



# Mobile for Development Utilities Programme

The Role of Mobile in Improved Sanitation Access

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# Executive Summary

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Defined in 2000 by the United Nations and their member states, Millennium Development Goal (MDG) 7 on “ensuring environmental sustainability” aimed to halve the proportion of people without access to “improved sanitation”<sup>1</sup> by 2015. From 49% of the world population with access to sanitation in 2000, the goal was to achieve 77% of improved sanitation coverage by the end of this year. This target is not expected to be met, as the latest monitoring activities<sup>2</sup> reported that 68% of the world population had access to such infrastructure. Although more than 2.1 Billion people gained access to improved facilities since 1990, 2.4 billion are still relying on “un-improved solutions”<sup>3</sup> and one billion practice open defecation. Moreover, as a result of population growth, there are more people without access to adequate sanitation today than in 2000.<sup>4</sup>

Lack of access to adequate sanitation has a heavy impact on public health, leading to mortality from diarrhea to stunting and malnutrition for children, directly affecting their school attendance. Open defecation, in addition to highly impacting privacy and dignity of individuals, is unsafe, especially for women, who are far more vulnerable to the risk of physical and sexual assault.<sup>5</sup>

Closing the sanitation access gap is far from being an easy task and “lagging progress on sanitation persist because of the complexity of the response needed. Improving sanitation requires changing behaviour and social norms (including open defecation)”.<sup>6</sup> Governments have the responsibility to improve sanitation capacity, but have often failed to provide service supply chain for operation and maintenance. Most practitioners also recognise that building a toilet cannot ensure that it will be used.<sup>7</sup>

While the MDG model of focalised international actions to increase living standards was failing to meet some of its targets, mobile phone ecosystems driven by entrepreneurial spirit and market forces managed to reach near ubiquity in many emerging markets: mobile networks now cover more than 85% of the population and unique mobile subscribers’ penetration is over 45%.<sup>8</sup> As a result, the gap between access to mobile and access to basic infrastructure such as utility services, has kept growing to the extent that, between 2002 and 2012, for every person gaining access to improved sanitation, ~2.5 persons became mobile subscribers.<sup>9</sup>

More than mobile phone ownership, the level of sophistication of mobile services in many countries, such as mobile money, mobile internet and machine-to-machine connectivity, starkly contrasts with the status of sanitation services. For example in Kenya, where access to sanitation is reported at 30%,<sup>10</sup> people are more likely to conduct financial transactions through their mobile money account (59% of the adult population use mobile money) and browse the internet on their mobile phone (up to 40% of the population), rather than benefit from the dignity, privacy and convenience of a well-maintained toilet.

This year, with the transition from the Millennium Development Goals to the Sustainable Development Goals aiming to set targets for the next 15 years, there is no doubt mobile devices, technologies and services have a role to play to support bridging the current infrastructure divide.

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1. An **improved sanitation** facility is defined as one that hygienically separates human excreta from human contact – Joint Monitoring Programme (JMP) <http://www.wssinfo.org/>

2. Joint Monitoring Programme 2015 Update - 25 Years Progress on Sanitation and Drinking Water

3. According to JMP, un-improved solutions include flush toilets not connected to piped sewer system, septic tank or pit latrine; pit latrine without slab/open pit; bucket; hanging toilet or hanging latrine; shared facilities; no facilities

4. IRC Wash - <http://www.ircwash.org/blog/let%E2%80%99s-face-sanitation-chain-challenges-together>

5. <http://www.embracingtheworld.org/news/sanitation-matters-empowering-rural-women-build-toilets/>

6. <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9437.pdf>

7. WIREs Water 2015, 2:9–20. doi: 10.1002/wat2.1055

8. GSMAi 4th Quarter 2014

9. GSMA M4D Utilities 2015

10. JMP 2015

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The GSMA Mobile for Development Utilities (M4D Utilities) programme sees an important opportunity for mobile ecosystems to help solve some of the sanitation access challenges in emerging markets, including data collection, monitoring, operation and maintenance, financing. Adding to our ongoing work in the energy and water sectors, this new report aims to outline how mobile channels can support sanitation service delivery while building new engagement models with customers in underserved settings.<sup>11</sup> Unlike the energy sector where mobile tools are increasingly integrated<sup>12</sup> in decentralized solutions, mobile in the sanitation sector is at an early stage of development. What is needed to better understand the role and impact of mobile in this sector, is a collaborative approach to mobile technology integration, grant support for developing and piloting such innovative solutions and rigorous monitoring and evaluation of the impact of these innovations in the service delivery.

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11. This report focuses on access to sanitation infrastructure; hygiene practices which constitutes an important part of improved sanitation are however not presented in details in this document

12. Example for solar Pay As You Go models, leveraging mobile services to interact with customers, mobile payments and/or machine to machine connectivity

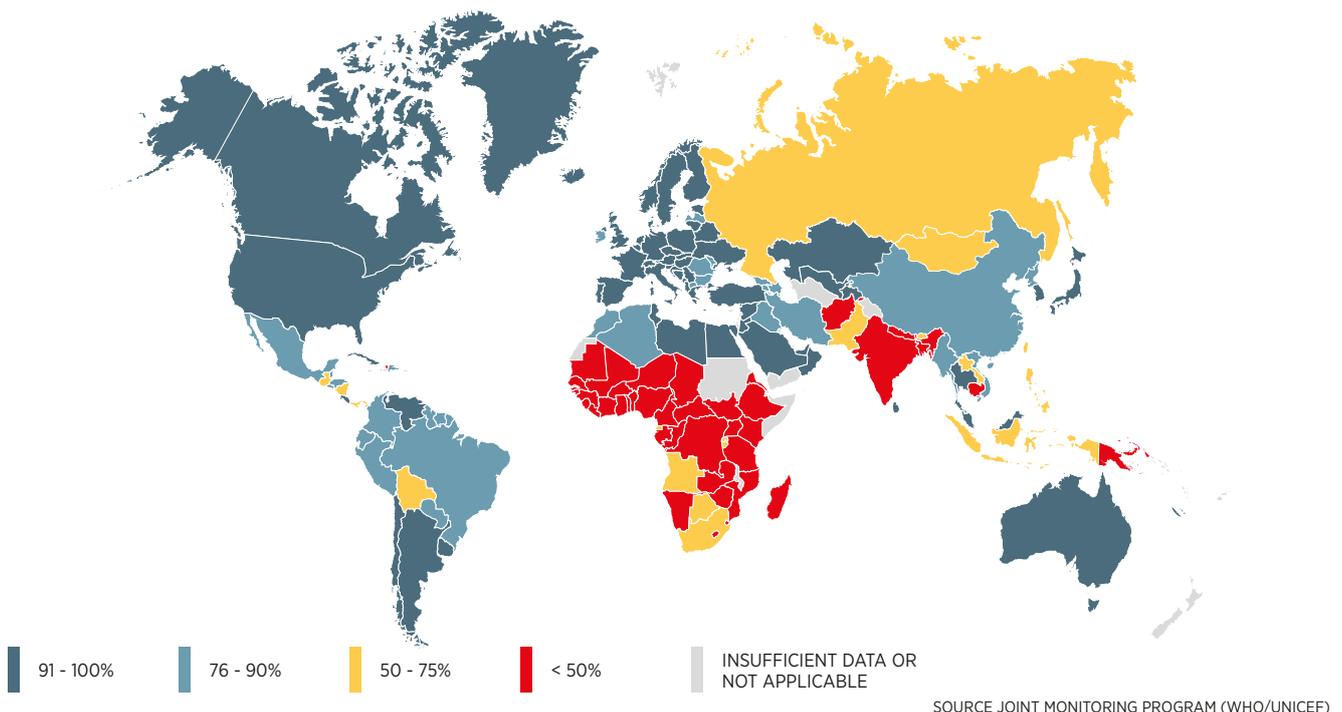
# Overview of Global Sanitation Access in 2015

## Insufficient Progress on the Sanitation Millennium Development Goal

More than a third of the world's population, 2.4 billion people, has no access to "improved" sanitation solutions, including 1 billion people practicing open defecation.<sup>13</sup> Although important progress has been made globally, with nearly a third of the global population gaining access to an improved sanitation facility since 1990,<sup>14</sup> the Millennium Development Goal (MDG) 7 on halving the number of people without access to sanitation by 2015 will not be met, with most countries of the Sub Saharan and South Asian regions clearly lagging behind (Figure 1). Progress on sanitation has also often increased inequality by primarily benefitting wealthier people<sup>15</sup> in urban areas, services declining sharply in informal settlements and rural environments (70% of those without access to an improved sanitation facility live in rural areas).

FIGURE 1

### PROPORTION OF THE POPULATION USING IMPROVED SANITATION (2015)



13. JMP WHO/UNICEF Update 2014

14. JMP Update 2015

15. Ibid

## WHAT'S THE IMPACT OF POOR SANITATION?

Poor sanitation has a direct negative health and economic impact on populations and countries. The World Health Organization (WHO) estimates that diseases related to unsafe sanitation are responsible for 6% of global deaths. Children suffer the most, as an estimated 2,000 children under the age of five die every day from diarrhoeal diseases and of these, some 1,800 deaths are linked to poor water, sanitation and hygiene. Countries where open defecation is most widely practised have the highest numbers of deaths of children under the age of five, as well as high levels of under nutrition, high levels of poverty and large disparities between the rich and poor. Overall the global costs of inadequate sanitation is estimated at US\$260 Billion per year or a cost of 1.5% of developing countries GDP (based on *Global Costs report from WHO 2012*). In India, inadequate sanitation causes economic losses equivalent to 6.4% of the country GDP or US\$53.8 Billion a year (*Water and Sanitation Program World Bank 2010 – “The Economic Impact of inadequate sanitation in India”*).

## Approaches to Improved Sanitation Access

Piped sewage systems and wastewater treatment plants only serve a fraction of those in developing countries, mainly due to the lack of political will, limited land availability and high cost of piped systems installation. As a result, a majority of the population (~2.6 Billion people)<sup>16</sup> rely on on-site systems, such as pit latrines and septic tanks, requiring Faecal Sludge Management (FSM) services. The faecal sludge, a mix of solid and liquid waste, needs to be collected regularly to prevent the toilets from overflowing and contaminate its environment, such as water bodies. The lack of planning and commitment to maintenance of such systems are however leading to large portions of the waste being uncollected or untreated, with significant environmental, public health and economic impacts as mentioned above.

### TRANSITION TO SUSTAINABLE SANITATION SERVICES

As the Sustainable Development Goals (SDG) are about to be announced, setting new targets to end poverty and improve people's lives (see box below), key elements that would support the development of sustainable sanitation services are:<sup>17</sup>

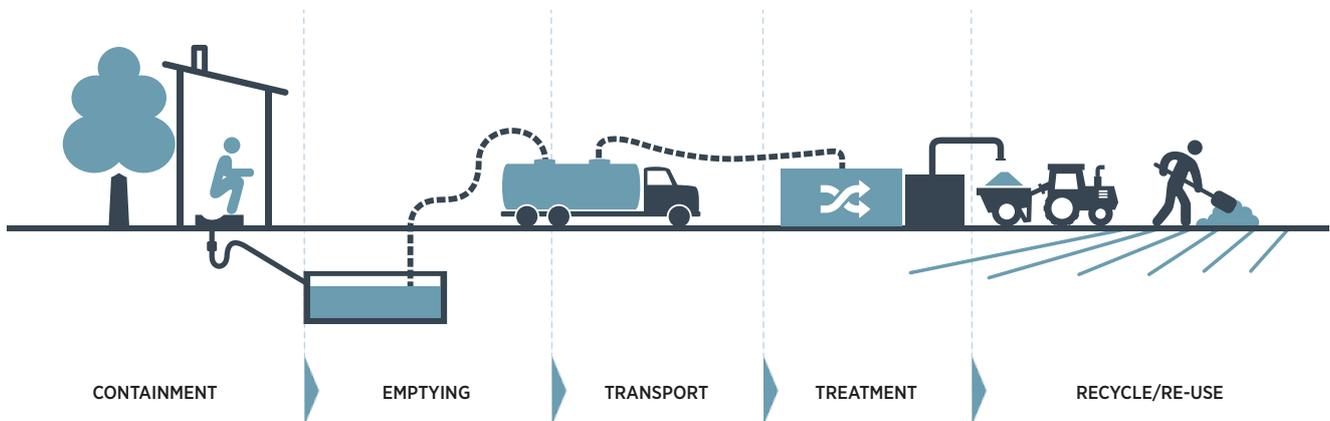
- More attention to the whole sanitation chain to move from a hardware delivery to a service delivery approach (Figure 2) - sanitation is more than building a toilet and includes changed hygienic behaviours, maintenance, emptying, treatment and disposal or reuse of faecal matter;
- Clear leadership for change - sanitation improvements are not the sole responsibility of one entity, being usually spread between households, private service providers (latrine builders, emptying companies) and local and national governments;
- Unlocking public finance for implementing efforts at scale - the level of knowledge and understanding of financial flows to sanitation is very limited, due to the lack of reliable data tracking systems.

16. ~2.6 Billion people worldwide are served by on-site sanitation methods that need Faecal Sludge Management - IRC WASH 2014 - <http://www.ircwash.org/news/faecal-sludge-lunch>

17. IRC Wash 2015 - <http://www.ircwash.org/blog/>

FIGURE 2

## SANITATION VALUE CHAIN



SOURCE BILL AND MELINDA GATES FOUNDATION

## A STAND ALONE SUSTAINABLE DEVELOPMENT GOAL ON SANITATION

Moving beyond the Millennium Development Goal on Sanitation, the new Sustainable Development Goals (SDG), to be finalized by the 3<sup>rd</sup> quarter of this year, will likely put new emphasis on management and monitoring of water and sanitation services, to guarantee their sustainability and availability for all. As proposed for now, the sustainable development agenda comprises 6 elements and 17 SDGs with 169 targets. Sanitation would be part of a standalone goal (SDG 6) on Water, Sanitation and Hygiene, with 8 targets, stating that, by 2030, will be “achieved access to adequate and equitable sanitation and hygiene for all; end open defecation; special focus on the needs of women and girls and those in vulnerable situations.”

## IMPROVING FAECAL SLUDGE MANAGEMENT IN URBAN AREAS

With over 90% of urban growth occurring in the developing world,<sup>18</sup> an estimated 70 million residents are added to urban areas each year; this trend is especially important in South Asia and Sub-Saharan Africa, where the urban population is expected to double by 2030. As a result, slums are spontaneously emerging as a dominant and distinct type of settlement in fast growing cities, hosting 863 Million people<sup>19</sup> (or a third of the developing world’s urban population). Although access to improved water and sanitation in slums has improved, with more than 227 million slum dwellers across Asia, Africa and Latin America gaining access to these basic services, more needs to be done.

The majority of urban dwellers do not have access to sewerage connections and rely instead on non-sewered onsite systems often shared with other families or public toilets. The number of such public solutions is however limited, as for example in Kibera, Nairobi largest slum, where 1,000 public toilets are available for an estimated several hundreds of thousands people.<sup>20</sup> Without access to facilities, people may defecate in the open or into a plastic bag (a “flying toilet”).

In such low-income and slum environments, improving Faecal Sludge Management represents one of the biggest challenges to achieving sanitation at scale. Without proper management, faecal sludge is often allowed to accumulate in poorly designed pits, is discharged into storm drains and open water, or is dumped into waterways, wasteland, and unsanitary dumping sites (see example in the city of Dhaka below). The market servicing dense and

18. World Bank 2011 Estimates

19. UN-Habitat, Global Urban Indicators Database, 2012

20. IRIN 2013

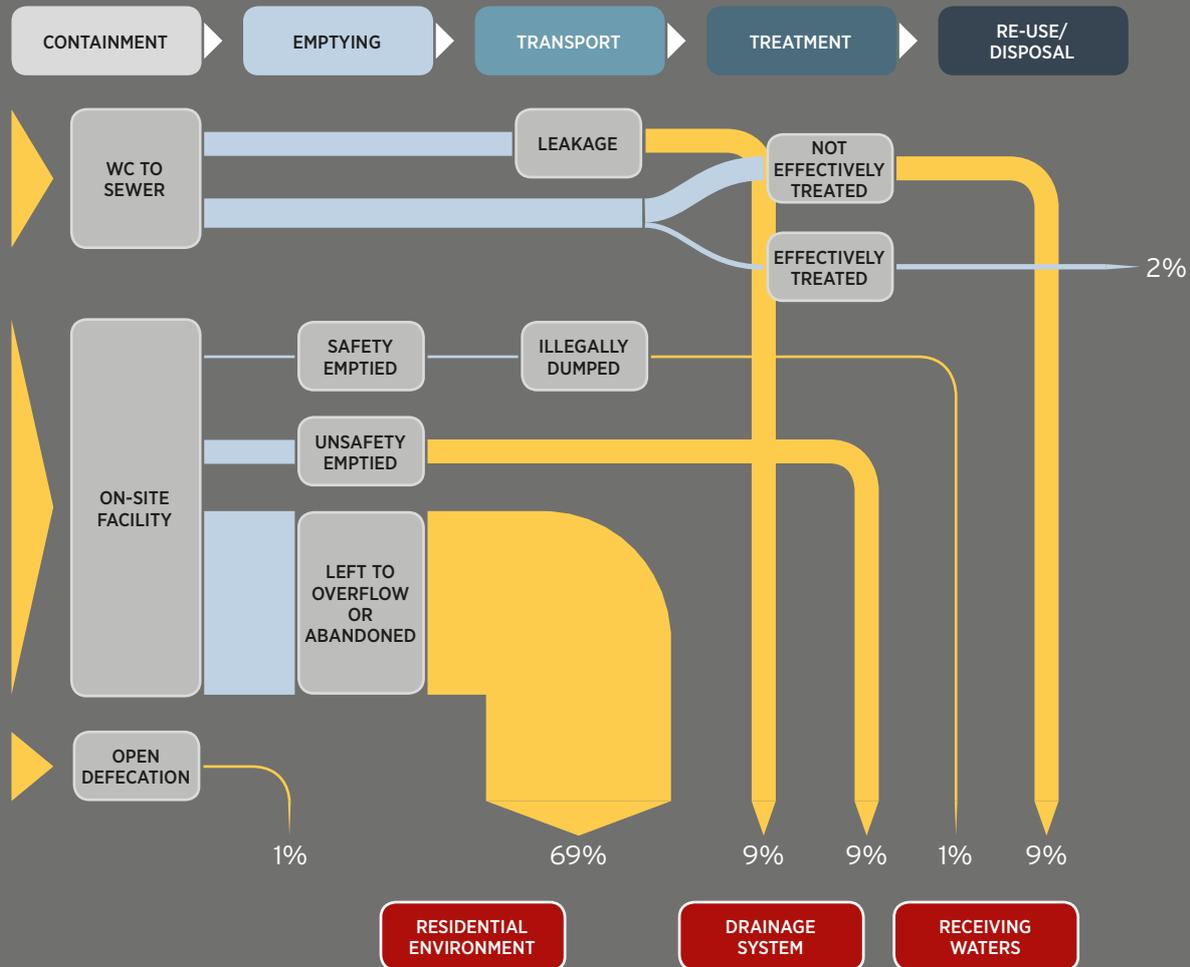
low-income urban areas is also often largely informal and highly unregulated. Land issues and high proportions of renters means that there is also very little investment in sanitation even if there is space available to do so.

### FAECAL SLUDGE MANAGEMENT IN DHAKA, BANGLADESH

In Dhaka, where up to 40% of the population live in slums, 20% of city residents have access to sewerage, 79% use on-site sanitation systems and 1% practice open defecation. As represented in the diagram below, although nearly all waste is effectively contained at the household level, unsafe management of on-site facilities combined with inadequate sewerage and wastewater treatment mean that faecal waste is distributed throughout the urban environment. Only 2% of the faecal waste flows is effectively treated, while the rest is either illegally dumped (1%), unsafely emptied (9%), not effectively treated (9%), leaked (9%) or left to overflow and abandoned (69%).

FIGURE 3

#### FAECAL SLUDGE MANAGEMENT DIAGRAM IN DHAKA (2012)



SOURCE WORLD BANK WATER AND SANITATION PROGRAMME (WSP)

### INCREASING ACCESS TO RURAL SANITATION SOLUTIONS AND CHANGING BEHAVIOURS

While the Faecal Sludge Management problem is less critical than in urban areas, as rural dwellers have more flexibility to dig another pit to store their waste once a main pit is full, a whole sanitation chain approach would

ensure waste is safely contained; this could also lead to the development of new business models, such as waste re-use for biomass or fertilizer, useful for local enterprises and communities.

Some of the main challenges to rural sanitation are access to local quality products and open defecation practices (see box below). Limited access to quality equipment from local entrepreneurs (e.g. masons able to build toilets) and their relative high cost compared to community's income are barriers to improved access. For local entrepreneurs, low population density, poor road access and low demand from rural communities, are also stifling the growth of such entrepreneurial sanitation enterprises.

## CHANGING RURAL SANITATION BEHAVIOURS

Open defecation mainly remains a rural problem: 9 out of 10 people who practice open defecation live in rural areas (JMP 2015). Although progress has been made in several countries such as Vietnam and Bangladesh to eradicate open defecation, many countries face systemic and cultural barriers; in India alone, more than 600 million people still practice open defecation. Convincing communities through education, of the benefits of using toilets and risks of open defecation, are first steps in implementing successful and sustainable sanitation services. Community-Led Total Sanitation (CLTS) is one of the promising participatory methods, involving communities in the design, operation and monitoring of sanitation services, and forcing them to recognise that their practice of open defecation causes sickness and disease in their area, triggering them to action.

## KEY ECOSYSTEM PLAYERS

Both the public and private sectors, as well as local communities, are responsible for improving sanitation services in urban and rural areas, enabling these to grow through the implementation of sustainable business models.

### THE GOVERNMENT: THE MAIN ACTOR TO ENSURE IMPROVED SANITATION ACCESS

In the sanitation sector, governments are often the main actors, responsible for the financing of sanitation services and creating demand. Their role is critical to regulate the sanitation sector and create an enabling environment, in which on the one hand, policies exist to support the delivery of sanitation services including to the most remote areas and on the other hand, encourage the private sector's investments to bridge the sanitation gap.<sup>21</sup>

### MOVING TOWARDS SANITATION AS A BUSINESS: THE ROLE OF THE PRIVATE SECTOR

With the support of engaged governments, entrepreneurs and service providers have the potential to transform the sanitation access sector, creating commercially viable and innovative business models and making the supply meet the growing demand for improved sanitation services. Universal access to improved sanitation services will require a concerted effort from both driven governments and the private sector, especially in light of the failure to reach the MDG sanitation target 2015.

### COMMUNITIES AND NON-GOVERNMENTAL ORGANISATIONS: PROVIDING LOCAL RELEVANCY

In order to ensure the good maintenance of sanitation facilities, suppliers (sanitation service providers, local government or non-government bodies) work on engaging local communities and giving them the responsibility to ensure the security and adequate maintenance of the facilities. Present on the ground, Non-Governmental Organisations (NGOs) can provide technical guidance, facilitate research, planning, design, capacity-building, implementation and monitoring activities.<sup>22</sup>

21. What does it take to scale up rural sanitation", Water and Sanitation Program World Bank, <http://www.wsp.org/sites/wsp.org/files/publications/WSP-What-does-it-take-to-scale-up-rural-sanitation.pdf>

22. Ibid

# Using Mobile in the Sanitation Value Chain

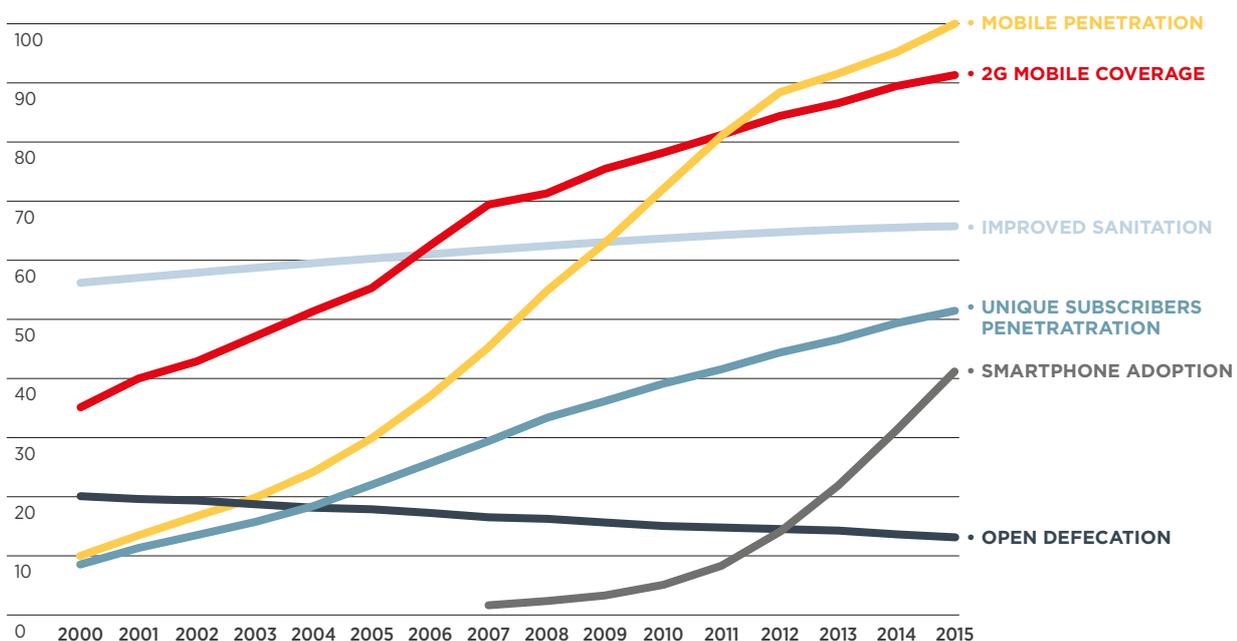
As a result of the growing availability of mobile services and devices across urban and rural populations, mobile has become an increasingly interesting proposition in the sanitation sector. Although mobile integration in the sanitation value chain remains for now limited, its potential is high to bridge the existing divide between individuals, service providers and institutions, enabling data collection, remote monitoring, digitize information at the field level or provide innovative financing solutions.

## Comparing Mobile and Sanitation Access

In terms of coverage, mobile access (see Figure 4) has outgrown access to improved sanitation in most emerging markets. The pace at which the number of mobile subscriptions grows is also much faster than the one of improved sanitation access: between 2002 and 2012, for every person gaining access to improved sanitation, ~2.5 persons became mobile subscribers.<sup>23</sup> As smartphones become increasingly available and affordable, their adoption<sup>24</sup> is poised to disrupt mobile usage and the number of smartphones across the developing world is estimated to increase by 2.9 billion by 2020.<sup>25</sup>

FIGURE 4

### EVOLUTION OF MOBILE AND SANITATION INDICATORS (2000-2015)



SOURCE GSMAI AND GSMA M4D UTILITIES

23. GSMA M4D Utilities

24. GSMAi - Smartphone connections expressed as a percentage share of total connections (excluding M2M)

25. GSMAi - "The Mobile Economy 2015" - <http://www.gsmapobileeconomy.com/>

## MORE THAN 4 OUT OF 5 PERSONS COVERED BY GSM NETWORKS

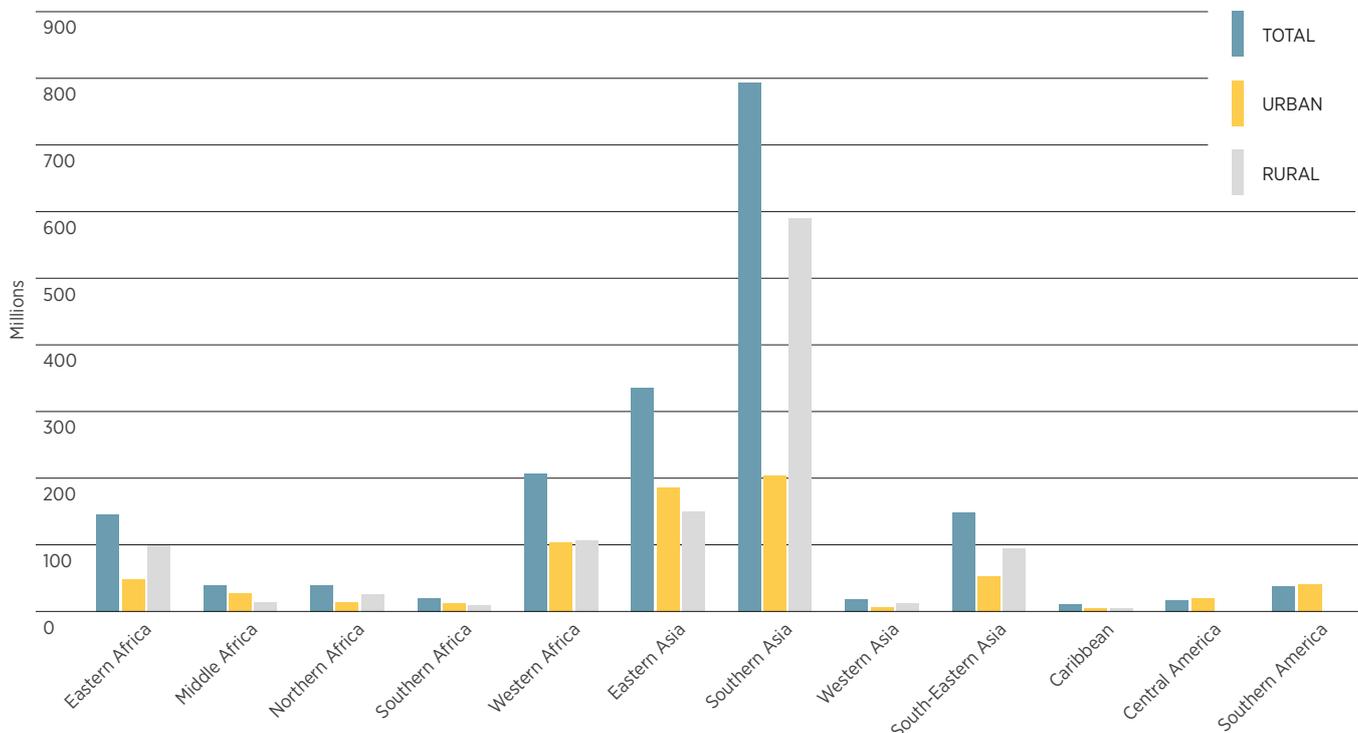
Mobile coverage (through GSM networks) is now reaching more than 85% of the emerging market population,<sup>26</sup> making access to mobile services nearly ubiquitous in urban and rural settings with high population density. The remaining 15% of the “un-covered” population is most likely to live in rural and remote areas, with low population density and sometimes difficult road access; in such locations, the business case for the deployment of mobile towers is often challenging for mobile operators and/or tower companies, due to high energy cost and low revenues.

Mobile can play a role to support existing sanitation services, which reliability and sustainability could be improved, and upcoming services, to improve the sanitation coverage. Of the 3.1 Billion people with access to sanitation services in the developing world, we estimate that 92% are covered by mobile networks.<sup>27</sup> In the context of un-improved sanitation and open defecation, e.g. 2.4 Billion people, we estimate that 72% of this population, or up to 1.8 Billion people, respectively 691 Million and 1.1 Billion in urban and rural settings, are covered by mobile networks<sup>28</sup> (Figure 5).

This divide between high mobile coverage and poor access to improved sanitation is especially strong in the regions of Southern Asia, South-Eastern Asia, Eastern Asia, Western and Eastern Africa. Overall, six countries account for more than 71% of this total addressable market: India, China, Nigeria, Indonesia, Pakistan and Bangladesh.

FIGURE 5

### SANITATION ADDRESSABLE MARKET (TOTAL, URBAN AND RURAL) - NUMBER OF PEOPLE (MILLIONS)



SOURCE GSMA M4D UTILITIES

26. GSMAi - “The Mobile Economy 2015” - <http://www.gsma-mobileeconomy.com/>

27. Based on JMP 2014 Update data and methodology used in previous addressable market calculation - see [http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/12/Sizing-the-Opportunity-of-Mobile\\_Nov-2013.pdf](http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/12/Sizing-the-Opportunity-of-Mobile_Nov-2013.pdf)

28. Ibid

## A FAST GROWING SMARTPHONE OWNERS BASE

Between 2000 and 2014, more than 5 Billion people gained access to mobile telephony around the world.<sup>29</sup> If global mobile penetration growth is slowing down, market saturation has not been reached yet in many emerging markets, still building their subscribers' base and moving to value added and data services, fuelling the fast growth of global smartphone connections. As smartphones and mobile data plans become increasingly affordable, smartphone adoption is in a high growth phase in many markets, urban centres driving this growth; in 2014 alone, more than 612 million smartphone connections<sup>30</sup> were added in developing regions.

As a result, in 2015, people might own a smartphone and browse internet on their mobile phone, but still don't have the dignity of a toilet and practice open defecation. In 33 countries, there are more unique subscribers<sup>31</sup> than people using an improved sanitation solution, the majority of this population living in Sub Saharan Africa. In 6 countries (Kenya, Chad, Tanzania, Ghana, Nigeria & Namibia), there are more mobile internet connections than people with access to toilets.

## MOBILE MONEY SERVICES ARE DRIVING FINANCIAL INCLUSION

Mobile money services are increasingly disrupting the financial landscape in emerging markets, allowing mobile subscribers to send remittances, pay their bills, save money or get access to micro-insurance plans through their mobile phone. There were more than 299 Million registered mobile money accounts, and more than 103 Million active accounts, in 2014<sup>32</sup> with 259 live mobile money services in 89 countries (Figure 6). Beyond the East African countries which still host the largest mobile money deployments, 21 deployments worldwide have now more than 1 Million customers. Leapfrogging the formal financial infrastructure, 16 countries have now more mobile money accounts than bank accounts.

In East Africa, the number of registered mobile money accounts has reached more than 93 Million,<sup>33</sup> which is more than the number of people using improved toilets<sup>34</sup> in this region. In Kenya where 30% of the population has access to improved sanitation, according to current trends, it will take five generations to reach full sanitation coverage for the Kenyan population.<sup>35</sup> However, in less than a generation, mobile networks have been built to cover the majority of the country, smartphones have been increasingly distributed providing mobile internet access and more than 25 million mobile financial services subscribers are registered.

29. Based on GSMAi data on mobile connections

30. Unique SIM cards (or phone numbers, where SIM cards are not used) that have been registered on the mobile network and are used in a smartphone device at the end of the period. It refers to a smartphone connections installed base but does not represent the number of smartphone devices sold or shipped.

31. Unique subscriber differ from connection (i.e. SIM Card) as a person is most likely to own several SIM cards based on prepaid plans or operators coverage.

32. GSMA Mobile Money for the Unbanked 2015 – Global Adoption Survey of Mobile Financial Services [http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/03/SOTIR\\_2014.pdf](http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/03/SOTIR_2014.pdf)

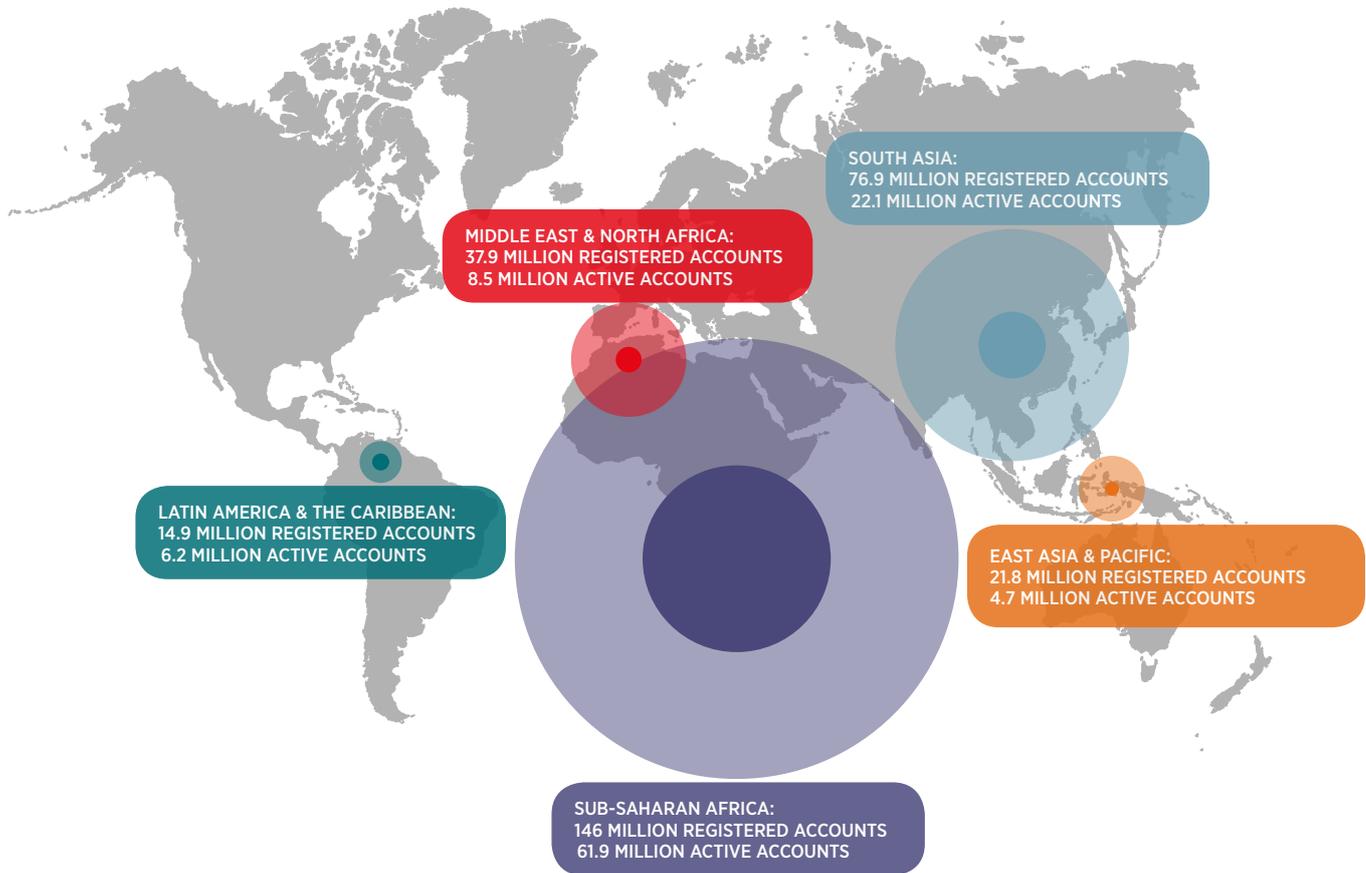
33. GSMAi Mobile Money Accounts in East Africa 2014 - <https://gsmaintelligence.com/topics/3363/dashboard/>

34. GSMA MMU 2014

35. Overseas Development Institute 2015 – “Adapting Development – Improving Service to the Poor”

FIGURE 6

**REGISTERED MOBILE MONEY ACCOUNTS (2014)**



## Sanitation Challenges and How Mobile Channels Can Help

The GSMA M4D Utilities programme has identified five mobile channels which can help improve the delivery of basic energy and water services.<sup>36</sup> Considering the challenges governments, local and international sanitation organisations are facing from urban to rural settings, we summarize in Table 1 the existing and possible usage of mobile technologies and services applied to this sector. Three of the five delivery channels – mobile services, machine to machine connectivity & mobile money – have the potential to improve the delivery of sanitation services. Currently, mobile services (i.e. SMS, USSD, IVR, data and apps) are the most commonly used.



VILLA EL SALVADOR, LIMA, PERU

36. <http://www.gsma.com/mobilefordevelopment/predicting-the-future-of-mobile-enabled-community-services-mecs-annual-report>

TABLE 1

## SANITATION CHALLENGES AND HOW MOBILE CHANNELS CAN HELP

LIMITED DATA FOR SANITATION PLANNING	AWARENESS AND USAGE	LIMITED AFFORDABILITY	POOR LEVEL OF SERVICE	DIFFICULT LOGISTICS AND COSTLY TRANSPORT
<b>URBAN &amp; RURAL SETTINGS</b>				
<ul style="list-style-type: none"> <li>Limited information on rural, low-income or slums sanitation practices, demand or willingness to pay</li> <li>Lack of information to improve management and provision of services and supply</li> <li>High inequality between wealthy and poor population access to toilets</li> <li>Very limited access to piped sewer connections</li> <li>Limited access to public toilets in informal settlements</li> </ul>	<ul style="list-style-type: none"> <li>Lack of community demand (i.e. open defecation practice), possibly leading to low toilet usage post construction phase</li> <li>Lack of health and hygiene best practices</li> <li>Lack of willingness to pay due to low awareness around benefits of sanitation services and of high costs</li> </ul>	<ul style="list-style-type: none"> <li>Lack of end-consumer financing solutions to improved sanitation service and/or facility infrastructure construction</li> <li>Lack of sanitation entrepreneur financing to get access to modern emptying solution or trucks</li> </ul>	<ul style="list-style-type: none"> <li>Poor waste/faecal emptying services</li> <li>Lack of maintenance, poor programming and implementation</li> <li>Lack of information to customers on facilities, operations and maintenance</li> <li>Poor toilet construction quality</li> </ul>	<ul style="list-style-type: none"> <li>Dense urban settlements make it difficult for sludge truck to reach latrines</li> <li>High cost of transport and equipment (buy or rent)</li> <li>Difficult to establish distribution networks</li> </ul>
<b>MOBILE SOLUTIONS</b>				
<p><b>Mapping the infrastructure needs &amp; meeting demand</b></p> <ul style="list-style-type: none"> <li>Surveys through SMS or Applications to collect information on facilities or lack thereof, geo-locating household and sanitation infrastructure, facilitate connections between local sanitation entrepreneurs (able to construct pits and/or shelters) and communities</li> </ul>	<p><b>Support behavioural change campaigns</b></p> <ul style="list-style-type: none"> <li>Mobile applications (SMS and Apps) to collect data on local sanitation practices</li> <li>Mobile Devices (smartphones and tablets) to support behavioural changes activities (ex. CLTS)</li> <li>Mobile reward programme for toilet usage, encourage behaviour change</li> </ul>	<p><b>Innovative financing solutions</b></p> <ul style="list-style-type: none"> <li>Mobile money as a channel to provide sanitation loans (consumers, entrepreneurs), support flexible cashless transactions to pay for pit latrine emptying, usage of toilet or disburse government sanitation subsidies (G2P)</li> </ul>	<p><b>Improving system self-reporting</b></p> <ul style="list-style-type: none"> <li>SMS or IVR or mobile applications to report information on facilities, better connect with emptying service providers or track maintenance</li> <li>GSM enabled sensors to track leakages, usage, waste cartridges' fill levels, GPS location and enable automated SMS to emptying service providers</li> <li>NFC enabled loyalty card, collect data to improve operations</li> </ul>	<p><b>Optimising Logistics and Transport Management</b></p> <ul style="list-style-type: none"> <li>Geo-locate sanitation infrastructure, trucks and routes through GPS-enabled phones</li> <li>Smart tags (QR codes or RFID tags) to track usage of facilities, improve fleet management and emptying services accountability</li> </ul>

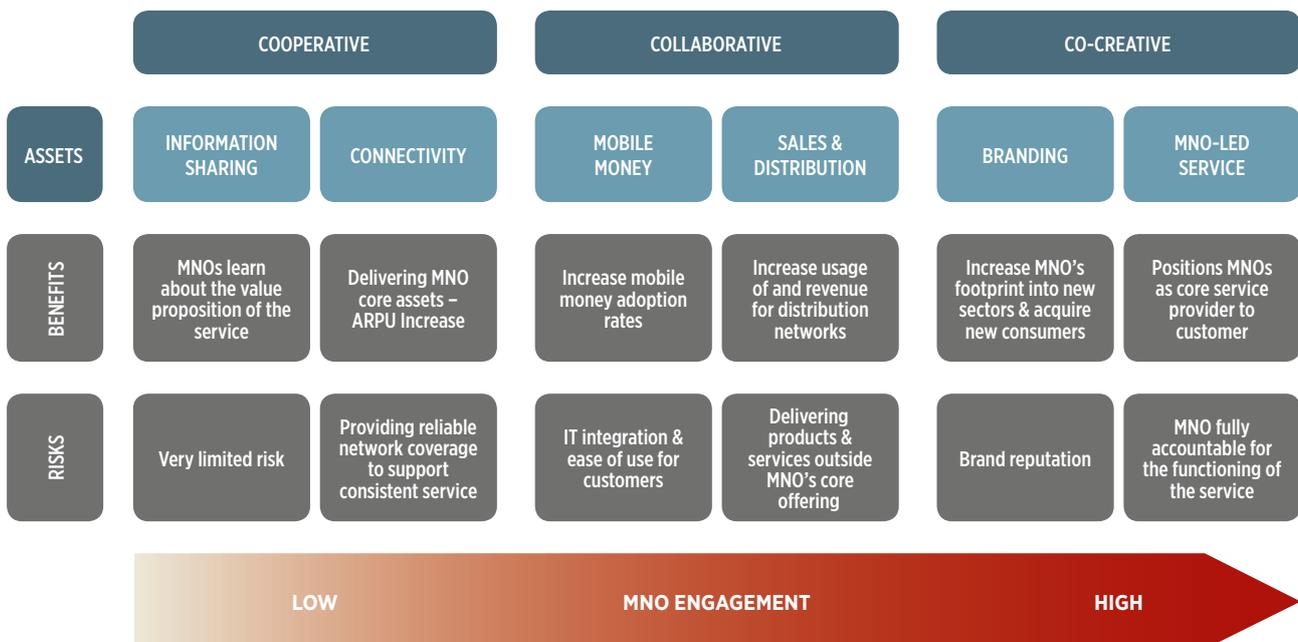
# Roles of Mobile Network Operators, Partnerships and Benefits

In light of mobile technology’s potential to improve access to sanitation services in underserved areas, Mobile Network Operators (MNOs) are likely to have a role to play and benefits to gain from being engaged, from the early stage, in the development of these services. As seen in the energy access sector, and increasingly in the water sector, the level of interest from mobile operators has grown, notably due to a better understanding of the opportunity, as well as the early signs of success from pioneering organisations in these sectors. As the offerings from sanitation service providers mature, so will the value proposition to mobile operators as well as their level of engagement and willingness to partner.

As highlighted in our last [Annual Report](#), mobile operators are engaging in different types of partnerships, providing them with the opportunity to develop either light touch engagements with new partners or more integrated partnerships when the mobile operator has established trust with their partners. Our analysis led us to identify benefits, correlated to the level of engagement between mobile operators and their partners. As illustrated in the Figure 7 below, the benefits for MNOs will be highest – e.g. increasing their footprint in terms of services and customers – when their level engagement is strong. Overall, by facilitating access to mobile channels, mobile operators are supporting the growth of a mobile-enabled utility ecosystem, where service providers and customers rely on their services. In the short term, this can prove especially interesting to increase mobile money uptake and usage in low income urban and rural settings, where populations need access to better affordable sanitation solutions and where mobile channels could improve financial flow between customers, solution providers and governments.

FIGURE 7

## BENEFITS AND RISKS FOR MNOS WHEN ENTERING IN PARTNERSHIPS



SOURCE GSMA

## **SEESAW'S EXPERIENCE ON THE PROS AND CONS OF ICT & MOBILE FOR SANITATION (BY DAVID SCHAUB-JONES)**

SeeSaw is a social enterprise that focuses on how ICT can be applied to the water and sanitation sector. Since its founding, SeeSaw has been keen to explore what the possibilities of ICT are in sanitation and was asked by the WSP/ World Bank to organise and host the sanitation leg of the global sanitation hackathon in 2012.

### **ICT FOR SANITATION: A HARD SELL?**

Despite being motivated to work on sanitation issues, SeeSaw has not found sanitation as fertile ground as the water sector. There are a few reasons for this:

1. Unlike the water sector, where there are easily identifiable lead organisations to work with, the roles for improving sanitation are scattered diffusely between many actors. This makes it harder to find 'change agents' with sufficient vision, reach and influence to adopt new ICT tools.
2. There are too few occasions where government takes its oversight or regulatory role seriously and is willing to invest resources into it. Consequently, when compared to water or electricity, there is less money in sanitation provision. This means that there is less of a budget to pay for new innovations.
3. There are not many strong providers of sanitation and the communities they work with are not always very demanding when it comes to sanitation issues. So even when ICT tools are provided for free - as SeeSaw does for small, deserving, projects - is it hard to find coherent sanitation 'systems' where ICT will provide direct benefits.
4. 'Getting sanitation right' is hard as it is; folding in another layer of innovation (i.e. ICT) can, sometimes rightly, be seen as a distraction from more pressing issues.

### **THE ROLE OF MOBILE FOR SANITATION**

Although challenges exist in getting ICT adopted in the sanitation field, there are some clear opportunities:

1. One is where governments are serious about tackling poor sanitation and are putting in large-scale programmes, as is the case in India or Indonesia. ICT can play a role in making such programmes more responsive to local needs (for instance supporting demand assessments or strengthening initial beneficiary surveys). Better still, ICT can improve transparency and accountability on how public money is spent (for instance via SMS surveys to see if subsidies are reaching the field, or hotlines to provide grievance mechanisms).
2. Another opportunity is in strengthening local feedback loops, which is what SeeSaw have tried to support (with some ups and downs) in Nakuru, where we work with an urban CLTS project, and have proposed to do around public toilet provision in South Africa.

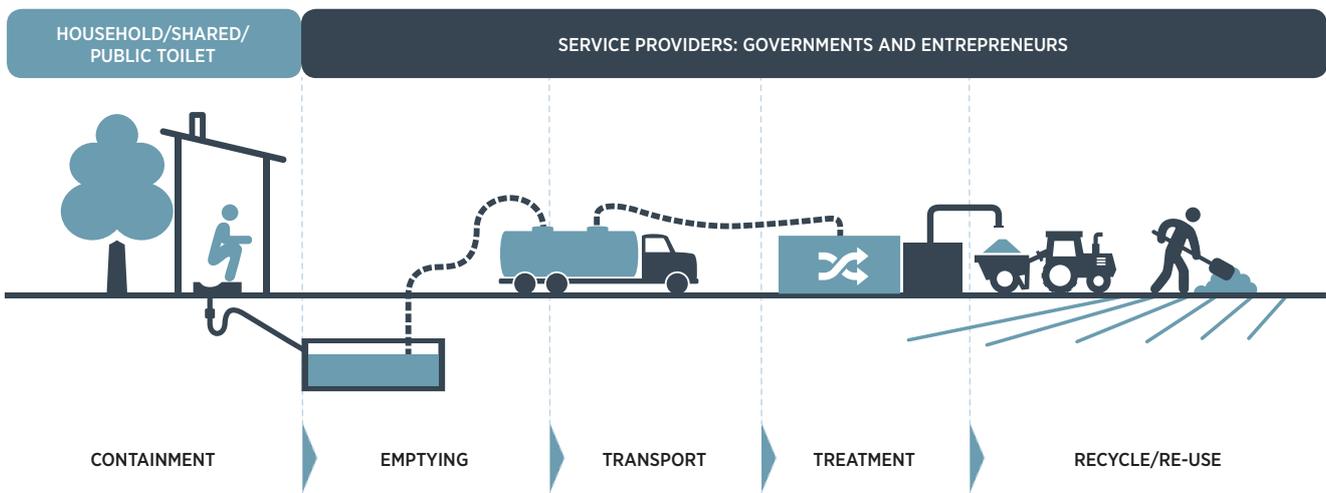
Nevertheless it is clear that anyone looking to apply 'mobile innovation' in sanitation needs to be perseverant and patient as well as have clear ideas about how they will add value.

# Examples of Mobile Integration in the Sanitation Value Chain

Focusing on the sanitation value chain (Figure 8), stakeholders (households, entrepreneurs, NGOs & governments) have more opportunities to leverage mobile services, mobile money and M2M solutions to support the entire chain or specific elements from waste containment, emptying, transport, treatment and re-use.

**FIGURE 8**

## MOBILE IN THE SANITATION VALUE CHAIN



**Current Level of integration in the sanitation value chain**

- Mobile Services:** mobile device ownership at different levels of the value chain can improve data collection and the flow of information between stakeholders, from customers to service providers and public authorities - such tools include direct SMS or calls, SMS surveys, smartphone applications for improved Customer Relationship Management & Supply Chain Management, smart tags for logistics.
- Mobile Money Services:** growing penetration of mobile money services can improve payment collection and financial flows in the sanitation value chain - this includes payment for toilet access, financing solutions for customers or entrepreneurs, mobile-based credit risk assessment, sanitation subsidies (through Government to Person (G2P) channel).
- Machine to Machine Connectivity:** M2M is still at a very early stage of integration in the sanitation chain, but would prove especially useful to centralize real time information coming from infrastructure more difficult to monitor for entrepreneurs or users (ex. pit latrine or septic tank levels), sludge truck routes.

SOURCE GSMA M4D UTILITIES/BILL AND MELINDA GATES FOUNDATION

Below are examples in which communities, entrepreneurs, NGOs or governments, use mobile tools from toilet construction, to financing, and operations and maintenance. We are also including in Appendix more details on three organisations and their use of mobile (SOIL in Haiti, X-Runner in Peru and iDE in Cambodia).

### IMPROVING ACCESS TO LOCAL SANITATION BUILDERS

Connecting supply and demand is an important challenge to improve access to quality sanitation infrastructure in rural environments. For communities in demand of a private or shared toilet, the lack of local sanitation entrepreneurs and poor distribution networks can lead to long delays before construction. IDE in Cambodia<sup>37</sup> has been supporting private sector initiatives since 2008, developing access to quality toilets in local markets at an affordable price (below < US\$50), leading to a four-fold sales increase since 2008.<sup>38</sup> IDE has also been using Salesforce as a Customer Relationship Management tool, with an Android-based application Taroworks<sup>39</sup> for mobile data collection, to support local teams efficiency and interactions with customers. The team is also looking to adopt a more sophisticated mobile solution which would be able to handle transactions, Supply Chain Management as well as the Monitoring & Evaluation functions.

### FINANCING SANITATION SOLUTIONS

The upfront cost of sanitation infrastructure and equipment is a significant obstacle to improving access in urban and rural areas. To overcome this financial barrier, NGOs or social enterprises such as Sanitation Solutions Group in Uganda<sup>40</sup> or Sanergy in Kenya,<sup>41</sup> offer payment plans for entrepreneurs to access financing solutions through local financial institutions partnerships. Financing access to sanitation infrastructure can be however viewed by financial institutions as risky: “a sanitation loan can be considered as a consumer loan, as it is non-income generating, although it can be income enhancing.”<sup>42</sup>

Recent studies show that repayment rates and impact could be high: in India in 2011, more than 146,000 toilet loans were provided to low income households, with high repayment rates (-98%).<sup>43</sup> Another recent research on sanitation microfinance in Tanzania nonetheless shows that “much remains to be done to scale up microfinance for sanitation, and more research is needed, particularly for assessing the impact of contracting a loan for

## MOBILE-BASED CREDIT RISK ASSESSMENT

New types of data such as mobile-phone usage patterns, airtime top-ups or mobile payments also offer new opportunities for financial institutions and lenders to have a more complete understanding of households' financial behaviours and needs, while developing new credit risk assessment models. Mobile operators, utility companies (this includes solar Pay As You Go providers) and data analytics companies (First Access, Lendable) are using new approaches to tap into the new forms of data spun off from mobile usage to build better risk models. Mobile payments data can provide credit underwriters with rich transactional information for generating credit insights. Having a better understanding of customers credit profiles would also lead to lower interest rates as the customer is less likely to default.

Telenor, an international mobile operator group operating in 29 countries, is developing new types of mobile credit products by building predictive credit-scoring models in-house. These solutions are currently being piloted in Thailand for mobile money loans, emergency airtime top ups and handset financing. Once this credit risk assessment model is validated, it will be interesting to see if financial institutions can rely on this model to provide loans of higher value to mobile subscribers willing to get access to a utility infrastructure.

37. <http://ide-cambodia.org/>

38. Findings from Four Field Experiments of iDE Cambodia Sanitation Marketing Program - <http://www.ide.org/OurStory/Publications/iDE%20Final%20Report%20without%20sunk%20cost%20analysis%20Oct%2030%202013.pdf>

39. <http://taroworks.org/> - Taroworks has been developed by the Grameen Foundation

40. <https://sanitationsolutionsgroup.com/>

41. <http://saner.gy/>

42. Developing microfinance for sanitation in Tanzania” - Tremolet Consulting, 2015

43. Tremolet Consulting/Microsave 2013 – Sanitation microfinance: a solution to the household sanitation cash strap?

sanitation on households' health and financial situation".<sup>44</sup> In markets where mobile money services are dynamic, mobile phones could offer efficient payment collection tools while enhancing payment plan flexibility.

## MONITORING SANITATION INFRASTRUCTURE USAGE

Although investments have been flowing in the water and sanitation sector (financial commitments increased by 30% between 2010 and 2012, from \$8.3 billion to \$10.9 billion),<sup>45</sup> a category of people do not use the toilets built, due to cultural (ex. open defecation) or operational factors (ex. poor maintenance). In India, the government has started to deploy a nation-wide campaign to monitor sanitation activities using mobile tools in order to ensure a sustainable approach to sanitation access.<sup>46</sup>

As part of such government strategies to improve sanitation coverage and reduce open defecation, mobile-based monitoring activities have been piloted in several countries in recent years: for example, by using mobile applications on smartphones or tablets to verify that communities are maintaining their open defecation free status<sup>47</sup> in India or through SMS-monitoring system in Indonesia.<sup>48</sup> Machine to Machine connectivity has also been piloted at a smaller scale, based on the integration in rural community latrines of a GSM connected passive infrared motion detector, microcontroller, memory card and battery<sup>49</sup> developed by SWEETLab of Portland State University.<sup>50</sup> Similarly to man-made structured observations, the results showed that such M2M solutions proved a promising technology to provide detailed measures of latrine use for a better understanding of sanitation behaviours.

Beyond data collection, current pilots and small scale deployments have also outlined that there is a need for a harmonized approach to rural sanitation, clear monitoring framework to measure performance and the need for multiple data verification systems to ensure data accuracy. For governments and service providers, it's also about providing timely response and action to support operations and maintenance of sanitation infrastructure in order to keep the community involved and confident in such monitoring processes.

## MONITORING COMMUNITY LED TOTAL SANITATION (CLTS) PROJECTS

CLTS is all about first generating community-level recognition of the prevalence of poor sanitation locally and its impacts, then community-led action to address it. SeeSaw has worked with Practical Action and Umande Trust in Nakuru, in Kenya, where there is an urban CLTS project.<sup>51</sup> For Nakuru, SeeSaw developed a customised android app that allows local Community Based Organisation (CBOs) using low cost smartphones to record progress in each of 13 'villages' (actually adjoining areas of Nakuru's growing semi-formal settlements). In addition, CBO leaders count the numbers of 'sanitation hotspots' (areas that are not free of open defecation) and report these regularly, using SeeSaw's 'missed call' system SeeTell. These reports are logged in a central database, mapped and relayed back to people in Nakuru who put the numbers up on a physical board, so as to report them back to the community itself, an important feedback loop that is too often overlooked.

## DIGITIZING PAYMENTS AND ENHANCING PRODUCTIVITY OF SANITATION ENTREPRENEURS

**Digitizing payments:** While domestic Peer to Peer (P2P) transfers and airtime top-ups continue to dominate the global mobile money product mix, the fastest growth in 2014 occurred in bulk disbursements, bill and merchant payments.<sup>52</sup> In slums, where storing and carrying cash can be risky, mobile money enables subscribers to safely store their money online, after a cash-in operation through their local mobile money agent. In growing mobile money markets, there is increased opportunity for sanitation solution providers

44. Tremolet Consulting/Microsave 2015 – Sanitation Microfinance in Tanzania

45. UN WHO JMP Update Report 2014

46. <http://www.wateraid.org/news/news/will-narendra-modi-free-india-from-open-defecation>

47. <http://www.worldbank.org/en/news/feature/2014/11/18/on-world-toilet-day-focus-is-on-equality-and-dignity>

48. <http://wsp.org/sites/wsp.org/files/publications/WSP-Indonesia-Mobile-Monitoring.pdf>

49. The cost of the parts to construct this device was about US\$60 – "Making Sanitation Count: Developing and Testing a Device for Assessing Latrine Use in Low Income Settings" – ACS Publication <http://pubs.acs.org/doi/abs/10.1021/es2036702>

50. <http://www.pdx.edu/sweetlab/india>

51. Lessons in Urban Community Led CLTS from Nakuru, Kenya – p.19 [http://www.communityledtotalsanitation.org/sites/communityledtotalsanitation.org/files/PracticalAction\\_LessonsOnUrbanCLTSNakuruKenya\\_Apr2015.pdf](http://www.communityledtotalsanitation.org/sites/communityledtotalsanitation.org/files/PracticalAction_LessonsOnUrbanCLTSNakuruKenya_Apr2015.pdf)

52. GSMA Mobile Money for the Unbanked – State of the Industry 2014 – Mobile Financial Services for the Unbanked

to offer digital payment options to their customers, limiting cash handling, reducing cost associated with payment collection and allowing service providers and customers to keep digital records of payments.

Some limits however exist on mobile money low value transactions, especially relevant for private or public toilet payments. In some mobile money deployments, the minimal amount a subscriber can pay or transfer is usually above \$US0.10; the fees charged on each transaction (which contribute to mobile money agent revenues) can also be too high to make mobile payments interesting in this segment (toilet access usually costs below US\$0.10). Because of these mobile money limitations, sanitation entrepreneurs such as the Umande Trust in Nairobi have been piloting cashless payments, allowing residents to pay for toilet access with pre-paid smart cards. Using Near Field Communication (NFC) enabled Android-based smartphones as Points-Of-Sale, customers are estimated to pay a 1% fee per transaction, lower than competitors in the mobile payment space.<sup>53</sup> Based on the number of transactions processed by such sanitation entrepreneurs, an interesting proposition to pilot with Mobile Network Operators would be to offer low cost or free transactions on this very low tier (sub US\$0.10),<sup>54</sup> to better understand how this payment category (low value high frequency) can contribute to mobile customer retention while supporting entrepreneur productivity.

**Mobile Productivity Applications for Entrepreneurs:** Data collection and geo-mapping tools,<sup>55</sup> customer relationship management (CRM) and supply chain management (SCM) applications further enable the digitization of an information collected at the field level. Open Data Kit (ODK) tools, free and open-source set of tools, can be used in combination with cloud based CRM solutions to push data directly in an organisation database and help automatize process. More social enterprises are now using such enterprise applications to track their business and agents performance from marketing, waste collection, toilet usage or entrepreneur income generation.

## OPTIMISING EMPTYING SERVICES

**Call Centre in Dakar for mechanized desludging services:** In Senegal, the public sanitation service organisation (ONAS) has developed, in partnership with local software company Manobi, a call center enabling urban households in Dakar to call in when in need of a desludging service.<sup>56</sup> This service aimed to improve linkages between service suppliers and customers, but also support the development of a sanitation private sector and enhance the demand for mechanical service.<sup>57</sup> Once an emptying call is registered, desludging operators can submit an offer and calls for bids go out over SMS, this requiring a low level of technology. The lowest bidder amongst the operators win the job. The service has been live since March 2014, so far leading to an increase in the number of mechanical desludging services provided and a slight decrease in the price of emptying services.

**Smart sensors to automate emptying services request:** Smart sensors are already in use in developed country cities to track the activity of sewerage networks in order to prevent blockages. In the case of lower income settings and on site systems, there is need to develop a more cost efficient solution for smart sensor integration in sanitation infrastructure. M2M connectivity, where sensors combined to a wireless connectivity chipset (GSM or other shorter range wireless technologies: Bluetooth, Zigbee,...), could improve access to real time information on parts of the on-site sanitation infrastructure more difficult to monitor by humans: for example, pit and septic tank levels. Such information would prove useful in commercial sanitation services where automated messages could help entrepreneurs provide timely responses, also able to better organise their route based on providers and customers location.

## IMPROVING SLUDGE LOGISTICS MANAGEMENT

As well as being poorly managed, waste transport or logistics is one of the biggest cost factors in the faecal sludge management chain. From waste collection to the treatment facility (when available), there is little

53. <http://www.gsma.com/mobilefordevelopment/world-toilet-day-discussing-the-potential-power-of-mobile-payment-system-for-the-sanitation-sector> - the Bebapay service mentioned in this blog post has since been discontinued (April 2015).

54. <http://www.cgap.org/blog/can-mobile-money-be-%E2%80%9Cfree%E2%80%9D>

55. Impact Tracker Technology Kopernik - <http://impacttrackertech.kopernik.info/digital-data-collection-apps>

56. <http://usaidsuwasa.org/index.php/component/k2/item/310-using-technology-to-optimize-dakars-sludge-market>

57. ONAS 2014 - Restructuring the Faecal Sludge Market in Dakar

incentive for trucks to dispose the sludge at the plant level; as a result, waste is often disposed into the environment and often contaminates local water bodies. One of the mobile tools being currently piloted is about enabling objects and infrastructure to become “passively” smart: information can be embedded in smart RFID tags or QR codes which can be scanned by mobile devices, connecting an object/infrastructure/location to an online database or “object hyperlinking”. Such solutions can prove useful to accurately monitor toilet servicing and maintenance but also improve logistics for toilet distribution or emptying services. X-Runner in Peru is using NFC tags in combination with mobile phones as readers to identify to which customers bucket belong and also keep track of servicing. In Indonesia, the Water and Sanitation Program of the World Bank had recently piloted the combined use of Android smartphones and QR codes to improve sludge trucks management. By scanning codes at the base, household and treatment plant locations, emptying services providers are improving information collection about their customers’ base, while this process also aims to prevent illegal dumping of sludge and improve asset management.

## Innovation Funding for Sanitation Service Providers

Data is critical to sanitation service providers and global organisations to monitor progress and a way for donors and investors to better understand the impact of the for-profit or non-profit organisations being financed. In that light, even though investments in the sanitation sector have increased in recent years, there is still a considerable gap between the demand and capital for funding in the sanitation sector. As many traditional approaches to WASH funding have not worked, local entrepreneurs and social enterprises are emerging as important players to improve capacity and efficiency of existing services. Such social enterprises can receive seed funding from organisations such as USAID DIV and Gates Foundation, which recently created the WASH for Life Partnership, to identify and test new WASH technologies and delivery models, scaling and replicating those that prove successful.<sup>58</sup>

As presented in the report “How to Spend a Penny”, outlining the Stone Family Foundation (SFF) innovation funding strategy to entrepreneurial initiatives in the WASH sector,<sup>59</sup> WASH is not a sector for quick wins and access to patient capital is needed to allow models to be refined before scaling. It is more than building toilets and taps, and the changes to attitudes and behaviour required to increase access to effective WASH services takes time. Access to innovative financing solutions will also improve households’ ability and willingness to pay for WASH.

### GSMA M4D UTILITIES INNOVATION FUNDING ON SANITATION

In October 2014, the GSMA and DFID announced an additional £6M in funding to extend the GSMA’s work as part of its newly branded Mobile for Development Utilities Programme. As part of this second phase of funding ending in 2017, £3.2M will be awarded to organisations trialling and developing innovations that improve access to energy, water and sanitation to underserved communities.

In the first call for applications, which received a high number of quality proposals demonstrating the untapped demand for additional risk capital to support early innovators, two grants were awarded to sanitation organisations:

- Loowatt in Madagascar to develop and test an ICT platform and mobile application to improve the coordination of waste collection logistics and customer service associated to their waterless toilets for households in an urban area of Antananarivo;
- Sanergy in Kenya, in partnership with SweetSense, to develop and test the use of sensors to determine the fill levels of Fresh Life Toilets, operator-owned waterless toilets designed for informal settlements.

58. [http://www.usaid.gov/global-waters/march-2015/thinking-outside-latrines?utm\\_source=Newsletter+-+March+2015&utm\\_campaign=Wasrag+March.2015&utm\\_medium=email](http://www.usaid.gov/global-waters/march-2015/thinking-outside-latrines?utm_source=Newsletter+-+March+2015&utm_campaign=Wasrag+March.2015&utm_medium=email)

59. How to Spend a Penny, NPC and the Stone Family Foundation <http://www.thinknpc.org/publications/how-to-spend-a-penny/>

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# Next Steps for Mobile in the Sanitation Sector and Future Works

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Digital landscapes in emerging markets are very different now than they were 15 years ago, when the Millennium Development Goals were first redacted. In the transition to the Sustainable Development Goals setting development targets for the next 15 years, Information and Communication Technologies have a strong role to play in strengthening but also monitoring progress. While mobile is at an early stage of integration in the sanitation sector, mobile technologies and services could play an important role to support public and private initiatives at different stages of the value chain in both urban and rural settings.

In urban contexts, where population is growing fast, often localised in underserved zones and putting increasing pressure on municipalities to provide utility services, widespread mobile phone penetration and growing mobile money services uptake in some markets are giving the opportunity to utilities and sanitation solution providers to increase efficiency of services, while building new engagement models with customers.

In rural locations, sustainable access to sanitation is challenged by poor distribution networks, low availability to local sanitation solutions and open defecation behaviours. Growing mobile and data connectivity and use of mobile monitoring tools (SMS or applications), can improve understanding of community sanitation behaviours, while allowing service providers to develop more efficient supply chain and customer relationship management.

Although a clear willingness from organisations and enterprises to pilot mobile tools has been identified, challenges remain about the types of tools available and more importantly how to integrate them. Considering the potential of mobile, grant capital is first needed to encourage and support pilots and the development of tailored mobile solutions, such as mobile communication platforms, low cost M2M solution or mobile payments. Partnerships with technology providers (software and hardware) and mobile operators would also strengthen the development of such solutions, while impacting both businesses.

Based on early analysis of the mobile for sanitation opportunity, future work would need to be done to better understand:

- Impact of mobile-based Customer Relationship Management and Supply Chain Management tools and how information digitization support commercial sanitation models;
- Impact of mobile financial services to improve payment efficiency, loan assessment and disbursement;
- Cost efficiency of machine connectivity and mobile-enabled monitoring versus human reporting;
- Potential of mobile as an educational and monitoring tool in behavioural change campaigns to reduce open defecation.

# Appendix – Insights on Mobile from Three Sanitation Organisations

We are presenting below three short case studies on sanitation organisations currently leveraging mobile tools in their service delivery model. The case studies provide more information about:

- the markets these different organisations are serving and data on access to infrastructure and mobile<sup>60</sup>
- which models are being implemented
- challenges to scale
- the use of mobile in these models

TABLE 2

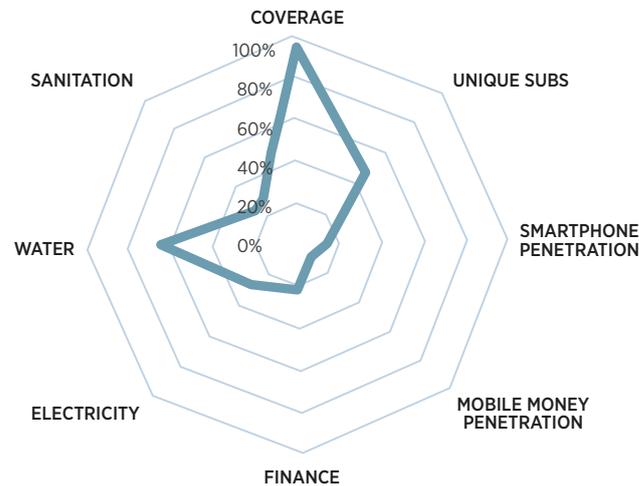
## SANITATION ORGANISATIONS CASE STUDIES

ORGANISATION	TYPE	LOCATION	SOLUTION/ SERVICE	MODEL	USE OF MOBILE
SOIL	Non Profit	Haiti	Urban Household Dry Toilet	End to End sanitation solution (design, sales, waste collection and treatment)	Looking to use mobile CRM platforms and mobile customer payments
X-RUNNER	For Profit	Peru	Urban Household Dry Toilet	End to End sanitation solution (design, sales, waste collection and treatment)	Looking to use mobile CRM platforms and mobile for logistic solutions
IDE	Non Profit	Cambodia	Rural Business Support and Community Outreach	Support local entrepreneurs for pit latrine sales and construction/ working with community to adopt sanitation solution and reduce open defecation	Piloting mobile CRM and SCM platforms for local entrepreneurs

60. Based on public and GSMAi data

# SOIL Haiti

## INFRASTRUCTURE & MOBILE ACCESS IN HAITI



## PRESENTATION

Founded in 2006, SOIL provides an end-to-end sanitation solution to Haitian urban slum dwellers of Cap Haitien and Port-au-Prince. SOIL manages the entire sanitation value chain from marketing, household dry toilet installation, emptying services, waste treatment and re-sale of treated products (compost).

## MODEL

SOIL is using a sanitation as a service model, where low income household have access to a low cost dry toilet service “Ekolakay” for a monthly fee. Customers pay ~5 USD per month (less than 3% percent of average monthly household expenditures)<sup>61</sup> for the toilet usage and emptying services. SOIL collects the wastes twice weekly and transports them directly to a local treatment plant. The waste is then processed and transformed into compost for agricultural purposes.<sup>62</sup> SOIL is at an early stage phase of development, with a base of >450 customers. They also recently launched activities in Port-au-Prince, looking to serve 500 houses in the capital by the end of 2016.

## CHALLENGES

High poverty and low ability to pay for sanitation services challenge solution adoption and long term usage. Managing customers can be difficult, including timely payment for monthly service. SOIL’s agents currently collect payments using a door-to-door technique. Transportation is also a major cost driver, as slum navigation is a challenging process and it takes time to convey sealed waste buckets from households to the treatment plant.<sup>63</sup>

## USE OF MOBILE

Mobile has a high penetration in Haiti (more than 75% of connection penetration), however low literacy can sometimes present a challenge to the use of more sophisticated mobile services (ex. mobile internet or mobile money). According to recent survey,<sup>64</sup> the level of monthly airtime among household was ~11.42USD/month.

61. Russel, K, Tilmans, S., Kramer, S., Sklar, R., Tillias, D., and J. Davis. Impacts of a container-based, household toilet and waste collection service intervention in Cap Haitien, Haiti. Manuscript submitted for publication.

62. D. Berendes, K. Levy, J. Kneee, T. Handzel, and V.R. Hill. Ascaris and Escherichia coli Inactivation in an Ecological Sanitation System in Port-au-Prince, Haiti. PLoS ONE 10(5): e0125336.

63. S. Tilmans, K. Russel, R. Sklar, L. Page, S. Kramer, and J. Davis. Container-based sanitation: assessing costs and effectiveness of excreta management in Cap Haitien, Haiti. *Environment and Urbanization*. April 2015: 27: 89-104.

64. SOIL / Re.source Sanitation research collaboration, 2013.

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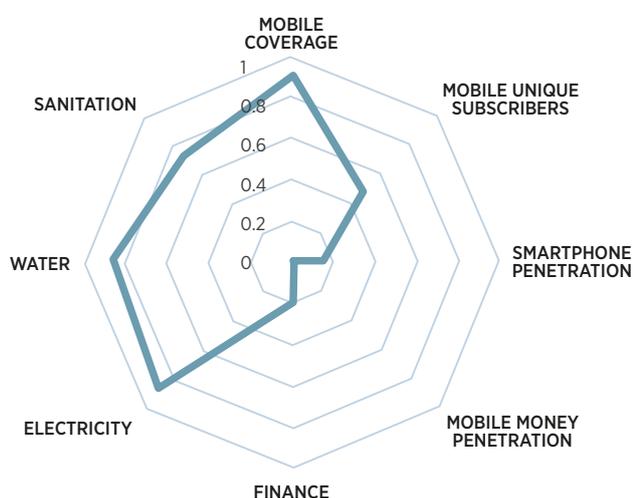
SOIL currently has a limited use of mobile, except for surveys or direct interaction between local entrepreneurs and customers. However, there is a high willingness to leverage the local mobile services to improve business efficiency and support local entrepreneurs. This includes:

- Reminders to customers on bill payment or waste collection
- Mobile platform to improve customer relationship management
- Mobile bill payment using the TchoTcho Digicel Mobile Money Service
- Mobile tracking technology monitors waste collectors' performance, maximizes efficiency and minimizes service costs.

To further integrate mobile solutions in their model, SOIL would look to work closely with Digicel for their mobile payment platform and partners for mobile CRM platforms.

## X-runner in Peru

### INFRASTRUCTURE & MOBILE ACCESS IN PERU



### COMPANY PRESENTATION

Created in 2012, X-runner provides access to personal dry toilets and a weekly waste collection service, to low-income households in peri-urban neighbourhoods of Lima whose alternative is to use poorly serviced pit latrines. X-Runner manages the entire sanitation value chain from marketing, household dry toilet installation, waste collection services, waste treatment and re-sale of treated products (fertilizer).

### MODEL

X-runner works with a Swedish toilet manufacturer to provide a dry toilet which specificity is that it separates faeces from urine for hygienic treatment. X-Runner's revenues come from the direct fees to customers and, soon, the sale of compost. After paying a US\$ 35 fee for installation, customers pay US\$ 13 per month, through their local bank or shop agent, for the collection service, the follow-up on the quality of the content of the buckets to verify the correct use of the toilet, the treatment of the faeces and a permanent free technical assistances. X-runner toilets come with a weekly emptying service, whereby the customer goes to a specific location to hand over the toilet buckets, which contains a full biodegradable bag, and receives an empty bucket with a fresh bag and sawdust. The faeces are then transported by truck to a local treatment facility to be processed. X-Runner is at an early stage of development but growing steadily, with more than 250 toilets installed and 6 tonnes of faeces picked up per month.

### CHALLENGES

Two of the main challenges that X-runner faces are around management of customer information as well as of the service value chain. More specifically, currently, information on customers and their payments are stored in excel sheets and google drives. However this information can be scattered, making it hard to find data and difficult to access on the field where it is much needed. Efficiency of the collection process could also be improved, notably improving coordination between collection agents and customers as well as the collection of data from the buckets to verify the correct use and state of toilet and tracking of buckets when transported to the treatment facility. X-Runner is currently looking for capital to meet the local demand for their dry toilet solution and pilot mobile technologies for improved logistics.

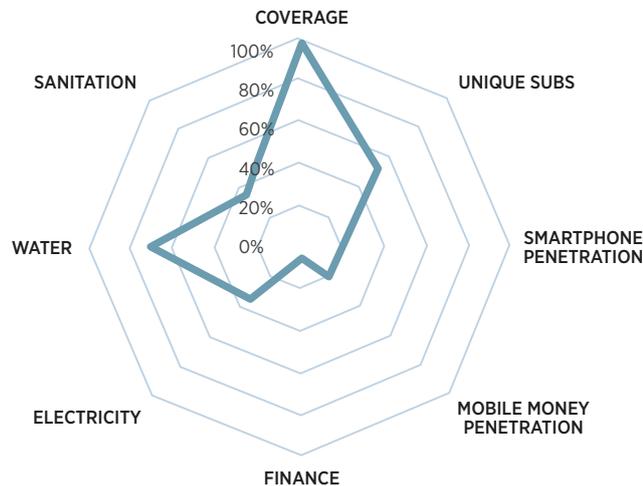
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## USE OF MOBILE

Mobile coverage and mobile penetration are high in Peru (~100% connection penetration), leading to increased adoption of smartphone and mobile internet services. Although the mobile financial landscape is changing, mobile money penetration is for now very low due to regulatory limitations. Paying for services through local banks or shops is a well adopted practice so the demand for mobile money is limited. X-runner does see the value of using mobile to stay in touch with customers, notably by sending SMS reminders a week before payments are due. Default has been low so far, with ~85% of customers paying on time, which allows them to collect points that can be redeemed later. The company also uses mobile phones and NFC technology during pick ups. Each bucket has an NFC tag that help collectors identify from whom is the bucket. This way, they also keep track of each users collections and specially the state of the buckets to identify if there are problems with the toilet or with the way the toilet is being used. X-Runner team members and volunteers also use mobile phones to apply surveys on the users and measure how well they are using the toilet, their level of satisfaction and the impact the toilet is having on their lives.

# IDE Cambodia

## INFRASTRUCTURE & MOBILE ACCESS IN CAMBODIA



## ORGANISATION PRESENTATION

iDE is an international non-profit organization dedicated to creating income and livelihood opportunities for the rural poor. Their Water, Sanitation and Hygiene programs focus on creating markets around aspirational and effective WASH products and services that reduce diarrheal disease among poor households. As of June 2014, iDE Cambodia had facilitated the sale of 100,000 latrines in two years through their iDE Sanitation Marketing Scale Up campaign, increasing average latrine coverage in seven provinces by 11% to 40%. Based on self-reporting, over 95% of households reported consistent use of latrines by adults.

## MODEL

iDE Cambodia is using a market-based approach to improve access to sanitation in rural Cambodia, where an estimated 72% of the rural population practiced open defecation. The project started with the design of a new affordable pour-flush latrine package (the 'Easy Latrine'), which could be easily manufactured by local entrepreneurs and affordable for low income communities. iDE trains local enterprises to produce such sanitation solutions and sell them, also developing sales and promotional strategies to increase consumer demand. On the demand side, lower entry-level costs and effective communications have been key to drive adoption; while on the supply side, providing quality products, training and business tools (marketing and sales) supported the growth of local sanitations, creating a virtuous circle. Observing the burgeoning rural demand for toilets, copycat businesses have since been set up.

## CHALLENGES

Part of their ongoing support to rural sanitation entrepreneurs, iDE is also looking to provide a holistic solution to the entire sanitation value chain, improving sludge management in rural areas and closing the sanitation loop. The team is also looking to improve the range of business tools they could provide to local businesses to further improve sales and reach.

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## USE OF MOBILE

Mobile coverage, penetration and mobile money services are quite advanced in Cambodia – the leading mobile money service provider Wing had more than 1.5 million customers.<sup>65</sup> To support their business process, iDE Cambodia has been using Salesforce as their Customer Relationship Management platform, with an android-based tool Taroworks for mobile data collection and monitoring and evaluation of their program. This type of Open Data Kit tool allows the team to push data directly into their data structure. Building on this platform, the team is currently documenting the specifications for another mobile solution that would further support Supply Chain Management for local businesses.

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65. <http://www.cgap.org/blog/wing-pushes-digital-finance-frontiers-further-cambodia>



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The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with more than 250 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and Internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces industry-leading events such as Mobile World Congress, Mobile World Congress Shanghai and the Mobile 360 Series conferences.

For more information, please visit the GSMA corporate website at [www.gsma.com](http://www.gsma.com). Follow the GSMA on Twitter: @GSMA.



## Mobile for Development

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Mobile for Development brings together our mobile operator members, the wider mobile industry and the development community to drive commercial mobile services for underserved people in emerging markets. We identify opportunities for social, economic impact and stimulate the development of scalable, life-enhancing mobile services.



## Mobile for Development Utilities

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Mobile for Development Utilities Programme improves access to basic energy, water and sanitation services in underserved communities using mobile technology and infrastructure. Our work encompasses any energy, water and sanitation service provided to a community which includes a mobile component, whether it is voice, SMS, USSD, Machine2Machine, NFC, a mobile operator's agent network or tower infrastructure. We aim to seize the opportunity, leveraging mobile technology and infrastructure to enhance access to affordable and reliable energy, clean and safe water and sanitation services in underserved communities. The GSMA Mobile for Development Utilities Programme receives support from the UK Department for International Development.

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