Full-Chain Sanitation Services that Last:

Non-sewered Sanitation Services

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PHOTOGRAPHS AND DIAGRAMS
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Summary

This paper sets out a framework for the delivery of non-sewered sanitation services that last, are accessible to all and are at scale. The framework is based on IRC International Water and Sanitation's (IRC) experience and lessons learnt from its engagement in non-sewered sanitation service at scale.

For IRC, sanitation is a public good. Hence, national and local governments have a key responsibility to ensure that sanitation services last for all. Any sanitation service model needs to address the full sanitation chain, which includes safe and hygienic collection, storage, and safe and final disposal or the productive uses of faecal sludge.

The framework identifies four key parameters for sustainable sanitation services:

1) easy and safe access to a sanitary latrine that offers user privacy, and operates throughout the year;

2) hygienic use of the latrine by all, when in and around the house, and equipped with an accessible handwashing facility;

3) adequate operation and maintenance (O&M), and repair and replacement to ensure that the latrine is usable; and

4) safe and final disposal of faecal sludge to ensure environmental protection.

Four components underpin the four key parameters above, which help to ensure the continuous use of a sanitation service by all members of a community:

1) the creation of demand to use the facility and continuous advocacy to change the sanitation-related behaviours of community members;

2) the strengthening of an enabling environment to support the delivery of sanitation services to all;

3) the strengthening of the supply chain; and

4) well-aligned financial arrangements and well-directed incentives that support efficient service delivery and promote the use of latrines by all.

Sanitation services need to include **all four** key components noted above in order to provide a sustainable service. In addition, all the components need to be interlinked: with increasing sanitation coverage, the focus of a sanitation service needs to shift from increasing access to and use of latrines (getting onto the sanitation ladder) to O&M and the safe disposal or productive uses of faecal sludge. This assumes that the four components will evolve over time.

The Global Sanitation Challenge

The water, sanitation and hygiene sector (referred to as the WASH sector) is facing deep-seated challenges. While all people have a basic human right to safe water and hygienic sanitation[1], the reality is—that at least two billion people are unable to maintain a safe separation between themselves and their own or other people's excreta (UNICEF/ WHO, 2012). Despite decades of sector reforms and billions of dollars of investment, progress towards achieving universal access to basic WASH services has been frustratingly slow, particularly for sanitation, with dramatic impacts. In their economic analysis, Hutton and Haller (2004) reported that the lack of adequate sanitation and hygiene results in 5.4 billion cases of diarrhoea leading to 1.6 million deaths, mainly among young children, each year[2].

- **Sustained access to adequate sanitation has benefits other than those directly related to health**. The World Bank (2013) estimates that globally, economic losses from lack of sanitation amount to US$ 260 billion annually. Hutton, Haller and Bartram (2007) estimate that each dollar spent on improved sanitation generates an economic benefit of about US$ 10.

- **Access to sanitation facilities also reduces the risk of rape or sexual assault for women and girls** (Lennon, 2011) as those who are compelled to defecate in the open and after dark expose themselves to serious danger. Girls are particularly vulnerable and require adequate and separated sanitation facilities at schools that are appropriately designed for menstrual hygiene management. Adequate access keeps girls from dropping out of schools, and increases their attendance rates (Mahon and Fernandes, 2010). Safety and privacy are very strong motivators for women wanting a latrine.

- **The safe and final disposal and/ or productive uses of faecal sludge remains a neglected area.** It is estimated that 4 billion people lack access to safe sanitation when the safe and final disposal of faecal sludge is taken into account.

- **Improved sanitation is linked to food security and energy production.** Opportunities exist in capturing and productively using human waste as a resource for nutrients, organic matter, energy and water. For instance, the value of human excreta from one single person in Niger equals US$ 9 annually: for a Nigerian household of nine, this is equivalent to approximately 90 kg of chemical fertiliser per year, an amount beyond the reach of many local, small-holder farmers (Linus, 2009). Over time, in many different places and cultures, local farmers and entrepreneurs have recognised the value of human excreta and wastewater. Scott, Faruqui and Raschid-Sally (2004) estimate that approximately 700 million people in 50 countries eat food from crops irrigated with untreated or inadequately treated wastewater from sewage systems. They estimate that a total areal surface of at least 20 million hectares is irrigated with unsafe water.

- **Finally, sanitation is everybody's business and in everyone's interest.** Hence, it is the responsibility of governments to ensure public and environmental health for all: sanitation is in the public's interest from a preventative health, education, economic and human rights perspective. The public sector therefore needs to assume a key role for the provision of sanitation services. For this role to materialise, political commitment to sanitation is needed at all levels. However, in many cases this commitment is insufficiently present.

1 On 28 July 2010, through Resolution 64/292, the United Nations General Assembly explicitly recognised the human right to water and sanitation, and acknowledged that clean drinking water and sanitation are essential to the realisation of all human rights.

2 In their report for WHO, Hutton and Haller based their global impact assessment on widely-accepted figures.

Non-sewered Sanitation Systems

This framework paper focuses on non-sewered sanitation services in both rural and urban areas. Non-sewered sanitation is the predominant sanitation service model in developing countries and is unlikely to change given the much higher investment and running costs of piped, waterborne sewerage services. Fernandes (2010) estimates that only 26% of the global population have access to sewered sanitation services. In West African urban areas with populations of a million or more, access to waterborne sewerage is limited to a quarter of the population (Norman, 2009).

It is important to distinguish between two different non-sewered, on-site sanitation systems. In completely non-sewered on-site sanitation systems, key elements of the sanitation chain—collection, containment, and disposal and/ or the productive use of faecal matter—happen on-site. Some examples include covering up full latrine pits and moving the latrine super structure elsewhere. In the case of the arborloo, a tree is normally planted where the latrine structure was previously placed.

Alternatively, systems may combine on-site collection and containment with off-site disposal or productive use. Within this system, sludge is removed safely, treated and safely disposed or used productively. Typical examples in dense urban areas are septic and storage tanks; but in rural areas, it is becoming increasingly clear that when pit latrines are emptied, the sludge is dumped indiscriminately, leading to what may be labelled as 'postponed open-defecation'.

Phases of a Sanitation Ladder

Sanitation service delivery is not a one-off static improvement. It is a gradual change process that covers the full sanitation supply chain. To signify this gradual change process, several sanitation ladders have been developed, but most relate only to latrine technology. Potter et al. (2011) developed—as part of IRC's WASHCost programme—a **sanitation service ladder** to specify the levels of a sanitation service that are provided across the sanitation supply chain, from containment to end-disposal or processing and use. Four key parameters were identified to assess service levels, namely: access, use, reliability, and environmental protection. On the basis of these four parameters, the sanitation service ladder (Table 1) is used to assess, plan for and monitor sanitation services. The four levels are: no service, limited service, basic service and improved service.

Table 1 Ladder for Assessing Sanitation Service Levels

	Accessibility	Use	Reliability	Environmental protection
Improved service	Each family dwelling has one or more toilets in the compound Easy access for all family dwellings	Facilities used by all household members	Regular or routine O&M (including pit emptying) service requiring minimal effort Evidence of care and cleaning of toilet	Non-problematic environmental impact/ safe disposal and reuse of safe by-products
Basic service	Cement or impermeable slab at national norm distance from households (per household or shared)	Facilities used by some household members	Unreliable O&M (including pit emptying) requiring high level of user effort Evidence of care and cleaning of toilet	Non-problematic environmental impact/ safe disposal
Limited 'service'	Platform without impermeable slab separating faeces from users	No or insufficient use	No O&M (e.g. Pit emptying) taking place and no evidence of cleaning or care for the toilet	Significant environmental pollution, increasing with increased population density
No service	No separation between user and faeces, e.g., open defecation			

Source: Potter et al. , 2011.

Although a separate hygiene ladder was developed in IRC's WASHCost Programme, this paper has integrated hygiene into the ladders mentioned above.

Box 1 Key Sanitation Findings WASHCost

WASHCost was a five-year action research programme, led by IRC, running from 2008 to 2012 with partner organisations in Burkina Faso, Ghana, Andhra Pradesh (India) and Mozambique. WASHCost collected and analysed cost and service level information for water, sanitation, and hygiene in rural and peri-urban areas, applying a life-cycle costs approach. A life-cycle costs approach examines the complex relationships between expenditure, service delivery, poverty, effectiveness and sustainability.

WASHCost's key sanitation-related findings were:

- Public expenditure on sector sanitation policy, planning, monitoring and staffing (indirect support) is not prioritised in the WASHCost research countries. There were equity issues, especially in rural areas; WASHCost research suggestes that it is unlikely that poor families can meet the costs of a basic and decent sanitation system.
- Technically advanced latrines cost more but do not necessarily deliver significantly better services. This may reflect an expenditure that is damaging service levels and sustainability.
- Improved traditional pit latrines are capable of delivering similar levels of service to more expensive latrines, and do not seem to require higher operating and maintenance expenditure.
- In Burkina Faso, Mozambique and Ghana, higher levels of service are achieved in peri-urban/ small town areas in comparison to rural areas, due to improved environmental protection and reliability. This coincides with generally higher construction expenditure and recurrent costs. The need for improved sanitation in higher-density urban areas is apparently recognised by households.
- The research makes a strong case for policy makers to refocus their sanitation priorities. Planning for demand creation and latrine construction is important. It is also critical to plan for higher expenditure on support and measures to promote latrine use and environmental protection, including systems for pit emptying and the safe disposal of faecal sludge.

Source: IRC, 2012.

A Sanitation Service Framework

A **sanitation service** focuses on the long-term provision of sanitation services **for all** and **at scale**, while meeting the following parameters:

1) it provides access to sanitary latrines;
2) it ensures continuous and hygienic use by all, throughout the year, for people in and around the household;
3) it ensures that latrines are maintained, replaced, and emptied when full; and,
4) faecal sludge is safely disposed of or used productively, to ensure that there are no negative impacts on the environment.

A **sanitation services model** describes the way in which sanitation services are provided. 'It defines the legal and institutional scope for delivering service, including commonly understood and accepted roles for the organisations involved' (IRC, 2012).

The BRAC WASH Programme is an example of a large-scale sanitation system that encompasses key determinants in ensuring sustainability.

Box 2 The BRAC WASH Programme: An Example

The BRAC WASH Programme seeks to create a lasting change in the lives of 55 million people living in rural Bangladesh by ensuring that all use a hygienic latrine, adopt safe hygienic behaviour, and have access to safe drinking water. Providing girls in secondary schools with adequate access to sanitary facilities is also key to the Programme's aims.

Changes in practices (such as handwashing with soap, continued use and maintenance of latrines, using safe water sources or keeping water safe from source to mouth) take time to establish.

The key components of the BRAC WASH Programme that signify success are:

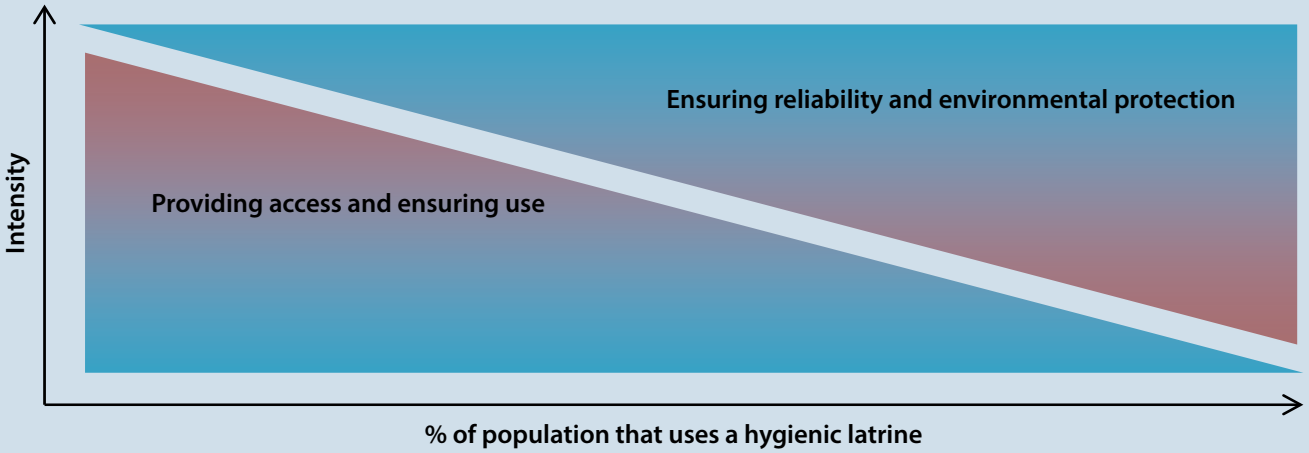
- **'Telling not selling'** with a focus on seven key behaviours related to water, sanitation, and hygiene: It involves a combination of social mobilisation and social marketing, and is characterised by frequent interpersonal communication through different channels. Activities in communities are initiated through social mapping, establishment and orientation of the Village WASH Committee (VWC), and a series of cluster meetings with different groups.
- **Strengthening the supply chain**: To ensure the availability of sanitation products such as rings and concrete slabs, at least one rural sanitation mart (RSM) per union has been set up. Through capacity strengthening activities (trainings) and granting loans (credit), a total of 1,648 RSMs have been set up.
- **Strengthening of enabling environment**: The VWC plays a key role during programme implementation and in monitoring progress in all communities. The enabling environment includes clearly-developed implementation strategies and guidelines and the implementation of a rigorous performance monitoring system.
- **Appropriate financial arrangements**: Individual household latrines are financed through three channels: self-finance (non-poor), soft loan (poor), and hardware subsidy for the hard-core (extremely) poor. Latrine construction in schools is jointly funded by the school (with support from parents) and BRAC WASH. Sanitation entrepreneurs receive a soft loan of Thaka 10,000.

Sanitation services models are country specific, as they are guided by national policies and legal frameworks, which set out detailed descriptions of standards, rights and responsibilities, and cut across different institutional levels (IRC, 2012). This paper identifies the components for such a service model for sanitation. The complete set of components is referred to as a **sanitation service framework**.

The private and public sectors and individual households all have a role to play in the delivery of sanitation services. For a sanitation service to work, interests of different stakeholders need to be well aligned, with the public sector playing a key role. In particular, the public governance of sanitation services requires that governments ensure that an enabling environment exists and that sufficient financing is available.

It is important to note that in many developing countries, the sanitation baseline is very low, even when only the access to – and not the use of – an improved latrine is taken into account. Hence, in many places the focus needs to be on providing access to a hygienic latrine and the promotion of safe hygienic behaviour during the initial phases. Once this had been established, operation and maintenance and the promotion of safe disposal or productive uses of faecal sludge can be addressed. As each of the two phases requires a specific approach, the sanitation service framework is divided into two phases as depicted in Figure 1.

Figure 1 Shift of Focus in Sanitation Service against Increasing Sanitation Coverage



Phase 1

The first phase focuses on providing easy access to sanitary household latrines and ensuring use by all. This is termed: "stepping onto the sanitation ladder". This phase is the establishment phase in the sanitation service: it includes a process of establishing relationships between stakeholders, of constructing infrastructure, and of advocating and affirming hygiene behaviour patterns.

Phase 2

The second phase seeks to ensure that services are reliable, and that faecal sludge is disposed of safely (or used productively) to protect the environment from further degradation: in other words, activities in phase 2 make sure that households stay on, and/ or progressively climb the sanitation ladder. Also referred to as the consolidation phase, systems are set in place and households affirm their adherence to safe and acceptable sanitation practices. During this phase, specific attention is paid to operation and maintenance, replacement and improvement, and the safe and final disposal of faecal sludge or its productive uses thereof.

Key Components

The key components for the sanitation service framework are identified on the basis of existing documented sanitation service models[3] and the lessons learnt from IRC's involvement in large-scale sanitation implementation projects[4].

Table 2 provides an overview of the four key components of the sanitation service framework.

Table 2 Key Components of the Sanitation Service Framework

	Stepping onto the ladder	Staying on the ladder
	Political support and commitment	
Demand creation and advocacy to change behaviour	Focus on the construction and sustained use of hygienic latrines and handwashing with soap (HWWS) by all when in and around the house.	Focus on the promotion of safe emptying of pits/ tanks and safe disposal or productive uses of faecal sludge.
Strengthening of the enabling environment	Generate political commitment for sanitation, improve institutional arrangements with clearly defined roles for the public and private sectors and individual households, ensure clear implementation guidelines, build capacity to support implementation, and ensure monitoring of outcomes. Reach out to other sector partners, including agriculture and energy sectors.	Foster and consolidate linkages with other sectors, in particular the agriculture and energy sectors, and related sectors to support the productive use of faecal sludge. Monitor commitments and institutional arrangements.
Strengthening of supply chains	Focus on the construction of durable, appropriate and hygienic latrines.	Focus on the appropriate operation and maintenance, replacement, and upgrading of appropriate and hygienic latrines and safe pit emptying, treatment, or productive use services.
Appropriate incentives and financial arrangements	Develop well-aligned financial arrangements and well-directed incentives that support efficient service delivery and promote the use of latrines by all.	Develop/ promote well-aligned financial arrangements and well-directed incentives supportive of O&M of latrines, and ensure safe and final disposal or productive uses of faecal sludge.

3 In particular, the work of Perez (2012) was used. See: Perez, E., et al., 2012. *What Does It Take to Scale Up Rural Sanitation*? (Scaling Up Rural Sanitation WSP Working Paper) [pdf] WA DC: Water and Sanitation Program of the World Bank. Available at: <http://www.wsp.org/sites/wsp.org/files/publications/WSP-What-does-it-take-to-scale-up-rural-sanitation.pdf> [Accessed 14 May 2013].

4 In particular this concerns project such as BRAC WASH (http://www.irc.nl/page/69649), Sanitation and Hygiene for All (http://www.irc.nl/page/57188), Sanitation Hygiene and Water (SHAW http://www.irc.nl/page/53746), and the design of the sanitation component for the Rural Water Supply and Sanitation Programme for Low Income States (RWSSP-LIS)—a US$ 1 billion WB programme in India.

Key Definitions and Determining Factors of an Improved Sanitation Service

The components that determine a sanitary latrine and the safe and final disposal or productive uses of faecal sludge are defined as follows (the parameters used to define improved service[5] were developed by the IRC):

- **Adequate access** is defined by the physical proximity of the latrine, the number of people that use the latrine, and the ease of use of special groups such as teenage girls, the elderly and disabled people. Although there are no generally-accepted international standards that define access, some countries determine the maximum number of people per latrine**.**
- **Hygiene components of improved service levels** provide easy access to sanitary and hygienic latrines that are operational throughout the year. A sanitary and hygienic latrine separates faecal matter from the environment (including people, insects, and rodents) and has no excreta in or around the latrine. As a rule-of-thumb no faeces or faecal smears are visible, there is no faecal smell, and flies do not reach the faeces.
- **Adequate use** means that a sanitary latrine is being used consistently and hygienically by all household members when they are in or around the house, throughout the entire year. Within the household, everyone practises good handwashing following defecation, and prior to handling food. Furthermore, such habits are practised even during extraordinary circumstances, such as floods.
- **Reliability** refers here to the continued serviceability of a latrine. It relates especially to regular or routine O&M, including pit-emptying services, upgrading (if wanted and if necessary), and replacement.
- **Environmental protection** implies that there are no problematic environmental impacts such as the faecal contamination of land and/ or water at any stage along the supply chain and that at the end, faecal sludge is disposed of or used for productive purposes.
- **Handwashing with soap** following defecation and before handling food.
- **Political support** and **commitment** is often lacking but is considered a crucial component to ensure ongoing success. It is needed to leverage policy reform, adequate allocation and use of budgets, etc. Generating political support and commitment are considered to be long, drawn-out processes without assured outcomes.

5 These definitions are based on the BRAC WASH Programme's monitoring framework developed by Dr Christine Sijbesma and Joep Verhagen of IRC International Water and Sanitation Centre.

- **Demand creation and advocacy to change behaviour** seek to promote a lasting change in social norms that favour the adoption of hygiene- and sanitation-sensitive behaviours, creating a demand for services and supplies that underpin the changed behaviour. Key behaviours for "stepping onto the sanitation ladder" are the construction, use and maintenance of a hygienic latrine, and handwashing with soap after defecation and before handling food. Key behaviours for "staying on the sanitation ladder" are safe emptying of pits and tanks, safe and final disposal of faecal sludge or safe productive uses thereof.

- **An enabling environment** relates to a number of critical factors that need to be in place to support the delivery of sanitation services to all: (a) broad and long-term political commitment; (b) a well-developed sanitation strategy and policy framework supported by a regulatory framework, programme and planning methodologies, and implementation planning mechanisms; (c) a clear and well-aligned institutional framework at central and decentralised levels; (d) sufficient dedicated personnel with the capacity to fulfil their tasks; and (e) monitoring and evaluation systems to support learning and to monitor the programme outcomes and changed behaviours (Perez, et al., 2012)[6].

- **A supply chain** that is well developed and competitive, and addresses increased demand for sanitation-related services *across the full sanitation life cycle*—including construction, maintenance, upgrading and emptying—is crucial. Over time, the demand for services is likely to shift from mainly construction to include maintenance, upgrading and the emptying of pits.

- **Incentives** and **finance instruments** that are appropriate and well-aligned to support service provision. All finances for sustainable sanitation services delivery are derived from a combination of taxes, tariffs and/ or transfers. Incentives refer to financial instruments that promote equitable and sustainable sanitation services.

- **A sanitary latrine** effectively blocks the disease transmission routes between humans and faecal matter. A working definition of a hygienic latrine is a latrine in which faeces cannot be seen, smelled, or reached by flies.

- **Safe and final disposal** or the productive uses of faecal sludge meets the WHO (2006) guidelines.

6 The factors expressed here have been adapted from the work of Perez et al., 2012.

Conclusion and Next Steps

This paper presents four components that enable the delivery of lasting non-sewered sanitation services. While the framework is not intended to be prescriptive, it does contain fundamental components, and it requires that the framework includes **all** of these. The IRC's position is that any kind of sanitation services provision needs to address the entire sanitation chain including the safe and hygienic collection, storage and final disposal or the productive uses of faecal sludge.

The sanitation service framework described in this paper accentuates the following significant gaps and weaknesses in current knowledge on non-sewered sanitation service delivery:

- Models and approaches for the delivery of non-sewered sanitation services that have emerged over the years are limited in their focus, and most of these models and approaches focus on the initial implementation phase. Limited attention is given to ensure sustainability of, or the possibility to scale up the service provision.
- There are many gaps in existing and combined global knowledge, such as: the efficiency and effectiveness of different approaches for demand creation and behavioural change, low-cost sanitation technologies for areas with high groundwater tables or are flood prone, the safe disposal of faecal sludge at scale, and the sequencing and linking of different sanitation components.
- Considering the millions of pit latrines and septic tanks filling up, the continued negligence of safe and final disposal of faecal sludge is an area of concern that needs to be addressed urgently. However, most current approaches focus on improving access to and use of sanitation latrines and hardly address the emptying of pits and tanks.

The framework described here forms the basis of IRC's future sanitation-related initiatives, action research endeavours, and design of actual sanitation services. It also serves as a framework for IRC's continued learning on sanitation. Recognising that there are many promising approaches being tested and implemented within the sanitation sector, and that a significant number of these approaches are limited to addressing one single component, IRC invites WASH stakeholders to collaborate in the joint development of integrated sanitation services models.

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