

Sanitation Market Analysis

SUMMARY REPORT: NEPAL

Acknowledgements

UNICEF contracted Oxford Policy Management to conduct an assessment of the sanitation markets in Bangladesh, Nepal and Pakistan. This report is part of a series and includes findings from the assessment in Nepal.

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Summary

Context:

Nepal has made an impressive progress in eliminating open defecation across the country in the last two decades. As a result, the percentage of households using improved (not shared) sanitation facilities in Nepal increased from 15% in 2000 to 62% in 2017, and open defecation rates fell from 67% to 21% over the same period (WHO & UNICEF, 2019). Nepal celebrated gains made towards ending open defecation in September 2019.

Key products:

The range of technologies and products is still relatively limited in Nepal. The pour flush toilet is the most common toilet used by households, particularly in the rural areas. The pans may be plastic or ceramic. There is a widespread preference for ceramic pans. The potential exists for product innovation and the introduction of new technologies to cater to flood-prone, earthquake-prone, water scarce and shallow-groundwater areas.

Levels of demand and market size:

On average the sub-structure of a domestic toilet costs US\$97 in Terai and \$140-160 in the hills and mountains. Our affordability analysis indicates that all common toilet types are affordable for the middle and highest income groups, but that none of them are affordable for the lowest income group without remittances and savings. If all those practicing open defecation or with unimproved or shared sanitation were to purchase a single pit offset pour flush toilet, this would represent a current market potential of US\$358 million. If population growth is included, the market potential rises to US\$422 million by 2030.

Constraints faced by businesses in sanitation:

For importers, inaccurate valuation and delays at the border push up costs. For ring producers (RPs), the availability of sand and aggregate can be hampered by quarrying restrictions by the government, meaning such materials may fluctuate in price and availability. Breakage, space requirements and continuity / volume of demand can deter some retailers and wholesalers from stocking ceramic products. There is also the risk of providing stock on credit to supply chain actors. For emptying service providers, access to appropriate equipment and infrastructure is a key challenge. The relative density of retail outlets, masons and RPs decreases from the flat and higher populated Terai up to the remote sparsely populated mountains.

Key opportunities to expand the sanitation market:

Government and development partners represent a key source of demand for sanitation products for institutions and for ad-hoc humanitarian responses. Local government WASH plan formulation process represents a good opportunity to increase investments in the sanitation market space. Increased urban sanitary inspection and 'post ODF monitoring' would also help to reinforce demand for (quality) sanitation products and services. The expansion of the supply chain into mountain and hill areas will bring the price down for consumers and therefore raise demand.

Introduction

Nepal is a landlocked country, sandwiched between India and China. At 29 million people (World Bank, 2018), Nepal has a growth rate of 1% (World Bank, 2018). The GDP per capita is US\$835, although it has grown significantly in recent years (World Bank, 2018) and is expected to grow by 5.5% in 2019 (ADB, 2018). The poverty headcount ratio has fallen significantly in the past few decades, with 15% currently living at or under US\$1.90 a day (World Bank, 2018). Nepal aims to graduate from least-developed country status by 2022 (UNDP, 2018). In 2015, the total remittance flow in Nepal was US\$6.6 billion, which accounted for around 29% of the GDP (Nepal Living Standard, 2014/15). The GINI index of Nepal is 32.8 which is similar to Bangladesh's (World Bank, 2018).

Nepal is both geographically and ethnically diverse, with 123 ethnic groups in the country (World Bank, 2014) and topographies ranging from the high mountains of the Himalaya, through the 'hilly' region, down to the flat lowlands of around 59 m altitude, known as the Terai. The Terai is the most densely populated ecological zone, hosting nearly half the population in around 17% of Nepal's surface area (Wikipedia, 2020). Nepal is one of the 10 least urbanised countries in the world, with 81% of its population living in rural areas (World Bank, 2018; Bakrania, 2015). However, it is also one of the top 10 fastest urbanising countries in the world, with an urbanisation rate of 3% in 2014 (Bakrania, 2015).

There are considerable disparities in wealth distribution between urban and rural areas, between the ecological zones (mountains, hills, and Terai), and also between the provinces. For example, more than half (51%) of the urban population belongs to the two highest wealth quintiles, whereas 53% of the rural population falls in the two lowest quintiles. Mountain areas have 58% of households in the lowest wealth quintile, in comparison to only 6% of households in the Terai (Demographic and Health Survey, DHS, 2016). Whilst gender equity, and inclusion statistics are progressively improving (ADB, 2018), some Nepalese still suffer from gender and

caste discrimination, with considerable inequities in terms of income and vulnerabilities between castes, particularly with the often-marginalised Dalit caste.

In 2015, Nepal adopted the Federal Constitution, effectively paving the way for the dissolution of former administrative structures (such as the development committees in districts and village) and the creation of new administrative boundaries for local government and provinces. There are now 753 local authorities (municipalities, rural municipalities, and sub/metropolitan areas), which are divided into seven provinces. The constitution of Nepal, 2015 has considerably accelerated the pace of functional and fiscal decentralisation, with the newly formed provincial and local authorities being mandated for a wide range of sectors, including ensuring and monitoring water, sanitation and hygiene (WASH) services in their areas. The current context is one of transition, whereby functions and personnel are being devolved from ministries and agencies to provincial and local governments (Tillett and Gautam, 2019).

Nepal is prone to natural disasters (such as earthquakes, flood and landslides). In 2015, a 7.8 magnitude earthquake killed nearly 9,000 people (ADB, 2018), causing widespread damage to infrastructure, including the partial or full damage of around 390,000 toilets (SPMER, 2017). The lowland Terai also experiences periodic incidences of flooding. Nepal is also highly vulnerable to the effects of climate change (Government of Nepal, GoN, 2011). According to 2014 government data, around 32% of water sources are seasonal (GoN, 2011) and water scarcity and seasonality is becoming an increasing challenge, particularly in the mountain areas (GoN, 2014).

This brief provides an assessment of the demand side, supply side, and enabling environment of the sanitation market in Nepal. It concludes with a series of recommendations for catalytic market systems changes.

Methodology

In the context of a world with 4.5 billion people without access to safely managed sanitation (WHO & UNICEF, 2017), one of the key programming approaches employed by UNICEF in its global WASH strategy (2016-2030) is building sustainable markets for water, sanitation and hygiene goods and services which balance demand and supply.

UNICEF contracted Oxford Policy Management to conduct an assessment of the sanitation markets in Bangladesh, Nepal and Pakistan, to improve their understanding of the product and market landscape, to inform UNICEF's market-led approach to improving the supply of appropriate sanitation for communities in the long term. This brief is drawn on the report of the market assessment for Nepal.

The methodology includes a number of steps:

Step 1: An inception phase

The inception phase is necessary to understand the priority focus areas for the assessment.

Step 2: Mapping the market system

Mapping the market system involves studying the demand-side; supply landscape and product assessment; as well as to analyse product and supplier data.

Step 2.1. Demand-side study

The demand-side study collects information on:

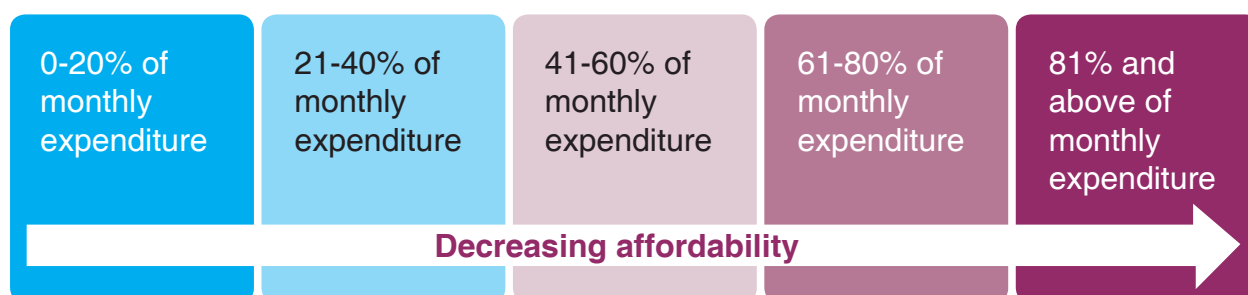
- Levels of demand (current and potential) for sanitation products and services amongst certain groups of the population (e.g. based on income or geographic location);
- Preferences for different types of toilet amongst different types of customer (e.g. rural or urban, geographic location and different income groups);
- Barriers to accessing the sanitation market for low-income groups; and
- Affordability of certain toilet designs.

Secondary data can be collected from sanitation programmes, sector reports, and peer-reviewed literature. Insights on the demand-side market dynamics can also be collected as part of the investigation into supply landscape and product assessment and the wider enabling environment affecting sanitation markets.

Toilet costs: The possible cost drivers inherent in the construction of typical toilet designs for household toilets can be assessed using costing information for materials, labour, and, to the extent possible, other cost drivers such as transportation from upstream supply chains to markets and vending points, profit margins, and transaction costs along the supply chain. Costs for labour can be collected in the form of daily rates of skilled and unskilled labour

Affordability: OPM developed an affordability model to better understand the financial constraints faced by householders (particularly low-income and middle-income householders). The affordability model considers monthly consumption data disaggregated by income quartiles (derived from the Global Consumption Database) against the upfront cost of constructing a toilet. The model also considers other factors affecting affordability including household savings, remittances, and willingness to pay (WTP).

Figure 1: Affordability framework



Source: Authors

In attempting to quantify demand, the Joint Monitoring Programme's (JMP) data on access to sanitation provides information on the number of people currently accessing a range of sanitation facilities. Existing studies and assumptions can be used to estimate the number of people who demand a sanitation facility that differs from the one they currently have access to.

For this exercise it is also important to consider two stages of demand. First, the level of potential demand, which can be considered as the number of people whose current sanitation facility is considered inadequate. Of course, every individual will have their own opinion of what they consider to be adequate, based on their knowledge and view of the importance of sanitation, in comparison to other areas of their life.

Using the JMP definitions, the customer groups includes: 1) those practicing open defecation, who can be considered as potential first-time users of a sanitation facility; and 2) those accessing an unimproved facility who can be considered as potential demand for an improved facility (unimproved and limited sanitation access under JMP terminology).

The second stage of demand is actual demand, defined as those people who have expressed a willingness and capability to improve their access to sanitation. A number of conditions need to be in place to support the conversion of this potential demand to actual demand. These include a dissatisfaction with current sanitation access, a knowledge of sanitation products and designs, access to sanitation-related products, materials and services, a willingness to pay for these, and an ability to afford them.

Existing surveys of WTP and user needs can be used to understand levels of actual demand framed around different customer profiles. Where feasible, WTP figures related to actual demand can be scaled up to estimate regional actual demand (within a country) or scaled up to the national level.

Step 2.2 Supply landscape and product assessment

The aim of the supply-side study is to:

- Identify the actors involved in sanitation supply chains;
- Understand the roles of these actors, the scope of their work, their motivations, incentives, and challenges;
- Understand the type, volume, and nature of sanitation products and services available;
- Identify constraints in the market, particularly to improving access for low-income customers;
- Compile a database of suppliers and their products/services; and
- Compile a list of stakeholders who could be considered as invitees to the industry consultation.

Step 2.3 Product and supplier data

Collect information on products and suppliers by tapping into known networks following a snowball approach to identify new suppliers.

Step 3: Identifying constraints

Following completion of the mapping exercise of the market system, the main market constraints are identified. The focus here is constraints as they pertain to lower-income households accessing better sanitation facilities. The analysis focused on understanding what is preventing and or discouraging the supply side from offering appropriate, quality sanitation solutions at affordable prices.

Step 4: Provision of recommendations for catalytic market systems changes.

Having identified the main constraints, in this step the constraints are prioritized in the order in which they can be tackled, and recommendations provided in line with the main components on the market analysis: demand side, supply side, and enabling environment.

Step 5: Validate findings, collate new insights, and begin action planning for improving sanitation markets

National industry consultation meeting is held in order to validate findings, collate new insights, and begin action planning for improving sanitation markets. This includes a prior step of helping to identify the main stakeholders to be invited.



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Results

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The demand side of the market

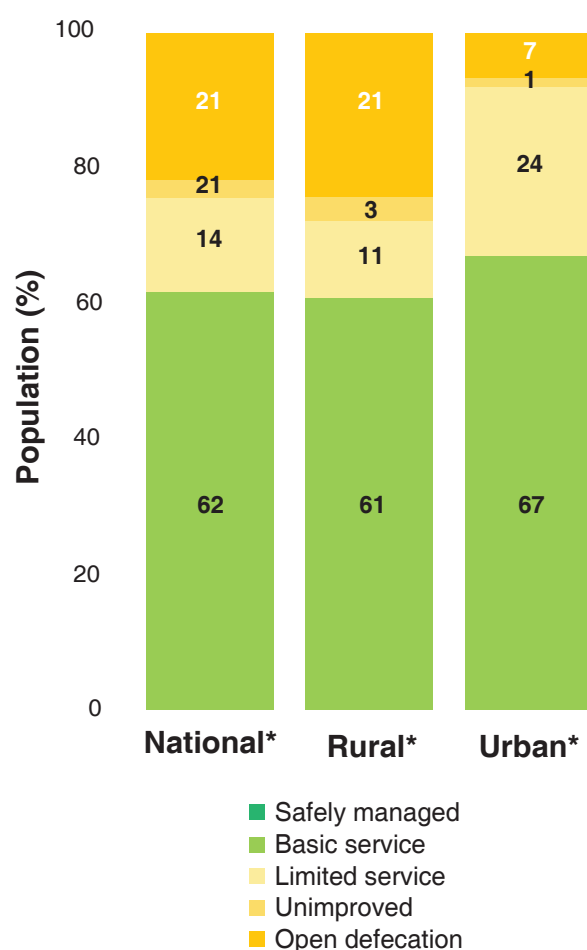
This section outlines the types of sanitation facilities available in Nepal, demand characteristics and quantifying demand for sanitation. It also discusses issues around financing such as toilet costs, willingness to pay for sanitation as well as affordability.

Sanitation in Nepal

Nepal's constitution legally recognises the human right to water and sanitation services, as well as the right to live in a clean and healthy environment. Nepal has experienced a major rural sanitation initiative over the last decade, trialling Community-Led Total Sanitation (CLTS) in 2003, and School-Led Total Sanitation (SLTS) in 2005, which were later adopted, and innovated new approaches particularly for rural sanitation at small scale. The Sanitation and Hygiene Master Plan (2011) provided a roadmap for the country to achieve 100 per cent sanitation coverage by 2017, and it helped to galvanise considerable support from government and a wide range of NGOs, civil societies and development partners to achieve this goal in 2019. Nepal has aligned its Sector Development Plan (SDP) targets with those of the Sustainable Development Goals (SDGs).

Nepal has made impressive progress in eliminating open defecation across the country in the last two decades. As a result, the percentage of households using improved (not shared) sanitation facilities in Nepal increased from 15% in 2000 to 62% in 2017, and open defecation rates fell from 67% to 21% over the same period (Joint Monitoring Programme, 2019) (See Figure 2). Post-Open Defecation Free (ODF) studies commissioned by government (with financial support from UNICEF) and UN-Habitat have identified varying levels of slippage since ODF declaration (SPMER, 2017; UN-Habitat, 2017).

Figure 2: Access to sanitation in Nepal



Source: JMP 2019 data.

Note: * no safely managed estimates available

Shared sanitation facilities are much more common in urban than in rural areas, more common in hills/mountains than in Terai but the proportion of households with basic access (e.g. unshared improved facilities) is relatively similar across rural and urban areas.

No data are available at this stage on safely managed sanitation services for Nepal. There are limited examples of faecal sludge management (FSM) initiatives that include entire containment, pit emptying, transportation and safe disposal or reuse in Nepal, and many to date have focused more on treatment technologies than sustainable FSM business models. FSM has received relatively limited attention in the sector relative to increasing toilet access and coverage, although this started to change as levels of ODF increased, as the SDP and SDGs place an emphasis on safely managed services, and as urbanisation continues to increase at a significant rate.

Whilst access to and coverage of sanitation is improving, there remains considerable disparities by geography and topography, by caste, and by gender. For example, for some time the Terai was relatively neglected during the ODF campaign and caste groups such as Dalits have been refused permission by landowners to build toilets on their land (ODI, 2017). Data from JMP (2019) highlights the considerable disparities in access between the rich

and the poor: the poorest quintile has approximately 17% open defecation, whilst the richest quintile has 0%. Likewise, the poorest have 4% unimproved versus the richest with 0% unimproved.

Types of sanitation facilities

Pour-flush toilets are by far the most common form of toilets in Nepal, mainly flushing to single off-set pits and septic tanks. A study by SPMER (2017), which found that 93% of households in formerly declared ODF communities used pour-flush toilets, and another from UN-Habitat (2017), which found that approximately 72% of households had pour-flush toilets with a single off-set pit.

Whilst rates of sewerage access are increasing, they still represent a relatively small fraction of the population using improved facilities in urban (13%) and rural (0.3%) areas. Only a very small proportion of households use unimproved sanitation facilities (3% according to JMP 2019 data, and 2% in DHS 2016).

The type of sanitation facilities, and materials used in rural areas, varies by ecological zones (See Figure 3). In some mountain areas dry pit toilets are common, likely due to the difficulties in obtaining water to flush, and due to freezing temperatures rendering pour-flush toilets unusable during winter months.

Figure 3: Construction materials used for toilets in rural areas

	Pit (sub-structure)	Slab	Superstructure
Mountains	Stone, mud	Pan (both ceramic and plastic), siphon, cement, iron rod, pipe, sand, gravel, stone	Stone, wood, plastic sheet, bamboo and mud, nails
Hills	Stone, mud, brick, cement and sand	Pan (both ceramic and plastic), siphon, cement, sand, iron rod, pipe, gravel, stone	Stone, mud, wood, bamboo, brick, cement, sand, GI sheet, thatch, nails
Terai	Cement ring, cement, sand and brick	Pan (ceramic), siphon, tiles, sand, cement, iron rod and plastic pipe	Brick, mud, cement, sand, iron rod, GI sheet, bamboo, wood, cement tile, nails

Source: SNV 2015

Demand characteristics

An SNV (2015) study suggested that the key qualities respondents desired in latrines were affordability, durability, and ease of construction and maintenance. Customers typically aspire to move progressively up the sanitation ladder (e.g. plastic pans to ceramic or pans to toilet seats) often linked to family members working overseas and increasing purchasing power, and also from increasing their exposure to higher living standards and wishing to bring such standards to their family at home. Changing consumption patterns are also linked to increasing urbanisation and domestic water connections allowing water closets (WCs) to become a reality.

Plastic pans were widely promoted and sold in the hills and mountains during the earlier years of the pre-ODF campaign, primarily due to their lightweight and easy-to-transport characteristics. However, the demand for plastic pans is predominantly in rural areas and has diminished significantly in recent years, with households opting instead for ceramic pans, which is perceived as easier to clean and less vulnerable to scratching whilst cleaning and flushing (and likely to be more of a status symbol than a plastic pan). Urban consumers opt for WCs. Demand from government and NGOs buyers relates to sanitation products for institutions (e.g. schools and clinics), and for ad hoc humanitarian response purchases.

Demand fluctuates throughout the year, with the rainy season, government procurement cycles, and annual religious festivals all influencing demand patterns (SNV, 2015). Prioritisation and motivation for sanitation investments have also been found to vary by gender. Studies by both CODEF (2013) and

SNV (2015) found that primary motivating factors for constructing toilets tended to be for safety and security for women, and for pride and status for males, in addition to other factors.

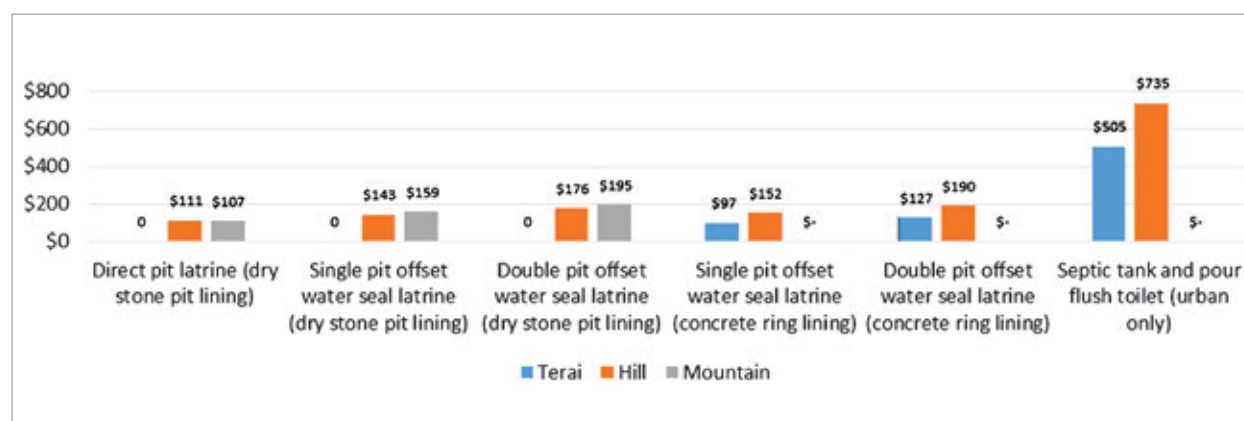
Affordability and under-prioritisation of sanitation are not the only potential barriers for households investing in sanitation facilities. Land ownership, tenancy, and lack of access to materials and information can deter some households from constructing toilets.

Demand for toilet pit emptying services is increasing in the Terai, where concrete rings are used and soil types reduce permeability, and shallow groundwater and relatively high-water usage lead to pits quickly filling. Whilst manual emptying services are reportedly relatively common in the Terai and also urban areas across Nepal, mechanical emptiers are becoming increasingly more present in rural and peri-urban areas of the Terai. In rural mountain or hill areas, soil types, topography, and more permeable pit lining (e.g. stone lining) reportedly mean that pits fill more slowly. Due to population densities and terrain, emptying services are rare in rural areas of the hills and mountains.

Toilet costs

The costs of toilets vary widely between ecological zone and also between technology options. Pour-flush single off-set pit toilets, which predominate across the country, cost around US\$97 in the Terai and US\$140-160 in the hills and mountains, to construct up to plinth level these prices include: materials, components, transport, and labour. These costs presume households need to purchase all materials (e.g. sand, stones, etc.) and pay for all labour, which may not be the case (See Figure 4).

Figure 4: Construction costs by technology and ecological zone

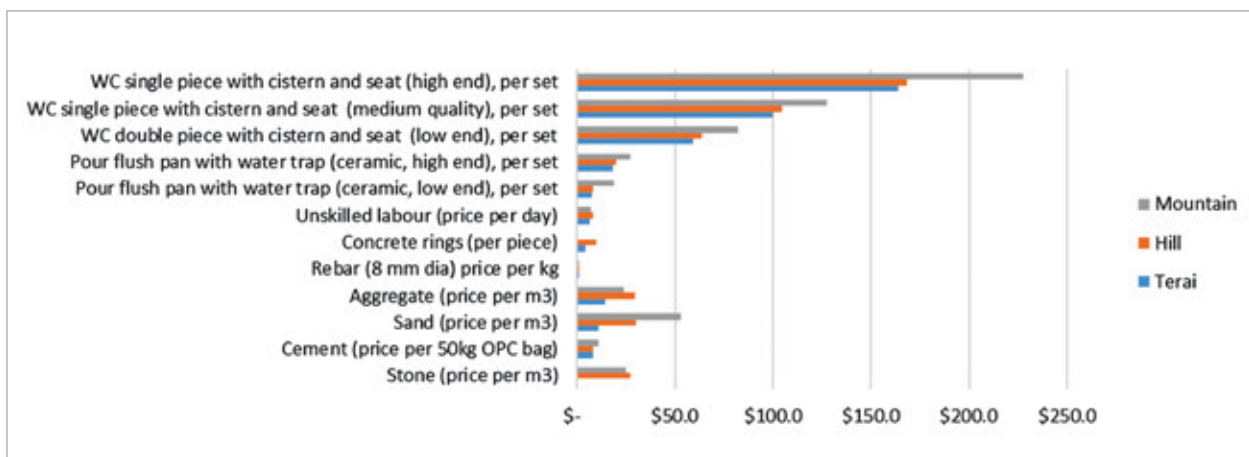


Products in the hills and mountains generally have a higher sales price due to factors such as the costs of transportation to retail shops, the limited number of outlets and hence lower market competition, and the potential for a ‘lengthier’ supply chain involving numerous wholesalers and retailers, each adding profit margins. In contrast, costs are generally lower in the Terai, as products from nearby India are readily available and population densities and road networks mean shorter supply chains and increased market competition between suppliers (See Figure 5). Previous studies in Nepal have found that, whilst costs of sub-structures can be broadly similar by technology type, cost variances for sanitation are primarily driven by differences in the superstructure (SNV, 2015). The cost range for superstructure or total cost is not available.

Affordability

OPM developed an affordability model to better understand the financial constraints faced by householders (particularly low-income and middle-income householders). The affordability model considers monthly consumption data disaggregated by income quartiles (derived from the Global Consumption Database) against the upfront cost of constructing a toilet. Affordability of pour-flush toilet options by consumption levels, which shows the cost of different specifications of toilets as a proportion of monthly household expenditure, for each consumption level. The affordability framework shows how affordability decreases as the upfront cost rises as a proportion of total household monthly spend. There is no hard and fast benchmark for

Figure 5: Unit costs of sanitation inputs per ecological zone



Willingness To Pay (WTP)

The national policy in Nepal is not to provide subsidies for sanitation, but it is often interpreted to be at the discretion of implementing agencies and local governments. The practice of subsidies before and during the ODF campaign reduced people’s readiness to pay in certain areas, although this is reportedly becoming less of an issue. Studies have identified WTP ranging from US\$730 for high-end urban toilets to US\$180 for more basic rural facilities, although these costs likely include the costs of superstructures. Figures on actual payments for toilets vary considerably, and there are comparability issues between studies due to different context. Toilets are rarely high on people’s list of purchasing priorities.

sanitation affordability, but 1-2% of the annual household income is used as a rough guide and this has been converted to 20% of monthly income as the most affordable category. Benchmarking from the healthcare sector suggests that out-of-pocket payments for healthcare services should not exceed 15–20% of the total cost to provide that service to ensure financial barriers to access to care are reduced, especially for the poorest households.

If affordability of a toilet (to plinth level) represents less than 20% monthly consumption expenditure, a single-pit off-set pour-flush toilet (i.e. USD 125-151) is only affordable for approximately 2% of the Nepali population, rising to 22% if affordability represents less than 30% of monthly expenditure. This is because the cost for such a facility represents

approximately 50-75% of the lowest consumption segment's monthly expenditure. The assumption for the calculation is upfront payment. To note, these costs include purchasing local materials and hiring unskilled labour, which may not be a reality for some households who may provide this in kind. The assessment also reveals that direct pit latrine (dry stone pit lining) costs around US\$109 whereas a double pit off-set water seal latrine (concrete ring lining) is US\$158 and a pour flush toilet with septic tank costs US\$620.

Savings, ad hoc transfers from remittances, use of loans can increase affordability. Households can also lower the costs of 'standard' designs to make them more affordable and source 'free' labour and local materials. The ultra-poor will likely continue to receive government or NGO-purchased subsidies.

Financing households

Households have constructed toilets through full direct investment, partial or full subsidy, or to a lesser extent through taking loans. SPMER (2017) found that 51% of households who were in ODF-declared communities in the past were provided with some form of subsidy, mainly as material subsidies. There are approximately 35,000 cooperatives across the country (Nepal Federation of Savings & Credit Cooperative Unions (NEFSCUN), 2018), thousands of community-based savings and loans schemes, and around 48 Microfinance Institutions (MFIs) serve around 3 million members (Nepal Microfinance Bankers Association (NMBA), 2018). Whilst access to credit is relatively high in Nepal, the proportion of households taking loans to construct toilets is relatively low. Few households purchase materials on credit from retailers or RPs. Some studies suggested households had not considered taking

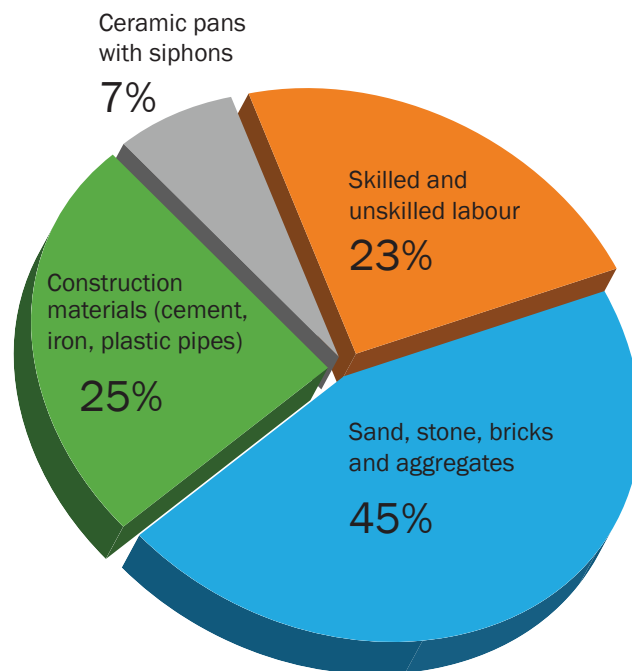
loans for toilets but felt they would be hard to obtain for a purpose that does not have clear repayment potential (SNV, 2015; CODEF, 2013). Some WASH projects have also encouraged the establishment of community-level financing mechanisms, although there is limited documentation on how effective these were.

Quantifying demand

Ongoing demand is likely to be based broadly on first-time users (decreasing), upgrading from limited (shared) to basic (private) services, or upgrading from unimproved to basic services, repairs, reconstruction (including humanitarian market demand), and moving from shared to basic sanitation facilities.

Accurate quantification of demand is a challenge while GoN data suggests 99% coverage of toilets, using JMP 2019 data, the number of households (first time users as well as upgraders) that are still to construct toilets (currently open defecators, unimproved or shared sanitation users) are 2.59 million. If all of these were to construct single-pit off-set pour-flush toilets, this represents a market potential of US\$358 million. This represents a potential market of US\$161 million for sand, stone and aggregate, nearly US\$90 million for cement, pipes and reinforcement, US\$24 million for ceramic products, and US\$82 million for the labour market. Furthermore, up to 2.6 million toilet pans or toilet seats would be needed to achieve 'at least basic' sanitation access in Nepal. This calculation is limited by data availability, and does not factor in differences by ecological zone or rural/urban demands, or, indeed, additional demands for repairs, replacements, reconstructions and further upgrades for households with existing facilities (See Figure 6).

Figure 6: Proportion of total potential market value per service or supply sub-sector (example of single off-set pit with either stone or concrete ring lining)



Factoring in population growth (1% rural, 4% urban according to World Bank 2018 data), the total number of households grows from 2.59 million households in 2019 to 3.06 million households by 2030, the total market potential rises from US\$358 million in 2019 to US\$422 million by 2030. To note, this calculation is relatively simplistic, limited by data

availability, and does not factor in differences by ecological zone or rural/urban demands, or, indeed, additional demands for repairs, replacements, reconstructions and further upgrades for households with existing facilities e.g. toilet construction is not a one-time cost, and does not capture wider FSM.



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2 The Supply Side of the Market

The section reviews new technologies and emptying services, the key supply-side actors, constraints faced by businesses in Nepal and financing options.

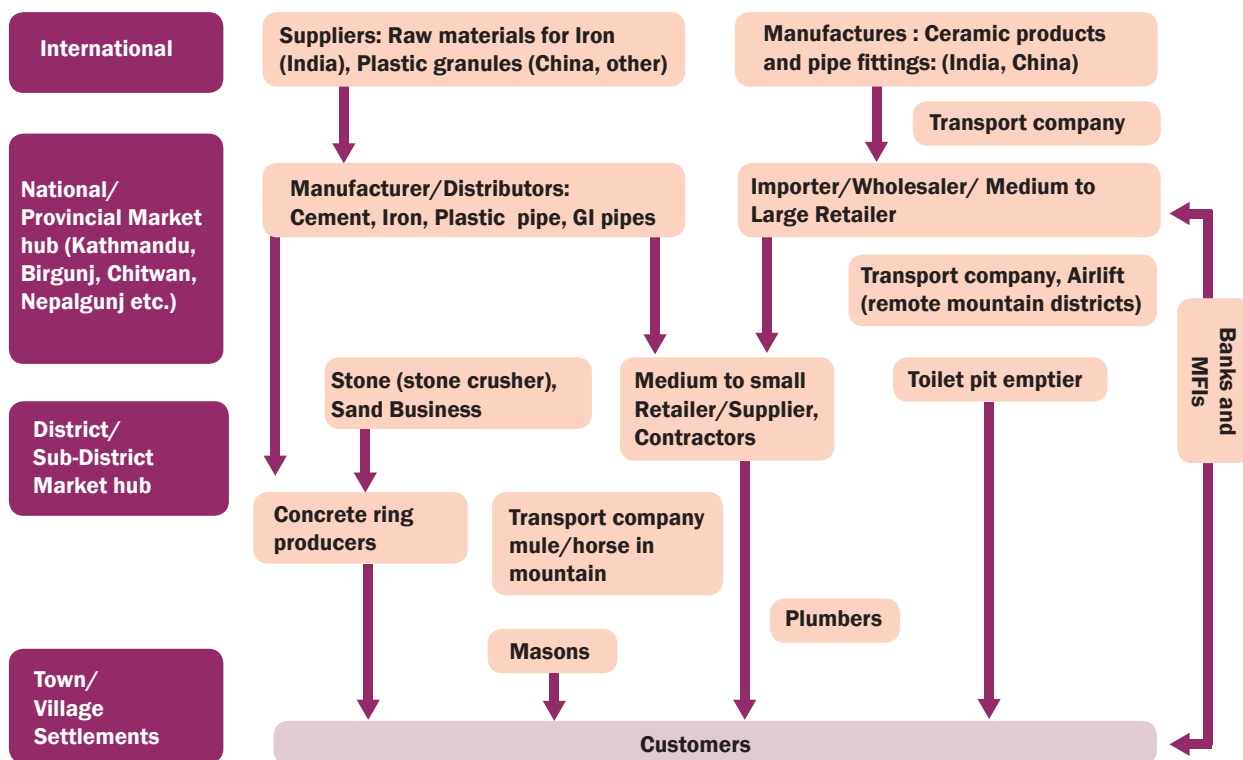
Whilst cement, steel, corrugated galvanised iron/ steel sheets and plastics are manufactured by numerous companies across Nepal, access and costs of raw materials and import duties reportedly favour import rather than domestic production for ceramic products. There has been domestic production of plastic pans, with standby capacity to continue to do so, but demand has dropped off due to customer preference for ceramic pans. The majority of prefabricated and mobile toilets are imported, but these mainly focus on the emergency response and public event market space. Figure 7 provides an overview of the key actors in the supply chain for toilet products and construction services.

Ceramic products come from India and increasingly also from China and incur 15% customs duty. Importers are mainly based in the Terai border

towns or Kathmandu, and subsequently distribute to wholesalers and retailers across the country. Imported products (such as pans, WCs and tiles) from Gujarat and Rajasthan in India and China (via sea freight to Calcutta) tend to enter Nepal via the border crossings in the Terai. The 30% customs duty on imported plastic products helps to encourage domestic manufacturing.

There are more wholesalers or retail outlets and masons in the flat and higher populated Terai compared to the remote sparsely populated mountains (SNV, 2015). Long supply chains make products costlier in hill and mountain areas. However, the road networks are advancing rapidly in such areas, allowing penetration to formerly more challenging markets and bringing costs down for consumers (See Figure 8).

Figure 7: Supply chain actors and routes



Source: Authors

Note: stakeholders and routes vary by ecological zone.

Figure 8: Map showing key manufacturing, importation, and wholesale hubs in Nepal



Source: Authors

New technologies

A range of products are available in Nepal, catering for different markets and different ecological zones. There are potential opportunities for innovation/introduction of products in the following areas:

- Commercially available adaptations or fittings for toilets and superstructures to make them easier to use for people with disabilities;
- Lightweight, durable pans that have low or no water for flushing and that can be fitted onto direct-drop toilets, to overcome freezing water in the mountains, or limited water availability in the hills;
- Easily transportable, low water consuming toilet seat/commodore for rural areas;
- Pre-fab septic tanks that can achieve urban codes;
- Technology options and commercially available adaptations for flood-prone and highwater table areas; and
- Options to replace (sometimes expensive and non-earthquake resilient) dry-stone walling for pits in hill and mountain contexts.

Emptying services

Emptying services are commonly provided by informal, unlicensed manual or mechanical emptiers, or occasionally by CBOs or municipalities. ENPHO found that in 2015 there were around 12 vacuum trucks servicing Kathmandu valley (Dangol 2015), it is estimated that there are now around 40 trucks operating.

Vacuum truck operators have generally received limited to no training and may enter the business as ‘graduated’ manual emptiers having acquired the capital to purchase a truck. Alternatively, it may be that investors (such as migrants returning from the Middle East) purchase a truck, seeing the business opportunity on FSM, and then hire staff to operate the vehicle. However, there are poor quality of service and limited appropriate technologies/options for treatment and disposal.

Whilst emptying services exist in many urban centres, there are limited examples of formal engagement and dialogue between local authorities and emptying service providers. There are few examples of emptiers forming informal associations as most of the FSM business are not registered or do not have license. In some municipalities, local authorities have procured their own emptying trucks in order to become service providers themselves. In other areas, development bank-funded projects are providing emptying trucks directly to municipalities (e.g. Birgunj).

Key supply-side actors

There are a range of actors involved in the manufacturing and supply chains for sanitation products in Nepal, with some variance by ecological zone. Overall, they include manufacturers (Nepalese, Indian, and Chinese), sanitation hardware producers, importers, wholesalers/dealers, retail shops, RPs (generally only in the Terai and urban areas), masons/carpenters, cement sales agents, sand/aggregate and brick suppliers (the latter mainly in Terai and urban areas), as well as pit emptying service providers and the households themselves. Importers of ceramic products are based in Kathmandu and along the Terai border towns and sell to wholesalers and sometimes retail businesses. Transportation service providers are also key in the different steps in the supply chain.

There is a significant plastic manufacturing industries in Nepal, producing pipes, fittings, and plastic pans (to a lesser extent). An association of plastics manufacturers mentioned that they had around 40 members, and major manufacturing centres are located in Biratnagar, Birganj, Nawalparasi, Nepalgunj and Kathmandu. There are an estimated a dozen cement manufacturing companies in Nepal, some of which manufacture across multiple locations.

Small-scale industries collecting sand and stones exist across the country, often quarrying from riverbeds. However, they are facing increasing regulation on dust pollution and environmental protection measures, which at times are interrupting or adding costs to their operations.

Sanitation products typically account for up to 20% of wholesalers and retailers' business. For larger manufacturing companies (i.e. cement, plastics, and steel) and higher-end ceramic products from India, it is not uncommon to have a nationwide network of dealers and sales representatives in different parts of the country. Alternatively, businesses may purchase cement and pipes directly from Nepali manufacturers without having a dealership. Retailers purchase goods from importers, wholesalers, or (especially in remote locations) other retailers.

RPs are small businesses that manufacture concrete products such as dug-well and toilet pit rings,

concrete pillars and other items to meet domestic, government, and NGO demand. Demand is seasonal, with most falling within the 'construction season' between October and May. RPs occasionally provide advice to customers around toilet design, and often have links to masons.

A small number of programmes in Nepal have trialed market-based approaches for sanitation products. For instance, UNICEF and iDE tested a sanitation marketing model in the Terai between 2011 and 2017, RPs were trained to manufacture and market 'Easy Latrines', and act as a 'one-stop shop' for all materials required for domestic toilet construction. RPs provided small commissions to (project-trained) community-based facilitators, who promoted their products to households. RPs also engaged masons to undertake the construction. Few reasons why this does not appear to have been widely upscaled or sustained beyond the project period include: 1) decrease in demand after ODF declaration; and 2) incentive to community-based facilitators (CBF or sales agent) from the project was terminated.

Access to skilled masons was a common challenge during the national ODF campaign, and those trained tend to migrate. The average daily rate for a mason ranges from around US\$12.50 in the hills and mountains, down to around US\$9 in the Terai. Whilst the masons in the Terai generally provide all services for the construction of the toilet, in the hills and mountains households may engage multiple masons specialised in plastering, pit digging, and carpentry skills. Masons rarely have formal qualifications and tend to learn skills on the job.

Whilst construction companies and individual builders in urban areas offer toilet construction services as part of their wider activities, there are no firms that focus specifically on sanitation.

Biogas has been an area of government and project-funded subsidy in the last decade, benefitting in part from revenues from carbon trading. Numerous biogas companies exist, which include toilets in their wider offering, but their reach is limited, due to less cattle in the rural or peri urban area. So far more than 300,000 biogas digesters are constructed and more than 70% are connected to the toilets (pers. comm. Uttam Jha, former Biogas Specialist, AEPC staff).

Constraints faced by sanitation businesses in Nepal

Specific to sanitation, a number of challenges have been identified including:

- Bureaucracy (enforcement of contracts and general government bureaucracy) remains a challenge.
- For importers, inaccurate product valuation for pans and WCs and delays at the Terai border push up costs. Reliable access to raw materials (i.e. sand, aggregate, cement and iron rods), and fluctuation of their prices, remains a key challenge for RPs.
- For retailers and wholesalers, breakage, space requirements, and continuity / volume of demand can deter some from stocking ceramic products. Consumer expectations of subsidy has been a challenge, although this issue seems to be decreasing.
- Whilst access to credit within supply chain actors (rather than credit to customers) was not widely considered an issue, some supply chain actors mentioned the risks of providing stock on credit. For emptying service providers, access to appropriate sludge pumping equipment, safe disposal and treatment is a key challenge.

Other constraints for emptying businesses include: creditworthiness, social stigma, health risks, challenges to obtain business licences, and lack of government engagement and investment in FSM.

Financing businesses

Credit is relatively widely available for businesses, in the form of loans from cooperatives, MFIs, and banks. There are no financial products that are specifically aimed at sanitation business activities. Whilst manufacturers, wholesalers, retailers, and RPs commonly take loans (mainly bank loans), masons rarely do (SNV, 2015). The readiness of financial institutions to develop specific financial products for the sanitation sub-sector is unclear and could warrant further investigation. Remittances, loans from family members, and business investors also form significant sources of capital (SNV, 2015). Access to credit can be a challenge for emptying service providers. Particularly for those emptying service providers wishing to 'graduate' from manual to mechanical emptying, access to capital to purchase equipment can be an issue. Another issue is exemption of tax for businesses to import new technology (e.g. prefabricated septic tank to address the FSM in urban areas and rural market centres).



3 The Enabling Environment in Nepal

This section provides an outline of the key actors influencing the enabling environment in Nepal and summarises sector policy and strategy, regulations and standards, reviews experience in sanitation marketing, promotion, and campaigns as well as the use of public-private partnerships (PPPs) for sanitation.

The key actors influencing the enabling environment

Aside from businesses and customers, there are also a number of key government entities, associations, and federations that influence the enabling environment around sanitation products and services. These include: Ministry of Water Supply (MoWS) and its Department of Water Supply & Sewerage Management (DWSSM); Ministry of Federal Affairs and General Administration (MoFAGA); Ministry of Population and Environment (MoPE); local governments and their associations; The Ministry of Finance and the Department of Customs; Ministry of Industry, Commerce, and Supplies and Federation of Nepalese Chambers of Commerce and Industry (FNCCI); financing institutions and their associations; development partners and NGOs; landowners and Federation of Water and Sanitation Users Committees in Nepal (FEDWASUN).

Sector policy and strategy

Policies, strategies, and acts relating to sanitation and FSM include (but are not limited to): the Constitution of Nepal (2015), the Rural Water Supply and Sanitation Policy & Strategy (2004), the Urban Water Supply and Sanitation Policy (2009), the National WASH Sector Development Plan (draft 2016), the Sanitation and Hygiene Master Plan (SHMP, 2011), the Millennium Acceleration Framework (MAF, 2013), the Total Sanitation Guidelines (TSG, 2017), the Institutional & Regulatory Framework for FSM Services (2017), and the Sewerage Policy (2018). Efforts are underway to bring these together under an upcoming harmonised WASH Policy and Act. There is now an expectation that all 753 local authorities will develop WASH plans that align to and can be aggregated to achieving the Sector Development Plan targets.

Regulation and standards

The earthquake in 2015 highlighted the importance of quality assurance of construction materials and setting standards. It is understood that the Nepal Bureau of Standards (NBS) does not monitor the standards for sanitation-specific products such as ceramic pans and WCs, as they are not produced in Nepal, although these products may be subject to regulation in their country of origin.

Whilst the ODF campaign widely promoted the uptake of pour-flush toilets, the government has avoided proscribing specific standards for domestic toilet products or overall facility specifications in rural areas. The National Building Code (2003) outlines requirements for septic tanks, but these are weakly enforced and are less relevant for smaller town contexts. The limited extent of post-ODF monitoring and building code enforcement may undermine demand for sanitation products and emptying services (including discharge of waste into drainage channels).

The Institutional and Regulatory Framework for FSM (GoN, 2017) and the Urban Environment Management Directives (2011) seek to establish institutional arrangements for monitoring of FSM services and set standards on treated wastewater effluent respectively. However, until local authorities have infrastructure in place for sludge to be discharged into, they are reticent about engaging in the regulation of the emptying services.

Marketing, promotion, and campaigns

The nationwide ODF campaign helped to create the demand and social norms around toilet construction and use. In certain districts, the ODF campaign aimed to create demand for specific sanitation products or to connect demand with the existing local entrepreneurs, and in many cases by establishing places for accessing toilet construction materials. In the 'Easy Latrine' project, community-based facilitators (CBFs) undertook marketing in their communities, receiving commission for sales from the RPs (iDE and UNICEF, 2016). However, such efforts were not applied across all areas of the country. The sustainability and durability of demand for sanitation products in the medium to long term, depends on follow-up in ODF communities and private sector actors creating demand themselves. Much of the demand creation for first-time sanitation has been through NGO sector, rather than the private sector. With such 'project based' demand creation, the sustainability of promotion is at risk.

Experience of Public Private Partnerships

Whilst there are some examples of public private partnership (PPP) for the management of public toilets in Kathmandu and work ongoing to review potential contracting models for the management of a Decentralised Wastewater Treatment System (DEWATS) in Gulariya municipality, it seems these are largely the extent of Nepal's experience on PPPs on sanitation. There are examples of RPs, retailers, and representatives from local chambers of FNCCI being invited to district WASH coordination committee meetings during the ODF campaign, this was not systematic and generally FNCCI does not tend to represent the smaller scale actors in the sanitation service chain (e.g. RPs, emptiers). There are few examples of business development support initiatives being applied to the WASH sector to build the capacity of the local private sector, for example through actions to improve creditworthiness, through supporting access to lower interest loans, and for technical and management training for businesses.



Recommendations

Specific recommendations for market shaping in Nepal are provided below.

Recommendations for the demand side include to:

Recommendation 1: Reinforce consumer demand through monitoring and follow-up. Actions include reinforcing rural demand through strengthening post-ODF monitoring mechanisms and to reinforce urban demand by strengthening sanitary inspection and enforcement.

Recommendations for the supply side include to:

Recommendation 2: Develop sustainable, scalable models for private sector-led demand creation for sanitation products and strengthen capacities for quality construction and installation. Actions include to develop the skills of masons and/or existing businesses, and their exposure to high-quality construction of a range of sanitation technologies.

Recommendation 3: Expand the range of toilet products and technologies to meet specific market needs and opportunities. Actions include for UNICEF to collaborate with the private sector at different levels to develop market adapted sanitation products, and manufacture/import that meet the needs of specific contexts in Nepal. UNICEF should use its comparative advantage to help bringing such products to the market.

Recommendation 4: Strengthen the capacity of emptying service providers, their access to credit and equipment, and the business and financing models in which they operate. Actions include to work with the private sector to increase the availability and use of improved, adapted desludging equipment in Nepal. This should start with a nationwide study by UNICEF on emptying services in Nepal. Attention should be given to strengthen the capacities of emptying service providers, their access to capital, and the standards around such services. UNICEF could support the emptying service providers to become associated, and better represented in the sector. Business and financial modelling for FSM services, together with the piloting of different approaches, is also required.

Recommendations for the enabling environment include to:

Recommendation 5: Clarify and build datasets that provide market intelligence on sanitation, to entice private sector engagement. Provide market intelligence on sanitation to entice private sector engagement. Actions include to clarify disparities between JMP and GoN statistics, so that the sector is clear about the market needs and market potential for sanitation. The process of developing and updating local WASH plans can be used to generate market intelligence for sanitation, and to foster engagement between the local authorities and the private sector for potential solutions.

Recommendation 6: Strengthen social norms for uptake of FSM services and expand the enabling infrastructure for transport and treatment as well as business/financing models for treatment and reuse. Actions include to work towards creating a social norm against filled up toilets and the discharge of untreated faecal sludge, to complement efforts to strengthen regulation and enforcement processes. A rights-based approach is recommended to mobilise populations to put pressure on local governments to engage in and finance FSM. Advocacy materials should be developed and use faecal flow diagrams to build political commitment and the economic and development case for public investments in FSM infrastructure.

Recommendation 7: Address policy and legislative constraints to further enable private sector activities and reduce the costs of basic sanitation products. Actions include to work with the Customs Department to more accurately value imported sanitation items as well as to support the process of licencing for emptying service providers.

Recommendation 8: Continue to support learning, coordination, and dialogue on moving up the sanitation ladder. Actions include to provide ongoing support and momentum to sector learning platforms.

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