Exploring smart enforcement within urban sanitation

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Authors

Joanne Chong (ISF-UTS), Antoinette Kome (SNV), Janina Murta (ISF-UTS), Juliet Willetts (ISF-UTS), and Melita Grant (ISF-UTS).

Citation

Cite this paper as: ISF-UTS & SNV (2017). *Exploring smart enforcement within urban sanitation*. Prepared by Institute for Sustainable Futures, University of Technology Sydney for SNV Netherlands Development Organisation, by Chong, J., Murta, J., Kome, A., Grant, M., and Willetts, J.

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This paper is part of SNV's Urban Sanitation and Hygiene for Health and Development programme.

Acronyms

BCC	Behaviour Change Communication
BNBC	Bangladesh National Building Code
BWD	Baliwag Water District
CWMC	City Wastewater Management Council
DEWATS	Decentralized Wastewater Treatment Systems
EHO	Environmental Health Officer
FSM	Faecal Sludge Management
INECE	International Network for Environmental Compliance and Enforcement
ISF-UTS	Institute for Sustainable Futures, University of Technology Sydney
ISO	International Organization for Standardization
KCC	Khulna City Corporation
KDA	Khulna Development Authority
KPI	Key Performance Indicator
MoU	Memorandum of Understanding
NSW EPA	New South Wales Environment Protection Authority
OECD	Organisation for Economic Cooperation and Development
ODF	Open defecation free
OS&H	Occupational Safety & Health
PDAM	Local government Water Supply Agency
Profepa	Procuraduría Federal de Protección al Medio Ambiente
SDG	Sustainable Development Goal
SNV	SNV Netherlands Development Organisation
STP	Sludge treatment plant
WASH	Water, Sanitation & Hygiene
WTP	Waste treatment plant

Contents

Key points

- Significant transformations in urban sanitation systems will be required to address the major sanitation challenges affecting many countries. These transformations will involve local governments changing how they encourage households and businesses to act in ways that improve sanitation outcomes.

- To date, efforts to influence the sanitation-related actions of households and businesses have been dominated by two main ideas: firstly, market-based incentives, and secondly, public awareness-raising (BCC – behaviour change communication). However, these approaches, either alone or in combination, are insufficient. Development and enforcement of regulations is also needed, but continues to be highly challenging. In many contexts regulatory agencies lack resources, capacity and legitimacy, and violation of regulations rather than compliance is the norm.

- A "smarter" approach to enforcement and regulation is clearly needed. This paper aims to explore key regulatory concepts from literature and practice to provide insight on how the urban sanitation sector mightadapt approaches that have been used elsewhere in other sectors (and in some cases within the urban sanitation sector).

- Whilst there is no single definition of "smart enforcement", this paper uses the term to describe the purposeful consideration of the following approaches and concepts when developing and enforcing regulations. These approaches extend beyond top-down penalty mechanisms and bottom-up communication approaches towards identification of a broader range of options which local governments can use to achieve sanitation outcomes:
  o Separation of roles – avoiding conflicting or competing interests by separating the policy, regulatory and implementation functions of government;
  o Enforcement styles – the ways in which regulators interact with regulated organisations or individuals;
  o Responsive regulation ("the regulatory pyramid") – recognising that different people have different attitudes to wards compliance, and matching the regulatory approach to the attitudes of the target segments;
  o Networked regulation / regulatory alliances – local governments collaborating with other stakeholders to implement enforcement activities;
  o Evidence-based behavioural change communication;
  o Risk-based regulation ("the regulatory matrix") – matching the level of regulatory effort to the risk non-compliance poses to health or the environment.

- There are a number of regulatory instruments, and combining them is a key element of a smart enforcement approach. Their effectiveness will depend on the context. Instruments include:
  o Voluntary approaches, such as information, education and awards;
  o Market-based and price instruments, such as subsidies, taxes, outcome-based contracts;
  o Self-regulation or co-regulation by industry (the regulated parties);
  o Command and control regulation – setting rules and enforcing penalties for non-compliance.

- Monitoring activities and outcomes is critical to establishing the legitimacy of the enforcement systems. For instance, in the case of onsite systems, this will include monitoring of households' and emptiers' containment, desludging and disposal actions and outcomes. It is not possible to monitor every single activity, but nor is this required for effective monitoring. A smart approach to enforcement will consider random inspections and audits, combined with complementary forms of reporting to provide more information (e.g. citizen reporting or self-reporting).

- This paper includes case studies and examples of "smart enforcement" from various countries globally (Australia, Bangladesh, India, Indonesia, Mexico, Philippines, Senegal, and Thailand) and sectors, including sanitation, waste management, industrial pollution control and food safety. These case studies illustrate the potential for "smart enforcement" strategies to be more widely used in the sanitation sector, with many valuable lessons to learn from both the successes and challenges.

1. Introduction

Urban sanitation is one of the most important and urgent challenges confronting countries aiming to achieve the Sustainable Development Goals (SDGs). More than half of the world's population now lives in urban areas, and sanitation coverage is not keeping up with population growth. Furthermore, even where people have access to toilets, wastewater and faecal sludge is commonly not safely contained, transported or treated before disposal. In many locations the environmental and health consequences of poor sanitation continue to impose significant economic and social costs on communities and countries.

Conventionally, centralised sewer systems have been regarded the main – and often only – option for managing human waste (faeces and urine) in urban settings. Yet, construction of sewers and related treatment plants is highly capital intensive, and there remain questions as to whether centralised systems are the best option economically, technically and environmentally. Meanwhile, cities have primarily developed primarily onsite sanitation technologies, often comprising only primary treatment in a pit or septic tank, without significant oversight in either construction or operation. As a result, poor sanitation outcomes persist. There is a growing recognition that, in most settings, urban sanitation service systems will need to involve a mix of options. This will entail improving existing onsite systems as well as further developing decentralised and/or centralised networked solutions. Developing and integrating these solutions operationally, financially and technically in appropriate ways is now a priority. This document is written with this mix of options, and their emerging service delivery models, in mind.

To achieve sanitation outcomes, a transformation of urban sanitation service delivery systems – and how they are regulated – is needed. This will ultimately rely on behavioural change among consumers or end-users, and among service providers and governments. Urban stakeholders have grown accustomed to, and sometimes even have vested interests in, status quo approaches to sanitation. Transforming urban sanitation service delivery means changing and challenging established modes of operation, such as inexpensive but unsafe manual emptying services. The range of stakeholders, behaviours and actions involved, and their interconnectedness, make achieving behavioural change outcomes in urban setting a more complex exercise than in rural settings. The lessons learned from rural approaches to sanitation cannot simply be transferred to an urban context.

Behavioural change in sanitation is dominated by two major ideas. The first idea is incentivising, especially through market and financial mechanisms, the private sector to deliver services through innovative models. An example is providing incentives for discharge that make it attractive for emptiers to dispose of sludge safely. The second idea is to raise public awareness and bring about behaviour change, particularly through behavioural change communication (BCC). Whilst both these types of approaches are essential, we observe that there are limitations to what can be achieved with either in isolation, or even in combination. For example, there are limits to appealing to the collective sense of "public good", and to people's willingness to prevent harm to the environment and/or the health of the wider community. A key imperative to achieve public health in cities and towns is regulation and enforcement.

It is largely indisputable that regulation and enforcement are important for achieving safe and sustainable urban sanitation practices. However, in the sector, practitioners, government and the community generally have low expectations of implementation. Successful regulation and enforcement in the waste and environment sectors are challenging everywhere in the world, particularly in developing countries. There appear to be several reasons for this, including limited capacities (skills, number of staff, strategies, political backing) for regulation and enforcement in development countries, poor compliance being the norm, and the questionable legitimacy of regulatory agencies, especially if regulation is applied unevenly. Also, politicians are often unwilling to pay the political price of enforcing sanitation rules and laws on individuals – the benefits might not be visible in the short term, in general they accrue to the public rather than to the individuals concerned.

Should we therefore give up on regulation and enforcement in urban sanitation? Or should we simply find smarter ways to address these challenges? This paper argues for the latter course, and aims to explore the topic by drawing on existing knowledge of regulation and enforcement from inside and outside the sanitation sector.

This argument in favour of a "smart enforcement" approach, outlines different strategies to bring stakeholders into compliance, using a mix of measures and choosing the most effective use of (limited) available resources. We present key concepts and illustrate them with examples.[1] This paper should be considered as a first step in learning about smart enforcement and its application to the urban sanitation sector. It is not intended to be a comprehensive roadmap.

In this paper, we focus on smart enforcement from the perspective of local governments as duty bearers. We do not comprehensively address the compliance and accountability issues faced by local government itself, though this is clearly part of the enabling environment for enforcement.

The structure of this paper is as follows:
• *Section 2: What is "smart enforcement"?* – This section introduces key concepts and frameworks for regulatory policy and practice, to inform a "smart" way of going about enforcement.
• *Section 3: Instruments* – A list of instrument types to select from.
• *Section 4: Compliance monitoring* – Mechanisms and strategies for the inspection and monitoring of actions by households and businesses.
• *Section 5: Case study examples of "smart enforcement"* – Draws on a range of examples from
• sanitation and other sectors.

Other areas of urban sanitation related to this document are covered in the following learning papers produced by SNV Netherlands Development Organisation (SNV) and the Institute for Sustainable Futures, University of Technology Sydney (ISF-UTS). These include:
• Financing sanitation for cities and towns (ISF-UTS and SNV, 2014)
• Septage transfer stations (ISF-UTS and SNV, 2016a)
• Legal and policy aspects of urban sanitation (ISF-UTS and SNV, 2016b)
• Sanitation planning (ISF-UTS and SNV, 2016c)

Photo: SNV/A. Dockery

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1. This paper was informed by: a literature review, a D-Group discussion, and a participatory session at the SNV Desludging Learning Event 2015, expert interviews, and a participatory session on smart enforcement at Stockholm World Water Week, 2016. Interviewees have not been identified, consistent with ISF-UTS' ethics in research approach. This paper draws on theories, practices and examples from the sanitation and other sectors.

2. What is smart enforcement?

Key terms and concepts

Enforcement, or the act of enforcing, is defined in the Concise Oxford dictionary (2011) as "compelling observance of a law" and "imposing action, conduct or one's will". When effective, enforcement will lead to compliance. Compliance is defined as "the act or an instance of complying: obedience to a request, command etc." In day-to-day language, enforcement is thus often understood as involving linear and top-down strategies to compel people to comply with laws and regulations. However, in practice, enforcement and compliance is more complex than this.

There are many different fields and disciplines which investigate how to improve regulation, compliance and enforcement, and each has different views about and ways of explaining what is a "smart" approach. There is no single agreed definition of "smart enforcement", and in this paper our intention is to emphasise the possibility of using a broad range of strategies to facilitate compliance.

In thinking about smart enforcement, it is useful to make a distinction between the "regulators", usually local government, and the "regulated", these can be service providers, households, industry and so on. Among the regulated, there will be compliant and non-compliant. Non-compliant organisations or individuals could also be called "offenders". Understanding the different groups involved is key. Smart enforcement encompasses more than just looking for the most effective way to identify offenders. It requires looking at the motivations of and constraints on all regulated stakeholders (organisations or individuals) to identify ways to make it easier for them to comply. This is addressed in the concepts below.

Though regulatory enforcement has not been a focus in urban sanitation so far, we can draw on other useful analysis and experience of enforcing environmental and pollution regulations in developed and developing countries. There is also work from behavioural change sciences, and economics and governance that can be useful for this topic. From these various fields, we have identified certain basic concepts that could be useful for smart enforcement in urban sanitation. These are not mutually exclusive:
• Separation of roles
• Enforcement styles
• Responsive regulation
• Networked regulation
• Evidence-based behavioural change communication
• Risk-based regulation

2.1 Separation of roles

In the WASH sector, particularly in relation to urban water supply services, there is a strong emphasis on separating the roles of policy makers, regulators and implementers (or service providers) (World Bank, 2006). The main idea is that it is important that the people working in the regulatory agency do not have conflicting or competing roles (OECD 2013). In practice however, in urban sanitation, separation of roles often does not occur. Both service provision and regulatory functions are the responsibility of the municipality itself and may even lie with the same agency within a municipal government. The question then arises whether the agency is capable to separate responsibilities, in particular those of service provision and oversight. This includes providing the opportunity for customers, citizens and workers to have access to ways of lodging complaints and reporting on levels of service.

2.2 Enforcement styles

The concept of "enforcement styles" as it relates to developing country contexts, is articulated in McAllister (2008). Enforcement styles refers to the ways that regulators interact with regulated organisations or individuals. The nature of these interactions is affected by regulatory agencies' capacities and degrees of autonomy. The degree of autonomy of the regulating agency refers to its level of independence from the organisations and/or individuals it is supposed to regulate. Even in a situation of

separation of roles, regulated organisations or individuals can, for example, provide advice to agencies on the content of regulations, or they may even be able to influence specific decisions. The right balance needs to be found, because regulating agencies that do not listen to the regulated organisations or individuals might come up with unworkable regulations. Capacity also influences enforcement styles, in the sense that under-resourced agencies are more likely to take a reactive strategy rather than anticipating potential issues and violations.

Enforcement styles can also differ in regard to whether they follow the letter of the spirit of rules and procedures, and in regard to the application of sanctions (castigating or educating the offender). Figure 1 below gives an overview of the dimensions that can be used to describe an enforcement style. What is deemed to be a 'smart' enforcement style will depend on the context and will nearly always be somewhere in the middle of two extremes.
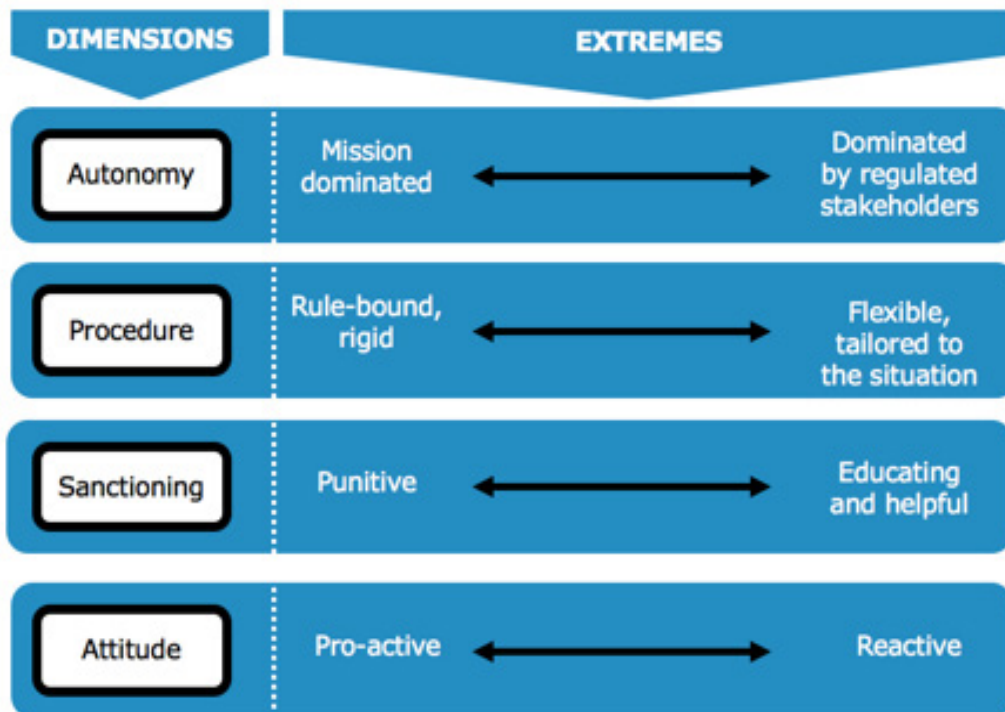

Figure 1. Dimensions of enforcement styles (adapted from McAllister (2008))

Being aware of current enforcement styles will help us to understand the relationship between the regulating agency and regulated organisations or individuals. In some cases, that relationship may be counter-productive, for instance, when it is too repressive, or when the regulating agency is influenced too much by the regulated organisations or stakeholders This becomes evident not only in the design of regulations but also in the implementation practice. The OECD (2013) states that (the style of) inspections and enforcement actions have as much influence on the (rate of) compliance as the design of the regulation.

2.3 Responsive regulation

Many regulators from across different sectors, including environmental protection authorities, have adopted the theory and principles of responsive regulation (Ayres and Braithwaite 1992) to develop their compliance strategies.

A responsive regulation approach recognises that different groups will have different attitudes towards compliance. Some people (or organisations) are willing to comply, or to try to comply, with regulations, and any non-compliance is "accidental"; some will not comply if they can avoid doing so, and their non-compliance is "opportunistic"; others deliberately decide not to comply and will go to any lengths to by-pass regulations. Using a differential approach to target these different groups is not only more respectful, but also a better use of resources.

Given the range of attitudes towards compliance, responsive regulation avoids applying strict, punitive penalties as a first response to the non-compliance of first offenders. It recognises that, because some people may only inadvertently fail to comply, a better approach is to first try to use cooperative and informative mechanisms to respond to non-compliance (see example in box 1). This has two potential advantages. Firstly, fewer resources are required for an information response such as a warning letter, than for more punitive approaches, such as launching legal proceedings. Secondly, an encouraging, cooperative response could help to foster positive relationships between regulators and target groups, which in turn has the potential to improve attitudes towards compliance and encourage future compliance (Nielsen and Parker 2009).

A responsive regulation approach also recognises that a different approach might be needed for repeat offenders. If someone repeatedly fails to comply with standards, they will be classified as being associated with a higher "risk level". One possible response it to impose stricter monitoring or reporting requirements on that individual or company (OECD 2013).

> **Box 1. Responsive regulation in practice:**
> **San Fernando City sanitation compliance schedules**
>
> In San Fernando City, the Philippines, the City Wastewater Management Council (CWMC) is responsible for overseeing compliance with sanitation regulations and requirements, including regulations requiring all new businesses and households to install adequate wastewater management systems. For those individuals or businesses served with notices of violation, a severe penalty is not necessarily applied. The CWMC holds regular hearings where the non-compliant parties can be invited to explain the situation and identify the factors preventing their compliance. Based on the reasons, the CWMC may negotiate with the non-compliant party and establish a schedule or plan with a reasonable timeframe for them to achieve compliance.
>
> *Source: Robbins (2011)*

Responsive regulation also appreciates that there are others who will not generally be interested in complying unless the costs of non-compliance outweighs the benefits. As illustrated in figure 2, a responsive regulation approach progresses from "gentle" responses to non-compliance, such as warning letters, to "moderate" responses such as directions to undertake certain actions or pay a penalty, to "strong" punitive responses requiring criminal enforcement.

Many regulators apply responsive regulation as a staged approach – e.g. first non-compliance might involve receiving a warning/information letter, and then progressively stricter approaches for subsequent non-compliance. The "regulatory pyramid" assumes that most non-compliers will respond to a cooperative approach, reducing the need for escalating to more punitive measures and prosecutions. If this model applies, then a small amount of effort to encourage compliance (e.g. advisory letters) will persuade a large proportion of the target group to conform, whereas compliance activities that take more resources and time (such as prosecutions) need only to be applied to a few non-compliers. An example of the regulatory pyramid is shown in figure 2.

Figure 2.   Example of a regulatory pyramid (adapted from Ayres and Braithwaite (1992) and NSW EPA (2013))

One challenge in applying the responsive regulation approach is that in the waste sector the attitudes, and hence effective compliance strategies, are often not distributed in a pyramid shape. For example, a review conducted by the Queensland Department of Environment and Resource Management (White and Heckenberg, 2012) revealed that most of those who were not complying with waste management legislation (through illegal dumping) were doing so wilfully and intentionally – the pyramid was indeed inverted, as illustrated in figure 3. In these situations, information/warnings are unlikely to have much impact and will probably not be the most cost-effective compliance approach.
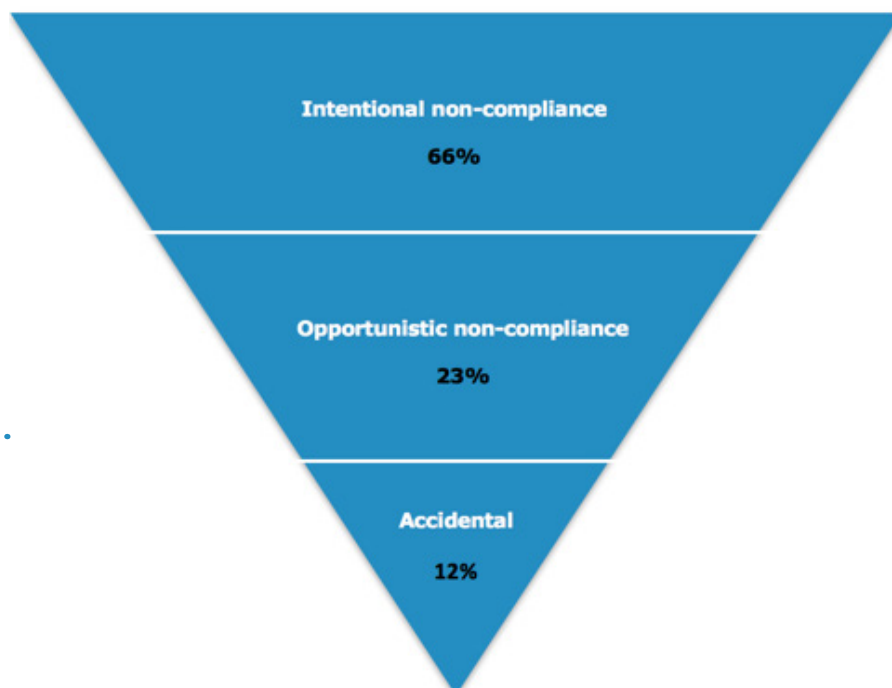

Figure 3.   An example of an "inverted" regulatory pyramid of non-compliance in the waste sector (White and Heckenberg (2012))

Despite these limitations, it is still useful to think about regulation as involving escalating levels of enforcement, not only because of resource constraints, but also because it builds a more constructive relationship with citizens.

2.4 Networked regulation and regulatory alliances

There are a number of challenges to applying either conventional top-down or responsive regulatory models in developing country contexts (Braithwaite, 2006; Rooij and McAllister, 2014). In particular, government authorities are likely to lack the necessary capacity (in resources, technical expertise and information) and independence. For example, the following assumptions are often made as regards what is required for effective responsive regulation. However, in many situations the conditions required for these assumptions to apply will not be present:

1. Implementation of responsive regulation requires good and reliable information about the regulated organisations and individuals.
2. Instead of a one-size-fits-all approach, officials need to be able to decide on differential treatment of different groups. This assumes technical capacity and also independent decision-making.
3. There needs to be a credible ultimate punishment that will be imposed irrespective of the political connections of the offender.

However, Braithwaite (2006) also suggests that the responsive regulatory ideas provide opportunities for developing country agencies to draw on capacity and expertise from third-party, non-state actors, especially NGOs, to create networks that promote regulatory compliance. Under this "networked" regulation concept, weaker actors with less power can align themselves with stronger actors to colla-borate on enforcement efforts. Third-party initiatives such as those which focus on transparency ("naming and shaming" offenders), recognising strong compliance with awards or publicity, and establishing standards, can complement and strengthen the efforts of regulatory agencies.

Similarly, Rooij and McAllistair (2014) call for "regulatory alliances". They argue that traditional methods of enforcement or behaviour change programs are unlikely to be successful in situations where the re-gulatory resources are small compared to the large number of violations, and where violation rather than compliance is the norm. Regulatory alliances focus both on combining instruments – such as combining punitive threats with an education campaign – and on enlisting a range of stakeholders to implement such activities. For example, one approach to extending resources, and to garnering public support for environmental outcomes, could be to pay citizens to report on pollution incidents that are subsequently verified. A further example of a network alliance to extend inspection capacity is provided from Mexico in box 9 (in section 4.2).

2.5 Evidence-based behavioural change communication

Behavioural change communication is an approach that uses an in-depth understanding of people's behaviour to design persuasive communication, and it has often been applied to hygiene promotion and sanitation demand creation (SNV 2015d). Experience and concepts from behavioural change com-munication in the WASH and broader health sectors can provide insights into why some organisations (or individuals) comply and others do not. This understanding in turn, can help to inform enforcement strategies, and potentially make them more effective.

The starting point for evidence-based BCC is in-depth investigation and analysis of the motivations underlying the practices of individuals in target groups – this involves investigating what motivates them to engage in some behaviours and not others. This analysis aims at better understanding human behaviour and is often described as 'formative research'. The insights gained form the basis for deve-lopment of key messages for targeted groups. The factors that influence behaviour are often referred to as behavioural determinants. They can include knowledge, skills, social norms, values, priorities, fears, abilities etc.

In the literature, there are many behavioural frameworks. Different frameworks group 'behavioural determinants' in different ways, and emphasise different aspects. The choice of framework depends on underlying theories about behavioural change, and on matching the chosen framework to the situation or context at hand. For example, research into behavioural determinants affecting HIV risk behaviour emphasises a different range of behavioural determinants than research into selling and using toilets.[2] The latter will focus on product attributes, for example. Whatever framework is chosen, it is important to remember that any framework is just a tool to help organise information. It cannot replace expertise and analysis, which in SNV's experience, is a critical component in meaningful formative research.

Key steps in undertaking formative research include clearly identifying the target group, the focus behaviour and the desired behaviour (behavioural objective). Behaviours related to regulation in urban sanitation can be expected to be less embedded in emotional and identity concerns than, for example, personal hygiene behaviours. It can be assumed that most cases of non-compliance will be related to practical issues and cost-benefit trade-offs. A barrier analysis[3] might thus be a good place to start, preferably combined with a doer/non-doer analysis. Other frameworks are: Evo-eco[4], Ranas[5], FOAM[6], and SaniFOAM[7]. Most of these were designed to research personal hygiene and purchase behaviours.

The results[8] of formative research should inform the identification of a communication objective[8], which together with a creative brief can inform the design of a communication campaign. However, such a communication campaign would only be a part of a broader package of interventions or measures, which together should shift the balance in favour of compliance. Both the communication campaign and the broader package could usefully be informed by the key behavioural determinants identified in the formative research (Halcrow et al 2014).

A key issue in urban sanitation with regard to behavioural determinants is that the negative consequences of certain practices may be experienced, not by the individual, but by the environment, or the population at large. Meanwhile, there may be benefits at an individual level that may encourage particular behaviour (e.g. not complying with construction regulations or using desludging methods that may reduce costs). Designing enforcement approaches that address this situation therefore needs formative research that provides an understanding of the motivations of the target group to practice the offense.

2.6 Risk-based regulation - the "regulatory" framework

Adopting a risk-based approach to regulation means that the regulatory efforts and resources spent by a regulatory authority are proportionate to the risk of harm due to non-compliance. As illustrated in figure 4, potential activities/behaviours to regulate can be mapped on a "likelihood-consequence" matrix. The approach to estimating the level of risk, where:

$$risk = likelihood * consequence\ of\ non\text{-}compliance$$

is widely used across many sectors (see e.g. ref ISO 9001). In an urban sanitation context, the risks to the environment and public health are considered highest when both the likelihood of non-compliance is high, and the impact (on health or the environment) is high. Where risks are higher, these are subject to stricter controls – see for example box 2.

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2. This does not deny the fact that significant learning can be enabled through exploring behavioural change frameworks across different sectors.
3. See, for example, http://barrieranalysis.fh.org/
4. See, for example, http://ehg.lshtm.ac.uk/the-evo-eco-approach/
5. See Contzen, N., Mosler, H.J. (2015). RANAS (Risks, Attitudes, Norms, Abilities, and Self-regulation) methodological fact sheets - 6 methodological fact sheets on behavior change. Swiss Federal Institute of Aquatic Science and Technology (Eawag), Dübendorf, Switzerland . Available at http://www.susana.org/en/resources/library/details/2397
6. See http://www.wsp.org/hwws-toolkit/behavior-change
7. See http://www.wsp.org/sites/wsp.org/files/publications/GSP_sanifoam.pdf
8. Having a clear communication objective and a broad consensus as well as understanding of this communication objective is often a key factor for success. It is not uncommon that formative research is done, a communication campaign is designed, but that during implementation, front line workers do not fully understand or buy-in to the main objective and message.

EPA's approach to targeted enforcement
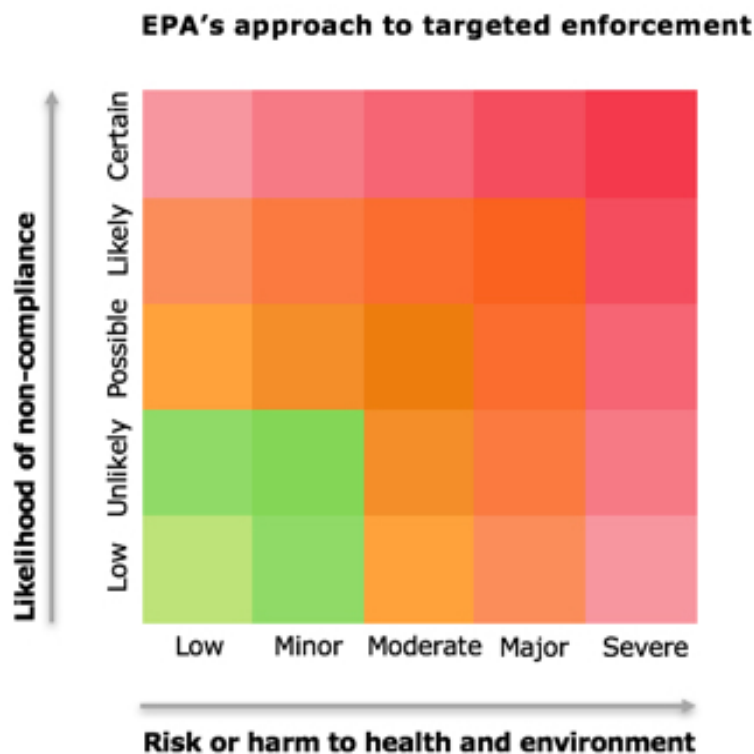
Figure 4. Example of a risk matrix (source: EPA VIC (2011, p. 7))

At the SNV Learning Event on Professionalisation of Emptying Services, the regulatory matrix was used to map actions by households and emptiers along the faecal sludge management (FSM) service chain (SNV 2015c). Those elements which were rated "high risk" could be targeted as priorities for compliance efforts (see figure 4 for an example).

**Box 2.   Risk-based regulation in practice:
Greywater reuse regulation**

In Australia there is great interest in reusing and recycling wastewater, driven by drought and water security concerns. This includes an interest in households and organisations reusing greywater, which is water from taps and showers, within the home, on gardens, or in parks and sportsgrounds.

Laws and regulations vary across states, but in general government health and water resource departments apply a risk-based approach to regulating greywater use, in order to manage public health risks. Where a higher risk to public health from poor water quality is expected – based on the likelihood of exposure – stricter rules and requirements apply.

Box 2.   Continued

The regulatory frameworks for different risk levels include the following measures:

- **Lower risk** – Manual collection of greywater for immediate use outside on gardens is considered low risk. The government provides information about the risks of storage, but no specific rules apply.

- **Medium risk** – Installing a greywater diversion system (e.g. from a multi-unit building into a storage tank for future reuse) is considered to pose some risks. Local government regulations generally require council approval for greywater diversion. However, exemptions are possible if all of the following conditions are met: prior approval is sought and obtained; the household or organisation can demonstrate that the system is installed in accordance with industry codes of practice and performance standards; the local utility is informed; and the system does not otherwise pose a risk to the environment.

- **High risk** – Drinking greywater is considered high risk and systems which enable this to happen are banned for individual households. Through audits and other measures, the regulator works with plumbing industry organisations to ensure that cross-connections do not occur. Recycled water systems that treat and reuse greywater or sewage (e.g. in toilets, washing machines, showers and for irrigation) are subject to stringent regulatory requirements (inspections, audits, reporting, both pre- and post-commissioning) to protect health and the environment, and these in turn require considerable government resources to administer.

Source: NSW Government (2008)

Photo: SNV/A. Dockery

3. Instruments

Combining and mixing policy instruments has long been advocated to achieve the goals of environmental management and policy, in areas ranging from pollution control to sustainable resource allocation.

As outlined in section 2, applying instruments in combination can be an effective way to achieve smart enforcement because of the range of motivations that influence and enable behaviour – at an individual level, as well as across individuals in a target group. Effective enforcement strategies often include a number of instruments, selected and developed in such a way that in combination they are the best option in terms of cost and effort.

Whatever the strategy, providing information and creating awareness will always be needed to make enforcement work. Information needs to be provided to target audiences about:
* the reasons for the regulation; and
* how to comply or change behaviour.

There are many ways to categorise the regulatory instruments that can be applied to influence people's actions. The following categorisation is commonly used: voluntary approaches (including information/education); market-based incentives; industry self-regulation; and command-and-control approaches.

It should be noted that options under "command-and-control" that involve state coercion require a legal basis, that is, laws and regulations specifying what actions or behaviour are illegal. For urban sanitation, this legal basis is often missing. In the absence of a formal legal basis, regulatory agencies will need to develop their own by-laws, regulations and rules, or are reliant on the other three instrument categories – market incentives or disincentives and voluntary citizen (or service provider) action. Note that some market incentive/disincentive instruments also require the establishment of new laws or regulations.

The different instrument categories are described in table 1 below.

Instrument category and description	Potential advantages	Potential disadvantages
Voluntary approaches – including information, education and awards.	Non-coercive	Can have low impact
Market-based instruments – also called "economic" or "price-based" instruments. They include subsidies, taxes, tax waivers and trading schemes. Output- and outcome-based contracts could be considered a form of price-based instrument.	Can be economically efficient	Outcomes can be uncertain. Requires getting the price and design right. Can have high administrative requirements.
Self-regulation – industry establishes a code of conduct and processes for compliance / industry accreditation. Could include independent auditing or, in a co-regulatory model, a role for government to assist in ensuring compliance.	Self-policing can help "raise the bar" from within industry, raise expectations in the market for higher quality, and create momentum towards improvement.	Can have low reliability. Requires other drivers and incentives for industry to self-regulate (such as threat of regulation, or reputation concerns).
Command and control regulation (the "regulatory approach") – set rules and laws, and enforce non-compliance with penalties.	Clarity about expectations and outcomes *but only if enforced*.	Enforcement requirements high. Lacks flexibility. Coercive.

Table 1. Potential advantages and disadvantages of different categories of instruments (adapted from various sources, including Gunningham and Sinclair (1999))

3.1 Voluntary approaches

Voluntary approaches aim to appeal to people's values, norms or self-interest. Any enforcement campaign will need to include communication and awareness raising, or people will not be aware of its existence. In a voluntary approach, the expectation is that this communication and awareness will lead to behaviour change. Voluntary approaches can include, for example:

• Awareness and public recognition of those who comply.
• Recognising and fostering leadership in the industry and community.
• Technical guidance, training, mentoring and assistance.
• Training, certification and accreditation.

Box 3 describes an example, which involves understanding the technical barriers to compliance and providing information in response.

**Box 3.   Voluntary approaches in practice:
          Marikina City, Philippines**

Community peer pressure and pride are strong motivators for improving sanitation, and in Marikina City a promotion campaign was core to success. To promote participation in the city's desludging program, window stickers were provided for participating customers to engender a sense of community among those who participated in the program. The awareness raising campaign also tapped into local pride about having healthy, clean waterways, and emphasised the direct link between desludging and environmental conditions.

The program also sought to understand the barriers to participation in the local context. For example, when the city realised that difficulties in accessing or removing septic tank lids was a key barrier, they ensured that they provided households with information about which private service providers could do this for a small fee.

Source: Robbins et al. (2012) and interviews with stakeholders

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In solid waste, public health and WASH there are many promotion campaigns, generally with an expectation of increased compliance. Experience in behavioural change communication shows that success should not be assumed, and that monitoring and fine-tuning is essential to make such campaigns effective. It has also been found that in many cases compliance rates drop once campaigns are discontinued.

3.2 Market-based instruments

Market-based instruments are also called "economic" instruments because they aim to influence behaviour and actions through economic (price-based) incentives. Taxes imposed to discourage "undesirable" behaviour and subsidies to encourage "preferred" actions are forms of market-based instruments. Examples of payment instruments are provided in box 4 and box 5. Market-based trading schemes, such as tradeable emissions permits, are also market-based instruments.

Examples of market-based instruments include:
- Fees or bill rebates to households for desludging as per schedule.
- Tax concessions for compliance.
- License or permit fee rebates (e.g. reduced fees for truck operators) to demonstrate continuous track record of compliance.
- Output- or outcome-based contracts, with payment on delivery, on the provision of evidence of
- compliance, such as a payment for delivery to a safe disposal site.
- Revenue-neutral "feebates", which combine fees on undesirable products or activities (e.g. high emission vehicles) with rebates (financed by revenue from the fees) for preferred products or activities (e.g. low emission vehicles).

There are debates about the appropriateness of rewarding "preferred" actions such as desludging or safe disposal, particularly when this involves financial incentives. Critics of such financial incentives are concerned that they set up expectations, which mean that rewards are required for actions that protect public health and the environment. The appropriateness of financial incentives will depend on the situation, the target group, affordability and market characteristics. Offering rebates or reduced fees is another option. Although the financial costs may be similar to those associated with direct payments, the impacts are different in terms of setting norms.

**Box 4.   Market-based instruments in practice:
            Subsidies for sludge collection, treatment and disposal**

Examples of payments to incentivise sludge management activities include:

- In *Patong city, Thailand*, subsidies from the central and local government support both faecal sludge collection and treatment. Furthermore, Paton city provides tax incentives to private sector companies to support the city in FS collection.

- In *Baliwag, the Philippines*, payment is made to collectors based on performance-based contracts. Baliwag Water District (BWD) pays a fixed annual rate to contractors and controls them closely with GPS truck monitoring and surprise inspections. If the contracting operator does not fulfil their responsibilities according to the contract, then BWD writes a letter of complaint to the contracting company, which can be used to justify non-payment of the full rate for the contractor's services.

- In *Faridpur, Bangladesh*, a business model has been developed where pit emptiers are paid by households as well as the treatment plant operator when they deliver sludge to the newly constructed treatment and composting plant. This is made possible through subsidies by the municipality to the treatment plant operator, using income from the lease of machinery to the pit emptiers. A challenging aspect has been to estimate revenue from emptying services and composting services, as well as to maintain 6 ongoing efforts in the form of service demand generation and awareness raising campaigns using street drama, cycling events, cleanliness drives, and quiz contests to prevent illegal connections to drains.

Sources: Taweesan et al (2017); SNV (2015c); de La Brosse et al (2017)

3.3 Self-regulation and co-regulation

Self-regulation involves an industry, business, professional or community group voluntarily developing and applying codes of conduct, standards or rules. The group involved also develops and implements the procedures and requirements for monitoring, compliance, reporting and enforcement. Industry-based accreditation arrangements are one example of self-regulation. Another is the norms agreed to in an open defecation free (ODF) community.

"Co-regulatory" models have similarities to self-regulatory models. In co-regulatory situations, a government authority might review or help develop the relevant code of conduct. A co-regulatory model could involve government legislating to provide a legal basis for an industry-designed system. For example, participation in the scheme might be voluntary for individual businesses, but once they sign up they may be obliged by law to follow the code or rules. In this situation, the potential incentive for businesses to sign up is the market advantage of accreditation.

Whilst self-regulation is voluntary in the sense that the industry is not compelled by law to set up the system, the prospect of governments imposing a mandatory, government-led regulatory system if self-regulation fails can motivate an industry to self-organise and establish a compliance system. An example of a self-regulatory system, co-designed by industry and government, is illustrated in box 6; box 8 illustrates an alternative model of self-regulation, based on industry accreditation.

Self-regulatory and co-regulatory systems have certain advantages, and if implemented appropriately they may successfully achieve regulatory outcomes. However, this is not guaranteed, and there remains a risk of high levels of influence by regulated parties, which could ultimately lower standards ("regulatory capture"). Whilst these approaches involve the regulated parties, they still require concerted effort on the part of governments as well as good knowledge of the issues at hand. Co-regulation should not be seen as a way for governments to reduce staff costs and fill gaps in their expertise.

Box 6. Self-regulation in practice: Product stewardship

Product stewardship schemes aim to manage the impacts of the disposal of products and materials. In particular, they aim to involve those who produce, sell, use and dispose of products so that they have a shared responsibility to manage the impact of those products on human health and safety.

Product stewardship schemes can be self-regulatory, co-regulatory or mandatory. Many are self-regulatory schemes in which the industry involved in manufacturing or selling a product self-organises to set up a scheme for safe reuse or recycling of the products at the end of their useful life. Self-regulatory schemes are essentially voluntary, but part of the impetus for developing the scheme may be the threat of a more regulatory approach being imposed by government. Self-regulatory schemes may also be underpinned by legislation, which sets frameworks for government agencies to endorse the scheme.

One example of a product stewardship scheme in Australia is the scheme for end-of-life tyres. The environmental impacts of illegal dumping of tyres include toxic fumes from fires and the potential for vector breeding. All stakeholders in the tyre supply chain may become participants in the voluntary scheme, and they commit to safe disposal or recycling. Extending participation in the scheme also has the potential to increase the scale of the market for recycled products.

Source: Australian Government Department of Environment and Energy (2016)

3.4 Regulatory (command-and-control) approaches

The "conventional" regulatory approach sets rules (standards, laws/ordinances, or licence conditions), monitors and inspects actions or outputs, and enforces penalties for non-compliance. Examples include: banning activities or products outright, or licensing or permitting certain activities (see box 7).

A range of penalties of varying severity can be applied. These include:
• Requiring an offender to monitor and report certain activities (this can include self-reporting);
• Directing an offender to undertake a particular activity, such as a clean-up or repair;
• Publicising an offender's failure to comply;
• Fines and monetary penalties;
• Criminal penalties.

Command-and-control regulation needs an effective system of monitoring and inspection, and the capacity to impose penalties. Often, it also requires effective institutions (police, the judiciary) to monitor compliance and adjudicate over disputes. As mentioned before, it also requires the legal basis to impose compliance.

**Box 7. Command-control approaches in practice:
Penalties for not desludging**

In a few cities in the Philippines, a range of instruments are applied to promote septage management. In locations such as Alabel, Marikina and Dumaguete these are underpinned by a clear set of enforced local ordinances. The main penalties on households for not desludging are notices, followed by fines.

Ordinances specify:
- septic tank construction standards – pre-occupancy inspection of new septic tanks;
- commercial pre-treatment programs;
- designated places for septage disposal;
- periodic and regular desludging.

Sources: AECOM and Sandec-Eawag (2010), OXFAM (2016), IWA (2014), SNV (2015c)

**Box 8. Self-regulation in practice:
Industry accreditation**

One approach to industry self-regulation is for an industry to establish minimum standards in product design, construction or service delivery that participating businesses must comply with in order to be accredited. The industry itself establishes the standards and the mechanisms for checking compliance with these standards. The requirements might include participation in training, self-reporting and industry-organised inspections to monitor quality.

Self-accreditation schemes can help enhance the reputation of the whole industry in terms of quality of service or production provision. It also differentiates between those in the industry who are accredited and those who are not. The market advantages of accreditation can be significant, and the incentive for companies to maintain accreditation can also be substantial.

Self-accreditation schemes can potentially reduce the regulatory efforts required by government. However, there is a role for government to act as a customer of services or products (rather than a regulator) to exert direct market influence through the large-scale purchasing, and also indirect market influence by promoting the legitimacy of a self-accreditation scheme. For example, if the plumbing industry in a particular jurisdiction were to put in place a self-accreditation scheme, the relevant government could set its procurement rules such that only plumbers who are accredited are eligible to provide services to government agencies.

See also: Mok et al. (2010), Hepburn (2007)

4. Compliance monitoring

For an enforcement strategy to be effective, three things need to happen. Firstly, enforcement activities need to be implemented and with quality. Secondly, the enforcement activities need to be successful in changing the behaviour of the regulated individuals or entities, and ensuring compliance. Thirdly, these behaviour changes or compliance need to lead to the desired outcomes (figure 5).
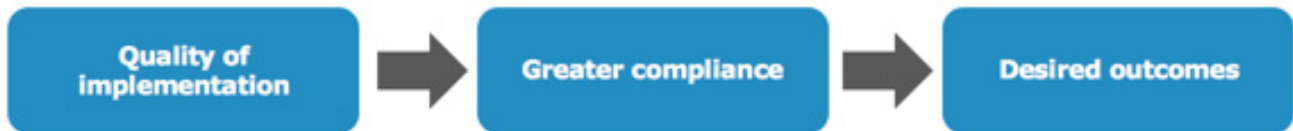
Figure 5. Key steps of an effective enforcement strategy

Monitoring is used to evaluate the extent to which these three things happened, and if not, where the issues lie. This section focuses on the second point above ('greater compliance'), and assumes that internal monitoring in regulatory agencies ('quality of implementation of enforcement activities') will identify whether or not activities have been implemented, and with what level of quality. Nevertheless, keeping this performance issue in mind remains important, because it is not unusual to be one of the causes of ineffectiveness. Monitoring of the third point ('desired outcomes'), can involve monitoring of sector performance indicators such as the percentage of sludge disposed in a treatment plant, water quality etc. It is assumed that established KPI's exist to monitor such outcomes. It would be valuable though to link to that information when efforts are made to improve compliance. When improved compliance does not lead to improved outcomes, the efforts may need to be redirected.

4.1 Monitoring whether behaviour is compliant

Monitoring households' and emptiers' containment, desludging and disposal activities is a critical element of any smart enforcement strategy. In the traditional regulatory model, if laws and ordinances are established mandating behaviour, then inspections and monitoring – and clear agreement on who is responsible for and has authority to conduct monitoring – is needed to identify any non-compliant actions. Monitoring is also needed to ensure compliance with market-based approaches; for example, if payments or rebates are available for safe disposal, then processes are needed to check whether this has occurred and whether payment should be made.

The robust monitoring of compliance is an important factor in establishing the legitimacy of the enforcement system – that is, there needs to be a credible likelihood of non-compliant activity being detected. However, monitoring, inspections, and obtaining information about activities are costly exercises for the regulating authority. There are also limitations, depending on the local context, on the local political or community appetite for monitoring and enforcement activities. Often it is not possible to monitor every single activity, nor is this required for an effective monitoring system. A smart approach to enforcement will consider the likelihood of non-compliance to determine random inspections and audits, combined with for example citizen reporting or self-reporting to provide more information.

There are a number of choices to make and issues to address in designing a monitoring and inspection system for a particular compliance issue. As outlined in Blanc (2012), these include:
- Clearly identifying the roles and responsibilities of agencies (for information collection and storage) to reduce duplication, ensure comprehensiveness, and increase clarity for both the regulators and the regulated.
- Transparently providing information about enforcement requirements and guidance, so that individuals and businesses know what they are expected to do, and what they can expect from inspectors.
- Applying a risk-based approach to allocating resources, planning and implementing inspections (see section 2.6 above).

To ensure a monitoring and inspection system is as efficient as possible, the aim should be to avoid duplication of information collection efforts. Information required for compliance may already be available through other channels, such as taxation databases, which often contain useful information such as types of new buildings constructed, and types of businesses (see box 10 in section 4.2).

It is also important to define and communicate (in regulations, by-laws or guidelines) the appropriate indicators or standards to avoid disputes that will arise if what is compliant is left open to inspector interpretation. For example, whilst it may be obvious that the act of dumping into a waterway is illegal, in the case of septic tanks or occupational health and safety, the regulator needs to specify what the details of what is considered compliant construction (e.g. refer to standards) or actions (e.g. refer to standards or guidelines on protective equipment and other emptying requirements).

Furthermore, additional ways to collect information could be considered, including:
• scheduled or random inspections;
• regular or random audits;
• reports from community (citizen monitoring);
• combining information from other regulatory authorities (e.g. water quality in waterways);
• self-reporting (can be combined with periodic or random inspections, so auditing the reports);
• investigations (of breaches).

The decision to include additional sources of information should take into account the existing capacity, additional costs as well as its vulnerability for gaming or providing false information. The advantages and disadvantages of different approaches are outlined below in table 2.

Compliance information source	Potential advantages	Potential disadvantages
Inspections – e.g. inspecting septic tank construction, desludging activities, or disposal. Can be scheduled or random.	• Provides reliable information, if inspection governance is sound	• Resource intensive • Requires staff with good technical knowledge
Monitoring nearby environmental conditions – e.g. water quality in drains and rivers close to septic tanks	• Useful for detecting breaches without entering properties • Can be used to determine whether a permit or license system is working	• Difficult to demonstrate the causal connection between source and impact • Resource intensive
Self-monitoring and reporting	• Shifts cost burden to the regulated parties • May provide extensive information • If combined with random inspections/ auditing and appropriate penalties for mis-reporting, can encourage truthful reporting	• Relies on integrity and capability of regulated party to provide information • Places cost burden on regulated parties
Citizen monitoring	• Can detect non-compliance that would otherwise go undetected • Can engender a sense of community pride in promoting compliance	• Sporadic, not consistent information • May mean inaccurate reporting • May put citizens at risk of reprisal • May be mis-used by citizens to address other grievances

Table 2.   Potential advantages and disadvantages of different sources of compliance information (adapted from Inece (2009))

4.2 Data innovations for compliance monitoring

There is significant interest in the potential role for data collection, transfer, storage and analysis technologies to assist in compliance monitoring. The use of such technology does not remove the need for the clear allocation of responsibilities, roles and authority. However, the speed, scale and accessibility of technologies related to data management can lead to new and innovative ways to collect information, involve the wider community in monitoring, and store and manage data. Also, automated data collection technology often is more easily accepted as more reliable evidence by stakeholders. One example is the use of GPS to track the movement of sludge trucks to ensure safe disposal (see case study in section 5.2). Of course, technology changes but does not replace the role of personnel to conduct data entry and analysis; clear incentives and roles are still needed to support those activities. Also, situating the technology in the local institutional setting often requires more time than expected.

As outlined above in section 2.4, there are opportunities for state agencies to form networks or alliances with other government or non-government actors to extend the resource base available to conduct inspections and hence increase the effectiveness of inspection regimes. Examples from Mexico and Bangladesh are presented in box 9 and box 10.

**Box 9.   Inspections:
            Mexico's Private Auditors**

Mexico's National Environmental Audit Program was instituted by the Mexican environmental enforcement agency, Profepa (Procuraduría Federal de Protección al Medio Ambiente) in the 1990s. This program aimed to complement the Mexican government's strict enforcement campaign to limit pollution by industrial facilities. Since its introduction, the Audit Program has been extended to cover the majority of the country's large industrial establishments.

Participating facilities select an auditor from a pre-approved list, to perform an audit in accordance with established Profepa "terms of reference". The auditor then proposes a plan of action listing all actions necessary for the facility to comply with the law. A written agreement is established between Profepa and the facility, with a time period for the company to progress activities towards compliance.

There are several incentives for companies to join this voluntary program. They include:
* *Exemption from sanctions:* Participating facilities are covered by a guarantee which ensures that they will not be sanctioned for violations found in the audit.
* *Risk-management:* The agency will not conduct enforcement inspections whilst the company is progressing with its compliance actions, as long as there are no public compliants or incidents.
* *Reputational benefits:* Environmental certificates are awarded on successful completion, which commend and recognise environmental performance and can be used for publicity (e.g. Certificates of Tourism Environmental Quality).

Source: Van Rooij and McAllister (2014)

Box 10. Compliance with the Bangladesh National Building Code (BNBC) for sanitation facilities in Khulna, Bangladesh

Septic tank construction is regulated through the Bangladesh National Building Code (BNBC). However, compliance with this regulation remains inadequately enforced both by Khulna Development Authority (KDA), which has responsibility for approval of new building construction, and the Khulna City Corporation (KCC), which is responsible for waste management. Within KDA, there is no designated role and no guidelines for checking the compliance of the sanitary components of buildings with the BNBC. Further, there is limited capacity within this agency to perform this role. In recent years, it relied on three staff to inspect and approve 700 buildings per year. KDA does not demand detailed drawings of the septic tank as part of the approval of the building development plan, and often the information provided only includes the location of the septic tank and not its size and chamber details. Approvals are given before construction starts, and no proper inspections are done at later stages to ensure construction is done according to the plan submitted. Moreover, neither KDA nor KCC provides any completion or occupancy certificate. The BNBC states that a licensed plumber should issue a completion certificate for the sanitary system, but there is no such practice, and nor is there a system for licensing and certifying plumbers. SNV has been working in collaboration with KDA and KCC to address this situation.

Under a proposed joint KDA-KCC building construction approval process and action plan (see diagram below) KDA would revise its guidelines for building construction applications and provide clear guidelines for incorporating septic tank design and sanitation plans in the building plan approval application. Further, under the proposed plan, in addition to the regular zoning, access and set-back assessment, KDA would conduct a 'plinth level inspection' to ensure that construction, including the septic tank, has been made as per guidelines and drawings in the development application. In addition, KCC would issue an 'occupancy certificate' after ensuring that the building's sanitary system met the appropriate standards. This 'occupancy certificate' should act as a key to obtaining a holding number, a utility connection and approval to receive other municipal services. For other smaller cities, where development authorities do not exist, the municipality will play both roles. It is also proposed that the KCC performs this role with the assistance of the ward level office.
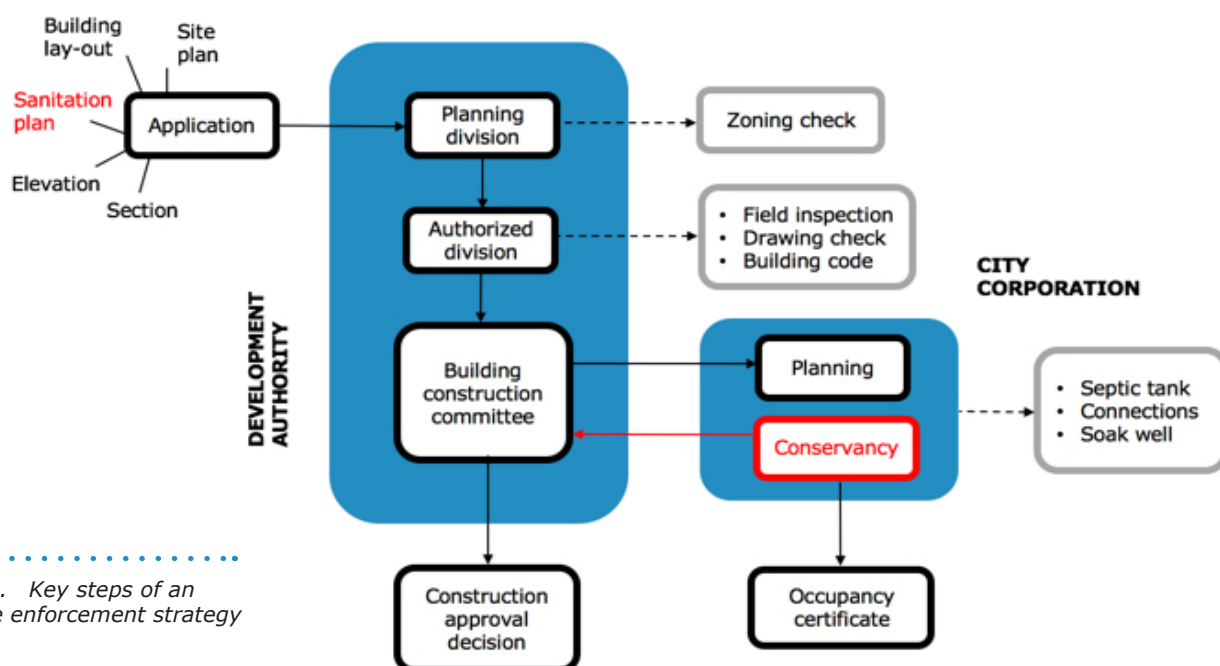

Figure 6. Key steps of an effective enforcement strategy

5. Case examples

This section includes five case studies of approaches to "smart enforcement" from sanitation and other sectors, in developing and developed countries. They highlight the experiences and the challenges, in practice, of applying innovative enforcement strategies in a range of contexts.

5.1 Enforcing safe dumping by private emptiers in Bandung, Indonesia, and in Patna, India

This case study highlights smart enforcement examples of:
- citizen monitoring of illegal dumping
- use of technology for both permitting and monitoring
- targetting of police resources to regulatory efforts which would yield the highest outcomes,
- combining financial, punitive and market opportunity measures to incentivise safe dumping
- a responsive approach to permitting that recognised the initial capacity constraints of private emptiers, and progressively increased standards from low to high over time, to encourage participation and overall quality improvement.

The cities of Bandung in Indonesia and Patna in India have both faced the major challenge of illegal sludge dumping by private emptiers. Bandung does not have a sludge treatment plant, and the only safe disposal site, the waste treatment plant (WTP), is located a considerable distance from the city. The high fines for illegal dumping have rarely if ever been imposed due to difficulties in monitoring, and therefore they have not acted as a disincentive for illegal dumping. The combination of high transport costs to the WTP and lack of effective enforcement resulted in a high incidence of illegal sludge disposal into natural waterways. A similar situation was observed in Patna. Private emptying was not legitimatised by government, and operators lacked access to a safe disposal site. Private emptiers were not allowed to discharge at the existing sewage treatment plant and even if they were, it was not conveniently located. Further, operators were harassed by government officials and the police for running illegitimate businesses.

Using different strategies, both cities aimed to establish financially feasible access to safe disposal sites for emptiers and a system for monitoring of illegal dumping. In the case of Bandung, the approach consisted of a system of disposal permits supported by police enforcement and community surveillance. In Patna, a system of disposal permits is also being implemented, however this is being supported through an engagement process in which the municipality relates to private emptiers as partners rather than offenders.

The following sections describe the smart compliance approaches adopted in each city in greater detail.

Bandung, Indonesia
In Bandung, sanitation is the responsibility of the local government water supply agency (PDAM). The PDAM addressed the issue of access to safe disposal sites by establishing a Memorandum of Understanding (MOU) with a selected group of 17 private emptiers who are awarded disposal permits to discharge at sewer manholes. Permits are awarded annually, with payments (estimated on the number of trips per month) due monthly.

Figure 7.   Bandung disposal sticker permit (source: World Bank 2016, p. 31)

The private emptiers were selected based on a number of criteria including the condition of equipment and business administration capacity. Initially, these criteria were loosely applied to encourage and enable many of the existing businesses to participate in the system. This was important to ensure the scheme was supported and successful, and to address illegal dumping. The restriction on the number of available permits, at least initially, also afforded some "market protection" to the emptiers and provided them with an incentive to sign up.

MoU signings were also witnessed by local police, who ensure that only those emptiers with permits empty into the sewer system. Fines can be imposed on emptiers who access the sewer system but do not hold a permit. This approach has shifted compliance monitoring away from the almost impossible task of detecting illegal dumping in waterways in the wider region, to the more feasible monitoring of truck access to sewer manholes within the city boundaries. Monitoring is made easy because each licensed emptier also receives a large, visible permit sticker, with a different colour each month (see figure 7). The PDAM has also launched a campaign to expand surveillance and the reporting of illegal dumping. They have encouraged the community – through a form of citizen monitoring – to use smart phones to take photographs and report illegal dumping.

Patna, India
The system of disposal permits of Patna city, gives the private emptiers access to the 24 lifting stations spread across the city linked the sludge treatment plant (STP). For tipping at these disposal points, private emptiers need to be registered with the concerned government authority by paying a fixed fee of $15 per year and pay a tipping fee of $4.5 per trip. Upon failing of disposing the sludge in to the designated places, the registration is cancelled and emptiers are subject to being barred from operating.

In the current scenario, the STP and lifting stations are yet to be opened for disposal. Thus, currently operators can dispose in to the open. However, government has opened one lifting station for disposal as a pilot to understand the behaviour of the STP. Based on the outcomes government will decide on the locations of the remaining lifting stations.

Although this system offers the operators some legitimacy and prevents them from possible troubles, in the absence of an effective mechanism to monitor and penalise illegal dumping, the costs of the disposal permits counterbalance as a disincentive. Instead operators may prefer to remain elusive and unwilling to conform to safer practices.

To address this, extensive engagement and consultation with private emptiers is being conducted. This is aimed at building trust and bridging a communication gap between emptiers and government as the problem is understood. The process has involved identifying and initiating one to one interactions with private emptiers, which eventually led to frequent meetings involving various private emptiers. These interactions and meetings served to discuss common concerns of operators and issues related to the safe disposal, including the government's position of imposing a registration and tipping fee to cover the costs of building a support infrastructure of surveillance and management. A surveillance plan has also been developed and discussed with the private emptiers. This proposes that the disposal sites are monitored by installing closed circuit television (CCTV) camera and keeping record of each of the operators while tipping at the designated places. This is aimed at ensuring that disposal is happening at the designated locations and prevent false reporting by emptiers. Simultaneously Municipal field inspectors will be trained to monitor the operators on a random basis.

5.2 Mobile phone monitoring of private emptier performance, Solo, Indonesia

This case study highlights smart enforcement examples of:
- use of technology for monitoring private emptiers;
- combining BCC, financial incentives (that raised neede revenue) with innovative monoitoring approaches.

Previously, the city of Solo faced sanitation risks at two key points of the FSM service chain. Firstly, there was no scheduled desludging program, and demand for desludging was low and emptying occurred on an irregular basis. Secondly, sludge was dumped illegally into local rivers.

The PDAM collaborated with USAID and IU-WASH to implement a set of initiatives to encourage regular emptying and safe disposal, including a program of regular scheduled desludging. Emptiers were contracted to conduct regular desludging at private households, and this was financed by including a compulsory levy to cover desludging services in residential water bills. An awareness campaign was targeted at households to promote participation.

An innovative smart enforcement approach employing location-based mobile phone technology was applied in the monitoring of private emptiers' compliance. The monitoring extends from the point of collection to the point of disposal, and it aims to promote regular emptying as well as safe disposal.

A process of verification of the geographic location, ownership and occupancy situation of the households that are to be part of the desludging program is in progress. This is supported by a mobile phone application developed by IU-WASH (e-census). The following data is collected: name of the homeowner; address of the house; water meter number; a photo of the front of the house and of the septic tank; floor plan of the house.

To control the number of households emptied, and to ensure the sludge is discharged at the sludge treatment plant (STP), a bar coding system is used. Using a mobile phone, the private emptier must scan the bar code sticker at the household at arrival and departure, and the STP plant operator scans the bar code sticker on the emptying truck on its arrival at the plant. To avoid cheating through scanning a copy of the truck's bar code at a location different to the STP, the mobile phone application used to register the bar code data also registers the location of the truck. The last scan indicates the completion of the order and the data from the phone is sent to the PDAM's database where it is used to update the customer information with the completed/ incomplete orders, and to pay the private operator.

Data collected through the e-census application will also allow the PDAM to identify the proportion of customers who don't have on-site systems or whose on-site systems are inappropriate/ malfunctioning, and design a program to address this issue. While these are all excellent innovations and stakeholders are enthusiastic, it is still hard work to bring all pieces of the puzzle together in a functional system. Some of the challenges faced so far include:

- Delays in the payment of the private emptiers by the PDAM;
- Bar code stickers getting older and not readable;
- Loss of signal in certain locations;
- Plant operators not being present at the plant, making the private emptier wait;
- Issues with the capacity of the treatment plant to receive sludge disposed by the private emptiers due to poor quality of construction.

This illustrates the potential, but also the complexity of smart enforcement, requiring a long term and persistent effort.

5.3 Keeping waterways clean by preventing illegal dumping of rubbish: local governments, Australia

This case study highlights smart enforcement examples of:
- combining instruments (financial penalties on illegal disposal, discounts for safe disposal, and information provision) that tap into a wide range of motivations and behaviours;
- a range of compliance monitoring approaches, including involving the community.

Stormwater management is a key concern for local governments (councils) in Australia. Stormwater runoff flushes material accumulated on surfaces including litter, dust and soil fertilisers and other nutrients, pesticides and other chemicals, micro-organisms, metals, oils and grease into waterways, and so the management of these pollutants is essential for keeping rivers, streams and oceans clean (Commonwealth of Australia, 2002, p.14). Local governments, often with funding support from state governments, have implemented a range of programs to encourage, and enforce compliance with rubbish management laws. Councils are authorised under national government legislation (the Environment Protection Act, 1970) to investigate illegally dumped rubbish.

Councils recognise that dumping rubbish has many impacts including:
- Pollution: Illegal rubbish dumping causes chemical and physical pollution of waterways and community spaces. The rubbish can block stormwater drains and can be a breeding ground for insects, which can spread unwanted pests and diseases.
- Fire risk: Dumping green waste, tyres, chemicals and other flammable items can increase the risk of fires.
- Safety: The dumping of sharp objects, asbestos, toxic substances, nappies and medical waste can have public health impacts, including children getting trapped in rubbish, especially fridges.
- Aesthetic concerns: Dumped rubbish can make the environment unattractive.
- Cost: Every year councils in Australia spend millions of dollars of ratepayers' money to clean up illegally dumped rubbish.

To prevent people from dumping their rubbish, including large items such as building materials, furniture and chemicals into and waterways, councils apply multiple instruments, including voluntary measures, providing information to make it easier to comply, and punitive measures for non-compliance. These tap into a wide range of motivations that people might have for complying. Examples include (FRRRC):
- Financial penalties: A removal notice is issued if the source of the rubbish is identified. If the person does not comply with it, they can receive a penalty of up to $8000.
- Discount for safe disposal: Some councils provide a discount for their residents to take waste to specific facilities.
- Information on how to comply: Community members are provided with information on council websites about where they can legally take their rubbish, including recycling and recovery centres.

A wide range of compliance monitoring approaches are also used, including:
- In NSW, a new statewide database has been developed with public land managers, using smartphone technology to report dumping and help the state government to develop a comprehensive database (Sydney Morning Herald 2015).
- Closed Circuit Television (CCTV) cameras are installed at illegal dumping hotspots (Herald Sun 2015).
- Community members are encouraged to report people that they see illegally dumping rubbish by calling a 24-hour EPA pollution hotline (Frankston City Council n.d.).
- A regional illegal dumping reporting website has been created by councils on the North Coast of NSW, in partnership with the NSW Government (NSW EPA n.d.)

5.4 Managing occupational safety and health hazards for manual pit emptiers in Bangladesh

This case study highlights smart enforcement examples of:
- engaging non-compliers in the process of designing enforcement approaches;
- promoting dialogue between non-compliers and regulatory agencies.

If not managed properly, manual pit emptying poses a range of health hazards to the emptiers, through direct contact with faeces and associated pathogens, as well as through exposure to harmful gases generated in septic tanks or pits (Tiwari 2008). In Bangladesh manual pit emptying is unregulated, harshly stigmatised and poorly paid. Manual emptiers often operate illegally without appropriate protective clothing, and are vulnerable to assault and extortion. Many also work at night to avoid objections from neighbours, and drink locally produced alcohol to cope with the odour, further increasing the chances of injury and accidents (SNV 2014; SNV 2015a; SNV 2015b). As a result of this situation, in 2015 within a period of 10 months, 31 manual emptiers died while emptying pits (Prothomalo National Daily, 11 November 2015).

Although the importance of faecal sludge management is well recognised and given high priority in national policies and strategies, it is remains largely neglected at the implementation level (SNV 2015a). Further, emptiers have a low level of awareness of the risks associated with their work. Thus, they are often not willing to adopt safety precautions (SNV 2015a; SNV 2015c).

> **"The pit cleaners, who belong to the lowest castes, are treated as outcastes. So we have to work towards making people accept them. This is a challenge for us, as part of the City Corporation and for them as well - to prove that their work is important for society."**
>
> ~ Md Moniruzzaman, Mayor of Khulna

In efforts to manage these risks, SNV has been working closely with national and local governments to legitimise the work of informal emptiers and promote safer sludge emptying practices. This has included advocating for the institutionalisation of OS&H guidelines for FSM and improving the knowledge and awareness of OS&H amongst pit emptiers and their employers. To support these efforts, and to assist with initiating dialogue with national and local government authorities, SNV developed two instruments: the 'Occupational Safety and Health Guidelines for FSM' and a 'Participation-Oriented Safety Training Manual' for emptiers. Lists of emptiers in the SNV's programme areas have been developed and endorsed by local government institutions, and up to now about 200 emptiers have been trained on OS&H. In order to mainstream OS&H issues a certification process is also being discussed with the National Skill Development Council.

> **"People don't feel like using personnel protective equipments such as boots, gloves, etc. They say 'it's too hot' or 'I can't feel things when I wear gloves.'"**
>
> ~ Rajeev Munankami, SNV Senior Advisor and Team Leader FSM Programme

The two SNV documents were developed based on an extensive field study conducted by the Bangladesh Occupational Safety, Health and Environment Foundation. The study included extensive conversations with national and local stakeholders. These discussions, as well as field observations and documentation of the emptying processes, together with consultation with an OS&H expert, were critical to understanding what were feasible and workable health and safety practice improvements, and to ensuring these were reflected in the guidelines and action manual.

The OS&H guidelines state the moral and legal obligations of local government bodies and suggest measures to be taken by them, as well as the roles and responsibilities of various stakeholders involved in FSM, including service recipients, NGOs and various government agencies. The training manual consists of a field-level trainers' training programme designed for contractors and leaders of sludge emptiers, concerned work supervisors, health and hygiene personnel at city authorities, as well as community leaders willing to serve as OS&H trainers and/or activists in their communities.

5.5 Restaurant and café compliance with food safety codes, NSW, Australia

This case study highlights smart enforcement examples of:
- Recognising the reputational motivations of businesses by providing publicly available information on compliance and non-compliance;
- Underpinning a reputational approach with fines for noncompliance.

In the state of New South Wales in Australia, the state government regulatory authority (the NSW Food Authority) works with local councils to promote compliance of retail food outlets with the Food Standards Code, which is legislated nationally (Australian Government 2017).

The Code and associated standards place a number of requirements on outlets, including (NSW Food Authority 2016):
- Obligations on owners to ensure that people involved in food preparation have adequate skills and knowledge;
- Requirements for food businesses to be designed and constructed to satisfy the requirements of the standards, including spaces and hand washing facilities;
- Health, hygiene, cleaning and sanitising and food handling requirements.

The state government and local governments work together to implement a regular schedule of inspections of food outlets to check compliance with the Code.

There are two main smart compliance approaches used to encourage compliance that act to punish poor compliance and reward good compliance. A schedule of fines is in place for infringements, which aims to tap into financial motivations to incentivise compliance. However, for some organisations these fines may be relatively small (NSW Food Authority 2016). The scheme also recognises that retail food outlets rely on their reputation for continued business, and targets compliance in two ways:

- Negative reputation: A publicly available register of penalty notices; a searchable database where details of all businesses' infringements and penalties are published (NSW Food Authority 2016).

- Positive reputation: A "Scores on Doors" food safety scoring program, in which compliant food outlets receive a sticker to display their score results of inspections (NSW Food Authority n.d.).

5.6 Mediation and enforcement of sanitation by-laws in urban Ghana

This case study highlights smart enforcement examples of:
* promoting dialogue and mediation between key stakeholders;
* adopting a responsive approach to facilitating compliance with by-laws before moving to prosecution of non-compliers.

In urban centres in Ghana, access to sanitation at the household level remains very low and residents often rely on public toilets, particularly in low-income communities where compound housing predominates. Landlords do not typically invest in toilets in compounds, in part due to a lack of pressure from either tenants or regulatory authorities. Easy access to public toilets also reduces the incentive for urban residents to invest in a compound toilet, or to demand a toilet from their landlords. Often, lack of a toilet is not sufficient to stop tenants from renting a property. Further, relevant government agencies have lacked the capacity to adequately enforce existing by-laws, which state that each house must have access to a toilet.

In Kumasi city, in efforts to address this challenge, Water and Sanitation for the Urban Poor (WSUP) has been working closely with the Kumasi Metropolitan Assembly (KMA) and the Ga West Municipal Assembly (GWMA) in developing and implementing a five-year compound sanitation strategy. The strategy aims to encourage investment in toilets in compounds by landlords, for use by compound tenants. As owners of the property who have greater financial means and responsibility for complying with existing by-laws, landlords are the strategy's behaviour change target group (as opposed to compound residents). However, the strategy also acknowledges that tenants must also be active in the process of acquiring the toilet.

The strategy proposes an Enforcement Management Model (figure 8), which promotes dialogue and mediation between tenants and landlords. The process begins with an inspection of the compound by an environmental health officer (EHO), which is managed by the Environmental Health and Sanitation Department (EHSD Town Council Head, to check if the compound has a safe toilet for use by live-in landlord(s) and tenant(s). If there is no safe toilet, the EHO interacts with the compound's landlord and tenants to inform them of by-laws and to offer them support for getting a toilet. The process then moves towards the toilet sales stage (if the reception is positive) or the prosecution stage (if the reception is negative). In the sales stage, the residents are provided with technical and financial information and support. This is followed by a final construction stage. If the landlord and tenants refuse to comply or fail to take action to have a toilet installed they will be warned, given a notice, and finally prosecuted if they remain non-compliant.
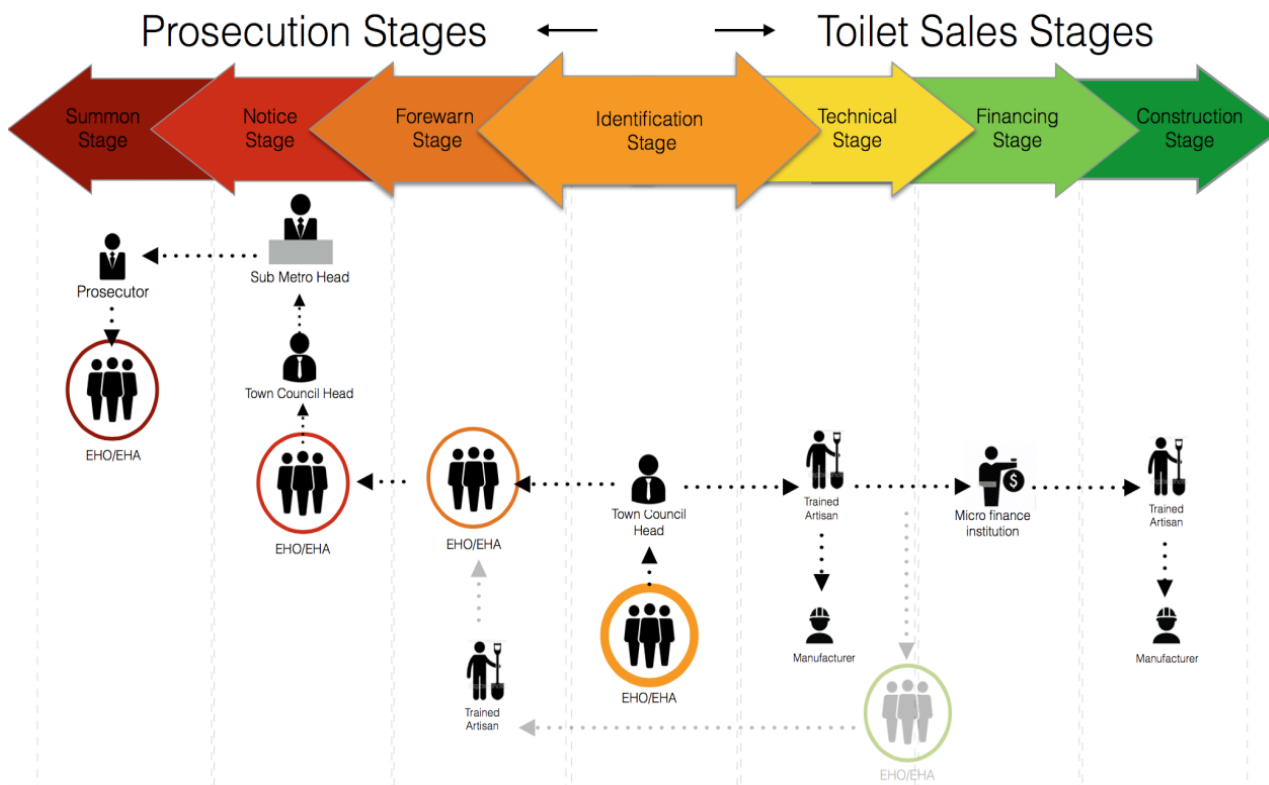
Figure 8. Diagram of enforcement management model in Kumasi (diagram provided by WSUP)

Other critical components of the strategy include mobilising municipal finance for sanitation (for example, by supporting EHOs to better undertake their roles), and building the supply side by engaging private sector suppliers and financiers.

EHOs will be given training and access to peer-to-peer learning to help them understand the model and the tools available to them for enforcing existing by-laws.

WSUP led a team of stakeholders in developing a proposal – submitted by the Municipal Chief Executive – which resulted in the district court agreeing to schedule one day each month to hear sanitation-related cases. Although this has not been a core part of the messaging to landlords, EHOs who interact with landlords are aware of these arrangements and can leverage this to prosecute non-compliant sanitary cases.

6. Conclusion

In many countries and contexts, the challenges of achieving safe and sustainable urban sanitation outcomes can seem insurmountable. At the forefront of these challenges is that of how to enforce regulations and standards and ensure compliant behaviour by users (households, businesses, institutions) and service providers. This is particularly complex given the often limited resources available for enforcement, entrenched current practices, and apparent roadblocks posed by institutional, governance and political settings.

This paper acknowledges the complexity of challenges facing urban sanitation practitioners and the local governments charged with service delivery. There is no easy way or formula to achieve a "smarter" approach to enforcement. Indeed, our search for and documentation of examples and case studies revealed limited examples of comprehensive and successful enforcement strategies in complex urban sanitation contexts. Nevertheless, these examples, and those from other sectors, also show that many practitioners and governments are innovating in their approaches to motivating, incentivising and enforcing compliance. These cover a range of facets, including targeting scarce enforcement resources; combining ranges of instruments; expanding the resource base for inspections by involving citizens and the private sector; and trialling new technologies for licensing and monitoring.

This paper has explored key concepts and examples that would be useful to consider when grappling with enforcement in urban sanitation. The applicability of concepts will vary depending on individual contexts. We hope that this exploration has helped encourage and inspire readers as they pursue effective approaches to smart enforcement in urban sanitation.

Photo: SNV/A. Dockery

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