

S13.3-18 第3次本邦機研修の報告会

WELCOME LADIES AND GENTLE MEN

Course: Meter Reading, Billing and Tariff Collection



Name: Rosta Tinarai, Mary Pidoke, Tima Kofana & Lawrence Iroi

Personal Experience

- Longest air travel in life



- Busy terminal and airport



<http://www.google.com.br/search?q=boeing+747+reference+center+for+a+coworker>

Presentation outline

- Personal experience
 - Socio-cultural and economic differences
- Lessons learned during the this training
 - Water supply (history, water safety plan, purification plant, HR, customer satisfaction, tariff collection)
- Recommendation
- Conclusion

Personal Experience

- Clean Surroundings



- First travel on a train and colourful night



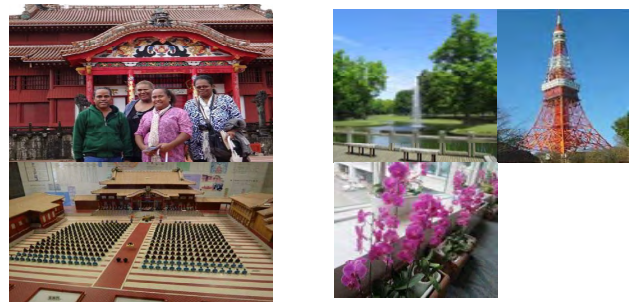
Socio-cultural

- Night lives, bars, tours, site seeing
- Respect for others, public properties,
- Sado (Japanese Tea Ceremony)



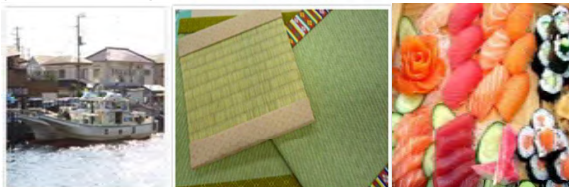
Socio-cultural

- Museums, shrines and palaces
- Parks and other sites

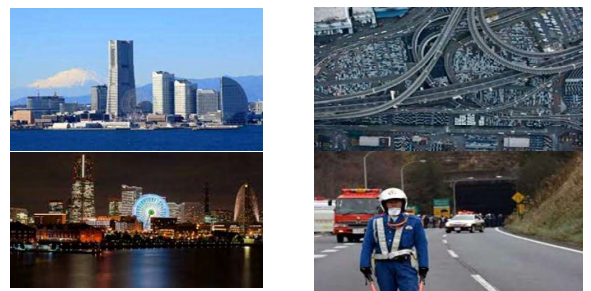


Socio-cultural

- Recreational activities
 - performing arts, cooking, arts workshop, sports, fishing



Economy



Lesson Learned

Water Supply Service

- ✓ The history (proper documentation)
- ✓ Natural disaster, population growth, technology
- ✓ Water supply planning
- ✓ Water safety plan



Public Relations

PR – awareness at school



Marriage hunting – Doshi River



Customer Service & Meter Reading

CS outsourced



Meter Reading outsourced



Billing and Tariff Collection



Payment methods

How to pay the bill



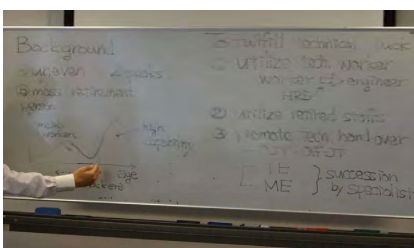
Yokohama Waterworks Bureau

Proposed Ideas

- Proper documentation
- Pipe lines or service lines properly buried
- Use of retired skill workers as trainers
- Open office
- More payment methods and cashier points
- Purchase meters with lock and casing

Human Resource Development

- HR development



Arigato Gozaimashita



S13.3-19 プロジェクトの進捗および課題

The Project for Improvement of Non-Revenue Water Reduction Capacity for SIWA in Solomon Islands

Progress -3 of the Pilot Project

1 July, 2014

NRW Project Team

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Pilot Project Areas

Total Pilot Areas – 15 [Pilot Project Areas and Location.docx](#)

Pilot Areas	Status	Period of Implementation
1. FFA KOLA ROAD	ONGOING	
2. MBUA VALLEY	ONGOING	
3. LENGAKIKI	COMPLETE + FOLLOW UP	1 JUNE-31 AUG 2013 (3.0 MONTHS)
4. MBOKONA	COMPLETE	15 OCT -10 DEC 2013 (1.8 MONTHS)
5. MBOKONA VERA 1	COMPLETE	1 AUGUST-20 SEPT 2013 (1.6 MONTHS)
6. VAVAE RIDGE	COMPLETE	10 SEPT- 10 NOV 2013 (2 MONTHS)
7. PANATINA VALLEY	ONGOING	
8. MBARANAMBA	COMPLETE	1 NOV -10 JAN 2013 (2.3 MONTHS)
9. WHITE RIVER-NAMORUKA	COMPLETE	1 APRIL-10 JULY 2013 (3.3 MONTHS)
10. INDEPENDENCE VALLEY	COMPLETE	20 APRIL-20 JULY 2013 (3.0 MONTHS)
11. BAHAI KUKUM	ONGOING	
12. NAHA 2	ONGOING	
13. NAHA 3	ONGOING	
14. TUVARUHU 1	COMPLETE + FOLLOWUP	20 AUGUST –10 OCT 2013 (1.6 MONTHS)
15. TUVARUHU 2	COMPLETE	20 AUGUST -10 OCT 2013 (1.6 MONTHS)

Contents

- Introduction
- Achievement of Project until current.
 - ◆ Pilot Project Areas and Period of Implementation
 - ◆ NRW Reduction Activity Results
 - ◆ Cost Effectiveness of NRW Reduction Activities
- ◆ Situation of ongoing project
 - ◆ Including follow up activities
 - ◆ Schedule for ongoing project

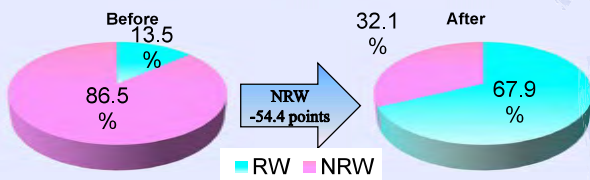
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Achievements of Project

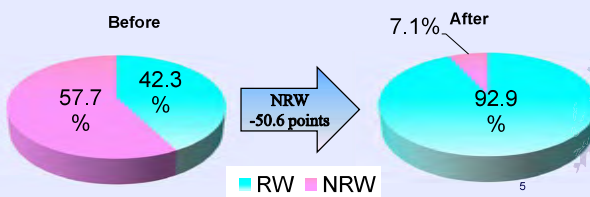
- ◆ 9 Pilot Areas -Complete
- ◆ 6 Pilots – Ongoing
- ◆ 2 pilots –Follow up with assistance from JICA Expert team

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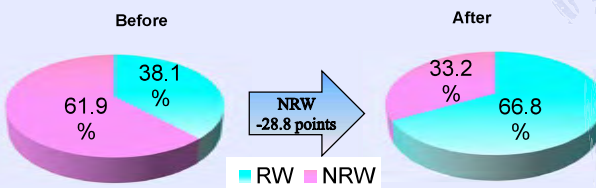
White River – Namoruka



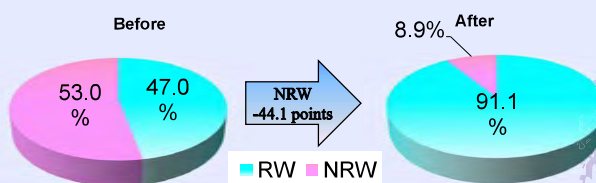
Independence Valley



Lenggakiki



Mbokonavera

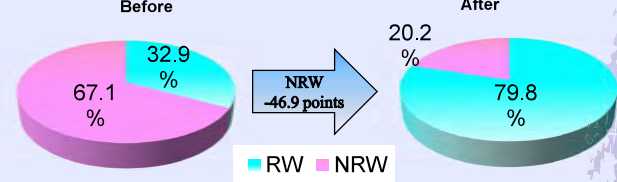


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Tuvaruhu 1

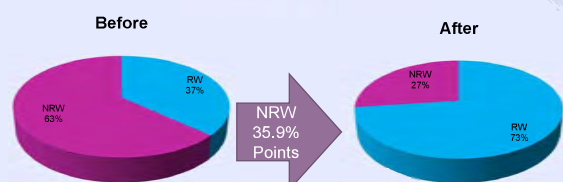


Tuvaruhu 2

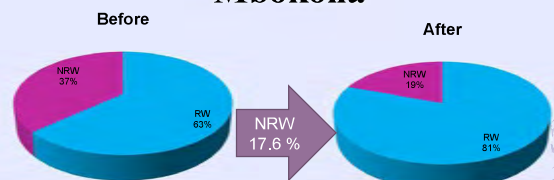


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Vavaya Ridge



Mbokona



8

Mbaranamba

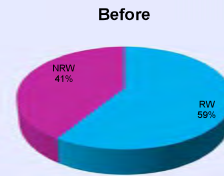


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Panatina

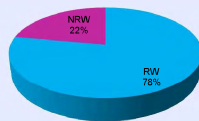


Naha 2

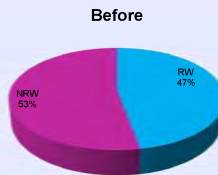


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Mbua Valley

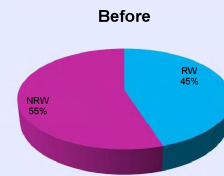


Bahai Kukum



10

Naha 3



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Increased Revenue Water by NRW Reduction Activities

Total volume increase after countermeasures is 861.14 m³/day or 4306 Drums of water each day from 9 pilot areas.

No	Area No.	Pilot Project Area	Revenue Water Volume before Countermeasures	Revenue Water Volume after Countermeasures ¹	Increased Water Volume by the NRW Reduction Activities
			(m ³ /day) [A]	(m ³ /day) [B]	(m ³ /day) [C]=[B]-[A]
1	No.9	White River- Namoruka	46.96	235.48	188.52
2	No.10	Independence Valley	67.54	148.27	80.73
3	No.3	Lenggakiki	224.89	394.99	170.10
4	No.5	Mbokonavera-1	83.74	162.33	78.59
5	No.14	Tuvaruhu-1	36.64	84.57	47.93
6	No.15	Tuvaruhu-2	37.39	90.89	53.50
7	No.6	Vavaea Ridge	185.57	365.60	180.03
8	No.4	Mbokona	78.42	109.39	30.98
9	No.8	Mbaranamba	122.49	153.45	30.96
		Total	883.64	1744.77	13 861.14

Cost Benefit Analysis for NRW Reduction Activities (for 3 years)

Revenue increase will be SBD 3,740,361 per year or SBD 11, 221,085 for three years through the NRW reduction activities.

IF the condition of the water system in the pilots is maintained in the same condition as that after countermeasure

Cost Benefit (A)> Cost of NRW reduction activities (B)

No	Area No.	Pilot Project Area	Increased Revenue Water Volume		Anticipated Additional Revenue by Unit Revenue for Water (@11.5SBD/m ³) ¹		Initial Cost incurred ² (SBD)	Initial and Recurring Cost for 3 years ² (SBD/3yrs)
			(m ³ /day)	(m ³ /yrs)	(SBD/day)	(SBD/3yrs)		
1	No.9	White River- Namoruka	189	206,429	2,243	2,456,510	99,689	199,378
2	No.10	Independence Valley	81	88,399	961	1,051,952	113,921	227,842
3	No.3	Lenggakiki	170	186,260	2,024	2,216,488	115,868	231,736
4	No.5	Mbokonavera-1	79	86,056	935	1,024,067	80,922	161,844
5	No.14	Tuvaruhu-1	48	52,483	570	624,552	43,968	87,936
6	No.15	Tuvaruhu-2	53	58,364	634	694,526	46,611	93,222
7	No.6	Vavaea Ridge	180	197,134	2,142	2,345,881	165,649	331,298
8	No.4	Mbokona	31	33,819	369	403,685	245,145	490,290
9	No.8	Mbaranamba	31	33,822	368	403,424	78,549	157,097
		Total	862	942,946	10,248	11,221,085	990,321	1,980,643

Total Cost Incurred by the complete pilot areas

Total Cost incurred for 9 pilot project- \$ 990,321
Average Cost for each pilot - \$ 110,036 (more for some pilots than others depending on pilot size).

No	Area No.	Pilot Project Area	Pipe Distance	Number of Household	Personnel Cost	Consumable Cost	Material & Equipment	Total Initial Cost incurred
			(m)	-	(SBD)	(SBD)	(SBD)	(SBD)
1	No.9	White River- Namoruka	1,063.23	83	74,710	2,306	22,673	99,689
2	No.10	Independence Valley	2,184.45	91	78,825	2,207	32,889	113,921
3	No.3	Lenggakiki	2,481.38	161	55,087	971	59,810	115,868
4	No.5	Mbokonavera-1	1,104.12	76	48,515	269	32,138	80,922
5	No.14	Tuvaruhu-1	1,205.88	47	43,084	884	0	43,968
6	No.15	Tuvaruhu-2	1,371.31	62	45,669	942	0	46,611
7	No.6	Vavaea Ridge	1,298.15	163	56,752	4,081	104,816	165,649
8	No.4	Mbokona	1,418.66	110	91,461	7,417	146,267	245,145
9	No.8	Mbaranamba	1,512.29	100	39,498	5,959	33,092	78,549
		Total	13,639.47	893	533,601	25,036	421,685	990,321

Situation of ongoing work

- ◆ 6 Pilot area project – ongoing
 - ◆ Mbua Valley (after countermeasure)
 - ◆ Bahai (countermeasure)
 - ◆ Panatina(after countermeasure)
 - ◆ Naha 2 (countermeasure)
 - ◆ Naha 3 (countermeasure)
- ◆ 2 Pilots – Follow up Activities
 - ◆ Tuvaruhu 1
 - ◆ Lenggakiki

Schedule for remaining areas

- ◆ [Pilot Timeline 20140626.xlsx](#)
- ◆ Proposed to complete all pilot by end of July to enable us to proceed to DMA's.

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Cont'd

Current Situation	Re – Counter Measures	Results After Re-Countermeasures
<p>CASE 2: Lengakiki – Ministers Ridge</p> <p>[NRW reduction ratio not achieved 30 points reduction]</p> <p>????????? → Do Countermeasure</p>	<p>a. General leak survey.</p> <p>b. Check all customer water meters.</p> <p>c. Check customer status after Countermeasures. (D/L, Metered, Illegal, Disco)</p> <p>d. Fixed all leakages</p> <p>e. Disconnect all illegal users & metered D/L.</p> <p>f. Invisible leak detection.</p> <p>f. Re-Step Test (Redo Task d & e)</p> <p>← Ongoing</p> <p>Do Countermeasure</p>	<p>In progress towards achieving 30 points reduction.</p> <p>Minimum Night Flow is schedule for next week.</p> <p>Achieved YES/NO (In progress)</p>

Issues After Countermeasures in 3 Pilot Sites

Current Situation	Re-Counter measures	Results After Re-Countermeasures
<p>CASE 1: Tuvaruhu 1 Pilot Site.</p> <p>[NRW reduction ratio not achieved 30 points reduction]</p> <p>?????? → Do Counter measure</p>	<ul style="list-style-type: none"> • General leak survey. • Check all customer water meters. • Check customer status after Countermeasures. (D/L, Metered, Illegal, Disco) • Metered a D/L Customer (1) • Fixed all leakages • Disconnected all illegal users(3) • Re- MNF <p>Do Counter measure</p>	<ul style="list-style-type: none"> • Achieve 30 points reduction. <p>Achieved YES / NO (Completed)</p>

Cont'd

Current Situation	Re – Countermeasures	Results After Re-Countermeasures
<p>CASE 3: Panatina Valley</p> <p>[NRW reduction ratio not achieved 30 points reduction]</p> <p>???????? → Do Countermeasures</p>	<p>a. General leak survey.</p> <p>b. Check all customer water meters (3 not working)</p> <p>c. Check customer status after countermeasures. (D/L, Metered, Illegal, Disco)</p> <p>e. Do leak detection, section by section, using leakage equipment.</p> <p>f. Fixed leakages & metered all D/L.</p> <p>g. Do MNF</p> <p>Do Countermeasures</p>	<p>Re – Minimum Night Flow After Countermeasures. (Schedule for next week)</p> <p>Achieved YES / NO (In progress)</p>

Field Activities

Lengakiki Pilot Site

[nrw\nrw_poto\Leng2.JPG](#)
[nrw\nrw_poto\Leng5.JPG](#)
[nrw\nrw_poto\Leng 6.JPG](#)
[nrw\nrw_poto\Leng 7.JPG](#)

Panatina Valley Pilot Site

[nrw\nrw_poto\Pan 1.JPG](#)
[nrw\nrw_poto\Pan 2.JPG](#)
[nrw\nrw_poto\Pan3.JPG](#)
[nrw\nrw_poto\Pan4.JPG](#)
[nrw\nrw_poto\Pan 5.JPG](#)
[nrw\nrw_poto\Pan6.JPG](#)



S13.3-20 GIS データベースに係る現行活動

Role of GIS

Solomon Water – Geographic Information Systems (GIS)

Gavin Bare
GIS Technician

- Solomon Water’s operation and service covers large area of land(Honiara ≈ 74 km²).
- Mapping of Facilities, Features, Assets or incidents are important to hold information for immediate planning or future reference.

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Introduction

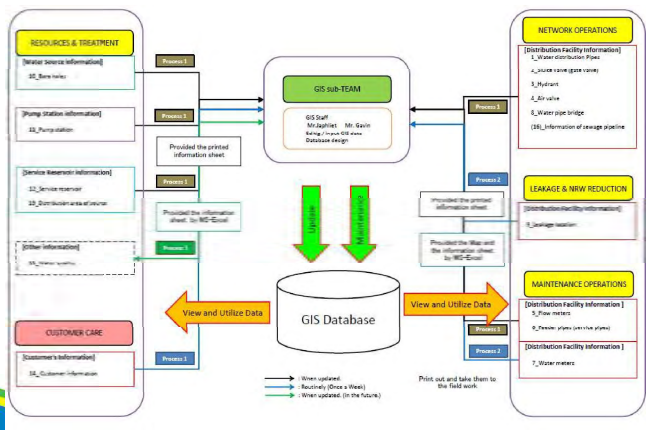
Geographic Information Systems is the technology to locate and hold information about objects.

GIS Current/Ongoing Activities

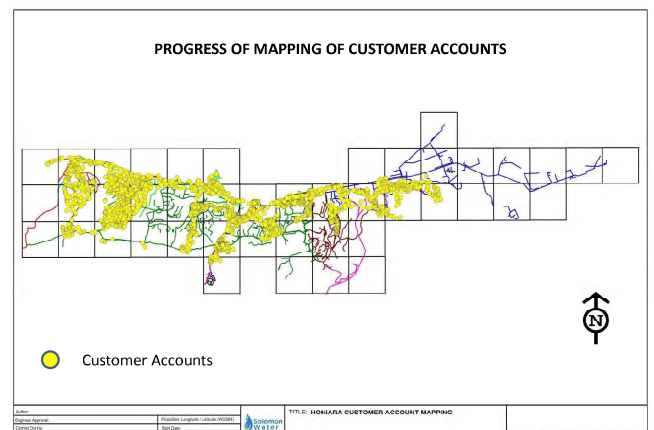
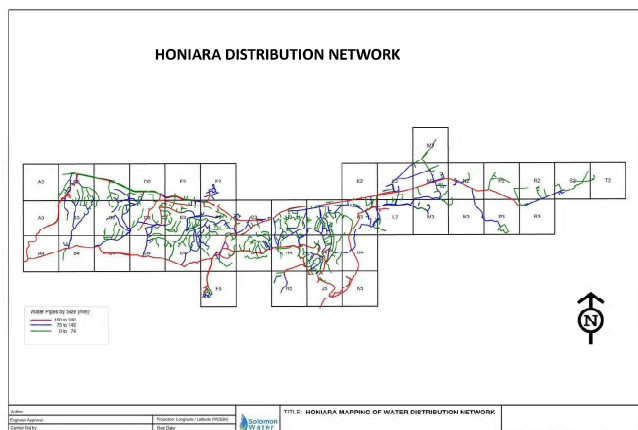
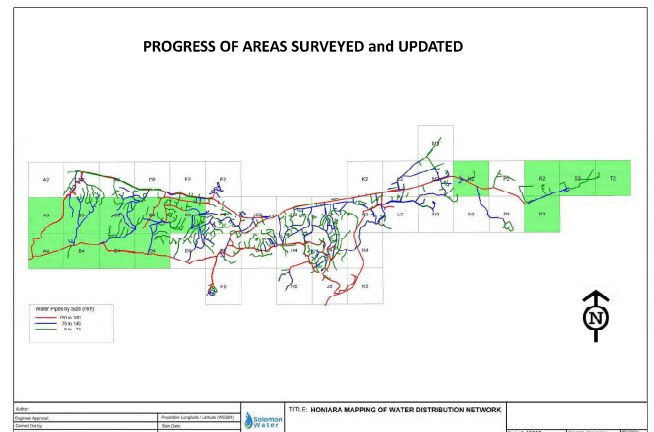
- Mapping of:
 - Water supply distribution network
 - Upgrade Modelling
 - For more accurate maps for field operation and distribution.
 - Honiara Customer accounts
 - Put a location to Volume Consumption
 - Link Billing and GIS – DMA Management.
- Development of a GIS workflow for Database
 - Establish procedural link between GIS and SW departments.

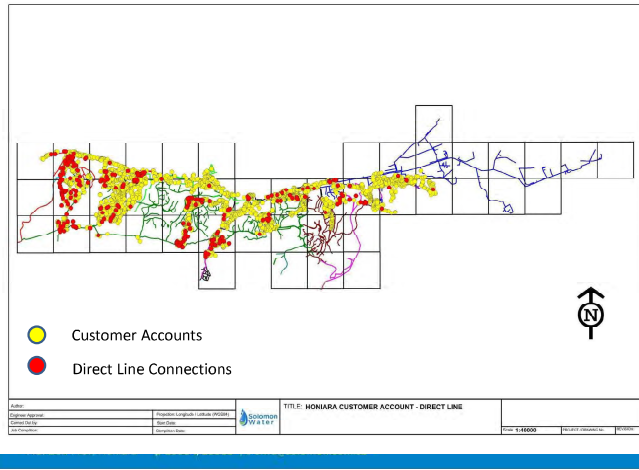
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Challenges

- Information availability
 - Lots of features are underground
 - Many records have been lost
- Information Sharing
 - No formal process in acquiring information yet.
- Precise data and quality information data

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Example of Output about Customers and Consumption by GIS

ZONE	No of Metered	No of DL	Illegals	Discon.	Consumption (m3/month)
ZONE-1	100	10	30	4	3,500
ZONE-2	60	30	5	10	3,000
ZONE-3	20	60	2	20	2,500

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Conclusion

- A better understanding of the role GIS plays in this organisation is achieved.
- Smooth cooperation between departments towards a more effective operation and much improved Solomon Water service.

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S13.3-21 DMA 対象の無収水削減活動および
モニタリング

The Project for Improvement of NRW Reduction Capacity for SW

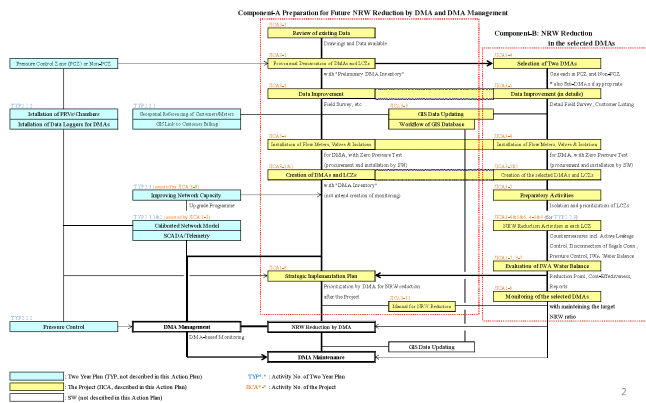
DMA-based NRW Reduction and Monitoring

SW Conference Room
1st July 2014

District Metered Area (DMA)

“District Metered Area (DMA)” is defined as a **discrete area of a distribution system** permanently created by isolation or the complete disconnection of pipe work in which **the quantities of water inflow and outflow the area are metered**. The water flow is analyzed to quantify the level of NRW. In this way, it is possible to determine **more precisely where and when it is most beneficial to undertake NRW reduction activities**.

Overall Implementing Flow



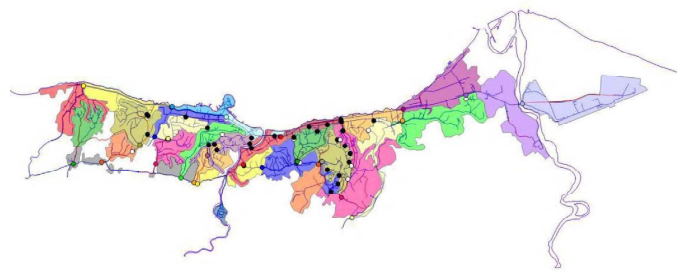
Leakage Control Zone (LCZ)

“Leakage Control Zone (LCZ)” specially-introduced in Solomon Water is defined as a **discrete zone of a distribution system tentatively created for implementation of countermeasures** such as Active Leakage Control against leakage (rather NRW) by isolation or the complete disconnection of pipe work in which the quantities of water inflow and outflow the area are metered temporarily. The Project assumes each DMA consists of a number of LCZs, but that may be not always the case because of DMA size or configuration of network. The size of LCZ and procedures of countermeasures are supposedly almost same as those of the Pilot Project in the Phase-2.

DMA Management and Maintenance

“DMA Management” (i.e. DMA-based Monitoring) is defined as a **solution to NRW by creation of permanent leakage (rather NRW) control system by dividing the network into a number of sectors called DMA** so that NRW in each sector can be quantified and the detection activities can always be directed to the part of the network with the most NRW. Once an acceptable level of NRW is achieved by countermeasures, **the water flow into the area and water consumption in the area is monitored** to identify new leakages or illegal connections immediately and prioritized them for solution. Then, **further countermeasures** are taken as “DMA Maintenance” to **keep the acceptable level of NRW**. So, DMA Management and Maintenance contributes to shifting **current passive leakage (rather NRW) control to active one**.

Provisional Demarcation of DMAs



Tentatively, 28 DMAs will be created in Honiara.

Schedule

1. Component - A
Jun. 2014 to Mar. 2015
Currently, provisional demarcation of DMAs is ongoing.
Strategic Implementation Plan will be finalized in the beginning of the Phase-4.
2. Component – B (2 selected DMAs)
1st DMA: Aug. 2014 to Dec. 2014 (4.5 month)
2nd DMA: Nov. 2014 to Mar. 2015 (4.5 month)

Thank you very much.

S13.3-22 ミニ・ワークショップ（JICA インタ
ーンシップ・プログラムによる社会的側面に係
る現況把握）

Report of JICA Internship

28 August 2014

Kimiko Tamotsu (Ms.)
 Department of International Studies
 Graduate School of Frontier Sciences, The University of Tokyo

According to this internship program, I observed such fields below;

Site Visit:

- Geographic information system data collection
- New connection
- Leakage repair
- Collect water sample at Konglai
- Service reservoir constructed under grant aid cooperation

Involvement:

- FAQ preparation
- Awareness Meeting at FFA
- School education program
- Interview to Mr. Andrew Ministry of Development Planning Aid Cooperation.

I . Activity report

- I . Activity Report
- II . Proposal for Elimination for illegal connection
 - II -1. Develop the User's Moral
 - II -1-1. Customer Relations
 - II -1-2. Awareness
 - II -2. Reform the system
 - II -2-1. Price Revision
 - II -2-2. Inspect illegal connection "Inspection Game"
- III . Regression Analysis of ODA and Solomon islands's Economy.
- IV. Conclusion

outline

I . Activity report

There are two main factors to eliminate the illegal connections.

1. Developing User's Moral
2. Reform the System

II . Proposal for Elimination of Illegal Connection

Customer Feedback Database

1st	<p>"Fact find and make commitment w/other section"</p> <ul style="list-style-type: none"> -collect the data 3-5customers /day, to know the tendency customer's complain. -by analyzing data know the tendency -report to optimal department the complain.
2nd	<p>"Increase the customer satisfaction"</p> <ul style="list-style-type: none"> -collect data 1000customers /year. -reform the customer service system efficiently. ex) make manuals for answer the phone, FAQ etc. -service revel must be "same".

II -1-1. Customer Relations

Adult	<p>"Awareness Meeting"</p> <ul style="list-style-type: none"> - The importance of conserve water. - The importance of NRW project, relation how to decrease the water price. - Why illegal connection is "BAD".
Child	<p>"School Education Program"</p> <ul style="list-style-type: none"> - Why conserve the water. - How the water is cycling and delivering. - Using scientific experience, make them understand of importance of water supply

According to such subject, let them know water is public goods.

II -1-2. Awareness

There are two main factors to eliminate the illegal connections.

1. Developing User's Moral
2. Reform the System



II -2. Reform the System

Notation: player1=Solomon Water(SW) , Player2=Customer(CS)
 strategy= Pay, Not pay
 preference order of payoff : $\textcircled{0} > \textcircled{1} > \textcircled{2} > \textcircled{3}$

The Matrix of Water Bill Pay Game

	SW	Pay	Not Pay
CS	Pay	$\textcircled{1}, \textcircled{2}$	$\textcircled{3}, \textcircled{0}$
	Not Pay	$\textcircled{0}, \textcircled{3}$	$\textcircled{2}, \textcircled{1}$

Result: the Nash Equilibrium is (SW, CS)=(Not Pay, Not Pay) because, if SW choose the strategy of pay there will be the conflict if CS choose the strategy of Not Pay. This strategic non cooperation game called "Prisoner's Dilemma".

II -2-1. Price Revision

- Market Failure
 "flood water": external diseconomies
 "high price for supply": undersupply goods
- Water is public goods
 SW is serving water 32% for GNI(2012), this is very expensive for users. According to compare with inflation rate, this is very high. In addition, average revenue of water is 16% increase(2011-2012), 38% (2012-2013) which can be the reason why people do not pay(can not pay) for water bill.

decrease the price is important,
 if it is difficult need to interfere by government.

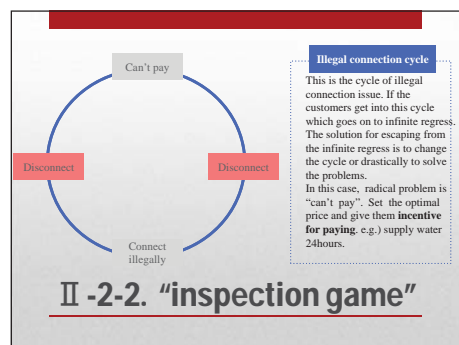
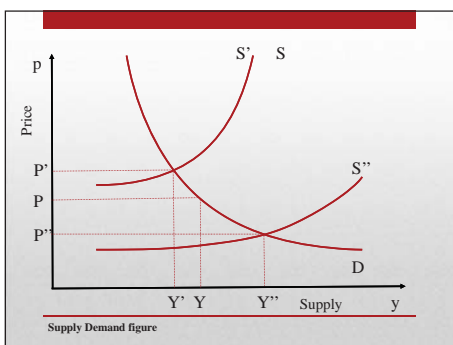
II -2-1. Price Revision

- Set the Optimal Price
- Separate the price for Commercial and Public

II -2-1. Price Revision


5

6



Q. What is the "Inspection Game"?

A. "Inspection Game" is one of the model of game theory (Mixed strategy non-cooperative game). This game is using for custom inspection, finding the nuclear weapon by IAEA. I set the hypothesis that the inspection game can use for decrease the illegal connection.



II -2-2. "inspection game"

- I set the hypothesis, and calculate inspection game of SW. The result was "inspect all the house" is Nash equilibrium.
- So how about this suggestion below:
 - inspect frequently and increase opportunity.
 - reinforcement of pain policy.
 - widely "inspection" to user, restrain illegal connection.

Radically, deter illegal connection,
 need reform the system.

II -2-2. "inspection game"

According to interview to people, many people told me this; "ODA is useful for us", "JICA/ODA is helping people in Solomon islands".

To prove those comment by mathematically, I use regression analysis.

**III. Regression analysis
ODA and DGP**

- By technical side, the NRW project looks successfully, make this project more efficient please focus on to systems and policy making.
- One of the reason of ODA is standing for Peace Keeping. I am grad to join the Solomon Water, Thank you for your cooperation.

IV. Conclusion

- Predictor Variable=ODA, JICA/ODA, Grant Aid/ Technical cooperation ODA
- Explained Variable=GDP of Solomon islands

All of those variable have correlation.

**III. Regression analysis
ODA and DGP**



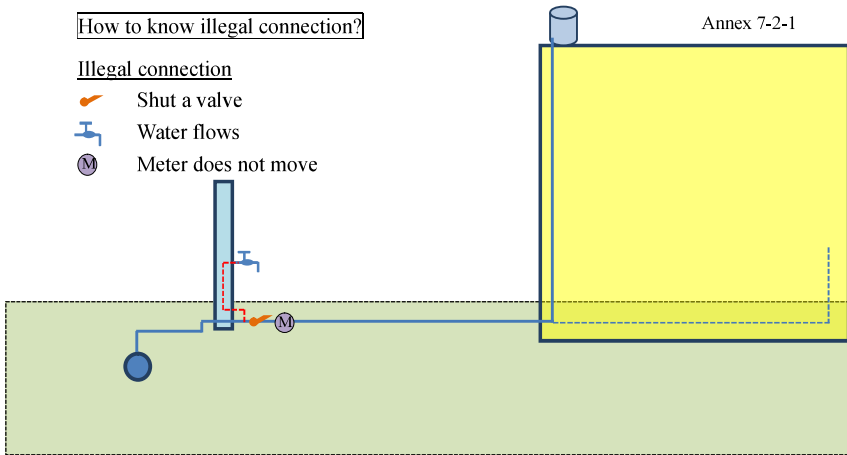
Thank you for your listening!

**S13.3-23 検針訓練（不法接続および宅内漏水発
見手法）**

How to know illegal connection?

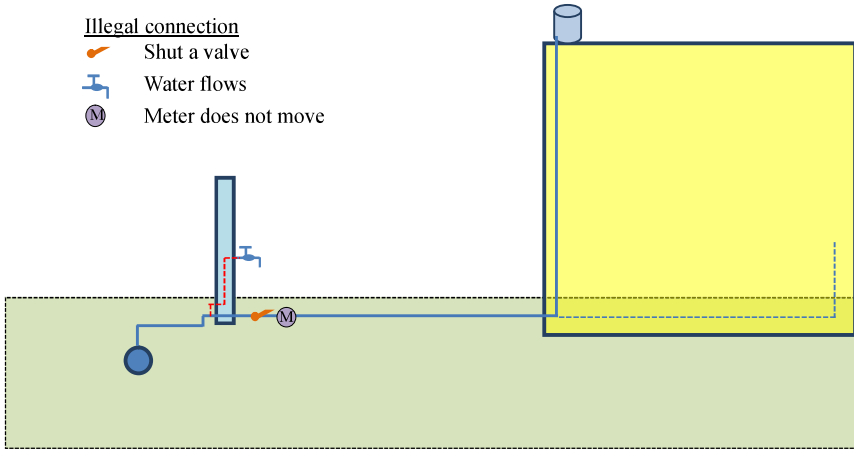
Illegal connection

- ✔ Shut a valve
- ⤵ Water flows
- Ⓜ Meter does not move



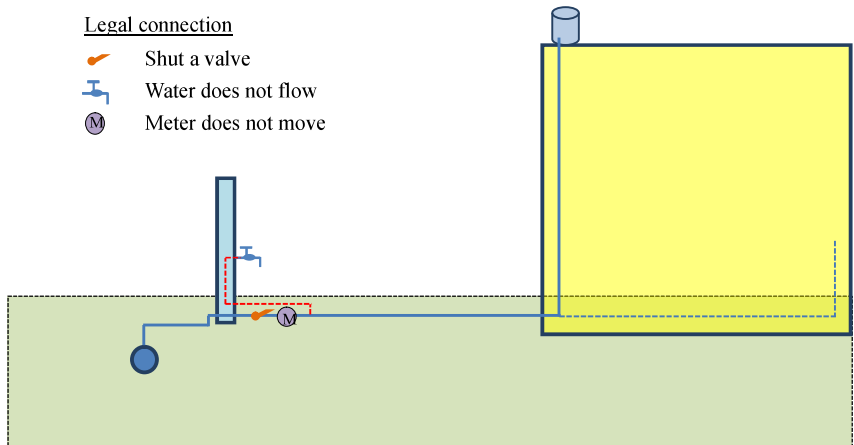
Illegal connection

- ✔ Shut a valve
- ⤵ Water flows
- Ⓜ Meter does not move



Legal connection

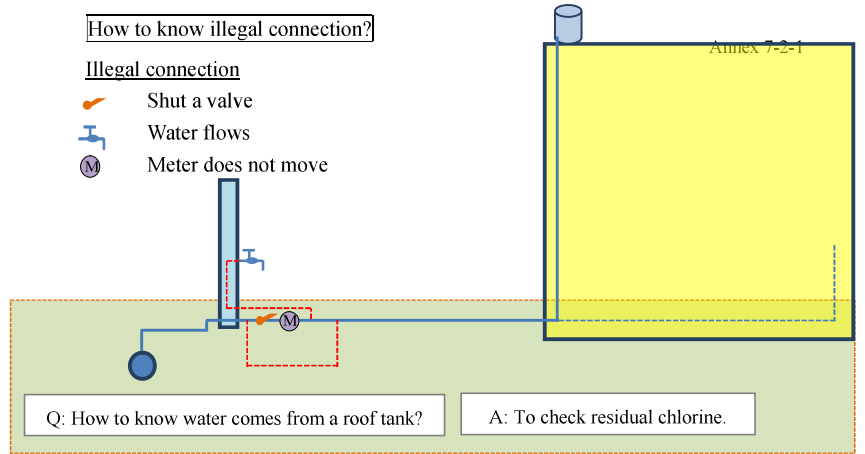
- ✔ Shut a valve
- ⤵ Water does not flow
- Ⓜ Meter does not move



How to know illegal connection?

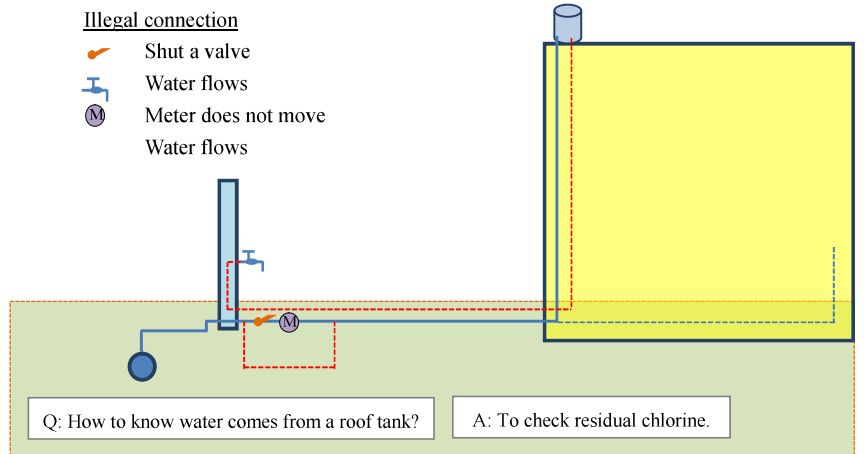
Illegal connection

- ✔ Shut a valve
- ⤵ Water flows
- Ⓜ Meter does not move



Illegal connection

- ✔ Shut a valve
- ⤵ Water flows
- Ⓜ Meter does not move
- ⤵ Water flows



Legal connection

- ✔ Shut a valve
- ⤵ Water flows
- Ⓜ Meter does not move
- ⤵ Water does not flow

