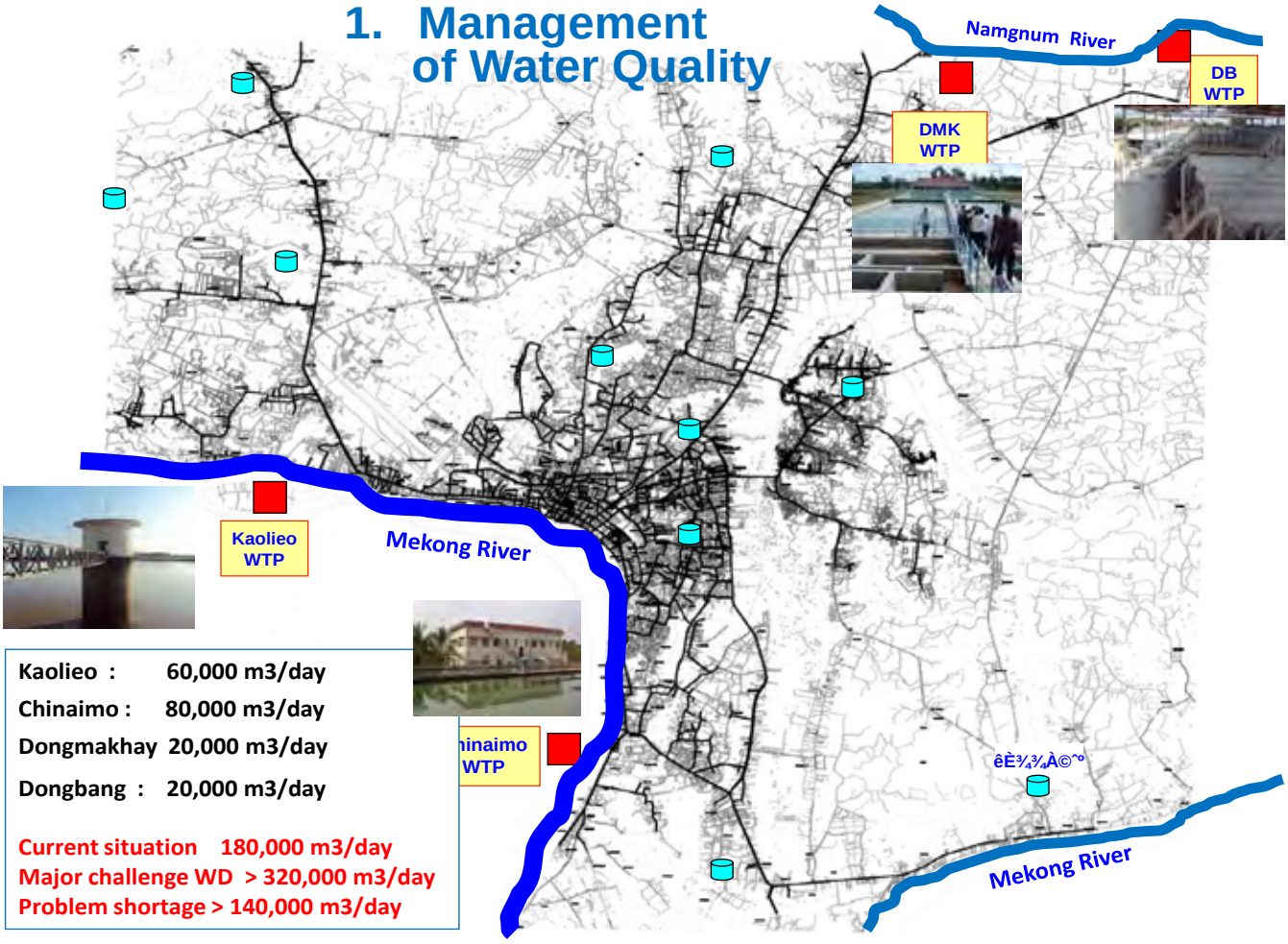


1. Management of Water Quality

Conventional Water Treatment System



1. Management of Water Quality

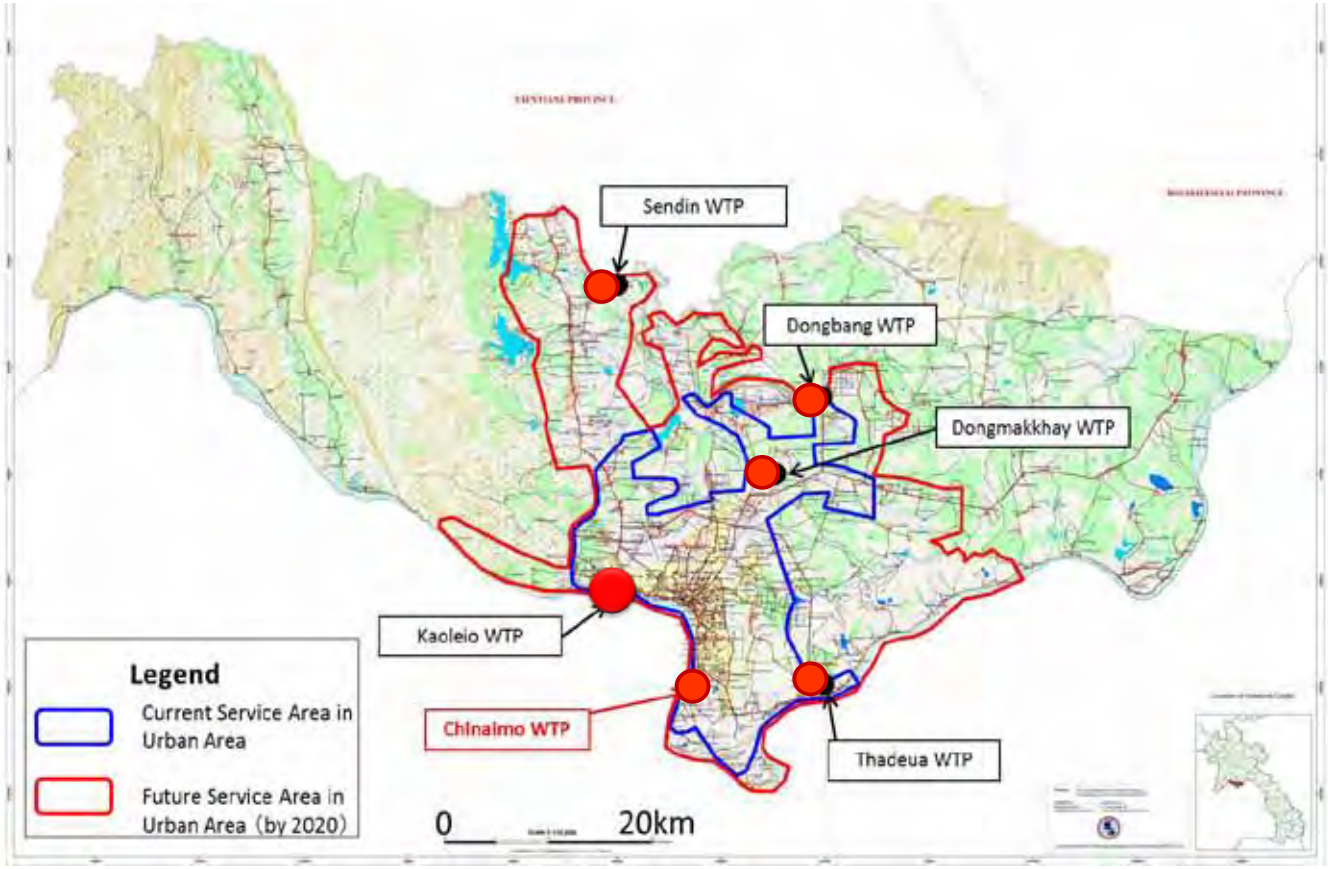


Kaolieo :	60,000 m3/day
Chinaimo :	80,000 m3/day
Dongmakhay	20,000 m3/day
Dongbang :	20,000 m3/day

Current situation 180,000 m3/day
Major challenge WD > 320,000 m3/day
Problem shortage > 140,000 m3/day

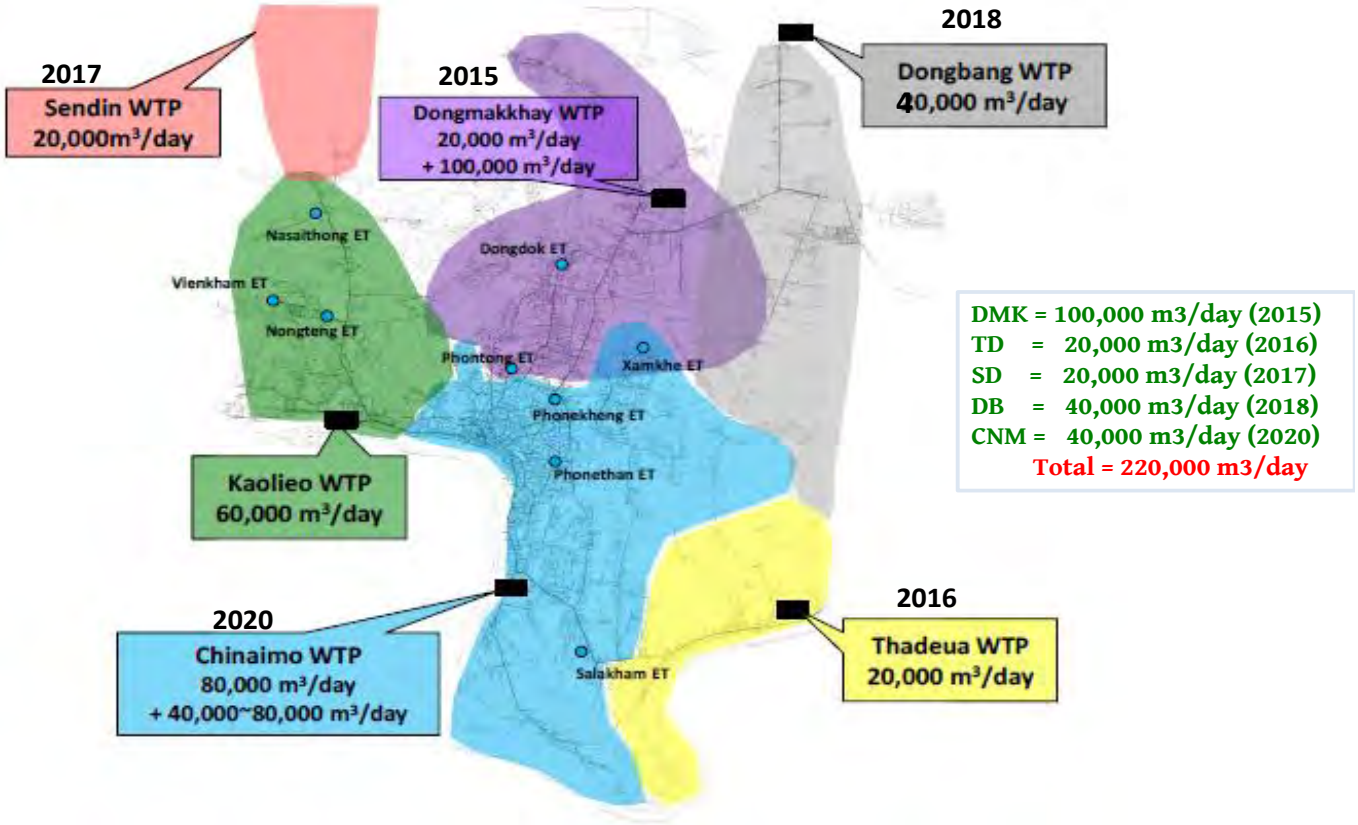
1. Management of Water Quality

Current actions against problem



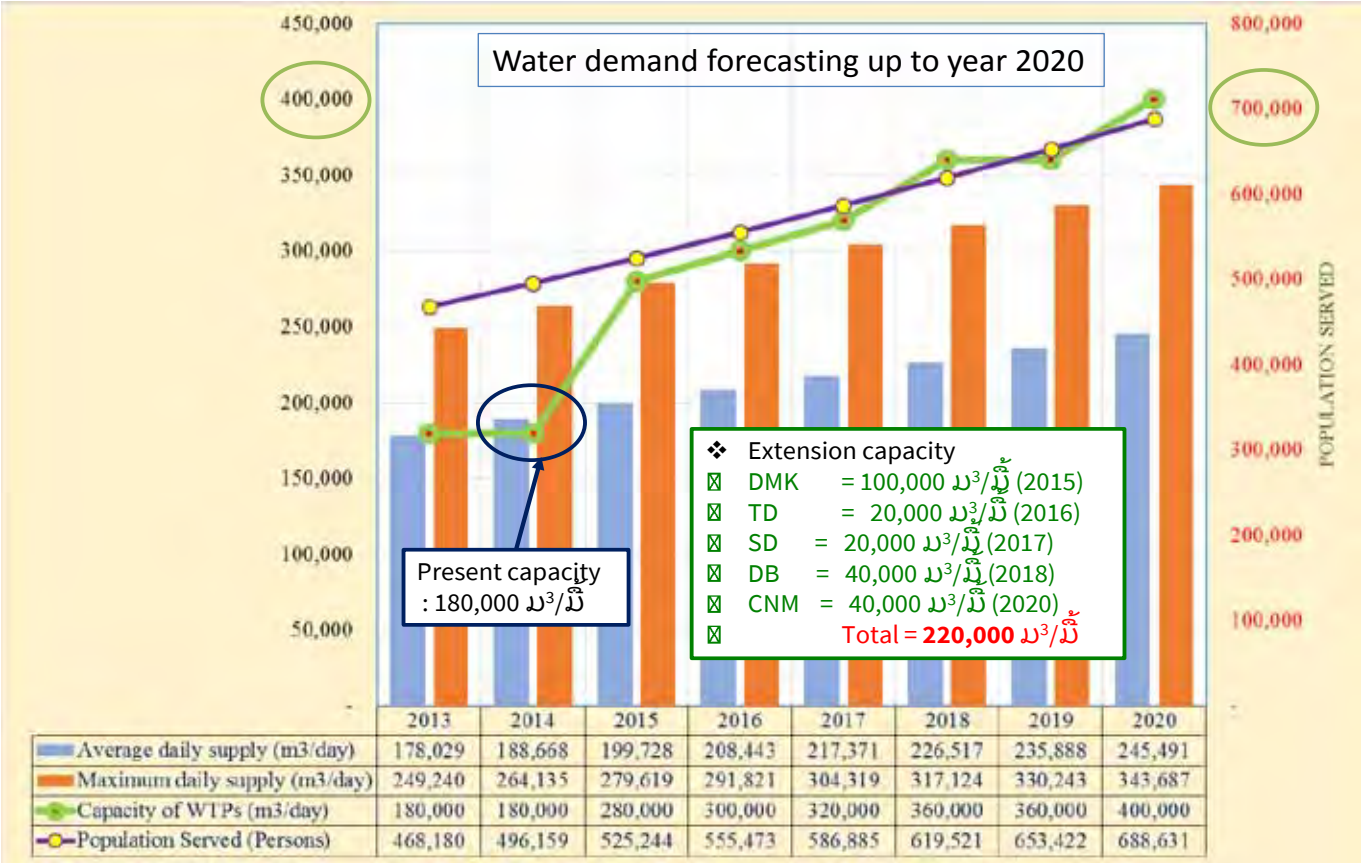
1. Management of Water Quality

Current actions against problem



1. Management of Water Quality

Current actions against problem



	2013	2014	2015	2016	2017	2018	2019	2020
Average daily supply (m3/day)	178,029	188,668	199,728	208,443	217,371	226,517	235,888	245,491
Maximum daily supply (m3/day)	249,240	264,135	279,619	291,821	304,319	317,124	330,243	343,687
Capacity of WTPs (m3/day)	180,000	180,000	280,000	300,000	320,000	360,000	360,000	400,000
Population Served (Persons)	468,180	496,159	525,244	555,473	586,885	619,521	653,422	688,631

1. Management of Water Quality

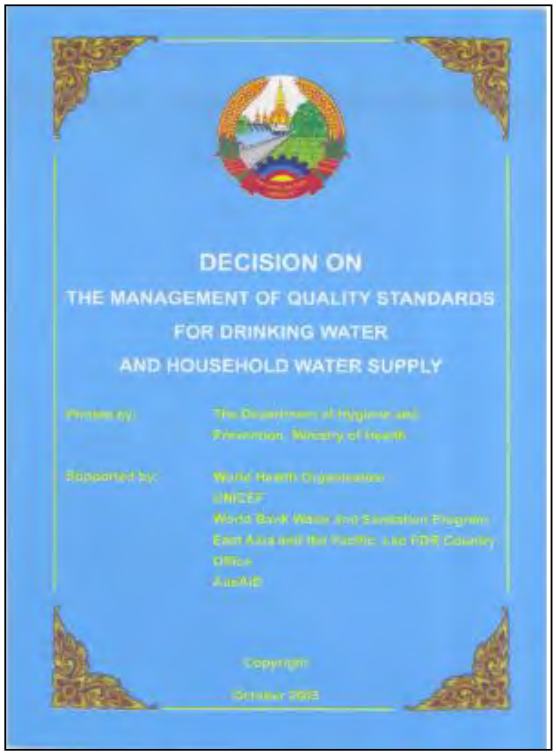
Current actions against problem

Monitoring System/Plan of Safety of
Supplied Drinking Water by Our organization

1. Management of Water Quality

Current actions against problem

Decision on Management of Quality Standard for Drinking Water and Household Water Supply Guideline



1. Management of Water Quality

Water for the people "

Water Quality Control in WTP

No.	Items	Raw Water	Sedimentation	After Filter	Tap
1	- Temperature Water - Atmosphere Temperature	√	√	√	√
2	pH	√	√	√	√
3	Turbidity	√	√	√	√
4	M. Alkalinity	√	√	√	√
5	Residual Chlorine	x	x	x	
6	Colour	√	√	√	√
7	Odour	√	√	√	√
8	Taste	x	x	x	√

1. Management of Water Quality

The Testing of water quality on sample 98 points

Chinaimo WTP = 34 Points
Koliew WTP = 37 Points
Dongmakkhai WTP= 15 Points
Dongbang WTP = 12 Points

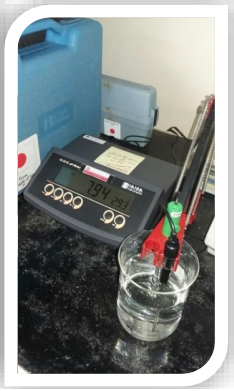
Testing Pass = 100%

Parameters for testing:

Chlorine, Turbidity, pH, Color

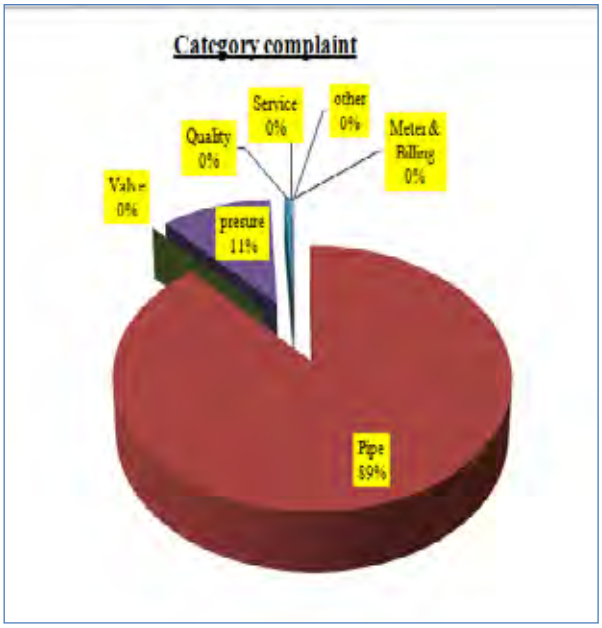
Turbidity of raw water 10/2015:

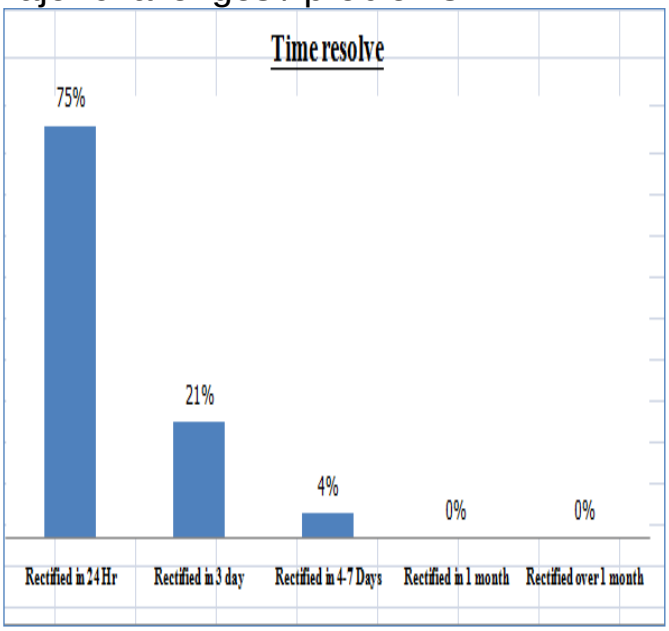
Max = 250 NTU
Min = 105 NTU
Avg = 180 NTU



2. Reduction of non- revenue water

Current situation and major challenges / problems





2. Reduction of non- revenue water

Current situation and major challenges / problems

Number pipeline by 2014								
Type								TOTAL (m)
DIP (m)	GSP (m)	HDPE (m)	PVC (m)	uPVC (m)	SP (m)	GFCP (m)	PB (m)	
-	-	-	-	-	386	-	-	386
1,538	-	-	-	-	9,685	-	-	11,223
3,118	-	-	-	-	7,774	150	-	11,042
464	-	-	-	-	2,919	14,678	-	18,061
18,465	-	-	-	-	7,296	-	-	25,761
23,400	-	-	-	-	10,875	-	-	34,275
9,735	-	-	-	-	4,264	-	-	13,999
38,211	-	-	-	-	6,607	-	-	44,818
36,736	50	-	50,544	-	-	-	-	87,330
36,833	153	400	101,094	352	42	-	-	138,874
22,481	631	-	131,092	789	27	-	-	155,020
-	-	-	-	3,969	-	-	-	3,969
24,739	3,701	-	196,429	3,024	-	-	-	227,893
-	-	693	18,873	8,503	-	-	-	28,068
36	-	-	-	-	-	-	-	36
27,406	4,371	-	247,635	5,994	-	-	-	285,406
-	8,173	36,288	32,741	32	-	-	-	77,234
2,870	8,750	46,783	160,218	680	-	-	1,000	220,301
30	4,858	2,093	70,323	-	-	-	-	77,304
-	-	59	-	-	-	-	-	59
-	1	7	-	-	-	-	-	8
-	-	1	-	-	-	-	-	1
246,062	30,688	86,324	1,008,949	23,343	49,875	14,828	1,000	1,461,069

2. Reduction of non- revenue water

Current situation and major challenges / problems

Figure: The pipe leaks repaired data

No.	Size Φ	Number of Repair		Compare	Remark
		Year 2013 (Place)	Year 2014 (Place)		
1	2	3	4	5=4/3	6
1	13-25	1,791	3,001	168%	
2	32-50	1,164	1,846	159%	
3	75-100	251	423	169%	
4	150-250	14	80	571%	
5	300-500	39	30	77%	
6	600	2	3	150%	
Total =		**3,261**	**5,383**	**165%**	

2. Reduction of non- revenue water

Current situation and major challenges / problems

2. Reduction of non- revenue water

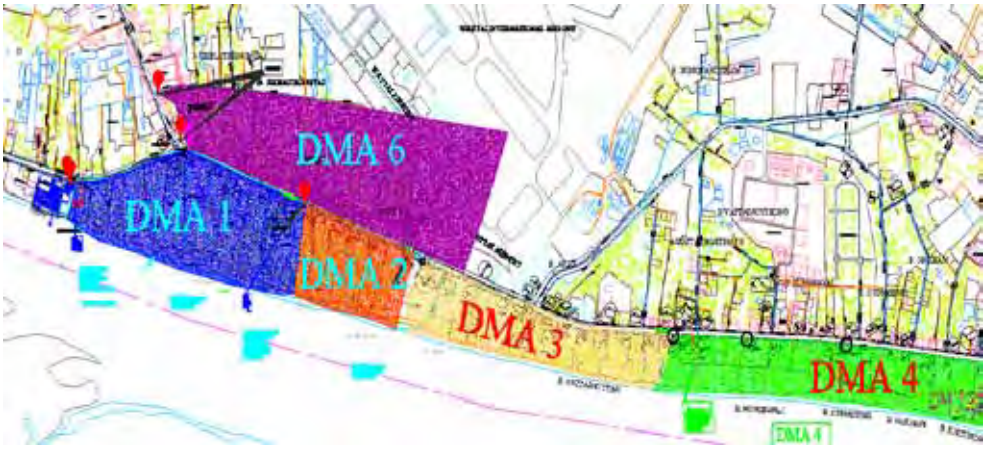
Current situation and major challenges / problems

Pipe replacement

2. Reduction of non- revenue water

Current situation and major challenges / problems

District Meter Area (DMA)



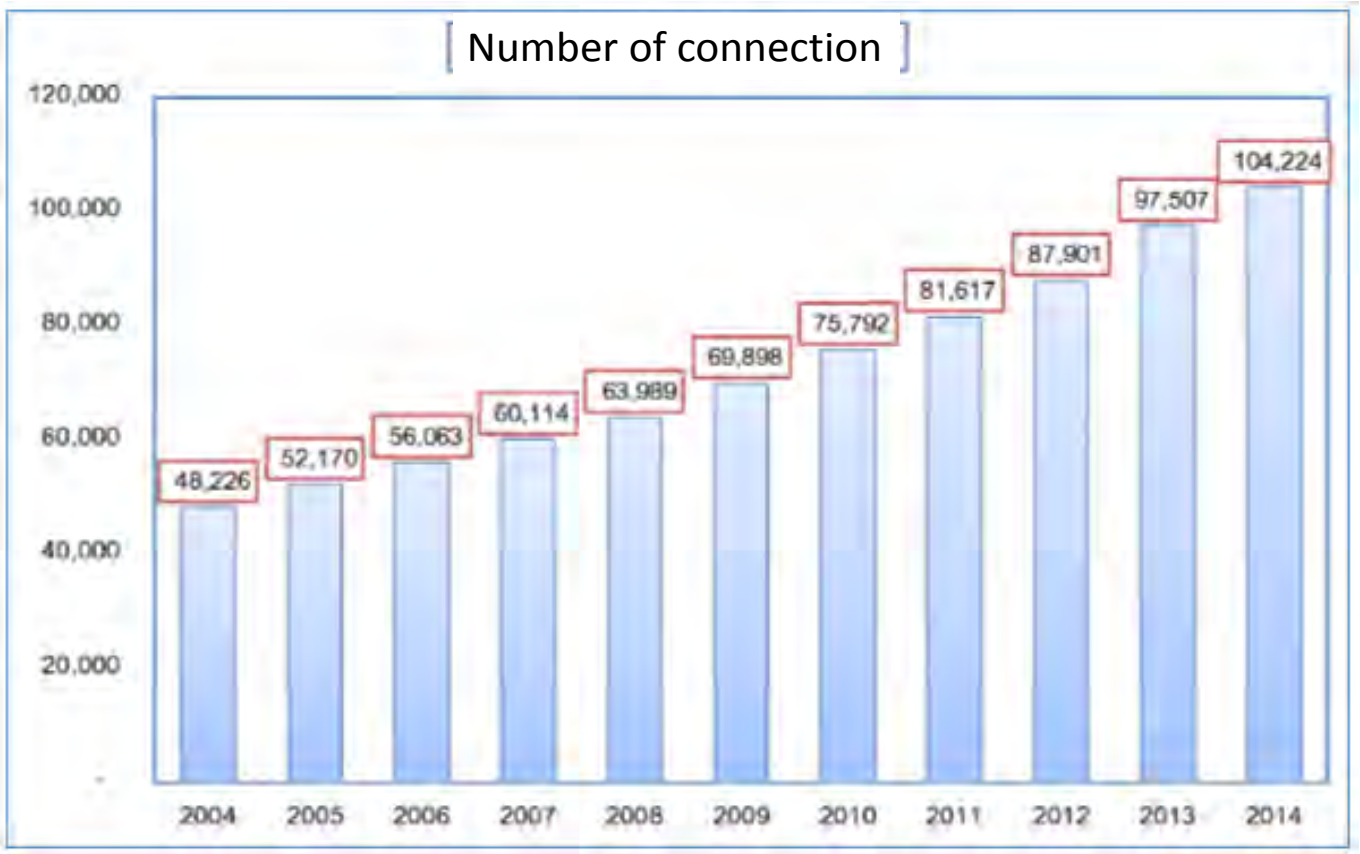
2. Reduction of non- revenue water

Current situation and major challenges / problems

Leak detection activity

2. Reduction of non- revenue water

Current situation and major challenges / problems



2. Reduction of non- revenue water

Current situation and major challenges / problems

Meter calibration

2. Reduction of non- revenue water

Current situation and major challenges / problems

Improving customer service

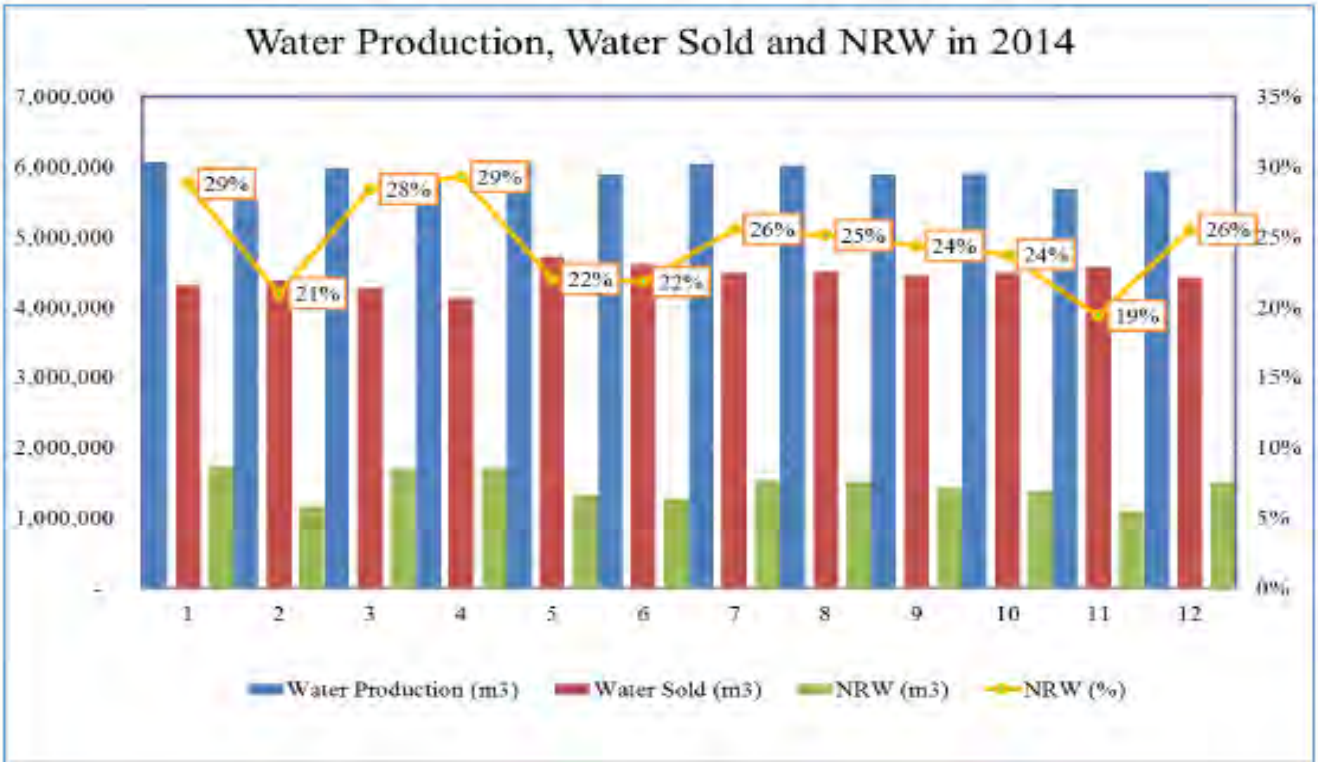
2. Reduction of non- revenue water

Current situation and major challenges / problems

Meter replacement

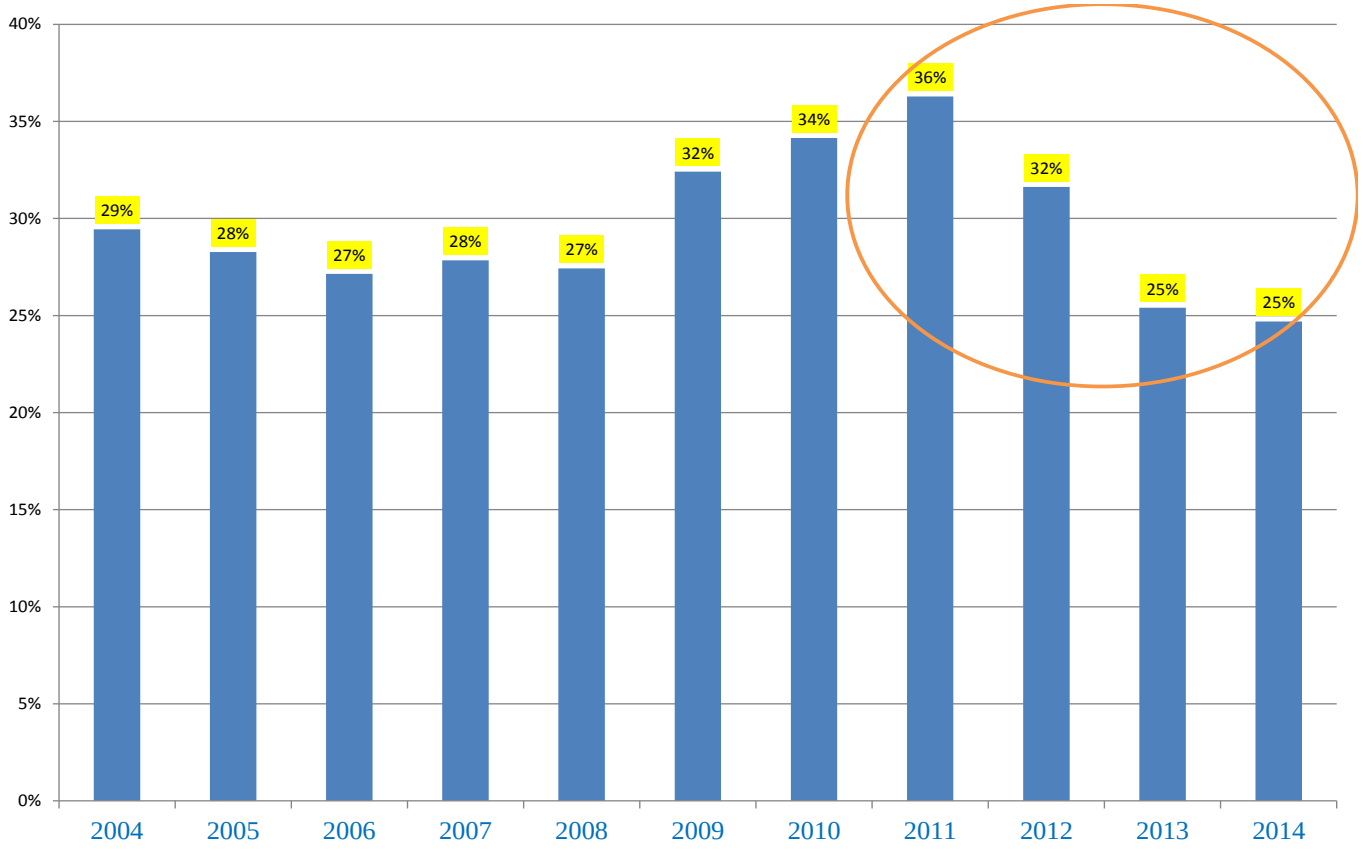
2. Reduction of non- revenue water

Current situation and major challenges / problems



2. Reduction of non- revenue water

Current situation and major challenges / problems



3. Water Supply Service Standard

Current situation and major challenges / problems

Vision

To public. Running business in the State Enterprise mode sustainability and stability in financial management, be able to increase the production of water, expanded pipeline network to public, supply a sufficient quantity and best quality water to public in order to formulate the development and the growth of the Vientiane capital. Must be able to supplied clean safety water to public about 80-90% in year 2020 for the Vientiane capital.

Mission

To produce, supplies the clean hygiene water to public Vientiane Capital insufficiently to meet the standard of the World Health Organization (WHO).

Good will

To paying high attention on running business, expanding the service, upgrading skilfully in using advanced technology into the production process, develop its owned State enterprise to be accepted by public and gaining the profit equal to surrounding region countries.

3. Water Supply Service Standard

Water for the people "

Current situation and major challenges / problems

No.	Description	Unit	Results		
			2013	2014	%
1. Safety					
1001	Violation ratio of water quality standard	%	**5.49**	**2**	**36%**
1002	Direct supply from distribution main	%	-	94	-
2. Stability					
2001	Population served (Coverage ratio)	%	**72**	**78**	**108%**
2002	Restricted water supply ratio	%	**0**	0	100%
2003	Water supply pressure inadequacy ratio	%	**58**	69	119%
2004	Hour of water interruption	Hour	-	-	-
2005	Non-revenue water (NRW)	%	**25**	25	100%
2006	Aging of water treatment facilities	%	**7**	7	100%
2007	Aging of electric and mechanical equipment	%	**24**	24	100%
2008	Aging of mains	%	**3.68**	1.88	51%

3. Water Supply Service Standard

Current situation and major challenges / problems

No.	Description	Unit	Results		
			2013	2014	%
	3. Sustainability				
3001	Billing issuance ratio	%	**100**	100	**100%**
3002	Non-payment ratio (Number)	%	**2.22**	6.76	305%
3003	Non-payment ratio (Amount)	%	**3.98**	19.68	494%
3004	Water supply service complaints	%	**1.06**	0.95	90%
3005	Resolved complaints ratio	%	**67**	70	104%
3006	Cost of Water supply	Kip/m^3	**1,643**	1,775	108%
3007	Unit tariff of water supply	Kip/m^3	**1,573**	1,666	106%
3008	Rate to total returns	%	**97**	102	105%
3009	Number of employees qualifications	Degree	**0.69**	0.94	1%
3010	Training time	Hour	**162**	1,086	670%
3011	Year of experience for water supply service	Year/person	**11**	11	100%
3012	Revenue on water sales per personnel	Kip/person/year	**178,108,297**	186,729,174	105%
3013	Transmission input per employee	m^3/person/year	**113,237**	148,201	131%

4. Management of Water Supply service on self-supporting basis

Current situation and major challenges / problems

Tariff structure

Customer's Categories	Year	2014	2015	2016	2017	2018
Tariff Increases overall	Rate		3%	3%	4%	5%
Category I: Domestic used 1 to 10 m^3 11 to 30 m^3 31 to 50 m^3 〉50 m^3	Kip/ m^3	 1,300 1,800 2,300 2,800	 1,339 1,854 2,369 2,884	 1,379 1,910 2,440 2,970	 1,434 1,986 2,538 3,089	 1,506 2,085 2,665 3,244
Category II: Government, Embassies and international Organization.	Kip/ m^3	2,300	2,369	2,440	2,538	2,665
Category III: Businesses, Commercial, industries, Hotel and restaurants.	Kip/ m^3	2,800	2,884	2,970	3,089	3,244

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

4-1. Current situation and major challenges/problems

- The New installation service

4-2 Current actions against the problems

- **To improve procedure of the new installation service to be faster at least within 15 days to be completed**
- **Improved and expanded pipe network to overall service areas and water quality as well**

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

1. **Increase the capacity to reached 320,000 m3/day by 2015.**
2. **2016-2020 capacity to reached 400,000 m3/day**
3. **2021-2030 capacity to reached 600,000 m3/day, expansion pipe network to town areas and ensure people be able to get water supply coverage 100% , controlling non-revenue water to be in a range 15-18%.**

Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

MYANMAR

INCEPTION REPORT

of

MYANMAR

WATER SUPPLY ADMINISTRATION

FOR

BETTER MANAGEMENT OF WATER SUPPLY SERVICES (B)

(From November 8th ,2015 to November 21st ,2015)

CONTENTS

- About Myself
- Introduction about Myanmar and Yangon city
- Organization charts of committee and department
- Existing water supply system
- Current problems and issues
- Current solutions
- Current water supply activities

ABOUT MYSELF

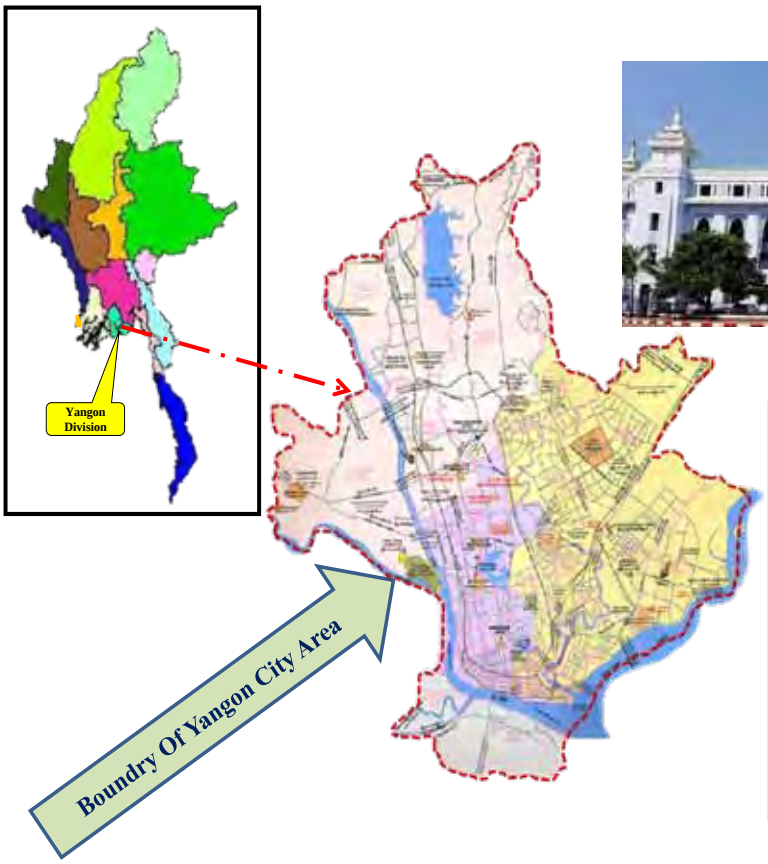
Personal Information

- Mr Nyi Nyi Aung
- 48 Years old (..,…,1968)
- Graduated with specialization of civil subject in 1993.
- Started my career in water and sanitation engineering department under Yangon City Development Committee in 1994.
- Sub-assistant engineer from 1997 to 2014
- Assistant Engineer from 2014 to at present

Work experiences in my career

- Site engineer at the construction of water treatment plant from 1994 to 1995
- Operation and maintenance engineer in this water treatment plant from 1995 to 1997
- Assistant in-charge of this plant from 1997-2014
- Deputy In-charge of this plant from 2014 to at present

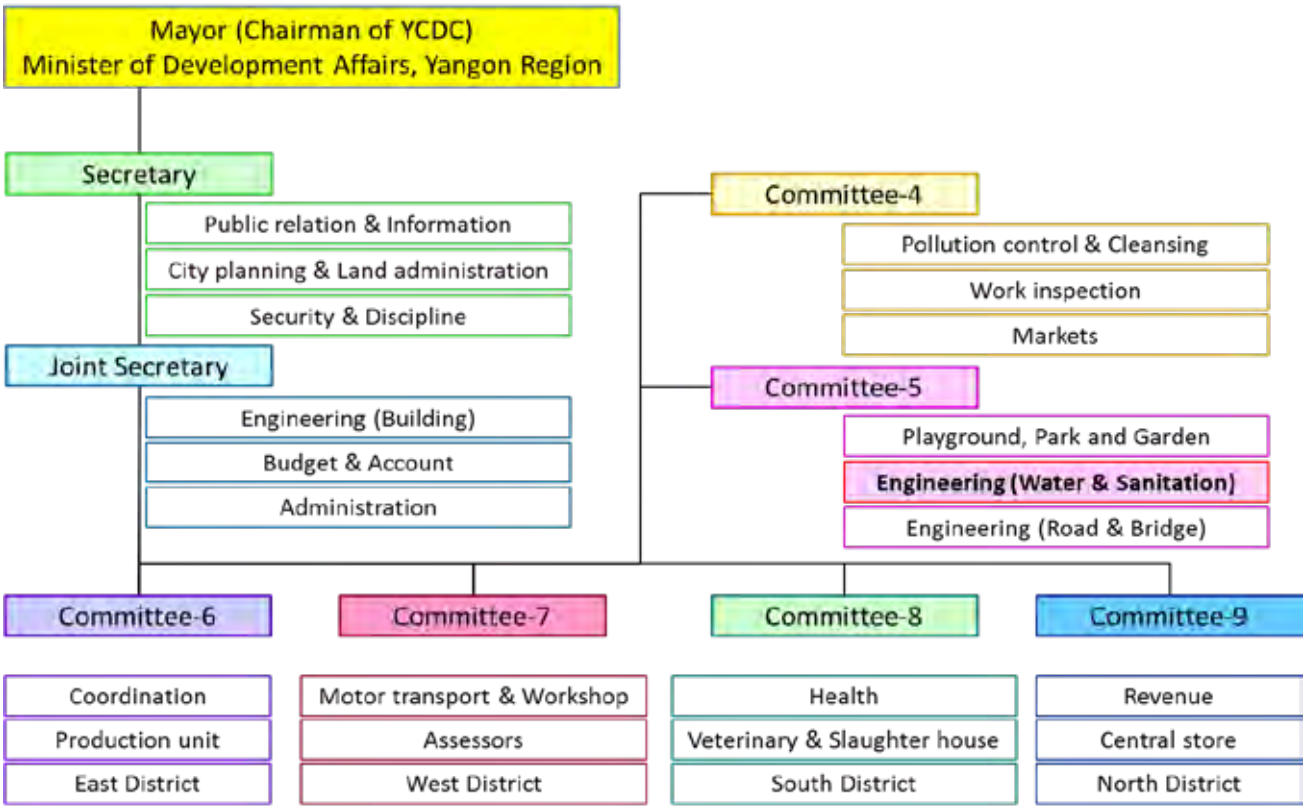
INTRODUCTION ABOUT MYANMAR AND YANGON CITY



YANGON CITY AREA	:	730 Km²
POPULATION	:	About 6 Millions
DISTRICTS	:	4 Districts
TOWNSHIPS	:	33 Townships
AVERAGE ANNUAL RAINFALL	:	2700 mm
MEAN MAX: TEMP:	:	33°C
MEAN MIN: TEMP:	:	21°C

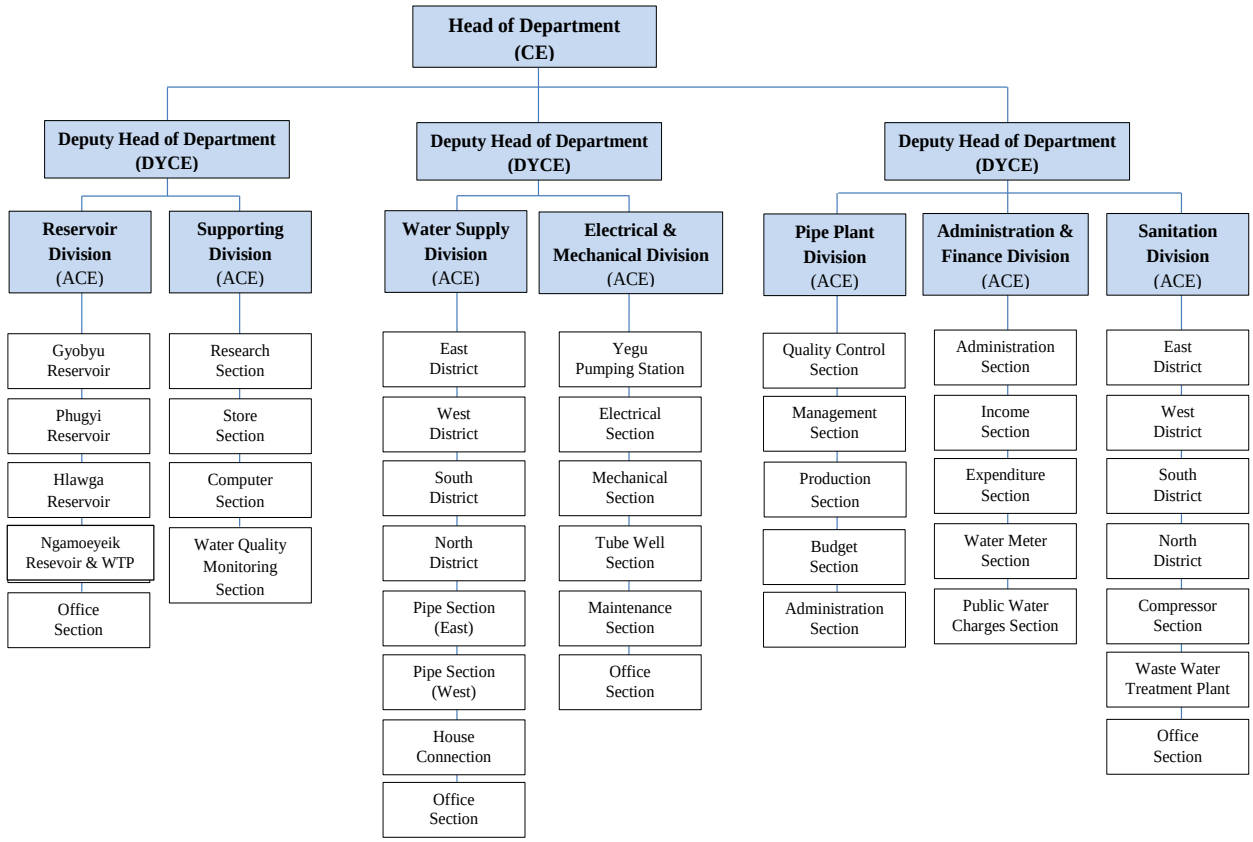
ORGANIZATION CHART OF COMMITTEE AND DEPARTMENT

Organization Chart Of Yangon City Development Committee



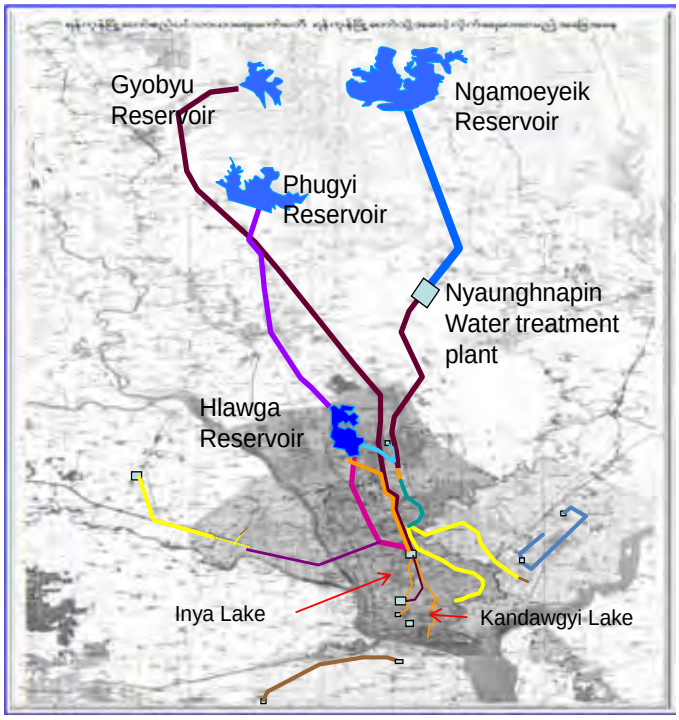
ORGANIZATION CHART OF COMMITTEE AND DEPARTMENT

Organization Chart Of Engineering Department(Water & Sanitation)

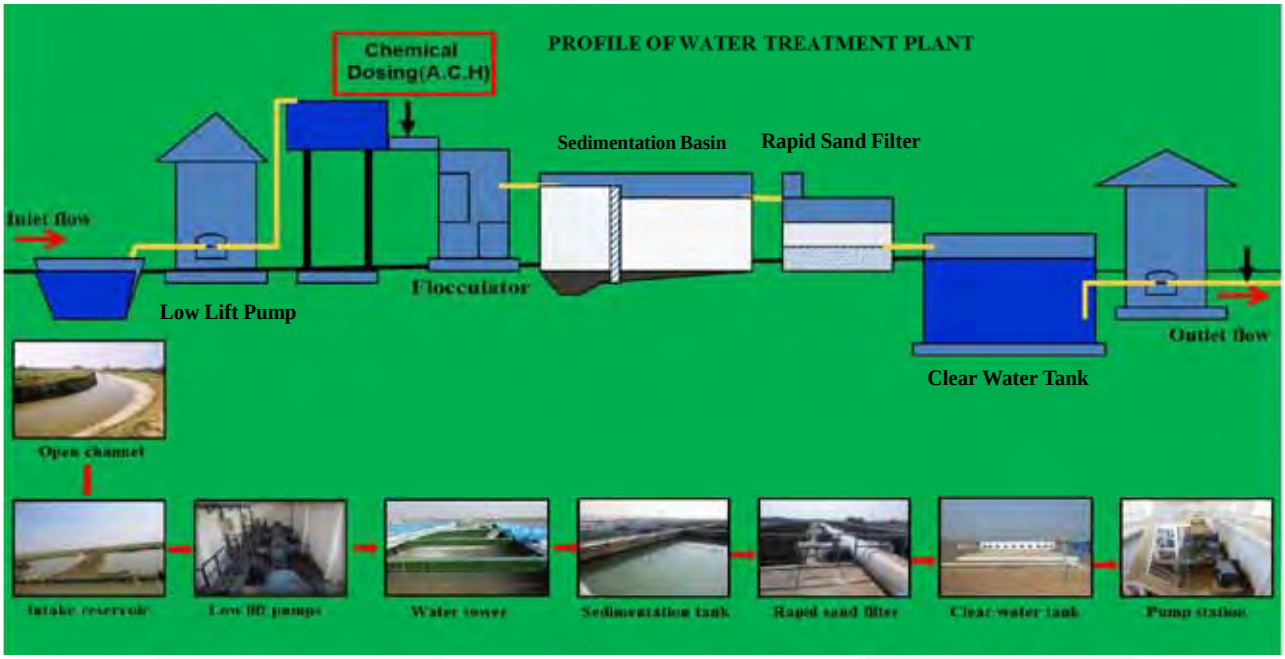


EXISTING WATER SUPPLY SYSTEM

1842 Dug Well (30)
1879 Kandawgyi lake(stop using)
1884 Innya lake(stop using)
1904 Hlawga Reservoir
1940 Gyobyu Reservoir
1992 Phugyi Reservoir
1995 Ngamoeyeik Reservoir
2005 Nyaunghnapin Water treatment Plant(1ST Phase)
2014 Nyaunghnapin Water treatment Plant(2ndPhase)



NYAUNGHNAPIN WATER TREATMENT PLANT



WATER TREATMENT PLANT 1 st PHASE

WATER TREATMENT PLANT 2nd PHASE

EXISTING WATER SUPPLY SYSTEM

Types of existing water resources

- **Surface water** — Gyobyu, Phugyi, Hlawga, Ngamoeyeik Reservoirs
- **Ground water** — 480 Tube Wells In 22 Townships
- **Lakes and ponds** — There exits 261 nos,but 108 nos in 12 townships are now using

Daily Water Supply Amounts In Yangon City

1- Gyobyu Reservoir	- 27 MGD (122727 m³/day)
2- Phygyi Reservoir	- 54 MGD (245455 m³/day)
3- Hlawgha Reservoir	- 14 MGD (63636 m³/day)
4- Ngamoeyeik Reservoir (First phase & Second phase)	- 90 MGD (409090 m³/day)
5- Y.C.D.C Owned Tube Wells	- 20 MGD (90910 m³/day)
Total	- 205 MGD (931818 m³/day)

❖ (MGD=Million Gallons Per Day)

CURRENT ISSUES AND PROBLEMS

(1) High Non-revenue water ratio

(2) Low water coverage

(3) Poor water quality facilities

(4) Ageing of water supply facilities

(5) Inappropriate layout of facilities

(6) Improvement of operation and maintenance of facilities

(7) Human capacity development

CURRENT SOLUTIONS

(1) Formulating the master plan for 2040

(2) Cooperating with developed countries

(3) Feasibility studies for improvement of current situation

(4) Upgrading of current water supply facilities

(5) Replacement of some aged pipe line network

(6) Rehabilitation of ground water, ponds and lakes

(7) Refreshment of staffs' abilities by trainings….

CURRENT SOLUTIONS-a

(2-1) DMA PILOT PROJECT BY JICA EXPERT

(2-3) GRASS ROOT GRANT PROJECT

(2-4) TECHNICAL ASSISTANCE BY JICA

(2-6) COOPERATION WITH Egis (French)

CURRENT SOLUTIONS-b

CURRENT WATER SUPPLY ACTIVITIES

(1) Management on spaghetti

(2) Pipe Line cleansing and reinstallation

(3) Damaged meter Replacement and New meter installation

(4) Transmission Pipe Line Repairs

(5) Initiation of Laboratory for Drinking Water quality testing

(6) Initiation of Laboratory for Waste Water quality testing

(7) New pipe line network installation

CURRENT WATER SUPPLY ACTIVITIES -a

(1-1) MANAGEMENT ON SPAGHETTI

(1-2) PIPE LINE CLEANING AND REINSTALLATION

(1-3) DAMAGED METER REPLACEMENT AND NEW METER INSTALLATION

(1-4) TRANSMISSION PIPE BURST REPAIREMENT

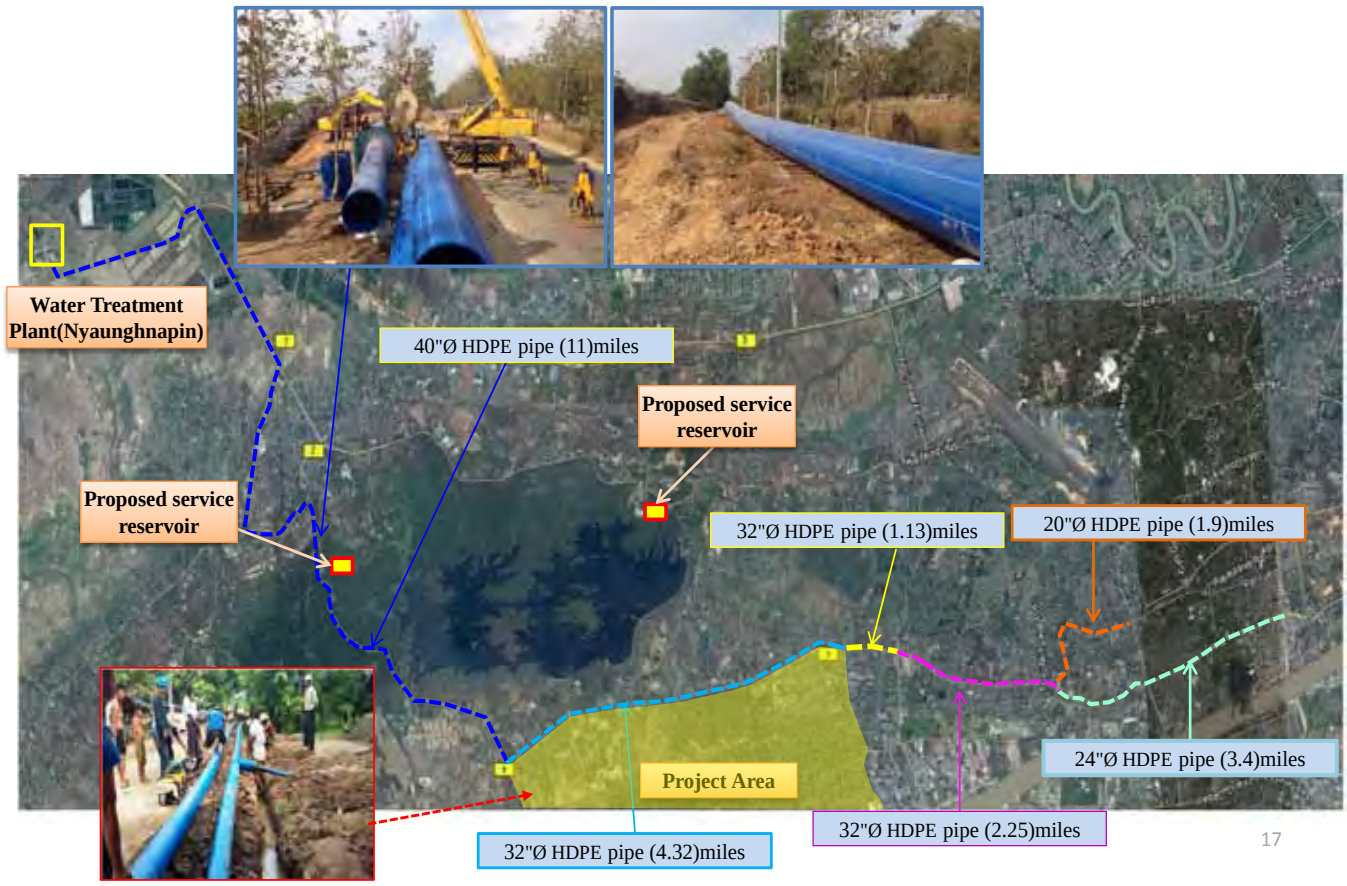
CURRENT WATER SUPPLY ACTIVITIES-b

(1-5) INITIATION OF LABORATORY FOR DRINKING WAER QUALITY TESTING

(1-6) INITIATION OF LABORATORY FOR WASTE WATER QUALITY TESTING

(1-7) NEW WATER SUPPLY INSTALLATION PROJECT (Shwepyithar Township)

(1-7) NEW WATER SUPPLY INSTALLATION PROJECT (Shwepyithar Township)



Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

NEPAL

Water Supply Administration for Better Management of Water Supply Services

Inception Report Outline Format

1. Country:Nepal

2. Name:Purna Bahadur Jwarchan
3. Position:Senior Divisional Engineer
4. Organization:DWSS

1

General Country profile:Background

Area : 147181km^2

Population : 26.6 million

Coverage Water Supply : 85 %

By 2017 - Both basic water supply and sanitation service coverage will be 100%,

- 27% have High Level Service.

- Major water sources are:
  - Glaciers, snow melt from Himalayas
  - Surface runoff (Rainfall)
  - Ground Water
- Nepal has 225 billion m^3 water available annually;
- Only 15 billion m3 water (6%) is utilized for economic and social purposes;

2

Administrative Division of Nepal

Ecological Division of NEPAL

Latitude : 26^0 22' to 30^0 27'
Longitude : 80^0 40' to 88^0 12'

Mountain: 18% (2700-8848m)
Hill : 65% (250-2700m)
Plain : 17% (60-250m)

My Mission (sharing among participating friends

- Mission of my organization is to facilitate the water service providers to provide water services ranging from basic to medium and high and ensure the sustainability of projects and functionality improvement of service providers. Organization is slowly shifting towards regulating body as well.

- My mission in the organization as a division chief is to implement the ongoing project with definite service standards and regulation of formed water user groups as a service provider to covered unreached population.

5

1. Management of water quality

- Nepal drinking water quality standard serves as the base document for water quality
- Water Safety plan has been taken as a tool to ensure water quality
- NRW has started to be an issue and it indirectly affects the quality issues as well
- Implementation of regulation framework can be a start to achieve the desired water quality
- Few frameworks manuals ,SOP's are yet to be formulated from government point of view

6

2. Reduction of non-revenue water1

Measurement has been initiated in few service areas only. available.

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

2. Reduction of non-revenue water2

- Calculation of NRW in few service providers service area has just started.
- Business plan has been initiated in few service areas which will include reduction of non revenue water as well.

3. Water Tariff

- Water tariff fixation act available but it does not include water user association
- Umbrella act and sector development plan focusing on those issues

9

4. Water supply service standards /Performance Indicators

- Government aims to provide water supply based in 3 service levels

Service level	Indicators
Basic	45 lpcd, 4 hrs/day supply, community tap runs throughout the year, safe
Medium	65-100 lpcd, 24 hours supply, yard connection, water quality standard - National drinking water quality standard
High	100 lpcd,24 hours supply, water quality standard - WHO water quality standard

10

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

- Water user committee model
- Board model (Local Authority)
- Nepal Water Supply Corporation
- Utility model (Cost recovery projects)
- Project insurance to ensure maintenance
- Business plan preparation
- WSP
- NRW issues
- Sustained monitoring and facilitation from government
- Benchmarking of projects, fund based on benchmarking

11

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

- Segregation of big projects/small projects
- Formulation of water service standards
- Implementation of water service regulation framework

12

Three Largest Water Works in the Country

Name of City	Name of Organization	Capital (Public/ Private/ PPP)	Total Population	Supplied Population
Kathmandu / Lalitpur	Kathmandu Upatyaka Khanepani Limited (KUKL)	Public	3.00 million	1.8 million
Biratnagar	Nepal Water Supply Corporation	Public	0.21 million	0.18 million
Pokhara	Nepal Water Supply Corporation	Public	0.27 million	0.25 million

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

- Orientation about autonomous systems
- Facilitation in adopting the technologies related to NRW
- Facilitation in ways of reducing NRW
- Implementation of water quality improvement plan

14

Vasi Water Supply Project

- **Location: Bhimdutta Municipality ward no 1, 2, 3, 4, 6,18 and Suda VDC ward no8**
  District Headquarter Kanchanpur District, Far Western Development Region
- **Name of the Source:** **Deep boring 2 no**
- **Design Discharge:** **20 lps**
- **Transmission Pipe Line :** **0.6 Km (HDPE Pipe)**
  Distribution Line : **46 Km (HDPE Pipe)**
- **Reserviour capacity :** **1 No. 450 cum**
- **Total number of connections : 1432**
- **Total water supply capacity : 1.4 mld**
- **Electormechanical Treatment plant**

Location of the Project

Vasi Water Supply Project

Water Billing (Users committee is responsible for the Management of the System)

- No of House Connections 1432 Nos
- Water Tariff : Minimum Charge US$ 2.0 (10 cu.m) for individual users and US$ 2.44 for Offices.
- Additional US$ 0.26/cu.m for Individuals and US$ 0.40/cu.m for Offices
- Percentage of metered water : 100%
- Average Water Consumption per HH: 12 cu.m/month

Cost for Operation/ Management:

(Annual Cost)

•Personnel (7 persons)	10000 USD
•Power/ Fuel	3000 USD
•Chemicals	USD
•Other materials:	USD
•Others:	1000 USD

Total O&M: 14,000 USD

Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

PHILIPPINES

DBP

Water Supply Administration for Better Management of Water Supply Services

INCEPTION REPORT

DBP

Background

Population : 100 million (2014)
Area : 343,448.32 km^2
Islands : 7,107
Political configuration : 81 Provinces, 144 Cities, 1,490 Municipalities, and 42,028 Barangays

Water Service Providers :

- 2 major concessionaires in MM
- About 800 water districts (about 500 operational)
- Others (LGU run, cooperatives, private)

DBP

Performance of 2 major water concessionaires

	West Zone Maynilad	East Zone Manila Water
Land Area (sq. km)	540	1,400
Service Area	17 cities/municipalities	23 cities/municipalities
Total population	8.4 Million	6.8 Million
# Water Connections	988,503	858,672
% Water Service Coverage	85%	99%
# Sewer Connections	451,166	90,292
% Sewer Coverage	9%	12%

DBP

VISION

By 2020, a regionally-recognized development financial institution, serving as a catalyst for a progressive and more prosperous Philippines

MISSION

- ✓To raise the level of competitiveness of the economy for sustainable growth
- ✓To support infrastructure development, responsible entrepreneurship, efficient social services and protection of the environment
- ✓To promote and maintain the highest standards of services and corporate governance among its customer constituencies

DBP

1. Management of Water Quality

- ✓ Water quality in the Philippines is governed by the Clean Water Act of 2004 or Republic Act 9275 or an act providing for a comprehensive water quality management and for other purposes
- ✓ It aims to protect the Philippines' water bodies from pollution and land-based sources
- ✓ It provides a comprehensive and integrated strategy to prevent and minimize pollution through a multi-sectoral and participatory approach involving all stakeholders
- ✓ Management of water quality for potable water follows Philippine National Standard on Drinking Water as defined by the Philippines' Department of Health
- ✓ In assuring the provision of safe and clean potable water by water service providers, it is required that water sampling be subjected to quality test be done on a weekly/monthly basis by the water service provider running the water system (Water Districts, Local Government Units, Private –large & small)

DBP

1. Management of Water Quality

- ✓ Parameters being subjected for monitoring under the Philippine National Standards for Drinking Water are:
  - Microbiological indicators
  - Chemical and Physical Quality
  - Radiological Quality

DBP

2. Reduction of Non-Revenue Water

- ✓ Potable water is finite resource and thus the need to address NRW
- ✓ NRW reduction is one of the priority projects being addressed by the water service providers given the limited resources and pressure from consumers as it affects the water rates
- ✓ According to the Philippine's National Water Resources Board (NWRB), the average NRW among participating service providers was at 27.5% in 2004
- ✓ Metro Manila's west zone confirmed in the record of having 35% NRW while the smaller utilities performed better in addressing their NRW than the larger ones
- ✓ However, many NRW data are also based on estimates, as not all service providers have100% production and consumption metering coverage

DBP

3. Water Supply Service Standards

- ✓ Performance of Water Service Providers in the Philippines are being monitored by two agencies namely: the NWRB (for the LGU-run systems and the privately owned systems) and the Local Water Utilities Authority (LWUA – for Water Districts).
- ✓ LWUA has a more organized manner in determining performance as foremost in LWUA's function is the review of the water rates (tariff) of the water districts, where they ensure rates charged are in accordance with the provision of applicable laws and regulations. Aside from that, LWUA is also mandated to establish standards for the local water utilities in the following aspects:
  - *Water Quality*
  - *Design & Construction*
  - *Equipment, materials and supplies costing*
  - *Operation and Maintenance*
  - *Personnel*
  - *Organization*
  - *Accounting*
- ✓ NWRB on the other hand monitors the tariff for the LGU-run & private water systems

DBP

4. Management of Water Supply Service on a self supporting basis

There are 3 types of management model implemented in the Philippines, as follows:

a. *LGU operated systems* – these are systems run by the Local Government Units, either directly through a city or municipal engineer or through a community based organization (CBO). This group is the biggest provider serving 55% of those with access to water having all Levels (1,2 &3). CBOs include 200 cooperatives, 3,100 Barangay Water Sanitation Associations and 500 Rural Water Supply Associations.
b. *Water Districts (WD*) - In urban areas outside Metro Manila, water districts serve 15.3 million people nearly 861 LGUs. A WD is legally and financially separate from the municipality. This group serves 20% of those having access to water which is exclusively providing only Level-3 water systems.
c. *Private Operators* – This group comprises of the Large private operators (operating within the Metro manila area) and the small scale independent providers. This group represents 5% of those served having access to water.

DBP

4. Management of Water Supply Service on a self supporting basis

- ✓ Water supply sector in the Philippines is fragmented in terms of regulation and management as there are more than 30 government agencies with overlapping functions

- ✓ There is a proposal in the Philippine Congress to come up with Water Regulatory Commission that would provide the tariff and economic regulations for water supply services

DBP

5. Major recent achievement in improvement of water supply services/management (PART 1)

1996-2000	INDICATORS	2004-2010
10	Staff/1,000 Connections	7
175 L/D/C	Production Capacity	118 L/D/C
None	Water Quality	LWUA/NWRB
63%	Coverage Area	92%
	Supply Duration	18-21 HRS/D
	Supply Pressure	
	Number of Connections	
	NRW	27.5
	Collection Ratio	98%
	Staff Number	

DBP

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

- ✓ ODA resources are made available to assist the improvement of the Country's Water Supply Sector. JICA, ADB, World Bank, USAID & others have collaborated with the Government Agencies and Government Financing Institution to show support by providing windows for financing.

- ✓ JICA, through the Environmental Development Project (EDP) implemented the Philippine Water Revolving Fund collaborating with the Development Bank of the Philippines (DBP). PWRF is a leverage funding mechanism. The primary objective is to improve access to safe and drinking water and sanitation by stimulating investments through the establishment of a sustainable financing program. The loan made by DBP to JICA will then be relent to water utilities with co-financing with other commercial banks. Presently, allocation for the PWRF has been used up and has been requested for re-allocation since the market has been picking up.

DBP

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

- ✓ Provide technical support in addressing the present problems of the Philippines water supply sector specially in the management of the water supply systems

Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

SRI LANKA

1.1 Current situation and major challenges

Climate change related water quality variations

1.1.1 Increased ground water salinity, Hardness, Nitrate etc. due to rainfall variability and temperature variations. (North Central Province and Kalpitiya)

Anthropogenic water quality variations

1.1.2 Changes in quality of water sources due to excessive fertilizer usage and agrochemical usage (eg. Algal blooms in dry zone , Kidney disease of unknown etiology (CKDu) in North, North Western, North Central, Uva provinces)

1.1.3 Unmanaged industrial discharges (eg. 9,000 industrial discharges into Kelani River, oil discharge by power plant in Jaffna)

1.1.4 Sewer discharges into surface water bodies (eg. Kelani Ganga, Gampola)

1. Management of Water Quality

1.2 Current actions against the problems and any achievement

Actions

1.2.1 Climate modelling for Sri Lanka available with predictions

1.2.2 Catchment protection policy by Ministry of Lands and Land Development

1.2.3 Actions to control the spread of CKDu under direct supervision of HE the President of Sri Lanka

1.2.4. Joint actions with Central Environmental Authority in case of incidents (eg. Oil pollution at the intake of Kelani Right Bank)

Achievements

1.2.5 Being aware of dry zone getting dryer, wet zone getting wetter and salinity intrusions due to sea level rise, disaster preparedness and be familiar with desalination technology.

1.2.6 Provision of good quality water to the CKDu affected community with new water supply schemes, pipeline extensions from existing schemes, rain water harvesting and installation of RO plants.

1.2.7 Joint actions with Central Environmental Authority on human induced oil pollution problems in Jaffna and Kelani river.

1.3 Monitoring system for water quality

1.3.1 NWSDB has a water quality monitoring program for its supplied water. This has internal daily monitoring, monthly reporting component and external verification system by the Ministry of health where public health officers all over the island collecting samples and testing on monthly basis. Cabinet approval is available for a National Water Quality Surveillance program (WQS) in collaboration with the Ministry of Health. National water quality surveillance committee is one of the important action point under water quality surveillance program.

1.3.2 Also NWSDB has got raw water quality management program with special attention to Kelani river termed "Pavithra Ganga" program.

Water Safety Plans (WSPs)

- Water Safety plan is a methodology of minimizing the risks to the safety of water using a planned risk minimization approach applying control measures or barriers.
- This approach is advocated by the WHO with two different approaches for Urban and Rural Sectors
- The urban WSP consists of 11 steps including rigorous risk assessment.
- The rural WSP consists of 6 steps including simple risk assessment.
- Water safety plan is a complete solution for the safety of water for consumption by the people. It addresses the health risk minimization in all stages of water supply, namely the catchment, treatment, distribution and the consumer practices.
- WSP addresses stake holder participation, incident management and improvements for achieving a safe water supply system.
- Its comprehensive features such as monitoring, verification and auditing helps the sustainability of the WSP implementation.
- In conclusion WSP is a comprehensive tool combining parameter testing and control measures to achieve sustainable water safety.

1. Management of Water Quality

1.4 Implementation of Water Safety Plans (WSPs)

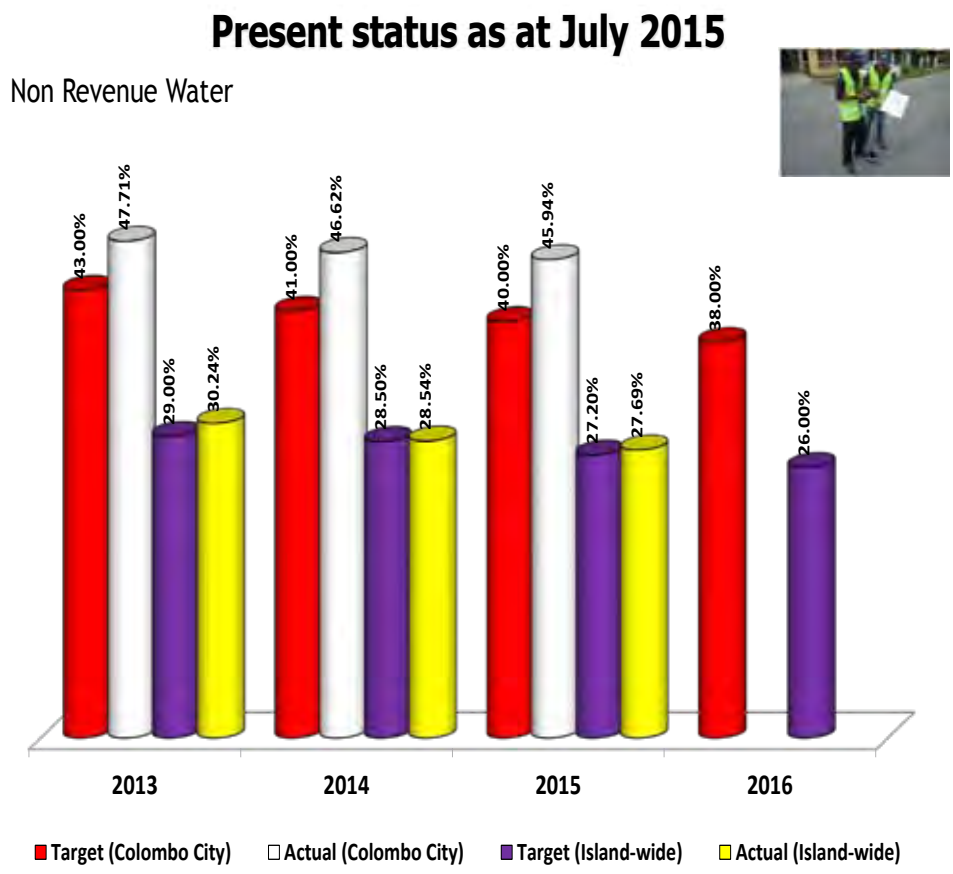
1.4.1 NWSDB has been working under the WSP concept since tsunami in 2004. The fist phase of the WSP was implementing WQS program. NWSDB received UNICEF and WHO support continuously for WQS and WSP related activities.

1.4.2. WHO implemented training programs in Sri Lanka for implementing WSP for urban sector. As a result they developed three master trainer for implementing WSP in Sri Lanka. At present this program is supported by the training division of the NWSDB covering entire country.

1.4.3 The master trainers have completed about six urban WSP training programs countrywide with initiation of WSPs in sixty four urban water supply systems.

1.4.4. The master trainers are planning implementing WSP for rural water supply systems in 2016 with WHO assistance.

2. Reduction of non –revenue water



3. Water supply service standards

3.1 Current situation and major challenges/problems

3.1.1 NWSDB is committed to provide piped water to the consumer with 24 h service at specified pressure and quality meeting SLS 614, Sri Lanka water quality standards and WHO guidelines.

3.1.2 Domestic and industrial pollution are the main challenge to achieving water quality service standards.

3.1.3 Other actions such as working towards climate resilience and integrated water resource management need to be addressed at national level achieve water supply service standards.

3.1.4 NRW reduction is an important step towards achieving high service standards

3.1.5 Investment on water supply coverage also contribute to the improved service standards

3.2 Current actions

3.2.1 NRW reduction program, investment planning could be considered as current actions

3.2.2 Implementation of WSP and IWRM efforts are the other notable actions

3.2.3 Obtaining ISO standards for the large water treatment plants is an important step towards achieving a high service standard.

3.3 Monitoring by KPI - NWSDB

Indicator	KPI	Trend
1. Service Indicator	i. Piped water connected coverage	Increase
	ii. Water quality	Increase
2. Financial Indicator	i. Stock efficiency	Decrease
	ii. Accounts receivable	Decrease
	iii. Operating Ratio	Decrease
	iv. Energy Cost/ cum	Decrease
3. Operational Indicator	i. Estimate bills	Decrease
	ii. Defective meters	Decrease
	iii. Staff per 1,000 connection	Decrease
	iv. Non Revenue water	Decrease
4. Customer Service Indicator	i. Customer Complaints/1,000 connections)	Decrease

Data collected from RSCs by monthly , calculated above KPIs as at end June and December every year and published.

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

4.1 Current situation and major challenges/problems

4.1.1 At present NWSDB is requested by the Government to be managed by the self supporting basis without government funding.

4.1.1 Overcoming inefficiencies and targeting higher tariff are the challenges.

4.2 Current actions against problems

4.2.1 Implementation of self financing strategy is being practiced

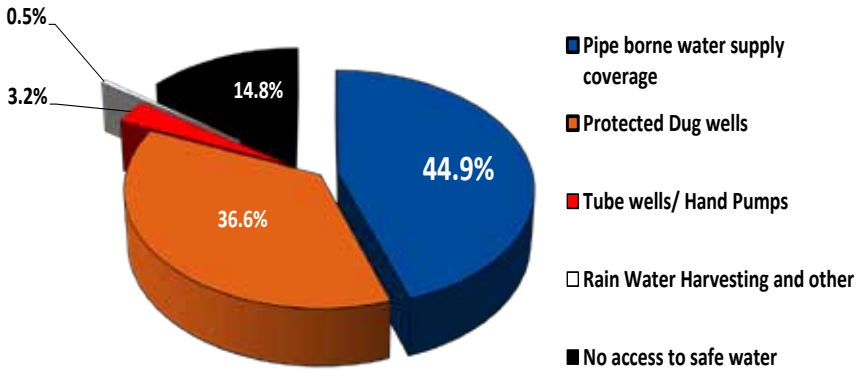
4.2.2 Strengthening community based water supply concept would be a supporting activity for this at rural level

4.2.3 Working on energy saving, NRW reduction and strategies on human resource management could be considered as current actions.

5. Major recent achievements in improvement of water supply

Water Supply Coverage as at 30.06.2015

Water Supply Coverage	
Piped (Total)	44.9 %
NWSDB	34.2 %
Others	10.7 %
Safe water supply	85.2 %



Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

THAILAND

การประปานครหลวง
METROPOLITAN WATERWORKS AUTHORITY

Inception Report

Knowledge Co-Creation Program (Group & region Focus)

Water Supply Administration for Better Management of Water Supply Services (B) (J15-04219)

Rapee Supradish Na Ayudhya (Mr.)
Kulnita Saipavan (Ms.)

การประปานครหลวง
METROPOLITAN WATERWORKS AUTHORITY

Management of water quality

Current situation

MWA produced and distributed 2,200 million cubic meters of water annually with total length of 32,060.5 km. of pipes consisted in water network. Water quality check points and automatic chlorine feeding system were installed to ensure that water quality keep up and met the World Health Organization (WHO) standard. However, the impact of the high salinity measurement in water supply during dry season and the sea level rise around mid-year of 2015 has become the major challenge in water quality management for MWA.

Major problem

The high salinity measurement in water supply due to the sea level rise

Action against the problem

MWA has collaborated with the Royal Irrigation Department to manage raw water allocation from Chao Phraya River to prevent saltwater intrusion that affects the water supply production and its quality.

การประปานครหลวง
METROPOLITAN WATERWORKS AUTHORITY
Management of water quality

Major problem

Odor in tap water caused by chlorine due to the high dosage of chlorine used in water treatment process

Action against the problem

In order to reduce the odor of chlorine in tap water, additional chlorination at MWA's water pumping station has been applied as well as the improvement of the filtration unit in the water treatment process by adding Biological Activated Carbon Layer and the reduction of algae in raw water which help reducing algae and their toxins in the raw water before entering the water treatment plants. This will help reducing the excessive use of chlorine dosage in the water treatment process and also help reducing the amount of toxic substance contaminated in raw water used for water production.

Monitoring system

MWA has been implementing ‘The Drinkable Tap Water Management Project’ in order to monitors all the pipe installation, repair and replacement work in accordance with the standard set by MWA. The 'automatic chlorine monitor and dispenser in water distribution system' has also been implemented. The monitor points and automatic chlorine dispensers were installed with the aim to maintain the free residual chlorine level in distributed water supply in accordance with the World Health Organization (WHO) standard. The system is also integrated into the remote water monitoring system to present real time data on water quality (free residual chlorine and turbidity) via the MWA's website, ensuring safe drinking water supply for customers.

Management of water quality

Implementation of Water Safety Plans

MWA has formulated both short-term and long-term Water Safety Plan as the continual projects which have been implementing in response to the service excellent enhancement strategy with focus on provision of clean, covering and adequate water supply.

MWA's Water Safety Plan has run in accordance with the guideline of the World Health Organization (WHO) cope with the measurement indicators that include heavy metal, trihalomethanes (THMs) and agricultural pesticides which be in compliance with the WHO Guidelines for Drinking-water Quality, integrates principles of assessment and risk management in every stage of waterworks system to ensure that the water distributed to the customer's households can be safety consumed.

Current situation and challenge problems

- About **94%** of the entire pipe under the service of MWA is **distribution pipe (Diameter : 100 – 400mm) of which 14% is AC pipe and 84% is PVC pipe.**
- Physical losses or real losses such as leak points, background losses (small leak from connection joints) is the most significant problem on MWA's losses. Therefore, MWA has focused on dealing with physical losses as the first priority.
- The major difficulty in reducing real losses is that it is very difficult to find underground leak under low pressure, because most of leak detection equipment require at least 1 bar of pressure to operate properly.

การประปานครหลวง
METROPOLITAN WATERWORKS AUTHORITY
Reduction of Non-revenue Water

Actions against the problems

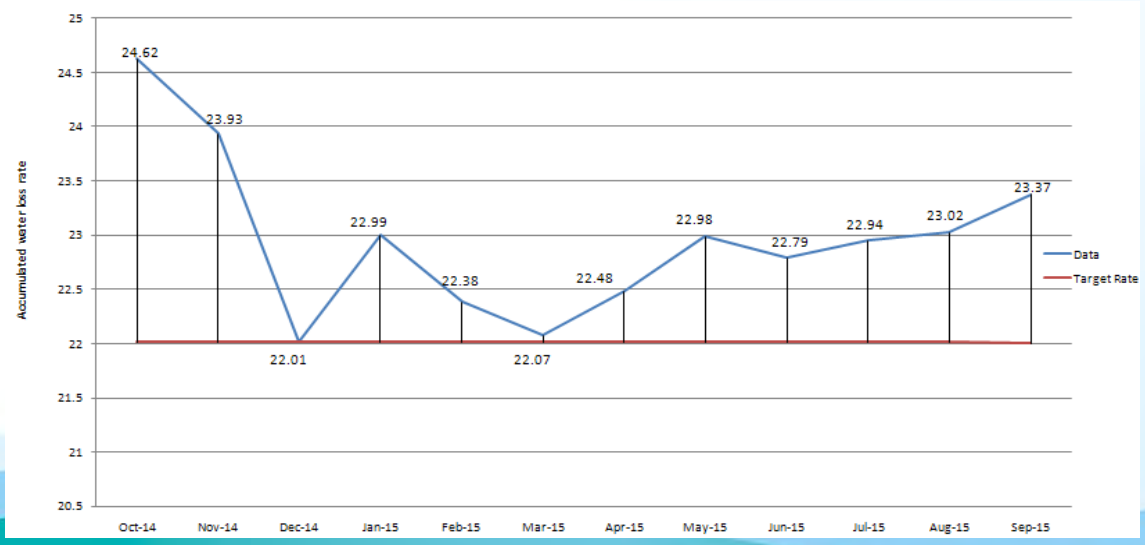
The first priority of MWA's losses control policy has been set to deal with physical losses in pipe network. Therefor, active leakage control program (DMA equipped with Pressure Reducing Valve (PRV), Step-testing and underground leak detection), quality of repair and pipe replacement are the most concern, in terms of annual action plan.

Based on the quantitative assessment, pipe leakage repairing and aged pipes replacement plan does not keep up with the aging/deterioration accordingly.

Reduction of Non-revenue Water

Achievement

The water loss rate has been reduced from 24.62% in October 2014 to 23.37% avg. in September 2015 with the target of 21.50% at the end of Fiscal Year 2016.



การประปานครหลวง
METROPOLITAN WATERWORKS AUTHORITY

Water Supply Service Standards

Current situation and major problems

Water pressure is one of MWA's key performance indexes, the average distributed pressure, which is the standard level of minimum average pressure, has been controlled to be higher than 6.0 m. The proportion of low pressure distribution area, in which the average pressure couldn't accomplish the minimum standard level, is about 2% of the entire service area due to the following causes:

- Improper pipeline sizes and bottlenecks in the distribution system.
- Low pressure due to high burst frequency of trunk or service pipeline.
- Low pressure due to high water loss zone.

Action against the problem

MWA has been performing a set of activities to manage and improve the low pressure distribution areas as follow:

- Stepping pressure up manually to serve customer demand according to time within pressure trends control (PTC) Pipe replacement or bottleneck elimination has been applied for areas where pipes are sensitive to pressure change.
- Pipe replacement or bottleneck elimination and Distribution system or service pipeline expansion.
- Rearrange DMA (District Metering Area)

Current situation and major problem

Water shortage due to severe drought and the consequence of saltwater intrusion crisis in the eastern raw water source.

Action against the problem

MWA has worked closely with Royal Irrigation Department in the allocating of raw water sources in Chao Phraya River and also considered reducing the water production capacity and managing water supply in accordance with raw water usage trend of customer in each area.

Moreover, the risk management plan aimed for the water production, transmission and distribution stability enhancement has been implemented in response to the impact of draught that led to saltwater intrusion crisis. Business Continuity Plan (BCP) was also formulated, reviewed and improved in order to maintain the operation of water production, and service stability.

Recent Achievement of MWA

MWA has formulated policies to expand water supply service to cover all areas under the responsibility. The successful implementations are:

1. Setting discount criteria for new connections at the rate of 10% for new Residence Type of customers who apply for permanent connection (1/2 inch- water meter)

2. Signing MOU with the Bangkok Metropolitan Administration along with Samut Prakan and Nonthaburi Provinces to expand service coverage by jointly installing pipes in area far from the trunk mains to improve the service pressure. The 83.95 km of service pipes was installed in the fiscal year of 2014.

3. Hosting joint meeting with housing developers in order to discuss the improvement of new connection application process.

As a result of the mentioned activities, there were more than 60,000 of new customers applying for the permanent connection of water meter this year.

Expectation for the Japanese private companies

As MWA located at Chao Phraya river delta, its soil conditions are vary from very soft (in the southern part of MWA) to stiff clay (in the northern part of MWA). There are some regions that soil conditions are corrosive so pipe materials and structures are easy to be corroded. This make MWA facing with deteriorating distribution network problem, such as differential settlement of pipe in soft ground and corrosion of pipes that is the major cause of water leakage. The accumulated non-revenue water rate is about 22 - 24% in the fiscal year of 2015. Apart from the implementation of DMA that effectively monitor water loss, the leakage problems due to aging pipes and pipe corrosion are the most vulnerable issues that MWA have to immediately take action.

Therefore, in expectation from collaboration with Japanese private sectors, to create a system to evaluate pipe conditions for MWA pipe network which are in need of replacement before the leakage occur or active maintenance planning is the most important countermeasure as well as the implementation of the effective pipe material such as Ductile iron pipe.

Water Supply Administration

For Better Management of Water Supply Services

Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

1.BANGLADESH ····· 169

2.CAMBODIA ····· 189

3.INDONESIA ····· 201

4.LAOS ····· 211

5.MYANMAR ····· 237

6.NEPAL ····· 249

7.PHILIPPINES ····· 261

8.SRI LANKA ····· 271

9.THAILAND ····· 279

10.VIET-NAM ····· 289

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

VIET-NAM

THAI NGUYEN PROVINCIAL PEOPLE'S COMMITTEE
DEPARTMENT OF FOREIGN AFFAIRS

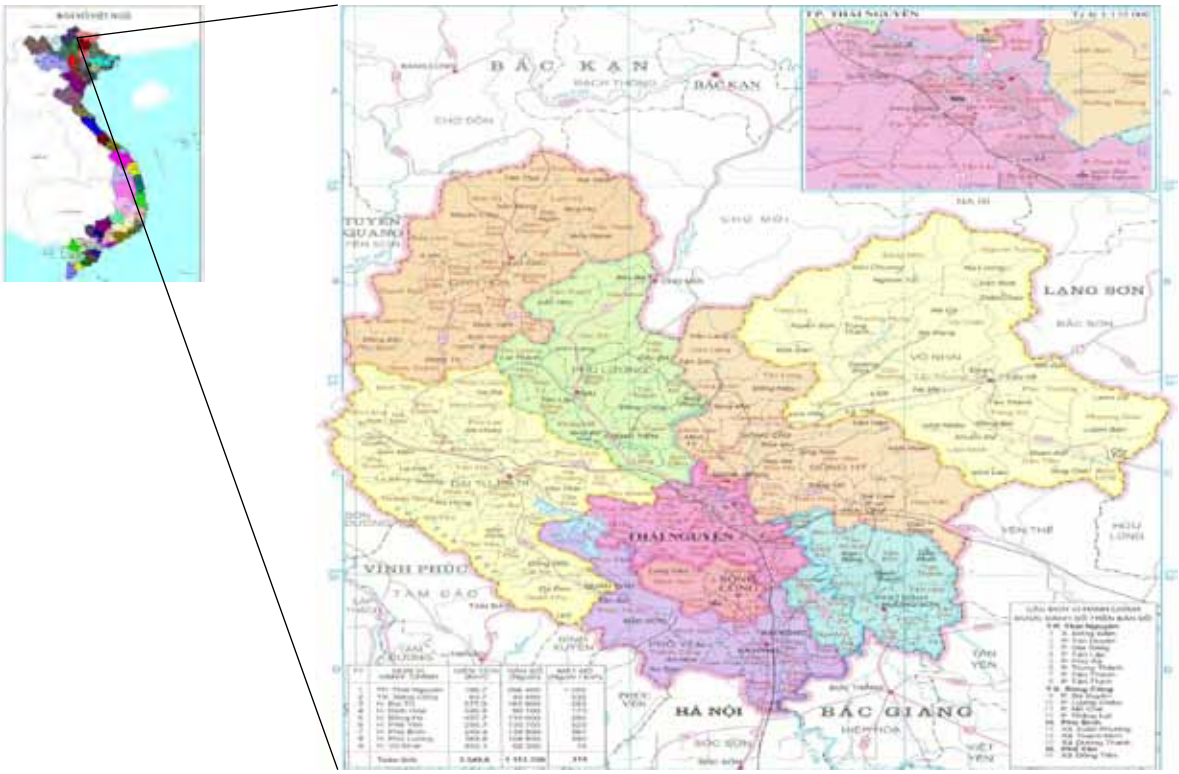
INCEPTION REPORT

Training and Dialogue Program
on
Water Supply Administration for Better Management of Water Supply Services

Name of the participant: LUONG CHI CONG
Country: Vietnam
Name of Applying Organization: Thai Nguyen Provincial People's Committee

CONTENT

No.	Topics
1	Management of water quality
2	Reduction of non-revenue water
3	Water supply service standards
4	Management of water supply service on a self-supporting basis
5	Major recent achievement on improvement of water supply
6	Expectation for the Japanese private companies



Thai Nguyen Province

1. Management of water quality

1-1. Current situation and major challenges/problems:

a) Current situation: Management and Operation

Total: 211 water supply plants/contructions

- Community based management models: 163 (77%).
- Cooperative based management models: 4 (2%).
- Government based management models: 20 (9%).
- Company based management models: 7 (3%).
- Individual based management models: 11 (5%).
- Other management models: 6 (3%).

b) Challenges/problems:

- Management system policies and financial mechanism: Not clear, rights and responsibilities of management each sectors are not clearly defined.
- Lack of professionality and equipment for monitoring, maintenance.
- Insufficient of financial resource, due to lack of water quality monitoring, water plant maintenance and water sample testing.
- Low living condition of community -> difficulty in using water supply system.

1-2. Current actions against the problems:

- Modify and develop the effectiveness of water supply management systems.

- Develop administrative capacity of water supply project managers and staffs.

- Revised water supply management policies.

- Rising water supply management awareness of communities.

1-3. Monitoring System

- 13 monitoring points in the South of province: Installed by Thai Nguyen Department of Natural Resource and Environment (DONRE);

- Still lack of water monitoring point in other region within the province.

- Lack of human capacity for operating monitoring systems.

- Lack of financial resources for expand, develop and apply monitoring systems, especially in remote areas.

1-4. Implementation of Water Safety Plans (WSP)

- Following Vietnam standard;
- There is no WSP applied yet;
- Lack of resources to apply WSP (i.e. budget, technical capacity)

2. Reduction of non-revenue water

2-1. Current situation and major challenges/problems:

- High volume of non-revenue water in rural areas (more than 15%);
- Water supply systems in remote/ rural areas: insufficient and not follow any planning
- Awareness of communities about reducing non-revenue water still low.

2-2. Current actions against the problems:

- Prepare and develop plans and strategies for reduction of non-revenue water
- Find solution to deal with technical issue relating to water supply systems in rural area
- Rising awareness of communities about reducing non-revenue water

2-3. Any achievement :

- Only in some areas (i.e. central, near water supply plant): non-revenue water lower than 15%
- Awareness of communities about reducing non-revenue water have changed.

3. Water supply service standards

3-1. Current situation and major challenges/problems:

- Central areas: Less than 100 l/person/day
- Rural areas: 60-50 l/person/day
- Lack of technical and management systems of water supply service standards
- Water supply service standards policies: Not updated (since 1987

3-2. Current actions against the problems:

- Improve management and technical systems of water supply standards
- Propose Government to modify water supply standards policies and management systems.
- Apply new water supply standards models (small scale)

3-3. Any Monitoring by Performance Indicators (PI):

- Lack of monitoring system by Performance Indicators

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

4-1. Current situation and major challenges/problems:

- Community based water supply service management: 163/211 units (77%)
- Management systems: Not effective, lack of experience and financial resource
- Low living standard of rural areas.
- Lack of technical and knowledge in communities regarding water supply service management.

4-2. Current actions against the problems:

- Improve technical and rising capacity of community on water supply service management.
- Finding more financial resources to invest in water supply service management for communities
- Develop living condition of rural areas.

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

- Water supply units increase from 150 to 211;
- Drinking water using: Improve from 70 to 82 %
- Vietnam water standard using: From 51 to 58 % in 2014.
- Contribute to improve infrastructure of rural areas; development of living conditions
- Rising awareness of people, authorities, communities on management and using of cleaned water as water supply services
- Contribute to protect water resources
- Improve quality of policies on water supply as well as development on local areas.

6. Expectation for the Japanese private companies

6.1. Difficulties:

- Small scale water supply.
- Insufficient of technical and financial invest in water supply management and using.
- Lack of management and monitoring systems
- Low living standard of communities
- Lack of policies management and investment on water supply management
- Lack of capacity in project coordination and management on water supply issues
- Negative effect from illegal natural resources using -> impact on water resource quality
- Development of new industrial zones -> high demand on water using.

6. Expectation for the Japanese private companies (cont.)

6.2. Japanese companies cooperation and investment opportunities:

- Invest in development of sufficient of scale water supply.
- Insufficient of technical and financial invest in water supply management and using: Working with Thai Nguyen PPC on cooperation and invite companies from Japan to invest in Thai Nguyen.
- Lack of management and monitoring systems: Invite Japanese companies to invest and transfer technical management/ monitoring.
- Low living standard of communities: Working with international organization (i.e. JICA, ADB) to invest in development of community living standard in connection with water supply management.

6. Expectation for the Japanese private companies (cont.)

6.2. Japanese companies cooperation and investment opportunities:

- Lack of policies management and investment on water supply management: Consultants from Japanese (JICA, companies) to cooperate to give advise on water supply policies.
- Lack of capacity in project coordination and management on water supply issues
- Negative effect from illegal natural resources using -> impact on water resource quality: Development cooperation with JICA, companies in order to increase capacity of water supply administrators as well as in project management.
- Development of new industrial zones -> high demand on water using: Working with international sectors, companies in Japan to develop quality of industrial zone planning as well water supply management systems.