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This document is a synthesis of a three-year collaborative transdisciplinary action research project to improve the long-term governance of local scale wastewater services (see website: communitysanitationgovernance.info).

To monitor the impact of this synthesis, we are keen to gather feedback on what resonates and what is missing. If you have comments or suggestions, please contact us (see the last slide).
Abbreviations

- **BUMD**: Badan Usaha Milik Daerah (Local Government-owned enterprises)
- **CBO**: Community based organisation
- **GOI**: Government of Indonesia
- **HH**: Household
- **IDR**: Indonesian rupiah
- **KSM**: Kelompok Swadaya Masyarakat (Community-based organisation, CBO)
- **LG**: Local government
- **MCK**: Mandi, Cuci, Kakus (Public Washing & Sanitation Facilities)
- **NGO**: Non-governmental organisation
- **O+M**: Operation and maintenance
- **PERDA**: Peraturan Daerah (Regional regulations)
- **SSS**: Simple sewer system

Acronyms for Indonesian sanitation programs

- **SANIMAS**: Sanitasi Berbasis Masyarakat (Community-Based Sanitation)
- **USDP**: Urban Sanitation Development Programme
- **USRI**: Urban Sanitation and Rural Infrastructure Project, funded by ADB
DOCUMENT OVERVIEW

This document has five sections:

1. Introduction to project
2. Project methodology
3. Key research findings
4. Key recommendations
5. Supporting recommendations
Introduction
The fundamental outcome of sewage management is to separate people from harmful excreta pathogens, and protect the environment.

Increasingly, it also seeks to capture the value: nutrients etc.
The Indonesia 2019 sanitation coverage target for improved access prioritises on-site.

85% On-site

7.5% Local scale

7.5% Centralised

But local scale is significant. It will service the same number of people as centralised systems.
Our focus is on local scale, which can be called many names.

- SANIMAS
- DEWATS
- Communal treatment
- Distributed
- Decentralised
- Local scale

The term ‘Local scale’ reminds us that other groups can Operate and Manage this scale of service along with, or instead of, community.

(Figure: T. Rosenqvist)
Meeting the 2019 target means constructing many more local scale systems.

Requires IDR 40T

- 2009 IDR 5T
- 2014 13,000
- 2019 100,000
What about operation?

Whilst some community scale sanitation systems work well, many have challenges

(Eales et al [WSP], 2013)

How do we ensure systems actually function in the long term?
Project Details: Effective governance for the successful long-term operation of local scale sanitation systems

**Duration**  May 2013 – June 2016

**Funding**  Australian Aid Development Research Awards Scheme
Contributors: UTS, ISF, BORDA

**GoI Partners**  BAPPENAS (Partnership Agreement)

**Methodology**  Transdisciplinary Participatory Action Research

**Collaborators**  Local Partner: AKSANSI
International Partners: BORDA Germany, ODI
Expert Advisors: Kathy Eales, Jeff Moeller, Chris Buckley
Methodology
Our mixed method approach includes qualitative and quantitative data collection, analysis and synthesis. This involves:

- **Semi-structured interviews** and focus group discussions with diverse groups including:
  - communities and village leaders,
  - local NGOs,
  - Government of Indonesia (GOI) and local government (LG) staff and leaders,
  - representatives from the main funding programs of local scale sanitation systems (GoI and donor), and
  - the Jakarta-based national Project Advisory Group

- **Observations** during study site visits on Java and South Sulawesi (~30),

- **Document and data set reviews and analysis.**
Our fundamental framework is multi-level governance:

Day to day activities that ensure system functionality

+ 

Formal and informal institutional arrangements that help or hinder the day to day

That means our focus was on

1. **What** needs attention

2. **Who** has what responsibilities and **how** should those responsibilities happen in practice

(Kooiman 2003, Kooiman 2008)
Our Global Practice Scan identified ‘what’ needs attention for long term success for local scale services.

<table>
<thead>
<tr>
<th>Functioning technology:</th>
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<td>Maintaining effective community demand for the service over time</td>
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(Ross et al, 2014)
Then with partners, we carefully chose 4 areas of inquiry that together provide powerful insights and improvements.

**Performance monitoring:**
What is the volume and quality of available data on community-based sanitation performance?

**Legal arrangements:**
What are the legal and informal arrangements for the Operation phase?

**Scale and distribution of costs:**
For a range of sanitation service delivery models, what are the scale and distributions of cost?

**Management partnerships:**
What are the range of structures and institutional arrangements that could deliver the responsibilities for managing community-scale systems?
Transdisciplinary, participatory, action research:

Performance monitoring
Legal arrangements
Cost scale & distribution
Management partnerships

National
Provincial
Local
NGOs
CBOs
Operators
Users
Performance monitoring

What is the volume and quality of available data on community-based sanitation performance? (Oct – Dec 2014)

(Mitchell et al, 2016)
A. City Case Study:
Institutional arrangement analysis to understand limits to, and prospects for, local scale sanitation service

(Mason et al, 2015)

B. Legal review:
Review 55 docs on:
• National regulation
• LG regulation
• Ownership outcomes
• LG funding options
• Legal entities for CBOs

(Al’Afghani et al, 2016)
For a range of sanitation service delivery models, what are the scale and distributions of cost? (Feb – August 2015)

Scale and distribution of costs:

- Documents
- Workshops

(Mitchell et al, 2016)
Management partnerships:
What are the range of structures and institutional arrangements that could deliver the responsibilities for managing community-scale systems?

(Ross et al, 2016)
Key Findings
Summary of key findings

1. Little **monitoring** occurs in practice
2. Local scale sanitation service has many **challenges** in practice
3. There are legal, institutional, equity, and normative **drivers** for increased LG participation and responsibility
4. Some LG already provide financial and/or legal **support** to local scale sanitation systems, but it is not always helpful
5. LG can **fund** the operation and maintenance phase for assets it does not own
6. Several **barriers** limit LG support
Key findings:

1. Little monitoring occurs in practice
The need to monitor effluent is recognised, but is challenging in practice, because of e.g., lack of **funds**, uncertainty about **responsibility**, access to **labs** and the **quality** of the lab testing.
Records are limited and disaggregated.
The collective, long-term performance of these systems appears to be unknown at both local and national levels.

20% post-construction check

2% had effluent data available for study

of which, 50-80% met standards.

<1% monitored longitudinally.

80% of systems appear to have had no assessment.

(Source: PU, ADB, AKSANI)
Monitoring primary impacts (human health, water quality) and governance aspects does not seem to occur routinely.

<table>
<thead>
<tr>
<th>Components of post construction check:</th>
<th>Governance aspects</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Financial sustainability</td>
<td>Functioning technology</td>
</tr>
<tr>
<td>Funded by: DAK SLBM</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>(77% of systems)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SANIMAS PU</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>(11% of systems)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USRI</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>(10% of systems)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitored by: AKSANSI</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>NAWASIS</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

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Data suggests average use of local scale systems could be about **half of system design**.
Key Findings:

2. Local scale sanitation service has many challenges in practice
Available data suggests declining technical performance is linked to rapid scale up and weaker capacity building.

Effluent was tested in 2011 (Eales et al). The majority of systems were SANIMAS and met standards (n=99).

Anecdotally, 50% compliance (n=~70) (pers comm).

80% had a BOD <100 mg (n=45).

Available data suggests declining technical performance is linked to rapid scale up and weaker capacity building. Independent testing by AKSANSI of a variety of systems under different funding sources, from 2011 to 2014 showed less than 60% compliance (n~300).
Cash contributions in construction phase of local scale systems are required by GoI from community. Scale of contribution varies, but can be significant and prohibitive.

<table>
<thead>
<tr>
<th>Cash</th>
<th>Cash Range (median)</th>
<th>Who pays?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal documentation for land security¹</td>
<td>IDR 1.5M – 5M</td>
<td>community</td>
</tr>
<tr>
<td>Acquiring land³</td>
<td>IDR 30M – 150M</td>
<td>community or donor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(mosque, individual)</td>
</tr>
<tr>
<td>CBO notarisation³</td>
<td>IDR 0.6 M</td>
<td>community</td>
</tr>
<tr>
<td>Pipework, treatment system</td>
<td>IDR 3M – 16 M (9 M)</td>
<td>community</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HH connection</td>
<td>IDR 0.3M – 3 M/hh (1 M/hh)</td>
<td>Often users, sometimes program</td>
</tr>
</tbody>
</table>

Sources: ¹ AKSANSI members; ² BEST; ³ Bogor CBO workshop and agencies; ⁴ For SLBM Regular, 4% community contribution
Program design may inadvertently prevent health outcomes.

- Sites chosen on basis of land availability or affordability
- Program design excludes pumps
- Program design does not pay for HH connection
- Program design has one CBO for installation and one for post-construction
- Program design does not include enough socialisation

- HHs that are lower than the treatment plant cannot connect
- Poor HHs cannot connect

- Incomplete coverage of HHs
- System does not function properly

- Effluent is not processed in the system

- System does not utilise less capacity

- Drinking water & environment contamination

- Inability to raise fees
- Challenges in collecting fees
- Insufficient maintenance funds

- CBO may lack authority in fee setting and collection
- Insufficient funds

- Poor performance unnoticed
- Lack of pathogen or health monitoring

[ In this systems diagram the arrows are to be read as “causes” or “contributes to” ]
Communities typically fail to legally secure the land: most CBOs have informal letters (*surat hibah*) at best.

<table>
<thead>
<tr>
<th>Type</th>
<th>Level of security</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Akta tanah (Land deed)</td>
<td>High</td>
</tr>
<tr>
<td>2. Akta hibah (Grant act)</td>
<td>Middle</td>
</tr>
<tr>
<td>3. Surat hibah (Letter &amp; stamp)</td>
<td>Low</td>
</tr>
<tr>
<td>4. Permit for govt land</td>
<td>Low</td>
</tr>
<tr>
<td>5. Verbal</td>
<td>Low</td>
</tr>
</tbody>
</table>

Reasons include:

- Cost
- Program design
- Knowledge gap
- CBO is not a legal entity
Contamination still occurs after system construction.

- Not all HH may connect
- Poor construction or O+M
- Septic tank may not be properly disconnected after connecting to treatment plant
- Pipes may leak
- Systems may not have enough effluent to function properly
- Effluent may not meet standards and be released to drinking water source
- Contamination / Pathogen removal limited

[In this systems diagram the arrows are to be read as “causes” or “contributes to”]

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CBOs has difficulty managing many important tasks.

<table>
<thead>
<tr>
<th>Manageable tasks</th>
<th>Challenging tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Successful operation</strong></td>
<td><strong>Challenging tasks</strong></td>
</tr>
<tr>
<td>✓ Flush the system</td>
<td>✓ Major repairs and rehabilitation</td>
</tr>
<tr>
<td>✓ Check pipes for cracks</td>
<td>✓ De-sludge every 2-4 years</td>
</tr>
<tr>
<td>✓ Plan and track completed O+M tasks</td>
<td>✓ Monitor effluent</td>
</tr>
<tr>
<td>✓ Fix blockages</td>
<td>✓ Optimise unused facilities (communal &amp; unconnected simple sewer systems)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Sustainable financing</strong></th>
<th><strong>Challenging tasks</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Keep records of group assets</td>
<td>✓ Collect user fees</td>
</tr>
<tr>
<td></td>
<td>✓ Plan &amp; budget for major expenses, uncertainty, emergencies</td>
</tr>
<tr>
<td></td>
<td>✓ Source supplementary income streams</td>
</tr>
<tr>
<td></td>
<td>✓ Manage the treasury book and bank account</td>
</tr>
<tr>
<td></td>
<td>✓ Prepare financial accountability report</td>
</tr>
<tr>
<td></td>
<td>✓ Forecast recurrent costs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Sustaining demand</strong></th>
<th><strong>Challenging tasks</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Conduct health campaign</td>
<td>✓ Educate about the benefits of the system</td>
</tr>
<tr>
<td>✓ Remind users of their responsibilities &amp; provide support</td>
<td></td>
</tr>
<tr>
<td>✓ Conduct monthly users meetings</td>
<td></td>
</tr>
<tr>
<td>✓ Clean the communal systems</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Effective management</strong></th>
<th><strong>Challenging tasks</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Host regular management meetings</td>
<td>✓ Pay operator</td>
</tr>
<tr>
<td>✓ Keep complaint recording mechanism</td>
<td>✓ Ensure operator legitimacy in community</td>
</tr>
</tbody>
</table>

(Source: AKSANSI)
Key findings:

3. There are legal, institutional, equity, and normative drivers for increased LG participation and responsibility
Legal drivers
for increased LG participation and responsibility
Legally, local government is responsible. According to a review of national law and legislation, sanitation is largely missing from national and local regulation.

However, sanitation is described as:

• A basic service (must be provided by regional government)
• Mandatory (every region must carry it out)
• A Concurrent affair (carried out by central + regional government)

(Al Afghani et al, 2016)
Legally binding **ownership** of systems is unclear post construction.

From a technical legal perspective, only a legal entity can legally own the assets (land and system). Community [‘masyarakat’] and operational CBOs are not legal entities. Current asset transfer documentation and processes are unlikely to be legally binding.

(Figure: T. Rosenqvist)
Institutional drivers
for increased LG participation and responsibility
In the long-term, institutional arrangements put LG in a pinch for supporting local scale services.

- Political drive for sustainable sanitation from national, provincial and regional leaders
- Expectations that LG is guarantor of service delivery
- Expectations as a result of LG involvement in scheme construction
- Inability of CBOs to sustain quality local scale services in the long term
Equity drivers
for increased LG participation and responsibility
Voluntary contributions of time from community members during construction are significant, especially for economically vulnerable people.

<table>
<thead>
<tr>
<th>Voluntary person days</th>
<th>Who pays?</th>
<th>Additional Donations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range (Median)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Securing land</td>
<td>25 (^2)</td>
<td>community</td>
</tr>
<tr>
<td>Socialisation</td>
<td>4 – 11 (^2)</td>
<td>community</td>
</tr>
<tr>
<td>Planning, design, oversight, admin</td>
<td>11 – 320 (100)</td>
<td>CBO</td>
</tr>
<tr>
<td>Construction labour</td>
<td>1070 (^2) 34 – 2,500 (135) (^{1,3})</td>
<td>community</td>
</tr>
</tbody>
</table>

Median is around 250 days (1 person year) per system
Experienced delivery partners estimate 1500 days (5 person years)
CBO members bear significant load

Sources: \(^1\) AKSANSI members; \(^2\) BEST; \(^3\) Bogor and Sulawesi CBO workshops and agencies
Poorer communities are typically asked to contribute more.
Poorer communities may receive less capital support and be asked to provide more.
O+M costs are similar across scales, but poorer communities are expected to fill the revenue-cost gap.
Typical user fees are insufficient to meet routine costs. Voluntary time equates to one full time worker.

<table>
<thead>
<tr>
<th>Monthly COSTS</th>
<th>Costs (IDR/month) Median (range)</th>
<th>Voluntary time (days/month) Median (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations</td>
<td>Operator: 200,000 (30 k – 800 k)</td>
<td>9 (1-75) community</td>
</tr>
<tr>
<td>Consumables</td>
<td>Electricity : 120,000 (50 k – 400 k) Goods: 50,000 (10 k – 360 k)</td>
<td>20 days / month</td>
</tr>
<tr>
<td>TOTAL</td>
<td>IDR 370,000/ month or IDR 6,000/ household/ month</td>
<td></td>
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Monthly REVENUE

Fees IDR 5,000/household/month (2 k – 27 k)

Source: Bogor CBO Workshop. MCK focus.
Normative drivers:
the community empowerment norm is changing in practice
Initially community empowerment was a key outcome of community-based sanitation. However, two key features of ‘community empowerment’ have little relevance in practice.

1. Behaviour change

SANIMAS original intent: discourage open defecation and encourage use of toilets and improved hygiene through Communal systems.

Now, only simple sewer systems (SSS) or mixed (communal/SSS) systems are built, not communal.

Where SSS built, people already have toilets. For people with toilets and onsite treatment or disposal, the next step is sewerage. For these people, SSS costs more in time and money, and provides lower level of service than centralised.
2. Community provides land

Because most systems are now SSS, where all the infrastructure can be underground, from 2016, having land is no longer a GoI (Ministry of Public Works) pre-requisite for a community to receive a system.

Local government is now able to provide public land (e.g., under roads or other public lands) which creates both a need and an opportunity for strengthening LG engagement and capacity.
Key findings

4. Some LG already provide financial and/or legal support to community or local scale sanitation systems, but it is not always helpful
In 2014, at least 19 LG were providing financial support, mainly for meetings and awards. A few supported local system operations with intermittent and asset renewal costs e.g., site repairs (~ IDR 170 M); extending communal systems to new house connections (~ IDR 150 M). Some provided equipment that could not be used e.g., desludging units that cannot reach installed systems.
Some local governments are developing local legal arrangements (eg PERDA) to support sanitation service delivery. However, these efforts often discriminate against local scale systems.

Our legal review found existing PERDA:

• Are very focused on separation of roles and responsibilities by technology scale (centralised, decentralised, on-site)

• Have many gaps for local scale (objectives, licenses, service standards) which makes it hard to achieve accountability

• Refer to CBOs as primarily responsible for planning and development, which raises questions of fairness across technology scales
Key findings

5. Local government can fund the operation and maintenance phase for assets it does not own
Our legal review and Focus Discussion Groups made clear that local governments can potentially use direct and indirect expenditure to fund local scale service.

- Direct: employee; goods + services
- Indirect: subsidy, grants for legal entities, social assistance

There are examples from other areas: the Governor of Jakarta funds people and consumables for solid waste management in a similar way.
Key findings

6. Several barriers limit local government support
According to a case study of a City in Java, 4 groups of formal and informal factors appear to shape the ability of LG to support local scale systems:

- Unclear rules around public finance and fear of sanctions around misuse of public finance
- Unclear legal arrangements for ownership
- Prevalence of the community empowerment norm (e.g. communities should manage the systems in order to develop self-reliance and capacity)
- Information deficit and disincentive for oversight
Unclear rules around public finance

1. Public financial processes are **complex**, including the process for determining regional-level budgets.
   - Most stakeholders had **little clarity** on how to use public funds for post-construction local scale support.

2. **Severe sanctions** were expected for non-compliance of public funds.
   - This fear **discouraged financing arrangements** for local scale sanitation in the **operation phase**.
   - It was perceived that allocating recurrent expenditure for assets **not owned by government** can be treated as **a criminal offence**.
Unclear legal arrangements for ownership

- Land and asset ownership remains unclear in law
- Grants made by owners and witnessed by various officials (e.g. village head) are likely to be legally contestable.
- Perception that legal transfer of ownership to the CBO could further restrict ability of government funds to be allocated to O+M expenditure
Expectations of self-reliance  
(Prevalence of the community empowerment norm)

• Community scale is frequently associated with the ideal of ‘community empowerment’.

• This concept appears to be embedded in a set of norms around what the state should and should not support.

• Associating a programme or investment with ‘community empowerment’ has important practical ramifications. In particular, it appears to discourage routine public spending on post-construction capital costs, such as major repairs for local scale facilities.
Information deficit and disincentive for oversight

• Currently, LG appears to be able to ignore the externalised costs (health impacts of ineffective treatment)
• The scale of system failure is as yet un-quantified and largely invisible – limited sanctions from above or complaints from below. Consequently, there are not many personal or corporate incentives to invest in addressing a problem which hasn’t yet been widely noticed.
• In this context, it is a ‘low-cost’ option for LG to defer the vast majority of post-construction responsibilities for services to CBOs. Addressing the factors mentioned above (‘allowable actions, control over choice’) would require significant individual effort.

But there is limited feedback into decision making (e.g. which CBOs urgently need support)
Based on this case study, there are three plausible opportunities for local government support in the future.

- LG provides **no/minimal support** to local scale sustainability: Continuation of low-level equilibrium/ deterioration of local scale systems until failure becomes visible and higher level of government intervenes.

- LG provides **modest support** on those issues which currently seem ‘allowable’: Tinkering with status quo, with a focus on specific operational responsibilities.

- LG takes the initiative to **rethink what is ‘allowable’**: Seizing windows of opportunity at the local level to tackle more systemic issues in the institutional arrangements.
Summary of key findings

1. Little **monitoring** occurs in practice
2. Local scale sanitation service has many **challenges** in practice
3. There are legal, institutional, equity, and normative **drivers** for increased LG participation and responsibility
4. Some LG already provide financial and/or legal **support** to local scale sanitation systems, but it is not always helpful
5. LG can **fund** the operation and maintenance phase for assets it does not own
6. Several **barriers** limit LG support
Key Recommendations
Key recommendations

1. Development clear minimum requirements for LG responsibilities for local scale
2. Policies and programs need to reflect all four of domains of governance
3. Use simple heuristics like the Pathogen Hazard Diagram to help direct investment
4. Use the Governance Spectrum to help LG improve governance in their area, based on their local strengths and opportunities.
Key recommendations

1. Local government takes ultimate responsibility for ensuring successful local scale sanitation service delivery.
   • National government sets clear minimum requirements for local government in this role.
   • Each local government discerns its own path beyond these minimum requirements.
The 2003 policy created a duality in national policy.

Unfortunately...

- Legal framework favours institution-based systems
- No ownership clarity for CB systems
- Challenges for enforcing CB service standards
- Equity implications of CBO-management

(Al’Afghani et al 2015)
Current ‘common’ understanding of sanitation service scales and responsibilities:

On-site

Local scale

Centralised

(Figure: T. Rosenqvist)
The benefits of local scale systems can be realised with improved governance models, beyond CBO-led approach.

- Easier to install in existing areas
- Easier to finance
- Simpler to operate
- Less consequences when things go wrong
- Can be connected up as financial and institutional capacity improves
Program guidelines and regulations should be modified to include the following minimum responsibilities for LGs, to ensure all systems achieve intended benefits.

1. Maintaining post-construction and longitudinal records of system location, as well as technical and management performance
2. Funding major costs e.g. effluent monitoring, desludging, rehabilitation, extension and retrofitting
3. Formalising tariff setting and fee collection

Push LGs to take **responsibility for improved services** by:
Key recommendations

2. Policies and programs need to reflect operation phase, including all four of domains of governance
These four essential, overlapping, and intertwined domains spanning the ‘what’ of effective governance are essential regardless of which actors are involved and who takes on what responsibilities.

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<td>Accountable and equitable administration and decision making system</td>
<td>Maintaining effective community demand for the service over time</td>
</tr>
</tbody>
</table>
A definition for successful, long term service

Successful governance for sanitation results in adequate separation of people from faecal pathogens, and environmental protection, through:

- **Technology** functions
- There is sufficient *money* to pay for things that need to happen
- People *continue to use* the system
- **Management** decisions happen and actions follow
Key recommendations

3. Use simple heuristics like the Pathogen Hazard Diagram to help direct investment
Where does it go?

The purpose of sewage management is to separate people from excreta, and protect the environment, so we need to ask what our technologies are doing:

What pathogens are coming in to the treatment system?

What pathogens are going out?

How much does it matter?
Three questions for exploring the hazard

A. How many pathogens are in the influent?

B. How many pathogens are leaving in treated wastes?

C. How much do the remaining pathogens matter?
How to determine if further treatment is needed:

A. How many pathogens are in the influent?

Influent pathogens (#/day)

B. How many pathogens are leaving in treated wastes (1, 2, 3)?

Treated wastes pathogens (#/day)

1. Leakage or leachate

2. Piped treated liquid effluent

3. Periodic sludge removal

C. How much do the remaining pathogens matter:

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Minimum Infective Dose</th>
<th>Potential Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>bacteria</td>
<td>$10^2 - 10^8$</td>
<td>?</td>
</tr>
<tr>
<td>viruses</td>
<td>$10^0 - 10^1$</td>
<td>?</td>
</tr>
<tr>
<td>protozoa</td>
<td>$10^0 - 10^2$</td>
<td>?</td>
</tr>
<tr>
<td>helminth eggs</td>
<td>$10^0 - 10^1$</td>
<td>?</td>
</tr>
</tbody>
</table>

(Mitchell et al 2016, Waterlines)
The significance of numbers: two representations of “99% removal of daily helminth production from infected individual”.

Arithmetic representation:
- $10^6$
- $5 \times 10^5$
- $99\%$ removal
- $0$

Logarithmic representation:
- $10^6$
- $10^4$
- $99\%$ removal
- $1$

(Mitchell et al 2016, Waterlines)
Pathogen Hazard Diagram could help work out what matters, using only textbook data e.g. sealed septic tank with no secondary treatment

1. No leakage or leachate
2. Piped treated liquid effluent
3. Periodic sludge removal

The boundary of the septic tank

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Minimum infective dose</th>
<th>Potential hazard (# doses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>bacteria</td>
<td>(10^2 - 10^8)</td>
<td>Up to (10^7)</td>
</tr>
<tr>
<td>viruses</td>
<td>(10^0 - 10^1)</td>
<td>Up to (10^{10})</td>
</tr>
<tr>
<td>protozoa</td>
<td>(10^0 - 10^2)</td>
<td>Up to (10^6)</td>
</tr>
<tr>
<td>helminth eggs</td>
<td>(10^0 - 10^1)</td>
<td>Up to (10^5)</td>
</tr>
</tbody>
</table>

\(^a\) After Feachem et al, 1983
\(^b\) Leclerc et al, 2002
\(^c\) See Table 1 in text

(Mitchell et al 2016, Waterlines)
Key recommendations

4. Use the Governance Spectrum to help LG improve governance in their area, based on their local strengths and opportunities.
Local governments have widely differing capacities.

• With respect to human excreta management, local governments have widely differing capacities (such as knowledge, resources, institutional arrangements) and attitudes to sanitation, and operate in widely differing contexts.

• Assessing this variation is challenging because it hinges on local individuals and local institutional arrangements: two cities may have the same level of documentation (e.g. City Sanitation Plan) but quite different levels of sophistication in local arrangements.
The research revealed a spectrum of governance.

Each box represents a different set of players and different type of effort.
The governance spectrum and ‘toolbox’

CBO-led
- Authority in tariff setting and fee collection
- Matching innovative financing to need
- Building innovation entrepreneurs

Co-management
- Strengthening CBOs
- Building network a network of support
- Co-management with LG

Institution-led
- Formalising PPPS
- Assigning risk-based responsibilities
- Collaboratively assigning responsibilities
It’s like a **toolbox**....One **Local Government** might try these approaches based on their needs and strengths.

**CBO-led**
- Authority in tariff setting and fee collection
- Matching innovative financing to need
- Building innovation entrepreneurs

**Co-management**
- Strengthening CBOs
- Building networks
- Co-management with LG

**Institution-led**
- Formalising PPPS
- Assigning risk-based responsibilities
- Collaboratively assigning responsibilities
It’s like a toolbox....Another Local Government might try these approaches based on their needs and strengths.
KEY MESSAGE

The best approach is working out what fits in your context.
As part of our project and training, we developed a game to help local governments and CBOs explore different governance arrangements.
Institution-led

Formalising public / private partnerships

Collaboratively assigning responsibilities

Assigning risk-based responsibilities
Collaboratively assigning responsibilities

Stakeholders?
- LG
- Mayor
- NGOs
- Users
- etc

Responsibilities?
- Desludging
- Fee collection
- Monitoring & corrective action
- Major repairs
- etc

How can these be linked appropriately based on the unique context in each space?
How can duty-bearers formalise O&M entity from the beginning?

- Build – own - operate (Blitar City)
- Build-operate-transfer
- Build – own – operate – transfer
- Lease / purchase

Engage private or public post-construction service providers:

- LG service delivery agency, BLUD
- LG-owned company, BUMD
Assigning risk-based responsibilities

If the goal is to reduce risk, who would do what? How would risk be defined?

“If I were mayor, the only thing that would move me would be risk”

Ministry of Planning representative
Case study of management based on risk – US EPA

**Responsible Management Entity (RME) framework** assigns responsibility based on risk to ensure decentralised sewage project’s health and envt in long-term

**Management models**

1. Homeowner awareness
2. Maintenance contracts
3. Operating permits
4. RME O+M
5. RME Ownership
Co-management via partnerships

- Strengthening CBOs
- Building networks
- Co-management
Co-management

Strengthening CBOs

- Formalise entities (cooperative, association, village-owned enterprise) (see Al Afghani 2015)

- Provide template and training for business model / work plan, as opposed to a volunteer plan (see Business Model Canvas)
CBOs could legally incorporate as (see Al Afghani 2015):

- Association
- Limited liability company
- Village business entity (BUM Desa)
- Foundation
- Cooperative

- No legal entity is perfect
- Cooperatives and associations would be easiest
- Multiple CBOs could be amalgamated into a single legal entity at District or City level to simplify paper and procedure (but this also increases complexity)
Co-management with LG

How can LG provide support for:

- Oversight
- Major repair
- Monitoring
- Training
- Incentives (awards)
- Legally securing the land
- Regulation
Building regional and national networks

Why:
• Coordination across districts
• Achieve benefits of aggregating

Examples:
• AKSANSI national organisation
  (organisation supporting CBOs for sanitation)
• Brantas Watershed partnership
  (agreement among 16 LGs to address sanitation to improve the watershed)
• East Java association
  (regional community of practice for CBOs)
CBO-led

Authority in tariff setting and fee collection

Matching innovative financing to need

Building innovation entrepreneurs
Authority in tariff setting and fee collection

Formalise fee levels:
- Who currently sets fees and how much authority do they have?
- Who has enough authority to set higher fees and incentivise users to pay?

Fee collection:
- Who currently collects fees?
- If a community member, what if someone else, with authority, collected the fee? What could that look like? Who could that be?
A vicious circle exists with financial failure.

- CBOs have no authority in fee collection or fee setting
- CBOs do not have highly technical expertise
- CBOs cannot collect sufficient revenue
- CBO can’t pay operator
- CBO can’t undertake major repair
- CBO loses interest and motivation
- System and service declines
- Lost investment
- Decreased health & env’t outcomes
- Unhappy users and CBO
One suggestion is to create **authority** in tariff setting and fee collection. It can improve operational success in several ways.

- **Authority in tariff setting and fee collection**
- Increased fee collection
- Increased hh connections
- Extend main pipe
- Improved maintenance
- Operational success
- Increase effluent into collection chamber
CBO-led

Matching innovative financing to need

Need/Opportunity
- Additional household connections
- Major repair
- Retrofitting communal to hybrid
- Revenue generation

Innovative financing
- Micro-finance
- Credit cooperative
- Arisan (pooling of community funds)
- Corporate social responsibility
These simple interventions could be funded in a variety of ways.

What is the value of the optimisation gap and who could pay?

Necessary incremental amount needed to optimise the existing investment

Optimisation gap

Could this be filled by:
- Government
- Donor programs
- Increased user fees
- Corporate social responsibility (CSR)

Initial 425,000,000 IDR invested to construct the decentralised system
Building innovation entrepreneurs

- Renting additional stalls
- Micro-loans for fisherman
- Catfish ponds
- Fertiliser
- Services for others (desludging)
- Cassava and banana fields
- Biogas
The governance spectrum and ‘toolbox’

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- Co-management with LG
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- Collaboratively assigning responsibilities

For more detail see: Ross et al 2016
Summary of key recommendations

1. Develop clear minimum requirements for LG responsibilities for local scale
2. Policies and programs need to reflect all four of domains of governance
3. Use simple heuristics like the Pathogen Hazard Diagram to help direct investment
4. Use the Governance Spectrum to help LG improve governance in their area, based on their local strengths and opportunities.
Other supporting recommendations
Specific next steps for **national policy and programs**:

• Develop **SPM (minimum service standard)** for sanitation and advocate for national sanitation regulation

• Modify program guidelines to (1) include minimum LG responsibilities and (2) require post-construction checks for all systems, to be recorded locally and in the national database (NAWASIS).

• Consider cross-program evaluation to embed the lessons (e.g. if unexpected costs arise during construction, all for the request of additional funds to build the system as designed).
Specific next steps for national policy and programs:

- Use the outcomes of our legal review to draft and implement local regulations to specify minimum LG responsibilities for all scales of sanitation and required performance of the systems; and leave open how other responsibilities are distributed among qualified, registered entities in the future (i.e., sanitation services in line with co-management and institution-led).

- Develop a National Expenditure Policy to clarify how LG can financially support Operation of local scale, regardless of ownership.

- Explore guidance for LG to either take on asset ownership or facilitate the highest form of land ownership for CBOs.
Specific next steps for **supporting LG**:

- Support LG to coordinate information and monitoring for improving efficacy of resource use and demonstrate performance. Create positive incentives for monitoring.

- Strengthen links between site selection and need: Explore potential guidance for LG to use the Pathogen Hazard Diagram to identify real risks from existing sanitation systems, including cesspits (*cubluks*) and identify where to locate SSS systems to reduce pathogen exposure risk.

- Create guidance for LG to help optimize existing investments (quick strategy to double coverage)
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