

WATER SAFETY PLAN : FINDINGS AND LINKS WITH WASTEWATER MANAGEMENT

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Nam Raj Khatri (namrajkg@gmail.com)

WSP PILOT AREA



SN	Name
1	Dili (Lahane)
2	Dili (Central)
3	Manatuto (Villa)
4	Manatuto (Cribas)
5	Aileu (Villa)
6	Aileu (Raifusun)
7	Liquisa (Villa)
8	Liquisa (Moraes)
9	Oecusse (Oetelu)
10	Oecusse (Oefoko)

TYPES OF CONTAMINATION



Source contamination



Un safe reservoir



Safe system



Partial treatment



TC AND E-COLI BEFORE AND AFTER IMPROVEMENT

After Improvement (June 2016) (Green font indicates sample with FRC presence)

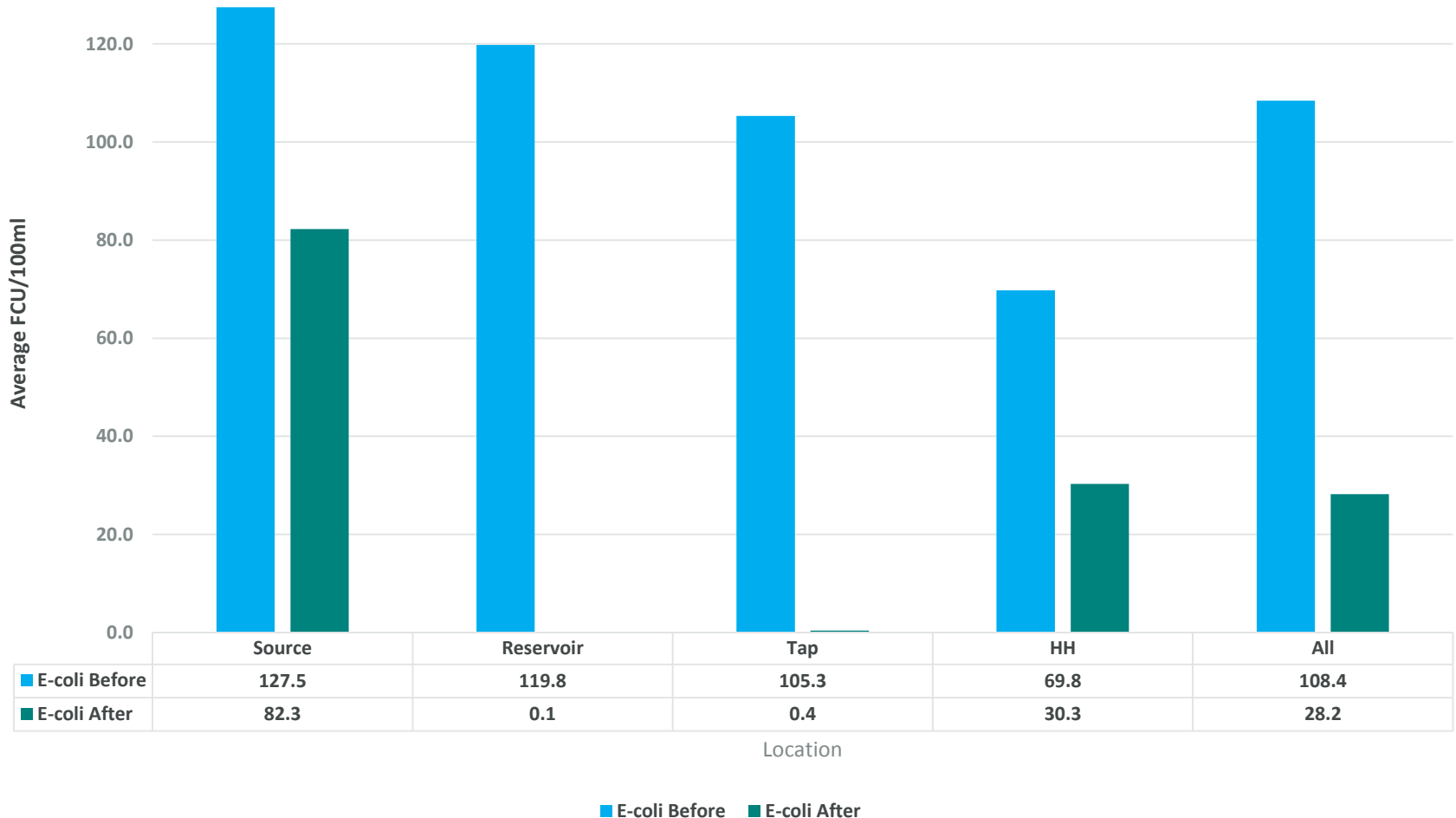
WSP	TC				E-coli					
	Source	Tank	Tap	HH	Source	Tank	Tap	HH		
Manatuto (U)	0		4	2	1	0	2	0	0	4
Manatuto (R)		7	2 TNC	TNC		0	0	3	3	2
Aileu (U)	0		0	0 TNC		0	0		TNC	5
Aileu (R)	TNC		0	0	0 TNC		0	0	0	6
Dili (Central)	TNC		0	0	0 TNC		0	0	0	6
Dili (Lahane)	TNC		0	0	0	0	0	0	0	7
Liquisa (U)	TNC		0	0	0	5	0	0	0	6
Liquisa ®	TNC		0	0	0 TNC		0	0	0	6
Oecusse(U)	0		0	0	0	0	0	0	0	8
Oecusse®		1	1	0	0	0	0	0	0	6
									56/80	70 %

Before Improvement (December 2015) (Green font indicates sample with FRC presence)

WSP	TC				E-coli					
	Source	Tank	Tap	HH	Source	Tank	Tap	HH		
Manatuto (U)		38	28 TNC		18	2	0	0	0	3
Manatuto (R)	TNC	TNC	TNC	TNC		10	7	5	6	0
Aileu (U)	0	TNC	TNC	TNC	0	TNC	TNC	TNC		2
Aileu (R)	TNC	TNC	TNC	TNC	TNC	TNC	TNC	TNC		0
Dili (Central)	TNC	TNC		1	7 TNC		3	0	0	2
Dili (Lahane)		12	0	0	0	0	0	0	0	7
Liquisa (U)	TNC	TNC	TNC	TNC	TNC		8 TNC	TNC		0
Liquisa ®	TNC	TNC		0 TNC	TNC	TNC		3	2	1
Oecusse(U)	0	TNC			0		18			2
Oecusse®		TNC	TNC		40	TNC	TNC		20	0
									17/80	21 %

TC AND E-COLI BEFORE AND AFTER IMPROVEMENT

E-coli distribution before and after WSP



POTENTIAL HAZARDS AT VARIOUS LOCATIONS

Control measures and status		Present condition (A)OK, (B)Need improvement, (C) Need new one)
	Source Area	
1	Protection of catchment and intake points from contamination	
2	Drainage near intake point to divert surface water	
3	Conservation of catchment area by vegetation and Pollution control.	
4	Control of unwanted access of animal and people at intake	
	Reservoir Tank Area	
1	Fencing of the reservoir tank and cover inspection cover	
2	Tank free from leakage	
3	Removal of bacteria by adding chlorine	
4	Regular cleaning of tank	
	Distribution Area	
1	Control of leakage from pipes	
2	Protection of pipe from heat and human action	
3	Control of pollution from pipes, joints and valves by waste waters	
4	Pipe free from bio-film or regular washout	
	Consumer Area	
1	Safe storage and use of water at home	
2	Hand washing practices	
3	Clean tapstands	
4	Clean households and use of improved toilets	

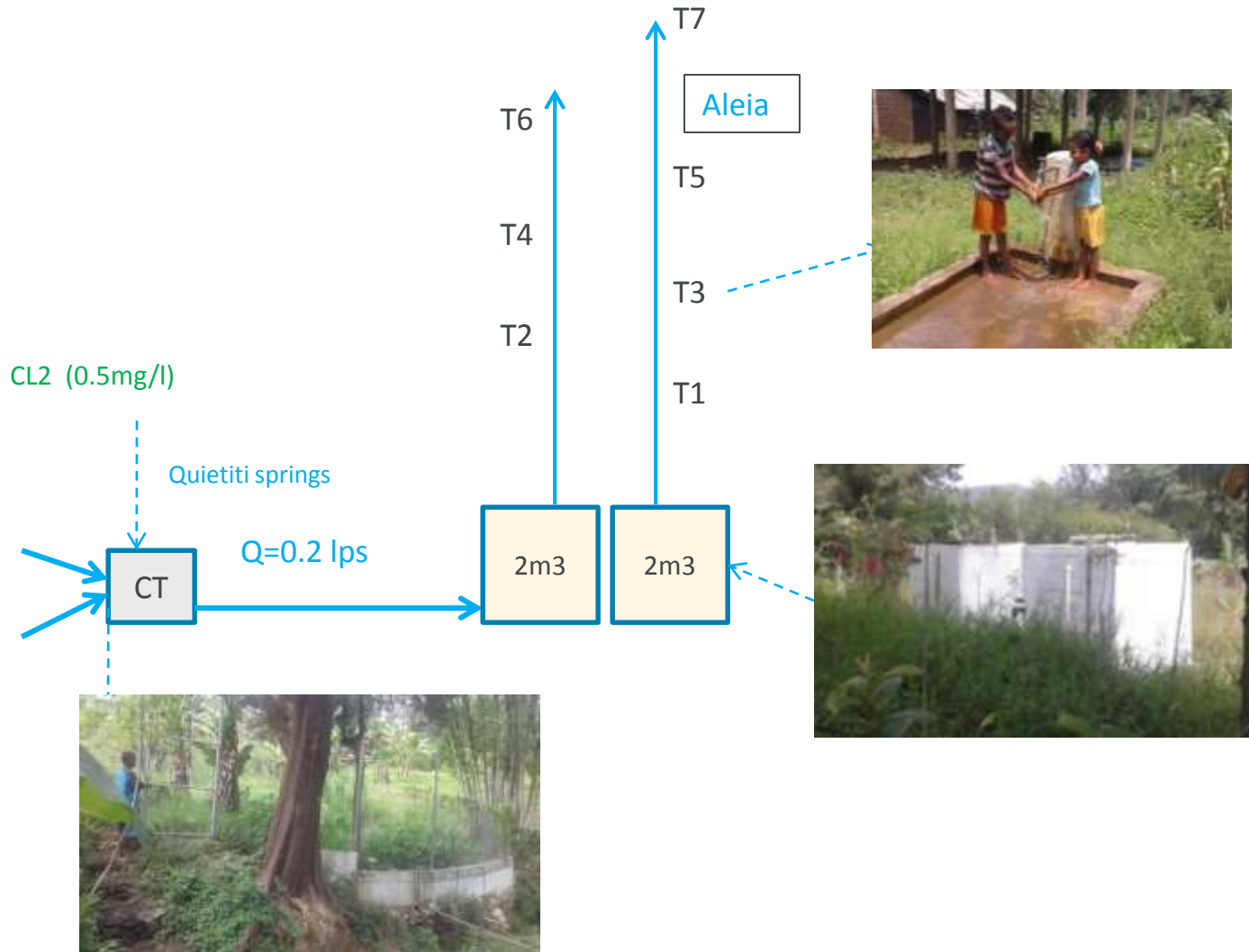
WATER PRODUCTION AND LEAKAGES

SN	System	LPCD
1	Dili (Lahane)	917
2	Dili (Central)	868
3	Manatuto (Villa)	212
4	Manatuto (Cribas)	22
5	Aileu (Villa)	60
6	Aileu (Raifusun)	114
7	Liquisa (Villa)	169
8	Liquisa (Morae)	77
9	Oecusse (Oetelu)	94
10	Oecusse (Oefoko)	126

WATER PRODUCTION AND LEAKAGES

SN	Name	Operation cost (\$/per m3)	Production LPCD	Diarrhea cases in 2013(%)	HH	Supply hours
1	Dili (Urban: Lahane)	0.04	917	8.3	470	8/7
2	Dili (Urban:Central)	0.04	868	8.3	993	11/7
3	Manatuto (Urban: Villa)	0.12	212	8.4	916	3/7
4	Manatuto (Rural:Cribas)	0.07	22	12.6	227	12/7
5	Aileu (Urban: Mantane)	0.4	60	17	991	5/6
6	Aileu (Rural: Raifusun)	0.08	114	17	25	6/7
7	Liquisa (Urban: Sarlema)	0.18	169	13	527	3/3
8	Liquisa (Rural: Morae)	0.18	77	12	56	5/7
9	Oecusse (Urban: Oetelu)	0.08	94	7.1	2325	8/7
10	Oecusse (Rural: Oefoko)	0.03	126	4.9	129	7/7

Process Map: Aileu Raifusun



LINKAGE WITH WASTE WATER

- ❖ There is high level of leakage in the both rural and urban water supply system
- ❖ There is onsite wastewater management system principally but waste water comes in the drainage
- ❖ Water distribution pipes are running through the drainage
- ❖ There is intermittent system of water supply
- ❖ There is high chances of water contamination in the distribution system even the water is safe at reservoir level
- ❖ Chlorination system is there is both urban and rural but it is not regularly applied
- ❖ People mostly boil water for drinking as instructed by ministry of health

CL2 Dosing Process, Timor Leste, 2017



Nam Raj Khatri (namrajkg@gmail.com)

Chlorine dosing flow diagram

$Q = 40 \text{ m}^3/\text{day}$

Effective chlorine: 0.5(50%)

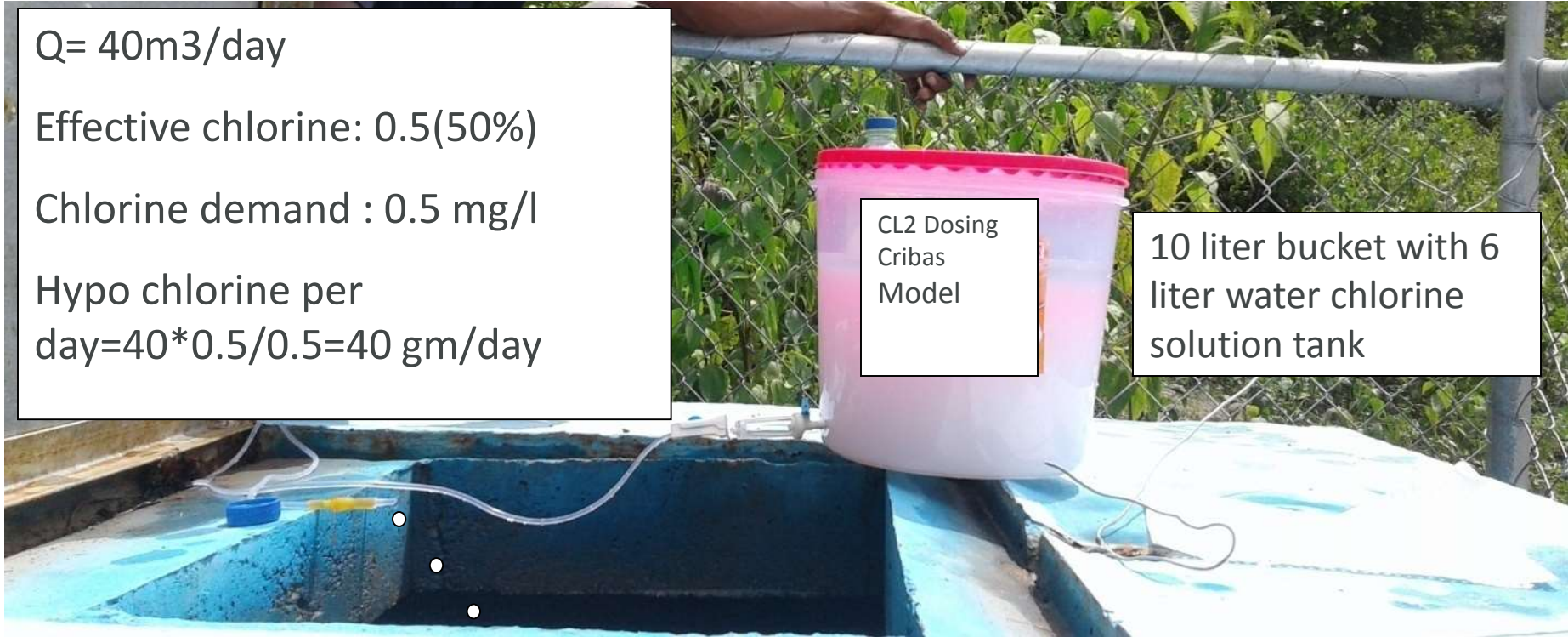
Chlorine demand : 0.5 mg/l

Hypo chlorine per
day = $40 * 0.5 / 0.5 = 40 \text{ gm/day}$

CL2 Dosing
Cribas
Model

10 liter bucket with 6
liter water chlorine
solution tank

Flow = 4.2 ml/min



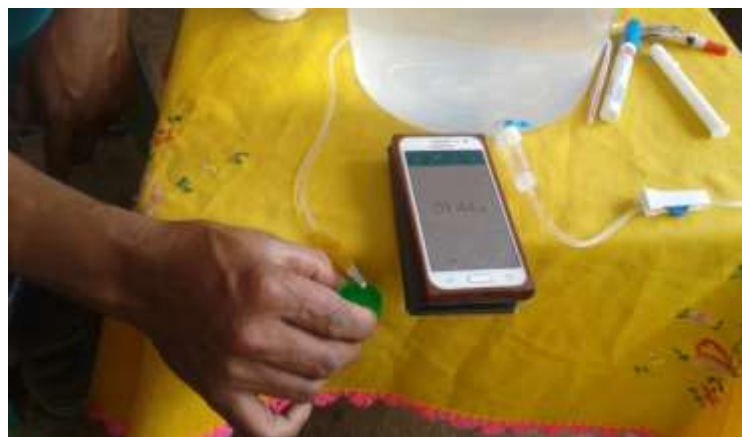
Preparation of CL2 dosing kit



Make a hole in Plastic bucket slightly smaller than head of slain pipe.



Fit Head of Slain pipe in to the plastic bucket . Apply super glue for safety



Adjust flow from the slain pipe with regulator and measure flow.



Add required CL2 powder in a Aqua bottle

THANK YOU

