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A Review of Fecal Sludge Management in 12 Cities

Annexure A.10
Palu, Indonesia

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FINAL DRAFT

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Link to full report: http://www.susana.org/en/resources/library/details/2212

A.10 Palu, Indonesia

All data sourced from Tayler (2013) except where shown.

A.10.1. Summary

Population (millions)	0.35
Percentage of households using on-site sanitation or open defecation	100%
Percentage of total fecal waste (sewage and fecal sludge) safely managed	up to 86%
Percentage of sewage safely managed	NA
Percentage of fecal sludge from OSS safely managed	up to 95%

FSM Framework	Improving
FSM Services	Partial
City Type	3

Most households in Indonesia cities use on-site sanitation (62%) while access to sewerage is low (2.3%); treatment of collected sludge does however lag far behind (4%) (USAID, 2010). There is no sewer network in Palu and it is estimated that over 90% of the households have access to on-site sanitation. These households are served by a local government run FSM service which collects, treats and disposes of the sludge effectively. The demand for the service is low and this is due in part to the type of containment used, the high percolation rate and the local trend for building large tanks that take a long time to fill.

A.10.2. Institutional framework

Brief summary of who is responsible for urban sanitation in the country and in the city if different…

In Indonesia, sanitation is fragmented across the ministries of health, infrastructure, planning and the environment each of which has developed laws that impact on sanitation practices. The major national agencies include the National Development Planning Agency (BAPPENAS), Ministry of Public Works (MPW), Ministry of Health (MoH) and Ministry of Environment (MoE) while at the local level key agencies include the Local Environment Agency (BLH), the Sanitation Agency (Dinas Kebersihan dan Pertamanam – DKP) and Water Utilities (Perusahaan Daerah Air Minum –PDAM). The fragmentation and overlap of authority among so many agencies makes it difficult to create integrated plans for sewerage and FSM development. These national agencies have not provided sufficient policy guidance or funding for cities to develop the necessary institutional and physical capacity and, despite the fact that 66 percent of urban residents use on-site sanitation, in many cities the institutional and legal framework for septage collection, treatment and disposal remains disorganized (USAID, 2010).

Nevertheless, there is evidence that the Government of Indonesia accepts that on-site sanitation will continue to be the norm in urban areas apart from in densely populated areas. These will be served by local 'communal' sewered systems discharging to 'DEWATS' treatment plants. Both local sewerage and on-site systems will require provision for septage removal, transport and treatment. This is recognised in the Government of Indonesia's *Acceleration of Sanitation Development in Human Settlements (PPSP*) Program. Furthermore, as part of its commitment to on-site and

decentralised systems, the Ministry of Public Works (*Menteri Pekerjaan Umum* or *PU)* will make substantial investments in septage treatment through 2014. Over 150 septage treatment facilities (*Instalasi Pengolahan Lumpur Tinja* or IPLT) were built in Indonesia during the 1990s and by 2009 fewer than 10% of these facilities were still operational; rehabilitation of these facilities is a key challenge to improving FSM service delivery in Indonesia.

Palu's septage is managed by a local technical implementation unit (*unit pelaksana teknis daerah or UPTD*) which falls under Palu Kota's Cleansing and Landscaping Agency. Solid waste management is the responsibility of a separate UPTD under the same agency.

A.10.3. The FSM scorecard

Description of key points in SDA scorecard….

The FSM scorecard for Palu shows that the core of the enabling environment is in place although fragmentation and overlap of authority means that further improvement is required. Overall, there is also significant improvement in the developing and sustaining pillars. The national focus on rehabilitation of treatment plants is evident in the high scores for this part of the chain, while locally in Palu the expenditure, output and maintenance elements all highlight the good level of service being provided to households accessing the service.

Significant areas of weakness remain in the lack of expansion planning to serve the rest of the city and particularly in reuse/disposal which remains a clear need in all three pillars.

A.10.4. FSM along the sanitation service chain

A brief description of each part of the chain….

Containment:

Sanitation coverage in Palu is over 91%, provided through up to 70,000 household latrines and 45 communal sanitation facilities (known as MCK units). All sanitation is on-site and most households use pour-flush water closets that discharge to a single compartment open-bottomed tank (locally known as a cubluk) rather than a septic tank with drain field or soakaway. The Ministry of Public Works (PU) provides guidance on on-site sanitation but there are no systems and regulations for implementing this guidance. In low-income areas, some tanks are inaccessible to conventional sludge tankers. Recognizing this problem, residents build large tanks, hoping to defer the need for tank emptying into the distant future. Indeed, tank capacities vary from less than $2m^3$ to over $12m^3$.

Emptying:

The septage management UPTD operates two $4m^3$ capacity sludge tankers, both of which date from 2006 and are in reasonable condition. Together, these tankers desludge an average of about 1400 tanks per year, meeting current demand and operating efficiently, close to their maximum capacity. However, even considering a three-year emptying cycle this amounts to less than a tenth of the pits in Palu – demand for pit emptying is therefore low.

Transport:

The two tankers haul the emptied sludge to a septage treatment facility. There are no reports of waste being illegally discharged en-route and it is understood that the plant receives 100% of the sludge emptied.

Treatment:

The PU constructed a septage treatment facility (*Instalasi Pengolahan Lumpur Tinja* or IPLT) about 12 years ago as a 'model' facility. It consists of an Imhoff tank, intended to separate the solid and liquid portions of sludge, sludge drying beds for the solid portion and a series of waste stabilization ponds to treat the liquid portion. The design capacity

of the IPLT is 72m^3/d. Low demand for tank emptying services means that it currently receives less than a third of this loading. Nevertheless, and following rehabilitation of the plant, the plant is understood to be treating the sludge satisfactorily and 100% of the sludge emptied is currently treated before disposal.

Reuse/disposal:

There is no formal reuse of treated fecal sludge in Palu.

A.10.5. Outcome

An overview or summary of the situation (i.e. poor FSM service delivery, limited FSM service delivery or partial FSM service delivery)

The FSM service delivery framework in Palu is improving and a 'partial' level of service is being delivered to the city's households. Despite the low volumes of sludge emptied and treated (9% of the total fecal waste generated) it is suggested that an additional 77% of the total fecal waste generated is currently safely contained. This situation is satisfactory in the short-term but it may be less so in the medium to long-term. Regular desludging is important for conventional septic tanks receiving all household wastewater since neglecting it will result in clogging of drain fields and soakaways, failure of the percolation mechanism and flooding from the tank. The same or worse problems might be expected from the commonly used open-bottomed type tanks if they clog up, stop percolating and flood[12]. A regular desludging programme would reduce this possibility but the data suggests that this would require deployment of additional vacuum trucks; there is, however, excess capacity within the treatment facility to cope with an increase in flow.

References

Giltner, S., Warsono, M., Darmawan, B., Blackett, I., & Tayler, K. (2012). *Development Of Urban Septage Management Models In Indonesia: : Paper prepared for FSM2, Durban, South Africa* (Vol. 4743, pp. 1–11).

Tayler, K. (2013). *Palu Report - Draft. Jakarta, Indonesia: WSP EAP.*

Tayler, K. (2013a). *Personal communication*.

USAID (2010). *A Rapid Assessment Of Septage Management In Asia: Policies And Practices In India, Indonesia, Malaysia, The Philippines, Sri Lanka, Thailand, And Vietnam*.

[12] Tayler (2013) also observes that the lack of demand for tank emptying suggests that percolation failure is less common than might be expected.

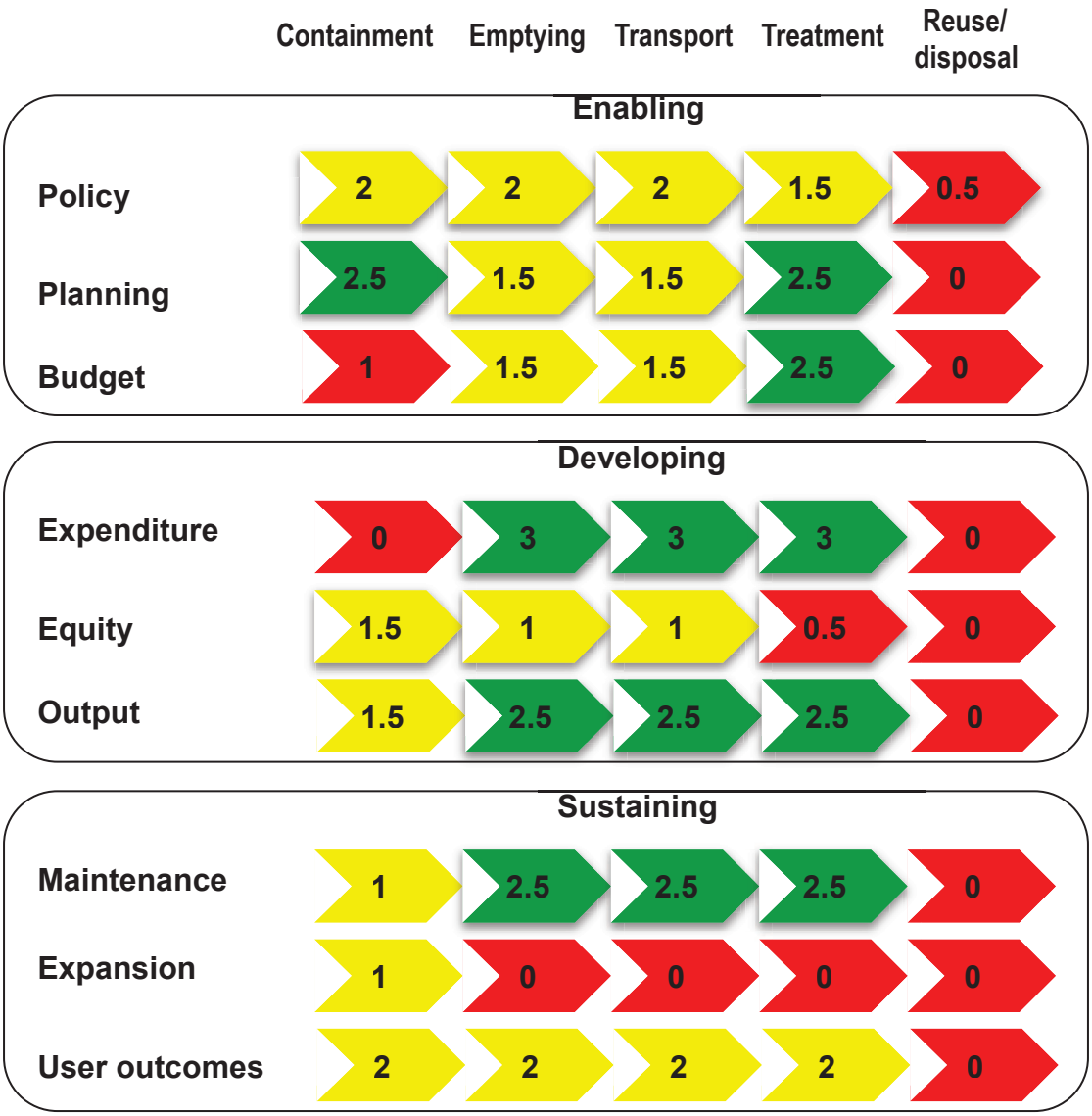
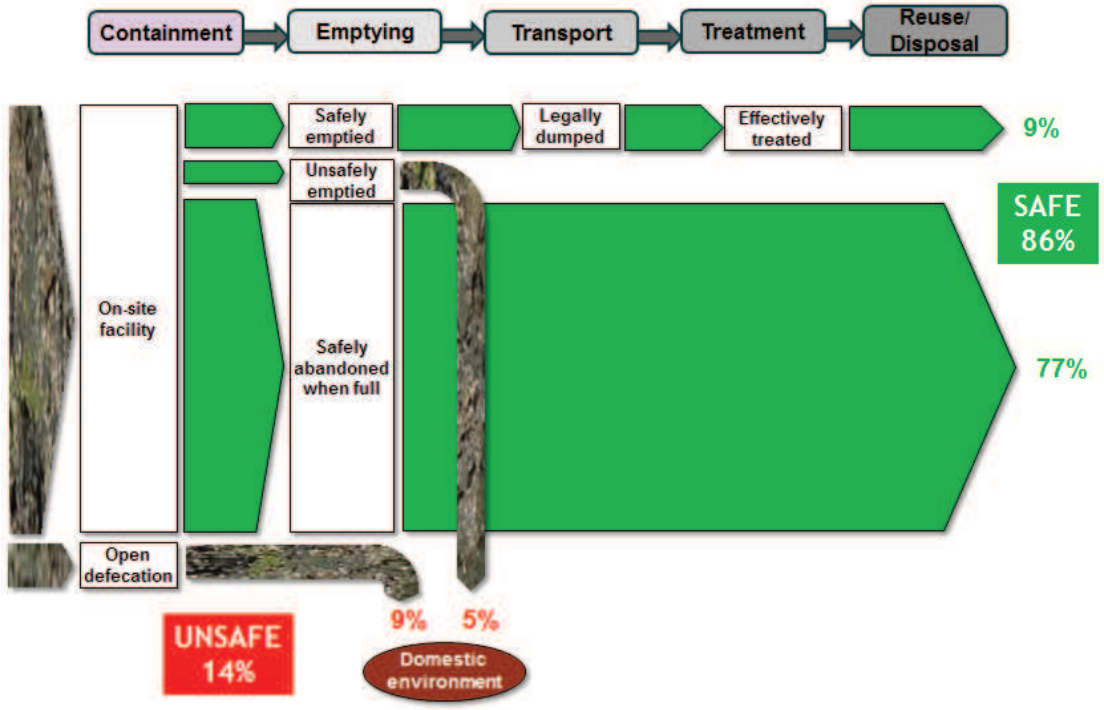


Figure 48: FSM scorecard for Palu, Indonesia

Fecal waste flow matrix Type of system	% of FW	*of which safely collected*	*of which safely delivered*	*of which safely treated*	**Safe: 9% to 86%**
Sewered (off site centralised or decentralised)	0%	100%	60%	0%	**0%**
On-site containment - permanent/emptiable	14%	65%	100%	100%	**9%**
On-site containment - cubluks (see note 1)	77%	100%	100%	100%	**77%**
Open defecation	9%	0%			
Unsafe: 14% to: 91%		**14%**	**0%**	**0%**	
Affected zones		*local area & drainage*	*drainage system*	*receiving waters*	

Notes:
1. 90% of the containers in Palu are either built very large and will take a long time to fill; and/or are open-bottomed pits (known as cubkuks) which percolate very efficiently, so accumulation rates are low. The fecal waste in these containers is therefore considered to be 'safely disposed of' but the exact number is unclear, therefore the total values are shown as ranges.
2: All sources shown in waste flow diagram below.

Figure 49: Fecal waste flow matrix for Palu, Indonesia



Sources: All from Tayler (2013) except where stated.
On-site sanitation 91% of households; open defecation 9% of households.
Mechanical emptying by municipality 10% of OSS; not emptied 85% of OSS.
Emptied and discharged to the environment 5% of OSS (nominal amount from Tayler, 2013a)

Figure 50: Fecal waste flow diagram for Palu, Indonesia