FOSTERING WATER AND SANITATION MARKETS IN LATIN AMERICA AND THE CARIBBEAN

HOW THE PUBLIC SECTOR CAN SUPPORT THE PRIVATE SECTOR TO BRIDGE COVERAGE GAPS AND IMPROVE SERVICE QUALITY FOR LOW-INCOME POPULATIONS

IDB Inter-American Development Bank
water for people everyone | forever
ONE DROP
IRC Supporting water sanitation and hygiene services for life
WaterAid

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Executive Summary

In Latin America and the Caribbean (LAC), according to 2015 figures from the Joint Monitoring Program, over 100 million people do not have access to adequate sanitation services, and nearly 34 million do not have access to safely managed drinking water. A disproportionate number of these households are from lower-income market segments and wealth quintiles, primarily residing in the rapidly growing, high-density periphery of established urban centers, small towns, and rural areas. Access to water and sanitation has been declared by the United Nations to be a human right, indicating that there is still a significant challenge in LAC with respect to universal access to basic human rights. To resolve this challenge, traditional practices involving the NGO, aid, development and public sectors as leaders will not solve the problem efficiently or effectively without adequate engagement and enabling of the private sector.

While there are differences between countries, across the region the volume of people without basic services represents a key market opportunity for the private sector to engage with households, water committees, and municipalities, among other actors, on the provision of a range of Water and Sanitation (W&S) goods and services, including water system rehabilitation and expansion, post-construction and technical support services, household sanitation infrastructure, latrine pit and septic tank emptying, fecal sludge management including waste transport and treatment, and possibly within the market for sales of composted human waste through re-use as fertilizer. For example, this study conservatively estimates that across the LAC region there is a potential market of up to US$ 15 billion for the construction of improved household sanitation infrastructure, and over US$ 1 billion annually for the provision of waste collection and transport services. Given the market size and theoretical revenue available, hundreds, and likely thousands, of jobs could potentially be created across the region if the private sector were able to capitalize on this market opportunity, especially in the sanitation sector. To support this growth, there is much room for engagement from financial services markets as well, primarily in the provision of loans or other financial alternatives to households or communities.

To support this private sector engagement and create a healthy enabling environment, the public sector and other actors looking to facilitate water and sanitation market growth could take any number of the following recommendations to better enable private sector involvement:

- Better understand and segment the market and demand for water and sanitation services, so that demand creation strategies are better targeted and more effective
- Clarify and refine subsidy policies so that criteria for receiving subsidies is more fair, poverty-focused, transparent, and based on objective criteria and data
- Clarify and enforce regulations
- Provide technical support to households (for sanitation), and water committees (for water system management)
- Support the development of financial alternatives (e.g. loans, bonds, etc.) for W&S infrastructure
- Leverage information management systems to better facilitate supply-and-demand dynamics and relationships between household customers and W&S service providers.

The challenge is still quite large, with millions of households without adequate W&S services. This paper will explore the extent to which W&S market development and the private sector can play a role in bridging the gap in W&S coverage among low-income populations in LAC, and how the public sector and government can take steps to create a healthier enabling environment for the private sector and sustainably improve W&S coverage and service quality. Moreover, promoting and supporting the growth of water and sanitation markets will be a key component of an overall strategy for achieving Sustainable Development Goal (SDG) #6 of ensuring access to water and sanitation for all. Overall, the public and NGO sectors will not be able to respond to this problem on their own, and it is time for a clearer acknowledgment of the role the private sector can play in addressing these challenges, and how to institute policies that will better enable them to do so.

Introduction: Market Opportunities and Challenges

"Individual and family toilets will not be subsidized," states one clause of the recent Strategic Guidance Document for Sanitation, prepared by DINEPA, the National Direction of Water and Sanitation for Haiti.[1] At first glance, this statement could seem to be counter-intuitive, counter-productive and possibly even unnecessarily strict or unfair for a country not only with the Western Hemisphere's lowest water and sanitation service coverage currently,[2] but also having to recover from a large-scale earthquake in 2010 and the subsequent cholera epidemic. Why would Haiti pursue a policy against subsidizing household sanitation infrastructure if coverage is so low compared to other countries? Wouldn't subsidies of household sanitation infrastructure help Haiti overcome this gap in coverage more efficiently and effectively? Is this not unfair to the significant proportion of poor households in Haiti? One answer to these questions could lie in one of Haiti's sanitation slogans, "If you can build a house, you can build a latrine," assuming that if households are able to invest in the construction of a home, what is then preventing them from constructing a bathroom on their own, and why should subsidies be applied?[3] While on the

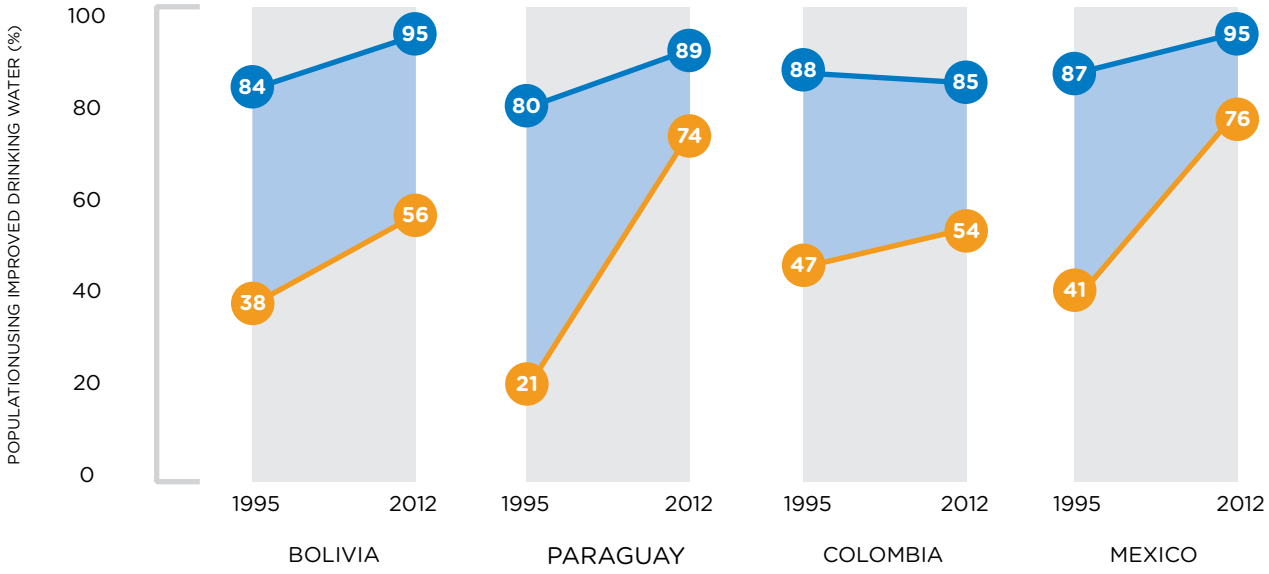

Figure 1: Trends in the Use of Improved Drinking Water in the Richest and Poorest Rural Wealth Quintiles, 1995-2012. Source: (UNICEF, World Health Organization and Joint Monitoring Programme (JMP), 2015)

1 "Les Toilettes individuelles et familiales ne seront pas subventionnées," taken from DOCUMENT D'ORIENTATION STRATEGIQUE POUR L'ASSAINISSEMENT EN HAÏTI 2014-2018, retrieved July 2016 from the DINEPA website: http://www.dinepa.gouv.ht/strategie-nationale-de-las-sainissement/

2 According to figures from the Joint Monitoring Programme (JMP), as of 2015, only 28% of Haiti's population had access to improved sanitation (with 58% having access to improved drinking water sources), one of the lowest in Latin America and the Caribbean, and well below the overall regional coverage levels for water and sanitation (See Note 3 that follows).

3 According to the JMP, as of 2015 in Haiti: 19% of all households (35% of households in rural areas) still practiced open defecation, implying that a significant portion of the population has built some kind of home, but has not constructed any type of adequate sanitation infrastructure.

surface this is a logical assumption, the challenge is a bit more complex, and to answer these questions and understand why DINEPA would propose this no-subsidy policy as part of their overall national sanitation strategy, one must begin to look at water and sanitation markets, the key participants in these markets, their incentives, and the roles that subsidies and policies from external actors such as the public sector can play to either hinder or facilitate the growth and sustainability of these markets.

Throughout Latin America and the Caribbean (LAC), there are still over 100 million people without access to improved sanitation services, and over 30 million still consuming water from unimproved or unsafely managed sources.[4] This is a significant and challenging problem, especially given that a disproportionate number of these people are generally classified as belonging to lower-income, "Base of Pyramid" (BoP) market segments who are already economically vulnerable.[5] The lack of access to improved sanitation is particularly concerning, given that inadequate sanitation practices is a large driver of the prevalence of water-borne illnesses such as diarrhea.[6]

Globally and among relatively wealthier market segments, the private sector has shown that it can play a key role in the provision of water and sanitation (W&S) services, from construction of infrastructure, provision of finance, management of W&S services, and waste treatment, among others. The private sector can also play a key role in the provision of W&S services for lower income market segments, but certain market factors have inhibited them from doing so to their full capacity. Below is a table describing some of the different potential market opportunities that currently exist for private sector actors around the provision of W&S goods and services throughout LAC.[7]

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4 Based on JMP figures, the Inter-American Development Bank reports that across the LAC region, 5.4% (representing approximately 34 million people) do not have access to improved, safely managed drinking water sources; and 17% (representing approximately 106 million people) do not have access to improved sanitation. (See Los Desafíos de la Agenda de Desarrollo Post-2015 Para el Sector de Agua y Saneamiento en América Latina y el Caribe, available here: https://publications.iadb.org/handle/11319/7583). Given the more stringent definitions of adequate W&S service access that may come with the Sustainable Development Goals, the number of people deemed to be lacking appropriate services could increase--it is estimated that it will cost approximately $14 billion annually to meet SDG6 Targets 6.1 (access to safe and affordable drinking water), and 6.2 (access to adequate and equitable sanitation and hygiene) for the LAC region. (Please see Hutton & Varughese, 2016). Although these investment costs are significant, it has been shown that there are compelling benefit to cost ratios for investment in W&S service improvement in LAC, particularly among poorer wealth quintiles in rural areas (See Hutton G. , 2015).

5 Although significant improvement has been made among poorer market segments, according to JMP figures as of 2015, it is still generally households in the poorest wealth quintiles that have the lowest W&S coverage, especially in sanitation. As an example (See Figure 1), when analyzing access to water in rural areas, despite significant improvement, although 95% of wealthier rural Bolivian households have improved access to water, only 56% of poorer households do. In Colombia, 85% of wealthier rural households have access to water services, while only 54% of poorer households do. According to one IDB study (Garzón & Sturzenegger, 2016), in LAC, 70% of the households that do not have adequate water services, and 85% of the households without improved sanitation services, belong to the poorest two wealth quintiles across the region. Given this, a disproportionate number of households that lack W&S services belong to the poorest wealth quintiles, implying a large disparity in W&S service access depending on income, and the primary reason behind the emphasis on lower-income market segments when efforts are made to address gaps in W&S coverage in LAC. Furthermore, there is also a disparity demographically between rural and urban household populations, particularly with access to water services: while in rural areas 82% of the population has access to safe water, and 63% to improved sanitation, in urban areas those values climb to 97% and 87% respectively, implying that a large part of the gap in services, particularly in water, disproportionately affects poor, rural populations (Ibid.).

6 There are numerous studies that highlight the importance of sanitation in the reduction of water-borne illness risk, please see (Esrey et al.,1991), (Scott, 2006), (Waddington et al., 2009) (Prüss-Üstun, Bartram, et al., 2014) for a sample of reports with more detailed analysis of the different contributions that water supply, sanitation and hygiene can bring to improving public health through reduction in water-borne illness risk.

7 Please note that the information in the table below is generalized across the LAC region primarily for illustrative purposes; to more precisely quantify and understand market size within countries or smaller delineated markets, more in-depth market analysis should be carried out that includes other factors such as willingness and capacity to pay, public sector involvement and the existing enabling environment, demand patterns, etc. Overall, the table is meant to explore the range of market opportunities available, as well as roughly hypothesize potential market size given current gaps in coverage.

Table 1: Market Opportunities in Water and Sanitation in LAC

WATER SECTOR MARKET OPPORTUNITIES	
Market Opportunities	**Potential Market**
- Provision of piped drinking water to households - Provision of water to households via means other than household connections (e.g. water kiosks, bottled water, self-supply water systems such as rainwater harvesting, etc.)	- Smaller market potential relative to sanitation given higher levels of current coverage. - In urban areas, in some cases existing utilities will likely be best suited to time-efficiently extend household water connections to those currently not served, in others there could be a significant delay (e.g. more than a few years) until they are able to do so. In areas where there will be a delay, a potential market exists for smaller-scale water service providers—in many cases these peri-urban markets are already adequately covered by the private sector and/or water cooperatives, in others an opportunity still exists around the market gap to be filled. - According to JMP figures, in 2015, 97% of urban households in LAC had access to improved water services, while in rural areas only 84% have access, implying a larger gap in coverage among households living outside of urban centers. Given this, there are a greater number of potential customers in rural areas around water service provision, although operating costs may be more challenging given that households are more dispersed and potentially more costly to reach. - Difficult to quantify market potential in monetary terms given the cost variability associated with the different factors of water provision. - Assuming average household size of five members per household: nearly 7 million potential household customers across the region who are potentially interested in improving their water supply services.
- Technical support to water committees, including post-construction support on operation, maintenance, repair, etc.	- Outside of large urban areas, in LAC there are thousands of communal water supply systems managed by private community water committees, the majority of which will need some form of technical support at some point in the course of the management of their respective water systems. Currently, in most cases either local governments or outside NGOs provide technical support to these water committees, but it often isn't sufficient and there is room for the private sector to explore offering these technical services. - Difficult to quantify the market in monetary terms given challenges in estimating when water committees will need support, or the scope of the support needed, but there is a high probability that some outside technical support will be needed for the majority of water systems at some point.

- Financial services to the water sector.	- There is much room for the financial services sector to explore ways to engage and support water service provision across the entire LAC region, especially with innovative and mutually beneficial (i.e. viable to financial institutions as well as water committees and households) financial alternatives for funding water system improvement, repair, expansion, etc. - In addition to water committees, space exists for creative financial models (e.g. bonds, etc.) to support the growth of larger-scale water utilities serving larger markets.
- Treatment	- There are fewer market opportunities around treatment for communal water systems given existing options (e.g. chlorine, etc.) on the market. - Opportunities for household-level treatment options if costs can be optimized, and economies of scale leveraged better in rural areas so that prices are more affordable.

SANITATION SECTOR MARKET OPPORTUNITIES

Market Opportunities	Potential Market
- Initial construction of household sanitation infrastructure (bathrooms, toilets, latrines, etc.), for household customers constructing their first improved sanitation solution. - Improvements to existing household sanitation infrastructure.	- Market opportunity is quite significant, with at least 15 million households currently lacking improved sanitation (in urban areas 12% of households do not have access to improved sanitation, 36% do not have access in rural areas). - Price of sanitation options varies depending on quality, type of technology, whether a connection fee to a sewer network is necessary, etc. The largest market potential arguably exists for on-site sanitation infrastructure such as improved pit latrines, septic tanks, etc., and primarily in rural areas given the higher lack of coverage currently. However, there is also a significant market for household bathroom improvements once a sewer network is constructed, primarily in urban, peri-urban, and small town areas that have the public resources to invest in a sewer network. Where a relatively newer sewer network has been constructed, there is a large initial market for bathroom improvements among households looking to connect to the sewer network, assuming their financial constraints can be alleviated somehow through alternative financing such as sanitation loans, etc. - For on-site systems, the amount invested can generally range from $200 for the most basic improved pit latrine, up to more than $1000 for a full-service pour-flush bathroom with septic tank.* Given this, assuming investment needs to be leveraged for 15 million households to acquire improved sanitation facilities, it can be estimated that the potential revenue available to service these customers across LAC amounts to somewhere between $1 billion (very conservatively assuming the least expensive sanitation option), up to $15 billion (assuming more expensive options). Even with conservative estimates, the market potential for initial construction of household sanitation infrastructure is large, especially in areas with relatively lower coverage. - The above figures refer to investment in initial household sanitation infrastructure; there is relatively less market potential for improvements to already existing sanitation infrastructure, given that: (1) households generally invest less in additional sanitation improvements once they have already invested in an improved solution; and (2) a network of providers for more sophisticated sanitation improvements in large part already exists. While the market potential is also significant for this segment, it is likely households that are investing in sanitation infrastructure for the first time that could represent the most significant opportunity for sanitation market growth.

* For a detailed breakdown of potential unit costs for water and sanitation service improvement by country, please see: (Hutton & Varughese, 2016).

Fecal Sludge Management (FSM) services such as latrine pit or septic tank emptying and transport of waste to treatment site.	- In some LAC countries, up to 75% of households, and across the entire region at least half of the population does not have access to sewer networks, implying a large portion of households with on-site sanitation systems. Unless waste is somehow treated on-site through an ecological toilet or otherwise, the majority of these households will need some assistance with FSM, implying an enormous market opportunity. - In many urban areas the private sector is already providing FSM services, but there are still gaps, and opportunities exist in smaller cities and towns, as well as less dispersed rural areas where transport costs aren't insurmountable. - Also a challenging market to quantify given different variables such as pit or septic tank fill-up rates, transport costs, etc.; but if it's conservatively assumed that 0.2 cubic meters of sludge is generated per person on an annual basis,[8] with a population of at least 300 million across the region without sewer services, this represents a theoretical demand of 60 million cubic meters of sludge generated annually. Even at conservative estimates of $50 of revenue per cubic meter of sludge emptied, this represents a potential market opportunity of $3 billion annually across the region. While existing providers are already covering some of this market, and there are other factors to take into account such as coordination, logistics and transport costs, there is a significant market opportunity in the LAC region for FSM services, especially in areas with high proportions of the population without sewer services.
- Waste treatment - Sales of composted waste	- A large portion of fecal waste generated in LAC is not treated adequately, primarily outside of urban areas. As such, there is much room for improvement in these markets, but given that households outside of urban areas are more dispersed, the costs (e.g. coordination, transport, etc.) of centralizing waste for treatment may be too prohibitive for the private sector to enter without public sector support. Potential public-private arrangements could be feasible, and even necessary, to help overcome some of the costs associated with waste treatment. - Given that the market for composted fecal waste sold as fertilizer is still very young and yet to be proven, it is difficult to draw quantifiable conclusions across the entire region until demand is better understood. However, certain initiatives are showing some promise, pointing to a potential market in the future, but will likely need much more research and development to better optimize the business model.
Financial services to the sanitation sector	- Similar to water, there is much room for the financial services sector to offer credit to households for sanitation improvements, including for on-site sanitation, as well as for investment in materials for connection to an existing sewer network. - In addition to households, space exists for creative financial models (e.g. bonds, etc.) to support the growth of larger-scale sanitation utilities serving larger markets.

From a market perspective, as one example in sanitation alone, there are at least 15 million households without access to improved sanitation, representing a market and potential revenue of up to $15 billion for construction of sanitation infrastructure for households currently lacking improved services. Regarding pit or septic tank emptying and wastewater/sludge collection services, the market is potentially on the order of more than a billion dollars annually across the region. Given the market size and theoretical revenue available: hundreds, and likely thousands, of jobs could potentially be created across LAC if the private sector were able to capitalize on this market opportunity, especially in the sanitation sector.

Sustainable Development Goal #6 (SDG6) is focused on ensuring access to water and sanitation for all globally by 2030—public sector, governments, and NGOs have been working to address this issue for decades, and will not be able to solve this problem on their own in an effective and efficient manner without adequately engaging, enabling, and incentivizing the private sector to take better advantage of these market opportunities in order to support W&S market growth. Effective promotion of water and sanitation markets will be a critical component in an overall strategy for achieving and sustaining SDG6 across the region. Over the last thirty years, consider how efficiently the private sector has helped the proliferation of cell phones and other goods throughout the region—this was not due to government planning or NGO intervention. Toilets and cell phones are of course very different and the analogy can only be taken so far, but given their role in the provision of numerous goods and services in a variety of markets, the private sector can undoubtedly play a key role in the efficient distribution of W&S goods and services across diverse market segments as well, and more importantly, sustain this provision and extend it to new customers through the natural development of supply chains due to healthy market development.

This paper will explore the extent to which W&S market development and the private sector can play a role in bridging the gap in W&S coverage among low-income populations in LAC,[9] and how the public sector and government can take steps to create a healthier enabling environment for the private sector and sustainably improve W&S coverage and service quality. It will also focus on other principal private sector support actors, such as the financial services sector, and their role in supporting W&S market growth. More broadly, the paper will shed light on what factors would influence institutions such as DINEPA to consider proposing a restriction on household sanitation infrastructure subsidies, and how these policies, among others, could be applicable to improving sustained W&S coverage in LAC. First, the paper will provide more details on the theory and motivations behind more market-based strategies in W&S. With this background and an understanding that water and sanitation markets are different, the paper will look at different water markets (Chapter 1), followed by a section on sanitation in Chapter 2. Finally, the paper will conclude by offering some general recommendations that could be applicable throughout the region to enhance W&S market growth.

8 Many factors influence sludge accumulation rates in a latrine pit or septic tank, including family size, diet, the extent that water is employed in the sanitation technology, climate, pit/tank wall and floor porosity and filtration rates, etc. All of these factors combined with variability in costs around coordination, transport, etc. make a precise quantification of the market for pit or septic tank emptying challenging. Furthermore, this market will also diminish as sewer networks are expanded, but given the slow rates of expansion, should be a significant market for some time, especially in rapidly growing peri-urban areas. This study is grateful to Steve Sugden and TEECs of Malawi for providing general guidance, figures, and caveats for quantifying the market for pit or septic tank emptying services; please see (Tools for Education & Enterprise Consultants (TEECs) and Water For People, 2011)

9 According to the World Bank, in 2012 nearly 6% of the population in LAC was living on less than $1.90 per day, and approximately 18% were living on less than $3.10 per day. By "low-income," this paper is referring primarily to this poorest wealth quintile living on less than $3.10 per day, and a portion of the quintile above it.

Audience, Methodology and Limitations

The primary audience for this paper is anticipated to be government representatives, development practitioners, and/or anyone else with experience in the W&S sector in LAC with an interest in potential policy recommendations that could support W&S market growth among low-income populations. A secondary audience would potentially be anyone interested in W&S market growth among low income populations globally, and/or people with experience and interest in initiatives involving private sector involvement and market development around the provision of public goods and services.

Information for this study was acquired through literature review, interviews with experts in the field, and based on the authors' experiences working in the W&S sector in LAC. Approximately fifteen different W&S experts were interviewed for this study, including development sector professionals, government officials and private financial sector stakeholders. Please see reference section at the end for more details on the literature consulted and experts interviewed. The LAC region is comprised of more than 650 million people and over 25 countries. Given this, and the scope of this particular study, some level of over-generalization is unavoidable, and lessons learned may not be completely applicable to all contexts. The recommendations and experiences discussed in this study are meant to be generally applicable in some form across many markets in LAC where there is a significant proportion of the population without access to W&S services. In some countries, coverage is such that many of these experiences and lessons learned will no longer be applicable; in others, such as Haiti, the gaps in coverage and financial constraints are relatively much starker than other countries, and more consideration should be taken to understand existing specific market conditions in those contexts before applying recommendations in this study.

Background on Market-based Approaches

Within approximately the last ten years, the W&S sector has become increasingly interested in the implementation of "market-based" approaches to facilitate greater coverage and access to W&S services, particularly in sanitation.[10] "Market-based" generally implies any approach or strategy that has as objective the overall enhancement and expansion of markets in some form such that the outcome is improved and more sustainable access—usually among marginalized and/or lower income populations—to a particular good or service. In general, the overall intent of focusing on local market growth is so that any gains in access to goods or services is not dependent on external financing, subsidies, and/or aid in the long-term, but instead is maintained through incentives implicit within healthy markets. For the purposes of this paper, "market-based" refers to strategies that specifically and intentionally aim to achieve long-term outcomes in W&S service improvement through approaches that strive to improve markets to achieve a particular outcome such as higher access or better service quality. In general, these types of interventions and approaches are based fundamentally on creating an environment that facilitates and encourages a market "transaction," or an improved and more dynamic supply-and-demand relationship between households and private sector providers around the buying and selling of W&S goods and services.

The primary reason for the paradigm shift mentioned above in the W&S sector was an understanding that development organizations, and in many cases the public sector, despite the best of intentions, were often distorting or undermining local markets and inhibiting the

10 "Sanitation Marketing," "Sanitation-as-a-business," and other approaches where a transaction between households and the private sector around W&S is encouraged could all be considered "market-based" approaches. The "W&S Sector" is meant to refer to all actors, including public, private, development/aid, and household stakeholders that are working to improve W&S coverage and service quality.

supply-and-demand dynamic between household customers and the local private sector through the provision of heavily subsidized W&S infrastructure. The W&S sector gradually began to acknowledge and recognize that the private sector can and has played a significant and sustainable role in the provision of W&S services in almost all countries globally, and that supporting private sector and W&S market growth among underserved populations had the potential to be more sustainable[11] than simply providing W&S infrastructure subsidies to achieve short-term outcomes.

Organizations have advocated more strongly for market-based approaches primarily because:

- It is assumed that households who are investing their own resources in W&S goods or services are more likely to value those goods and maintain them over time, given the increased sense of "ownership" people feel over goods or services they invest in directly. Anecdotally, experience has shown that in the medium and long term, W&S infrastructure provided for free and/or with heavy subsidies is usually not maintained as well as infrastructure that is purchased with investment from the actual users of that infrastructure.[12] Encouraging household investment and ownership over their W&S needs is one factor potentially influencing DINEPA's no-subsidy policy in Haiti.
- Given that households are the primary clients in a market-based model, they will have a more direct supply-and-demand relationship with the private sector provider; the provider will be more accountable to the household client, and the relationship between provider and customer will not be dependent on an external intermediary or subsidy in the long run. This more direct client-provider relationship, between demand and supply, can lead to a better level of service provision given that in healthy markets providers are directly accountable to (and often competing for the business of) their client constituents instead of an external intermediary such as an NGO or a government agency. In healthy markets, providers are incentivized to compete and provide a good or service that is appealing, affordable and meets the needs of consumers, otherwise they will lose their business and consumers will look elsewhere. In markets where there are not many providers and monopolistic tendencies prevail, service quality often diminishes and consumers have fewer options—market-based approaches seek to foster markets that have a healthy level of competition and a number of providers.
- Market-based approaches are seen to have more potential for self-scalability given that private sector providers will be incentivized to seek out and compete for new customers in order to continue generating revenue. This inherent incentive for seeking out new customers can be contrasted with a more subsidy-led model in which new customers are dependent on the funding cycles for subsidies and outside resources to seek out new households or "beneficiaries."
- Finally, for the above reasons, market-based models are generally believed to be more sustainable than heavily subsidized approaches given that markets and the private sector have an inherent longevity, while NGOs and outside aid generally have a bounded period of operation and funding cycles. Furthermore, funding decisions from external

11 Regarding sustainability, the failure rate for water systems is quite high in parts of LAC. For example, in Peru the percentage of water point failure (non-operational systems) has reached more than 65%; in Haiti and Honduras it is almost 50%, (Prado, 2015), (Smits, Lockwood, Le Gouais, Shouten, Duti, & Nabunnya, 2012), (Blanc, Bertrand, & Francois, 2012). While it is unproven yet exactly what causes this lack of sustainability, it is clear that sustaining improved water services has been a significant challenge throughout LAC. For additional water-point information and data, please see: https://www.waterpointdata.org/

12 While little quantitative research exists analyzing the subsidy- and payment-related factors influencing the lack of use and maintenance of W&S infrastructure in the long term, almost all interview respondents for this study mentioned the numerous sustainability challenges and risks of market distortion around the free provision of W&S infrastructure. In some respects this assumption is intuitive: while many people will not initially refuse something that is offered to them for free, even if it's not exactly what they wanted, there is less incentive for them to care for and use a less-than-ideal good provided for free in comparison with a good they have chosen and invested their own resources in. What seems to be a key factor around the sustainability of W&S infrastructure is a sense of "ownership," and how much ownership households and/or communities feel over W&S services (See Marks, Onda, & Davis, 2013). In this sense, it is assumed that people could feel less ownership over something that was provided to them for free, and conversely are less likely to sustain that freely-provided good in comparison with something they might choose, invest in, and consequently feel more ownership of and responsibility toward.

stakeholders could be motivated by other factors (e.g. political), which are less relevant or important to households actually utilizing the W&S service. In other words, the transactional and market relationship between household and W&S private sector supplier has much more implied longevity than that of an external source of support.

The table below illustrates some general differences between market-based approaches and more traditional[13] approaches.

Table 2: General Differences Between Market-Based and "Traditional" Approaches

Element	Market-Based Approach	"Traditional" Approach
Financing and Cost-Effectiveness	- Households invest significant amount of cost. - If households can't afford to invest, options sought out within the existing financial services market to make up shortfalls. - Subsidies applied transparently and using objective criteria only to households that truly need assistance.	- All target households generally assumed to be too poor to invest significant amount of cash, with sweat equity being the primary means of household investment. - Subsidies often applied to entire communities with little effort to differentiate between market sub-segments and their respective needs and demand patterns. - Financial services sector rarely engaged, financing shortfalls come from external sources such as NGOs, aid, etc. - Budgets less dependent on household capability to pay or invest, and more on NGO or local government funding cycles. - Less cost-effective than market-based approach given that improperly-subsidized models often include all administrative and overhead costs of managing the program.

13 Traditional approaches are not uniform and some level of over-generalization is unavoidable to illustrate key differences. Occasionally referred to as "Subsidy-driven," "Supply-driven" or "Welfare-based" models, for this paper traditional approaches will generally refer to any approach that assumes that all households currently lacking a good or service are too poor to invest their own resources and require a subsidy to cover a significant portion of costs. In many respects, it is from this well-intended but misguided assumption around household payment capabilities that market-based strategies have stemmed over the past 10 years or so, recognizing that populations currently lacking W&S services aren't economically homogenous, and universal subsidy applications to that entire group risk distorting W&S markets in the long-term, and including households who do not really need subsidies, while potentially excluding those who do

Ownership, Use and Maintenance of Infrastructure	- Households theorized to have a greater sense of ownership given their direct investment in improved services. - As a consequence of this greater sense of ownership, usage rates and ongoing maintenance assumed to be much improved. In other words, an improved sense of ownership instills greater level of household responsibility for upkeep of infrastructure. - Private sector incentivized to provide technical support on operation and maintenance of W&S infrastructure as needed.	- High potential for a lower sense of ownership of infrastructure that is provided for free or with heavy subsidies. - Less sense of ownership of infrastructure can imply lower usage rates, as well as less responsibility taken by households for upkeep and maintenance of infrastructure. - Heavily subsidized approaches often lack sufficient training or incentives for sound operation and maintenance to occur following initial construction of W&S infrastructure.
Effect on Markets	- Large emphasis placed on encouraging and sustaining healthy market growth. Programs hinge on positive effects to local markets, including improved relationships between customers and providers, a better supply-and-demand dynamic, greater competition leading to improved service quality at a better price, etc.	- Households are often a marginalized or secondary market participant given that they are not the primary payer for goods and services, nor have as much role in decision-making, etc. - Private sector often disincentivized to take an active role seeking out household customers, instead playing more of a passive role waiting for NGO, local government, or other outside payer budget and project funding cycles.
Private Sector Involvement	- Similar to other healthy markets, ideally private sector encouraged to compete for household investment in goods and services, offering better quality at the lowest price possible. Private sector views household as their primary customer.	- Fewer incentives for competition and innovation given third party payers, private sector views local government and/or outside NGOs as primary customer, with less focus on the household and their individual preferences, needs, constraints, etc.
Sustainability	- Assumed to be more sustainable approach given the inherent sustainability incentives around profit-seeking within markets, and the overall longevity of the private sector in general.	- Given that much of the initiative can often be dependent on outside funding, sustainability is dependent often on factors outside of the market, and households often take less responsibility for sustaining original investments paid for by others on their behalf.

Scalability	- Assumed to be able to scale up on their own given market incentives that drive the private sector to continue seeking out new customers.	- Scale incentives often not included directly in the project; achieving a larger scale is usually dependent on outside factors such as NGOs or government support to directly bring projects to different markets and household customers.

Given the incentives inherent in market-based approaches that will, in theory, lead to sustainable and scalable W&S service provision, it is understandable why there has been a shift in strategic focus away from more subsidy-driven models. However, there are some counter-arguments to market-based approaches:

- While markets may be a more efficient and sustainable way for goods and services to be exchanged, it is questionable whether there is any inherent proclivity towards equity within them. In other words, markets may continue to provide goods and services in the future, but there is no guarantee that everyone will be able to afford and access those goods and services, and likely the most economically constrained market segments may be unable or the very last to obtain necessary services such as water and sanitation. In short, markets can be efficient and sustainable but are not inherently poverty-focused nor pro-poor, and it would not seem fair to support a system where the poorest market segment would likely still be marginalized and/or have to wait the longest to benefit from W&S services.
- In the short-term, markets can appear to be much less time-efficient at providing a good or service than a subsidy-driven approach. It is much more straightforward in the short-term to subsidize W&S infrastructure than to wait for the private sector to develop and begin offering products and services to different market segments. This is one of the strongest complaints of the public sector, which is incentivized to improve coverage among their constituents as time-efficiently as possible. Despite the risks of market distortion[14] and inequitable or unfair application, providing subsidized W&S infrastructure is in almost all cases more time-efficient than a market-based approach in the short-term, given the relatively longer amount of time needed to allow for healthy markets to develop, especially among marginalized and low-income consumers.
- Quality control around W&S goods and services is more straightforward in heavily subsidized approaches, as the entities providing the subsidy can have more direct say in minimum construction standards. In market-based approaches, quality is not necessarily implicit (especially in markets with monopolistic tendencies such as water service provision), and can take longer to achieve.
- Supporting market-growth is complex, and can necessitate a significant amount of creativity, flexibility and iterative trial-and-error steps to understand how best to focus efforts so as to support and not undermine markets.

Notwithstanding some of the counter-arguments above, generally market-based approaches have grown in importance primarily due to the high potential for scale and sustainability

14 Market distortion is a broad term that applies to any time a market relationship between supply and demand is "distorted" or hindered due to some outside factor (in many cases, a subsidy). Clear and healthy markets involve suppliers competing for the demand of consumers, resulting usually in the fairest price being offered for the good or service consumers in a particular market segment most want. Distorted markets can be caused by monopolies, third-party payers, subsidies or other outside factors that inhibit price signals and the relationship between suppliers and consumers such that incentives are skewed or reduced, quality inhibited, and prices often not as fair or optimized as they could be.

benefits in the long run implicit within the fostering of healthy W&S markets. While subsidies may bring about short-term change quickly, this change is usually dependent on external support in the long-term, and improperly targeted subsidies have a proclivity to lead to market distortion. Furthermore, governments and other organizations looking to support W&S coverage growth should focus their scarce resources on the populations that most need those resources; traditionally, heavily subsidized approaches have a tendency to support a large segment of households that do not need pubic resource and/or subsidy-support as much as others.

Overall, this does not mean that subsidies and market-based approaches are mutually exclusive; subsidies have a role to play especially in addressing some of the valid counter-arguments above and in assisting low-income market segments attain access to basic services. However, it is crucial that subsidies are provided in such a way so that they reach the people that most need them, and do not undermine W&S market growth.

Chapter 1. Water and the Private Sector: Opportunities and Challenges[15]

Both water and sanitation are seen as fundamental human rights under United Nations Resolution 64/292.[16] Given this, and perhaps even more so for water than sanitation considering that people will not survive long without it, the commodification of water is fraught with challenges. The idea of a commodified human right is borderline oxymoronic, and it is important to distinguish between the concept of water as a free and fundamental human right itself (i.e. everyone's right to water for consumption purposes including drinking, irrigation, domestic needs, etc.), and the concept of the cost involved with the convenience of treating and conveying that water from its source to the point of use, costs that usually involve initial capital expenses for water system infrastructure, as well as regular ongoing operation and maintenance expenses to sustain that infrastructure.

It is beyond the scope of this paper to explore the complexities of national- and international-level water resource management strategies, and best practices for integrating private sector interests within those frameworks. However, with respect to water resources, it is critical that national governments have frameworks in place for national water resource management, especially in cases where different management arrangements and usage of water resources have the potential for overlap and competing demand, such as between agricultural interests and household need for drinking water, etc. Concessions granted to private sector stakeholders for the use of public resources such as water within a business model should comply and fit within a clear and consistent national (and/or regional, district, etc. as appropriate) resource management plan or framework.

Overall, with respect to water, it is and should always be a human right, but over time treating and conveying it has a cost, which is where it can begin to be viewed through the lens of market development to better understand inefficiencies and opportunities for improvement in service quality.

Demand for Water

In economic terms, as a commodity water for human consumption can be seen as inelastic in that people are likely to need and consume a base amount, almost regardless of price. As price decreases, people could likely consume more, but the important factor around water demand is that in order to survive, all of us will need some basic amount of water, which is why this basic amount for survival is viewed as a right and not a commodity.[17] If it's taken as a given that everyone has some level of demand for water consumption to survive, one can further look at and separate the demand for water in a couple of different ways: (1) demand for convenient access to water (e.g. via a household connection); and (2) demand for treated water. The first area almost always involves some level of financial investment to construct and maintain the infrastructure necessary to convey water from source to household. Despite

15 Although water and sanitation are commonly linked together in the development sector, in the context of market-based approaches, and given some of the subtle differences between the two, they will be explored separately in this paper. Please see Table further below for some general differences between water and sanitation markets.

16 See: http://www.un.org/waterforlifedecade/human_right_to_water.shtml

17 According to the World Health Organization (WHO), between 50 and 100 liters of water per person per day are needed to ensure that most basic needs are met and few health concerns arise" (UN Water Decade Programme on Advocacy and Communication and Water Supply and Sanitation Collaborative Council, 2012). Above and beyond this necessary amount of water needed for survival, water demand tends to then become price elastic, in that even at extremely low prices, households will likely not consume more water if their basic needs are already satisfied.

water being a human right, globally it is generally customary and acceptable to pay for the convenience of having water available closer than the original source, ideally through a private household tap which is what nearly all households aspire toward in LAC. However, given that there is usually a high upfront capital investment needed to establish a water provision system, the barriers to market entry are significant for suppliers and water systems are vulnerable to monopolistic tendencies. As such, there is a strong argument for public involvement in the management of these systems. Without some public level involvement and regulation over prices, and given the inelastic nature of the demand for water, consumers can occasionally be vulnerable to extreme price changes and service quality can more easily diminish. To guard against this tendency to profiteer given that the provision of water is a natural monopoly, in LAC most large urban water systems have some significant level of public sector involvement, especially around tariff arrangements. In rural areas and smaller towns, administration of water systems is mostly private but is usually understood to be under a non-profit, community-based arrangement. The larger public sector is often involved in initial financing of capital expenses and occasionally in post-construction support, but day-to-day operation and management of the water system, including setting tariffs, is generally a more private, community-based model. As such, outside of concessions granted to private operators to manage water systems under a specific time and tariff arrangement, there is not much room in LAC for private sector growth and competition into the management of communal water provision given that community water boards usually take on this role. In most countries in LAC, the majority of the population (89%) already has access to piped water at their household, and as such most large-scale investment going forward will be toward the rehabilitation of existing and ageing water system infrastructure. Furthermore, the supply chain and technical know-how for the initial construction and rehabilitation of water provision systems is already fairly developed, the main inhibiting factor is often around appropriately conveying technical knowledge resources to water system management committees. In other words, households and water committees that represent them are very interested in having and maintaining convenient water access, but there are a few technical and financial factors that can serve to inhibit demand:

- The first, and arguably most important, factor constraining household demand for water services is lack of access to financial resources. Households can and are willing to pay tariffs and connection fees for water services, but the amount they are capable of paying is usually not enough to cover initial capital or significant rehabilitation expenses without a significant amount of time to save up funds initially.
- Although the perception is changing, in many places in LAC there is a strong expectation that eventually the government (or some outside entity) will pay for the capital construction and/or rehabilitation of water system infrastructure. While in many cases subsidization of water system infrastructure is appropriate, in LAC water system subsidies have often been applied too liberally, serving to hinder demand given that households would rather wait to receive access to a water system for a heavily subsidized price as opposed to invest their own resources.
- In some areas, a misinterpretation of the UN's declaration around the right to water has caused some to believe that water should have no cost whatsoever, including around the conveyance of that water from source to household. The financial deficit created by this misperception is often mitigated again via liberal subsidies and external aid, although on the whole this practice seems to be changing and almost everywhere households understand the need to pay something for the convenience of accessing water at their households.

For the above reasons, the main factor inhibiting demand and willingness to pay for water provision services are primarily financial constraints: capital and rehabilitation costs are usually too high for communities to cover all at once, so if they have not otherwise already saved money, their only option is to wait for and solicit outside support, either from government, NGOs, or other entities.

Water and the Financial Sector: Alleviating Constraints

Relatively recently, alleviating financial constraints is where the private financial sector has begun to play a role around supporting improved communal water supply in rural areas, and to some extent in underserved urban areas through supporting water vendors and kiosks.[18] In rural areas and small towns particularly, this is less a direct involvement of the private sector in the provision of water, and more the private sector playing a market-support function, as in this case when the (private) financial sector begins to provide loans and extend credit to water committees for the construction and/or rehabilitation of water systems. There are examples of these experiences in Guatemala and El Salvador, with financial organizations providing credit to water committees in over a dozen communities, with plans to extend credit to other communities as well based on the successes of these experiences. Extending credit to water committees is a relatively new activity in the market in LAC, as before financial service providers did not have experience providing credit for water infrastructure, and were very reluctant in some cases given their lack of experience in the area and the lack of lending capital available. In these experiences, the change occurred when

Box 1. Azure: Finance for Water Committees in Central America

In El Salvador, through the Azure program and building on an IDB-supported pilot project, Catholic Relief Services (CRS) in partnership with Absolute Options has developed a model linking up financial service providers with rural water committees seeking funding to support larger-scale repair, rehabilitation and/or expansion of their community water systems. Among other challenges, water committees in El Salvador are generally faced with two key barriers when considering large-scale rehabilitation of water systems they manage: (1) Lack of available financial resources to cover costs; and (2) lack of technical (engineering) capacity. With an understanding of these barriers, the Azure program works with financial institutions to develop loan products tailored for water committees to be used for water system rehabilitation, improvement, and expansion. These loans would be disbursed to the water committee and paid back by water system users through (a) part of the monthly tariffs collected, and (b) costs of connection fees for new water users. Initially, Azure's main activities were to identify interested financial institutions and water committees, work with financial partners to design a loan product, provide technical support to water committees, and provide linkages between financial institutions and water committees. Initially, financial institutions were hesitant to provide loans to water committees given that it was a relatively new sector for them with unknown risks, and there was a lack of lending capital from which to offer water system improvement loans. With water committees themselves, the Azure technical team supported them to structure tariffs appropriately for loan payback, as well as providing technical support on water system rehabilitation planning. The Azure technical team also supported the water committee to operate the system efficiently to reduce costs, with the installation of water meters being a key element to this work. To date, 15 loans have been issued with the average loan amount being US$ 20,000 (ranging between US$ 10,000-70,000), with the largest community receiving a loan being 1200 households. Overall, the Azure program has established an initial bridge between water committees and the financial sector, pointing to a potentially viable model that could continue to grow on its own as financial institutions seek out new water committee clients, with an end result of increased and continued access to improved water services in financially constrained communities that is not dependent on external aid support in the long term.

18 In urban areas not served by household piped connections, the private sector has stepped in through businesses selling water to households via truck delivery or kiosks to which households go to obtain water in containers. Areas where this has happened include some urban areas of Mexico; Asunción, Paraguay; Haiti; and Cochabamba, Bolivia, among others. In most LAC urban areas, populations are growing too quickly for infrastructure to keep up with demand, and there is almost always some (peri-) urban population without household access to water that has to obtain their water from elsewhere.

NGOs[19], in looking for ways to support communities improve access to water through water system construction or rehabilitation of existing infrastructure, approached private sector lenders to encourage them to consider lending to water committees. Given their lack of familiarity with lending to water committees specifically, financial institutions needed initial assistance in structuring the loans, as well how best to market those loans and link up with water committees. In addition to helping bridge the gap between the financial institutions and potential water committee customers, NGOs played a role in providing technical support to water committees to ensure some level of quality control over how borrowed funds are utilized, as well as in some cases providing a capital fund from which the financial institutions could borrow to then lend out to water committees.

Although this particular model is still relatively young, initial results are promising in that water committees (and households) are paying back loans through adjusted household tariffs, water system infrastructure is being improved, and financial institutions themselves are eager to identify new clients in the water sector. This model shows promise in that households are able to cover the significant expenses of water system rehabilitation by spreading the expense over time through loan repayments included in their tariff amount, and financial service providers are incentivized to continue alleviating financial constraints faced by water committees given the revenue they are able to generate from interest on the loans. More importantly, in this model, water committees can take more ownership over the improvement of their water systems, and the overall system has much less risk of dependence on external subsidies to maintain a level of adequate water service provision.

A key criticism of models similar to this is that lending terms (e.g. interest rates, etc.) are often too expensive for it to be a feasible model for water committees to afford—water system improvements can be expensive enough on their own, add to that the cost of servicing a loan and it can become too onerous a financial burden for some communities to take on.[20] Furthermore, most water committee loans require that the committee itself be legally recognized, and have a bank account in good standing. These requirements can be overly burdensome for water committees in some areas, and represent a potential barrier to this model that still needs to be mitigated. In many areas, especially for larger scale water utilities, it may be more appropriate to look into financial alternatives outside of traditional loan providers (e.g. banks, MFIs, etc.) such as through bonds or other water financing mechanisms.[21] MFIs or banks may provide a long-term solution to the financial constraints faced by water committees, or they may solely provide a viable intermediate step for financing, assisting some water committees; while other, more affordable, financial alternatives are developed for poorer communities that are unable to afford the lending terms in their respective financial markets.

Other challenges in the model are that it currently appears to be in large part dependent on outside entities (e.g. NGOs) for lending capital, technical support, and establishing linkages between water committees and financial institutions. At this stage, removing NGOs from the model would make it less likely that financial institutions would be incentivized to lend to water committees, that the technical know-how would be sufficient in all cases, and that there would be enough lending capital available. This reliance on NGOs opens the door to a potential longer-term role for the public sector.

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19 In El Salvador this process was supported by CRS (Catholic Relief Services) through the Azure Program (see text box); in Guatemala this process was supported by Water For People.

20 In El Salvador, the interest rates for the loans were between 12-14%. In some cases this is affordable to communities, in others the interest rates are too high for community members to afford. In other countries, if interest rates are reflective of current market rates, interest can occasionally exceed 30% annually.

21 For larger utilities, the water financing facility may be one relevant option: http://climatefinancelab.org/idea/water-finance/

Within the context of this model, which shows promise in alleviating community water committee financial constraints throughout LAC, the public sector could take some of the following actions to better support financial markets around water systems:

- Instead of using government W&S funds to directly fund infrastructure through broadly applied subsidies, government could instead consider using some of these resources to support the financial sector to provide credit to water committees and encourage those communities to seek out these financial support mechanisms, either for rehabilitation or new construction of water systems. When legally possible, a portion of public government W&S funds could be placed in a trust or similar instrument to serve as lending capital for financial institutions to be used exclusively for water system rehabilitation or expansion, with government providing less of a direct subsidy function through grants, and more assisting the financial sector to provide credit directly to water system improvement. A diminishing of direct subsidies in the form of grants would allow and encourage communities to take more direct ownership of their water systems (as opposed to waiting for subsidies for large scale repairs), and should stretch public W&S funds further and allow them to be better targeted given that they will be used to leverage community investment.
- In cases where communities can't afford the loan terms and subsidies would be appropriate to assist community members access to basic W&S services, instead of directly funding infrastructure, government could consider poverty-focused mechanisms for subsidizing the loan, such as reducing interest rates or otherwise establishing more favorable terms for communities deemed to be more in need based on objective and transparent poverty criteria.
- Government can play a stronger role around technical support, including not only support with the design, construction, management and maintenance of water system infrastructure, but also in assisting communities and water committees to appropriately structure tariffs so that revenue is covering expenses.[22] Government could also work with water committees to identify the most financially constrained households using objective criteria, in order to identify if subsidies might be appropriate for certain families.
- Government and the public sector can continue to develop additional financial alternatives, such as bonds or other financing mechanisms that are more affordable than loans in the existing financial markets, so that a range of different water committees or utilities can access financial assistance most appropriate to their context and needs.
- Leverage existing W&S service monitoring frameworks[23] and/or information platforms[24] to better understand specific financial constraints and barriers around water system management so that support strategies can be better targeted.
- Finally, beyond financial markets, government should continue carrying out basic and obvious market support functions (that affect other markets as well), such as assisting with transportation and communication infrastructure that is crucial for all markets to grow, particularly in rural areas.

Overall, if financial constraints are one of the key barriers to unleashing greater demand in the market for water system services (whether construction or rehabilitation), instead of stepping

22 In many cases throughout LAC, tariffs are not currently enough to cover ongoing operation and maintenance expenses around W&S infrastructure, let alone enough to cover eventual larger-scale replacement, repair or rehabilitation that will be needed in the medium and long term.

23 For example, SIASAR: http://www.siasar.org/

24 Such as AkvoFlow (http://akvo.org/products/akvoflow/), mWater (http://www.mwater.co/), etc.

into the market to directly pay for expenses, government could instead use resources to support households and water committees to alleviate financial obstacles via increased access to credit or other financial alternatives. Government could help committees navigate credit markets including training in financial management skills such as accounting, provide subsidies or other alternatives if loan terms appear too onerous for certain communities, and provide technical assistance to ensure water system infrastructure is both sound from an engineering perspective but also sustained financially through appropriate tariff structures.

Post-Construction Support to Water Systems

Most outside support provided to rural communities in the development and management of their water systems is during pre-construction and the construction phase itself. For the post-construction phase, communities are often seen to be more independent in the management of their water systems, including taking responsibility for resolving maintenance issues, repairs, tariffs, new users, etc. In some cases, water committees are able to manage their systems with little difficulty; however, in much of LAC there is need for post-water system-construction support mechanisms, primarily through technical assistance around maintenance, larger-scale repairs, rehabilitation or expansion, and occasionally in financial management and optimization of tariff frameworks. In many countries, there is a developing private sector around post construction support (see Circuit-Rider Model example), involving water system repair technicians, or experts in other aspects of water system management, who respond to individual water committees' maintenance or repair needs. These models have applicability throughout the region, and more support (e.g. training, assistance with business development, linkages with water committees, assistance with promotion and marketing of services, utilization of information and monitoring platforms to more time-efficiently respond to problems, etc.) could and should be provided by the public sector

Box 2: Circuit-Riders

In many markets in LAC, post-construction support is provided through what is known as a "Circuit-Rider" model, whereby water committees can consult water system technicians and experts for questions and challenges they are encountering that are beyond their capacity to resolve on their own. Within this model, the private sector plays a key role in the sustainability of a high level of service quality for community water systems, responding to community needs efficiently and effectively. In many instances, circuit-riders and water system technicians are often strongly linked to larger-scale associations of water committees, entities that provide a significant support mechanism to smaller-scale water committees when they face challenges with the management of water system infrastructure and service delivery. In El Salvador, ASSA (Asociación Salvadoreña de Servicios de Agua), and in Honduras, AHJASA (Asociación Hondureña de Juntas de Agua y Saneamiento), are two examples of water associations that utilize a private circuit-rider model for post-construction support provision to member water committees.

Water System Repair in Central America--Photo Courtesy of Paul Hicks and Catholic Relief Services (CRS)

throughout LAC to encourage the growth of the private sector around post-construction support, which should ideally contribute to a higher and more sustained quality of water service delivery.

The public sector can also better support the market for post-construction water system services by clarifying service quality regulations and better enforcing them (especially in rural areas), instilling more of a "stick" approach to water committees to ensure service quality meets established norms. Within this context, if water committees are currently providing a service that does not meet regulations and are liable to fines or other penalties from the government, they can seek out support for water system improvement through the circuit-rider model or otherwise from technicians and experts who understand regulations and can guide water committees in improvements and maintenance as needed to better meet standards. In general, clarification and enforcement of regulations around water service quality should provide a robust "stick" incentive for water service quality improvement and engagement with private sector providers of post-construction services.

Household Water Systems

In addition to the provision of community water supply, there is room for market growth in the water sector at the household level, in some markets around household water self-supply (e.g. rainwater harvesting systems or individual wells), and especially in household treatment. In the former area, the primary constraint to households accessing improved smaller-scale household water provision systems is financial, and greater access to credit accompanied by a better targeted subsidy policy could help free up much demand from households.

Regarding household water treatment systems (HWTS), much of the water that is provided to households through community water systems in LAC arrives with inadequate treatment (if any type of treatment is carried out at all). In many cases households continue to consume this contaminated water, implying that while they have the convenience of obtaining water from a tap in their household, they are still placing themselves at risk for water-borne illnesses and thus not receiving an adequate level of water service. Some households mitigate this through boiling, which while effective can be expensive and fuel-intensive. Other options are low-cost household filters or other treatment options, but in many instances the demand for these filters is still nascent and undeveloped, especially in poorer rural areas given their relative lack of availability on the market when compared with urban areas, as well as the ongoing costs involved with eventual filter or cartridge replacement. Related to this and in some areas, particularly urban, there is also a vibrant market for bottled water, as households would rather buy already-treated water than invest in the application of some form of treatment themselves. In most urban areas the market for bottled water is already quite developed and functioning well; if the provision of treated, bottled water is to be a viable model in rural or more dispersed areas, the costs of transporting the bottled water would have to be offset such that the price would likely be too unaffordable for many households to satisfy their entire water demand from bottled water. It is likely more economically viable in rural areas and smaller towns to either establish a more robust communal treatment arrangement, or rely on HWTS. Unless the quality of the source water is such that treatment is prohibitively expensive, transport costs and logistics often preclude large-scale bottled water markets from providing all of household water needs in more dispersed areas.

Given the low cost of HWTS, it is unlikely that the financial sector has a role to play in facilitating household demand for water treatment options via household loans. However, there could be some space for the financial sector to provide a loan to a water committee for a larger-scale improvement to a communal-level water treatment system, or to extend credit to a private sector HWTS goods and service provider to help expand their business.

With water committees, like the above scenario around the provision of water supply, government could support linkages between the financial sector and water committees to address water system treatment needs. For HWTS specifically, government could use public W&S funds to assist HWTS providers with marketing and promotion, to help generate greater demand and knowledge around those products and their benefits, clarify regulations and assist with quality control or standards, and/or look for means to support supply chain efficiency through improved distribution channels to disperse areas. HWTS products could be marketed in public spaces, such as health clinics or local government offices through “clean water” campaigns, for example. Given some of the challenges around treatment at the communal level, there appears to be much room for growth in the HWTS sector, but demand will need to be increased through greater awareness and marketing of the different options, especially to lower-income market segments. This demand creation can be taken up by the public sector to support the growth of the private sector into lower-income market segments, but the private sector will also have to play an ongoing role in continuing to optimize HWTS products and communicate their benefits to consumers.

Chapter 2. Sanitation and the Private Sector: Opportunities and Challenges

Sanitation has many similarities to water, chief among them their shared and mutual relationship to public health—access to and use of adequate sanitation is crucial to protecting the quality of drinking water. In addition to pollution of water sources through agriculture, livestock and other animals, poor FSM and sanitation is one of the largest contributors to poor quality drinking water, due primarily to contamination from microbiological pathogens prevalent in improperly managed wastewater or fecal sludge. The F Diagram that follows illustrates some key pathogenic pathways, and how different interventions (water, sanitation, and hygiene) contribute to creating a barrier between humans and environmental pathogens. As can be seen, in addition to hygiene, sanitation can provide a key protective barrier between humans and pathogens by blocking contamination pathways.

Routes of fecal disease transmission and protective barriers

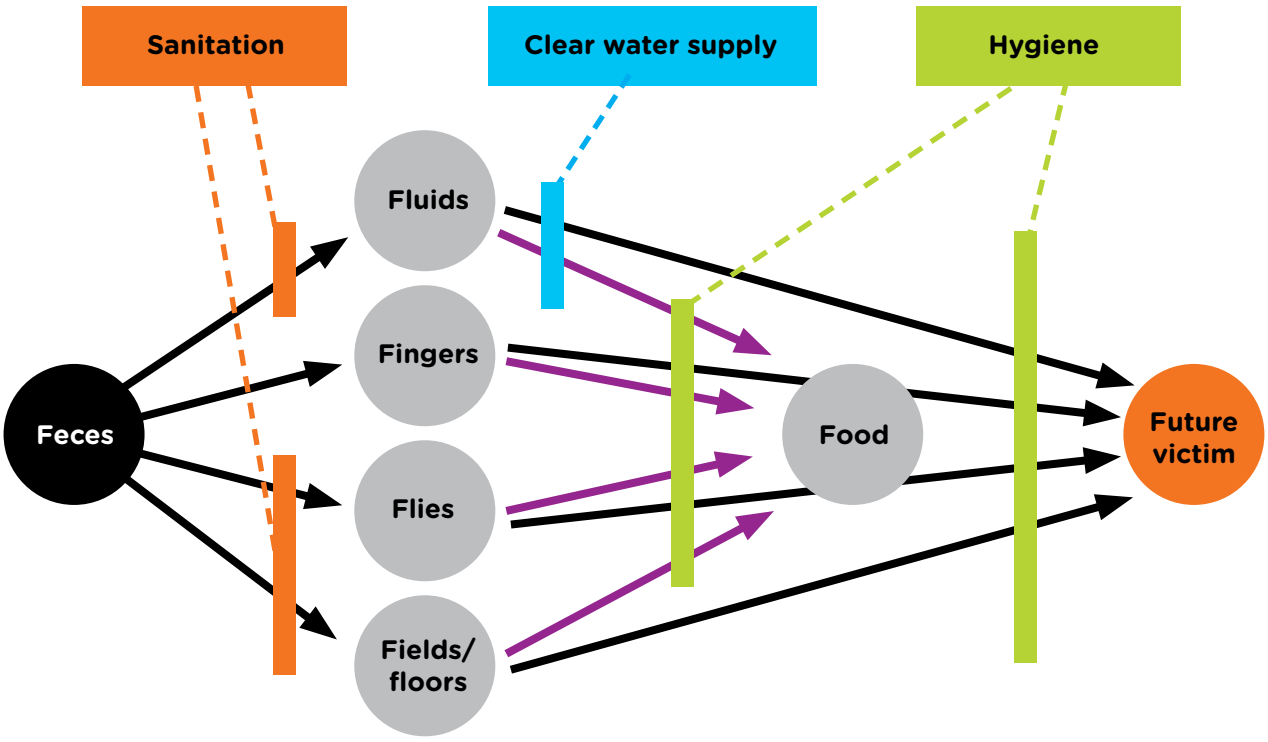

Figure 2: F Diagram showing contamination pathways and barriers (Source: World Bank)

Although there are numerous similarities, and W&S are usually combined in many projects, there are some subtle differences between W&S with respect to how their markets work and what role government might play to support the growth of these markets. Some key differences are highlighted in the table below.

Table 3: Some General Differences Between Water and Sanitation Markets

Element	Water	Sanitation
Demand Patterns	- Demand is more urgent given that there are no substitute goods for water. People are at an immediate survival risk if water needs are not satisfied in some way. - Given this fundamental survival need for water, demand is inelastic. - Communal solutions are usually the most applicable; demand is therefore often aggregated and more uniform than sanitation across communities. - Markets often segmented by types of communities, not individual households. - Not a significant need for marketing around water services, demand is already fairly established.	- Demand less urgent, given some prevalence of substitute sanitation options such as open defecation, etc. Despite public health risks and potential inconveniences, households can and have gone decades without adequate sanitation. Going without water for a significant amount of time is much more problematic. - Demand is more elastic and individualized at the household level, with more variability in household preferences for sanitation options. Motivations for improved sanitation are often more subtle and diverse (e.g. status, hospitality, convenience, pride, property value, etc.), than for water, where demand is fairly urgent, intrinsic and survival-based. - Market-segmentation by households is most appropriate given the individualized nature of sanitation decisions and preferences. - Demand is often quite latent, necessitating marketing or other demand-creation strategies to encourage households to invest in sanitation.
Supply Patterns	- Given that water is a natural monopoly, private sector engagement is often in close coordination with the public sector.	- More room for a range of private sector involvement given the diversity of potential sanitation goods and services theoretically available throughout the sanitation chain.
Finance	- Finance is often more community oriented, with any outside financial services usually provided at the community level to water committees, utilities, etc.	- Outside of treatment, finance needs are generally more household-focused, as type of sanitation infrastructure, amount invested, etc. are household-level decisions. As such, financial challenges need to be resolved at the household level.

Public Sector Involvement	- Similar to sanitation, there is much room for public sector involvement around training, technical support, providing finance when need is demonstrated, clarifying and enforcing regulations, and enabling private sector involvement when most appropriate.	- Although household-level sanitation infrastructure is predominantly a household decision, public sector can support by clarifying and enforcing a household sanitation regulatory framework, providing subsidies to households with a demonstrated need, providing technical support, and establishing a supportive enabling environment within which the private sector can offer goods and services to households. - More room for public sector engagement in the more "public" elements of sanitation such as sludge management, transport, treatment, etc.

Sanitation: Supply, Demand and Financial Constraints

From a market-based perspective, also similar to the market for water in LAC, in many respects the supply side is fairly well developed for sanitation: in most countries there are a variety of sanitation technologies available, from on-site bio-digester pour-flush toilet models, ecological sanitation options, inexpensive dry pit latrines, as well as a full range of conventional household sanitation infrastructure designed to connect to an existing sewer network. In some cases, such as geographically isolated rural markets in lower-income LAC countries, the supply chain for sanitation is still poorly developed and there is room for business development and technical support to providers in order to improve the supply side. In most markets however, the chief barrier between households attaining a sanitation solution they aspire to is financial.

On-Site ecological composting toilet and bathroom purchased with loan in Bolivia – *Photo Courtesy of David Sparkman*

This barrier is often amplified, primarily among lower income market segments, due to improperly targeted subsidies for household sanitation infrastructure. These subsidies come either from national, subnational and/or local government or outside organizations, but throughout the LAC region over time a well-intended but often-poorly targeted subsidy policy has generated entrenched expectations among many poor households that the government or some outside organization will eventually provide latrines or some sanitation facility to them for free, or nearly free, through subsidies.[25] These subsidies in

25 The deleterious effects of poorly targeted subsidies on sanitation markets was something mentioned by all people interviewed for this study.

the past have been applied to entire communities, with little effort to differentiate between and segment households to identify consumers that truly would need a subsidy vs. those that are able to afford a sanitation solution on their own or through a loan. Communities or households are sometimes selected for reasons not rooted in poverty or need, causing occasional distrust, confusion and skepticism among poor households around sanitation investment. Furthermore, this free or heavily subsidized household sanitation infrastructure in many cases isn't maintained properly over time, and when things fall into disrepair, even if households have the financial means they will often wait for the next subsidy instead of taking the initiative on their own to invest in repairs or improvement of their sanitation facility. This lack of initiative often exhibited around sanitation improvement typically points to households not feeling a sense of ownership or individual responsibility for sanitation. In recognition of this, as with DINEPA in Haiti, over the last few years NGOs and governments in LAC have begun diminishing or eliminating subsidies for sanitation infrastructure in favor of strategies that leverage more household investment in their own sanitation. The assumption is that if households are investing their own resources in sanitation, they are much more likely obtaining something they truly want and will care for and maintain over time, and public funds could be stretched further to cover a greater number of families if household finances can be leveraged for investment in sanitation.[26] Whether or not increased household investment in sanitation will alone lead to greater sustainability of sanitation infrastructure has yet to be shown conclusively; however, a too-liberal application of subsidies has created expectations and served to inhibit demand for sanitation in many markets among households that could still afford to pay for services on their own.

Therefore, possibly to a greater degree than in the water sector, the expectation for household subsidies around sanitation infrastructure has hindered demand among a segment of the population that doesn't currently have services, could likely afford them, but is reluctant to invest given an expectation for a subsidy. This expectation, and the inhibited demand for sanitation that accompanies it, causes the private sector to gravitate toward primarily designing options for market segments with more economic resources. In the past, if the private sector were to have responded to lower income market segments, it was usually through an intermediary outside payer such as local government or NGO subsidizing construction. In this arrangement, the main customer interacting with the private sector was not households, but whoever was paying for the sanitation infrastructure. This dynamic has an unhealthy effect on supply-and-demand relationships, taking the decision-making power out of the hands of households, and often making it even less likely that households are receiving something they truly want, even if provided for free.

To help break this pattern, NGOs have begun focusing on supporting market-based models that leverage household investment for sanitation, instead of directly providing subsidies for household sanitation infrastructure. This shift is still incipient in LAC, and there are still cases of sanitation infrastructure being provided for free given the perceived short-term time-efficiency and political capital possible from the provision of subsidized W&S infrastructure, but there are positive signs of change. This change has generally involved a few different activities:

- Encouraging NGOs and local and national governments to stop directly subsidizing sanitation hardware, and to develop models that involve leveraging household investment (not only sweat equity, but cash) in sanitation so as to better enable a healthy supply-and-demand dynamic between households and providers.[27]

26 As mentioned above, much of the evidence reinforcing this assumption is anecdotal and has not been backed up by rigorous research methods such as RCT-based evaluations, etc. However, experiences have been significant enough to influence DINEPA to try this approach in Haiti, and all people interviewed for this study mentioned that a refinement of subsidy policies is something they have advocated for in many of the areas they are working in throughout LAC.

27 DINEPA in Haiti is one key example of a government entity adopting this shift around subsidies, the incentive-based model in Villa Rivero, Bolivia (described in the following section) is another.

- Promotion, marketing and other demand-creation activities that simultaneously inform households about changing subsidy policies (so they won't continue to expect and wait for subsidies) and attempt to promote the uptake of improved sanitation not for health reasons (which has often been shown to be a poor motivator for households), but for reasons around status, hospitality, and home value, among other incentives and motivating factors particular to different sanitation market segments.
- Identifying opportunities for the financial sector to alleviate household financial constraints around sanitation through sanitation loans and thereby increase demand.

Box 3: Water and Sanitation Credit in Peru, Part 1: Agualimpia

An important experience to highlight around sanitation lending is that of the Peruvian NGO Agualimpia and their partners, where over the last few years over 25,000 in peri-urban areas like Lima have taken out loans for improved sanitation as part of the program. Prior to this program, numerous households faced financial constraints and did not have the money on hand or other financial options available to assist with investment in connecting to sewer networks through improved household sanitation infrastructure such as toilets, pipes, plumbing materials, and other sanitation-related products. To help alleviate this financial constraint, Aqualimpia worked with Peruvian Microfinance Institutions (MFIs) to design a sanitation loan product for inclusion within their overall portfolio of financial services, targeting households that were interested in improving their sanitation but were too financially constrained to do so without access to credit. Agualimpia supported their MFI partners to develop the sanitation loan products, including assistance with marketing strategies and messages, linking MFIs with potential customers, and establishing loan terms that were affordable to households, economically viable for MFIs, and did not distort financial markets. Households received loan funds directly, and were able to utilize the funds to invest in sanitation infrastructure that most suited their needs and interests, from providers of their choosing. Throughout the program, Agualimpia verified that households who took out sanitation loans used the funding to invest in improved sanitation, and loan payback rates have been very positive overall. Loan amounts averaged near $3000, often including other home improvement projects beyond just the bathroom. To qualify for a loan, households had to show income over 12 months, be in good standing with the national credit bureau, as well as other requirements. The key success with this program is not only that it far surpassed, by more than ten-fold, the original goal of 2000 households accessing credit to invest in the improvement of their own sanitation, but that MFI partners are continuing to offer loans and seek out new clients, even after Agualimpia has exited the project. This project illustrates a model whereby a previously under-served and economically constrained market segment was able to invest in improved sanitation, and where there is a high potential for additional households outside of the original project to invest in improved sanitation given that the MFIs, on their own, are seeking out new potential customers to offer loans to. Overall, this experience offers an example of how an external entity such as Agualimpia can positively intervene in sanitation markets to initiate a process that will continue to grow on its own and be led by MFIs interested in identifying new customers for sanitation loans, resulting in continued spread of improved sanitation coverage without continuous external involvement. Agualimpia has helped identify a key barrier between households and sanitation services, and the removal of that barrier through MFI participation in sanitation markets has helped households invest in improved sanitation and initiated a sustainable process where the financial private sector will continue to spread service and bridge financial gaps that previously existed between households and sanitation goods and service providers.

It is in this last area that many of the developments around sanitation market-based strategies in LAC have established a market entry point: working with the local financial sector to provide (micro)

credits or loans to households for investment in sanitation infrastructure.[28] In some cases these loans are for household infrastructure to connect to an already existing sewer network, in others the loans are provided to households to purchase some type of on-site sanitation system available on the market and to which they aspire (such as pour-flush bio-digester models), but haven't been able to afford without some form of credit. Across LAC, tens of thousands[29] of sanitation loans have gone out to lower income households and allowed them to overcome financial constraints in order to invest in an appropriate improved sanitation option that meets their needs and expectations. As the assumption goes, unlike a latrine or bathroom provided for free, because households have invested their own resources in this particular sanitation solution, they are much more likely to maintain and even upgrade over time, helping to sustain improved access to sanitation among populations who before were using an unimproved option.

Before: Example of household latrine often found in peri-urban areas in Peru. – *Photo Courtesy of Water.org*

After: Example of improved bathroom funded by sanitation loan in Peru. –*Photo Courtesy of Water.org*

In most of these models working with micro-finance providers on sanitation loans, and similar to the market for water, the primary role of the NGO has been around technical support and establishing linkages between household customers and credit providers. Somewhat different from water, NGOs have often played a key role in marketing and demand creation around sanitation loans, communicating to households that sanitation micro-credits offer one of the most viable mechanisms for obtaining the bathroom they aspire to have (especially in the absence of subsidies). In some cases NGOs have often assisted with lines of credit and even guarantee funds to help minimize the risk perceived by financial institutions in entering a sector they are very unfamiliar with, but in almost all cases financial institutions have seen such positive results that they are providing sanitation loans from their own capital resources. Moreover, going forward, financial institutions have expressed willingness to continue offering sanitation loans to new

28 Some notable examples of experiences with sanitation and micro-credits in the LAC NGO sector include Agualimpia's and Water.org's experiences in Peru (See Boxes 3 and 4), and Water For People's experiences with sanitation loans in Nicaragua. In both of these experiences, micro-finance providers have expressed high satisfaction with the lending model, and state that they will continue promoting and offering sanitation loans to new households even as NGOs withdraw from the project due to changes in their own budget cycles.

29 Solely based on figures from organizations surveyed for this study, over 30,000 sanitation loans (and counting) have been provided to date across LAC.

Box 4: Water and Sanitation Credit in Peru, Part 2

Over the last three years, Water.org has been working with three different financial institutions in Peru to provide household water and sanitation loans in peri-urban Lima, and towns and cities in the north and central mountain regions, in both peri-urban and rural areas. To date over 4000 loans have been provided by Water.org's financial institution partners, with projections estimated between 25,000-40,000 in the next few years. Prior to the start of this program, financial institutions were unaccustomed to providing financial products around water and sanitation infrastructure, so much work was supported initially by Water.org to assist financial institutions develop the water and sanitation loan product, including assistance with marketing and demand creation, linking financial institutions to customers, and technical assistance, among other areas of support to help initial market growth around the new financial product. Financial institutions bought into the model initially by providing their own lending capital from the very beginning. This model is unique in the flexibility it provides: households can use funds to invest in their choice of water or sanitation improvement options available in the market, from connecting to existing water and sanitation infrastructure, to sanitation solutions such as bathroom upgrades or toilets with on-site septic tanks, to other household-related water infrastructure such as storage tanks. Repayment rates are at 100% currently, and despite it being a new product for them in the beginning, financial institutions are initially pleased with the model, their new customers, and are interested and incentivized to continue offering additional water and sanitation loans. Households who before did not have adequate water and sanitation services, and did not have financial options available to them, have been able to invest in improved water and sanitation services thanks to this loan product. Water.org has plans in the future to share the experience and model with other financial institutions in Peru, who have the potential to extend the model to other markets. In addition to not providing lending capital, Water.org also does not subsidize interest rates so as to avoid market distortion--interest rates are consistent with market interest rates for other financial products in Peru, currently at around 32% annually. Roughly half of the loans that have been granted are for sanitation products at an average of $586 per sanitation loan; the other half are for water-based improvements, with an average of $1470 per water-related loan (please note that this average is skewed somewhat as it also includes other home improvement expenses not directly related to water services). Currently the public sector plays a minimal role in this model, but there will be future needs as the model scales up for increased support around demand creation and in bringing additional financial institutions on board, pointing the way for a possible long term role for the public sector (this role is currently being filled, using external support, by Water.org, but plans are in place next year to invite the public sector to forums and workshops to explore what role they could play in expanding the model in the long-term). While there will still be households who will not be able to qualify for a loan under current requirements, this model has allowed a previously underserved market segment that does qualify for credit to take ownership of the decisions for how best to improve their water and sanitation services; and given the interest from the financial sector in the model, has much potential for additional scaling up and growth throughout Peru and possibly as a model to replicate in other countries as well.

customers, using marketing techniques and strategies originally designed with the support of NGOs but now being implemented on their own. Some elements that made these experiences successful include tying in sanitation loans with home improvement loans, allowing both households and financial institutions the opportunity to relate sanitation loans to a product they were already familiar with. As such, when assessing lending risk for sanitation loans, financial institutions were able to use similar criteria used in general home improvement loans.

Sanitation: The Role of the Public Sector

Despite the initial promising results, the sanitation-lending model is still young and has yet to expand significantly to other markets outside of pilot initiatives without the help of NGOs. Similar to water, this dependency on NGOs to initiate and expand the credit model points to a potential role for government. To help the growth of the market in the context of sanitation loans, government and the public sector could:

- Help to establish linkages between potential sanitation loan customers and financial institutions, including assistance in marketing loan products and promoting household sanitation generally. This promotion could be "carrot-based" (i.e. providing incentives to households through subsidized sanitation loan terms, etc.), or "stick-based" via increased enforcement of household sanitation regulations that would encourage households to invest in appropriate sanitation infrastructure using new financial products being promoted around sanitation.
- Provide technical assistance to households and the private sector around different sanitation options that are both affordable and meet government sanitation regulations.
- When the legal framework permits it, establish a specific sanitation capital fund from which financial institutions could draw or borrow from in order to increase their own lending capital for sanitation loans.
- As DINEPA is carrying out in Haiti, refine and clarify sanitation subsidy policies at the national and/or local levels, including policies and protocol (such as objective and transparent poverty classification criteria) to better identify households that truly need sanitation subsidies, and those that can afford sanitation infrastructure on their own or through a sanitation loan. Moreover, governments should take steps to instill this subsidy policy across districts so that sanitation subsidies and the promise of free W&S infrastructure is de-politicized, and that households have a clear understanding of how, when and under what circumstances W&S subsidies are available.
- As with water services, utilize information management systems to better understand and segment different household financial constraints so as to improve and better target financial support mechanisms such as subsidies.
- For sanitation loans specifically, if there are households that have expressed demand for a sanitation credit product but do not necessarily qualify under the stipulations of the particular financial institution's lending criteria, or are unable to afford the cost of accessing the loan given high interest rates[30] and terms, governments could take steps to mitigate and diminish the perceived risk to financial institutions of lending to households in this segment. Identifying households that do not qualify for sanitation loans and do not have sufficient income to invest their own resources could indirectly be a way for government to effectively classify households that should receive government assistance for sanitation in the form of a subsidy.

Overall, in the last few years, NGOs and financial institutions have made great strides in expanding credit access to households for sanitation infrastructure, alleviating financial constraints and supporting market growth among market segments that had previously not been able to access improved sanitation services. To continue this growth and capitalize on the financial sector's interest in expanding their sanitation-lending portfolio, government could play

30 In Peru, interest rates for sanitation loans, although reflective of market rates, can often surpass 30% annually. It is also important to highlight that sanitation loans, like most home improvement loans, do not necessarily generate additional income (like a business loan), and the "cost," through interest rates, of acquiring a sanitation loan can be too great a financial burden for households to take on, despite the ability to spread out payments over time.

a significant role in establishing linkages between household customers and credit providers, providing technical support, and better targeting public W&S government resources toward households who aren't able to access credit or other financial resources necessary to improving their sanitation access.

In the absence of credit opportunities, if local governments elect to provide subsidies to households for sanitation infrastructure, they can still be targeted in such a way that leverages some household investment for sanitation, stretching subsidy resources to be applied to more households. Instead of freely providing all sanitation infrastructure to all households in a given community, local governments can delay subsidies until a household or community has invested a certain amount in sanitation, or use subsidies to leverage more household investment than previously, in an "output based" approach to subsidies.[31] One promising example of this model is in Villa Rivero, Bolivia (See Box 5), where the water and sanitation division of the municipal government has taken a unique and innovative approach to providing subsidies to households currently lacking adequate sanitation

Box 5: Public Sector Involvement: Social Marketing and Creative Sanitation Subsidies in Villa Rivero Municipality, Bolivia

Water For People-Bolivia, in partnership with the Basic Sanitation Directive (DMSB) of the Villa Rivero Municipality, have initiated an innovative use of social marketing combined with intelligently-targeted subsidies and household incentives around sanitation. In the predominantly rural communities of Villa Rivero, households face financial constraints that in the past have made it challenging for them to invest in household sanitation. Throughout Bolivia, like in many other LAC countries, sanitation subsidies for households are common, although in most cases there are not enough public funds to cover everyone currently lacking service. In many of these situations in the past, subsidies were allocated to some households, but many are still left unable to obtain and access improved sanitation until more public funds are made available. In Villa Rivero, they began to recognize that public sanitation funds could be stretched further and cover more families if households also co-invested some of their own resources in sanitation. Instead of phrasing things in terms of "subsidies," the Villa Rivero DMSB instead created a model whereby public funds would be allocated as an "intelligent incentive" to households in the form of different bathroom items such as toilet, sink, etc. These "incentives," representing on average approximately 10% of the total cost of the bathroom, would be provided to families that had enlisted in the program, once those households had constructed an improved bathroom superstructure using their own resources, and this construction had been verified by the DMSB. To date, more than 250 households have constructed bathrooms under this model, investing between 80%-90% of their own resources, with the Villa Rivero DMSB covering the rest of the cost through the provision of bathroom products to program participants to finalize construction. Reframing the subsidy as an incentive, granted once the household has invested their own resources in the majority of their bathroom construction, has allowed for many more households to access sanitation than if the public funds were instead applied to cover 100% of the bathroom cost. Furthermore, there is a higher likelihood of sustainability in this approach given that households have invested their own resources, and have been able to take ownership of the process of constructing their bathroom. Currently, there is a waiting list to join the program, and the Villa Rivero DMSB reports that between 3-5 families inquire about the program on a daily basis, so demand appears to be very strong. While better targeting subsidies is a significant challenge throughout LAC, combining a sound social marketing campaign with a restructuring of public fund allocations to incentivize households to invest their own resources in sanitation has proved a very promising model for public sector involvement in sanitation markets in Villa Rivero, and could have applicability in other similar contexts throughout the LAC region.

31 Output-Based Aid is another development strategy whereby aid is provided following the achievement of a particular output. In this case, aid in the form of a subsidy would be provided following a specified output by a household related to sanitation.

infrastructure. Instead of providing a latrine for every household, the municipal government has allowed families to sign up for a program where in return for the household constructing and purchasing materials for their own sanitation superstructure (i.e. walls, roof, etc.), they will receive technical assistance on sound construction practices; and, once construction is verified, receive the "subsidy" in the form of bathroom components such as the toilet, sink, etc. This model has shown promise in that households still feel they are getting some government support through a free toilet component and consequently political expectations are managed, and this support has then spurred them to invest their own resources in other sanitation infrastructure, catalyzing market growth and household engagement with the private sector around sanitation. Government W&S funds, instead of paying for the full amount of household infrastructure, can be stretched further to include other households and/or look into supporting other areas in sanitation such as eventual waste transport and treatment. Furthermore, as micro-credit is expanded to the area, households having difficulty investing in the superstructure can take out loans to cover those elements, still building their own superstructure and receiving the government subsidy via the toilet component. This model appears to be win-win in that households are investing in sanitation and designing a bathroom how they would like it to be, are engaged in a healthy supply-and-demand dynamic with the private sector, yet are still receiving some government support through technical assistance and a reduced output-based subsidy, all leading to an overall process whereby previously underserved households acquire improved sanitation services more efficiently and effectively.

In addition to clarifying subsidy policies, government and the public sector can do much to generate demand by clarifying and enforcing regulations around household sanitation norms. While household sanitation infrastructure is very much a household-level decision, at a minimum some norms around quality could be established to ensure that whatever sanitation infrastructure constructed at the household is providing an effective barrier between feces and humans. If households are not in compliance with these norms, a "stick" approach of enforcing regulations combined with establishing linkages to the private sector for financial and affordable technical options to lower-income households could be an effective way of generating demand for initial investments in household sanitation improvements, as well as in sustaining a certain level of service quality over time as households are incentivized to comply with established norms and standards around sanitation.

Lessons Learned in Sanitation Markets: The BoP is not Homogenous

This underscores one of the most important lessons learned around how to improve enabling factors in sanitation markets: with respect to subsidies, it is important that whoever is providing subsidies does so in a way that does not distort the market, and in a transparent manner using objective and established criteria. Well-intended as it may have been, in the past there was a tendency among government and outside aid organizations to assume that everyone that lacks access to adequate water and sanitation services were exactly the same socio-economically, and universally too poor to invest in those services. While this may be true in many cases, this misperception around those that do not have service has caused subsidies to be applied too liberally, such that anyone that doesn't currently have adequate W&S service must be too poor to afford them, and a subsidy should be applied. This has caused a large proportion of households currently without access to just assume that it is better to wait until an outside subsidy comes from somewhere to take care of their W&S needs, instead of taking the initiative to invest in improvement themselves.

What has become better understood is that the market segment currently without W&S services is not homogenous: there are segments within this broader segment that require different strategies. One segment, which could be classified as the middle or upper income segment of the BoP, could

benefit from access to micro-credit, and likely only needs a loan and not a subsidy to help alleviate some of their financial constraints by allowing them to spread capital expenses over time. However, if subsidies are applied to everyone currently without adequate service, this smaller segment will not be incentivized to seek out a sanitation loan and will wait for a subsidy. Another segment, which may not want or qualify to take out a loan necessarily, could be encouraged to save up money to eventually invest in sanitation, or benefit from a partial subsidy as in the Villa Rivero example, but in many cases members of this BoP sub-segment are currently disincentivized to save for sanitation given their expectation that eventually a full subsidy will be granted. Finally, there is another micro- or sub-segment within this broader lower income segment that will not qualify for a loan nor has enough income to invest in adequate sanitation. This BoP sub-segment, which could be classified as the poorest of the poor and is likely the 5% in LAC living on less than $1.90 a day, is the segment most in need and deserving of public support through a subsidy.

It can be challenging to identify which households belong to which segment. One way to classify households would be through poverty mapping, by which objective criteria are set (e.g. monthly income, monthly expenses, etc.) to categorize different households. Based on these categories, different sanitation financing strategies could be tailored to different segments, some offered a loan, others offered a partial subsidy, with the poorest sub-segment offered a full subsidy for basic but adequate sanitation infrastructure. Another way to segment the population is to first call for a moratorium on sanitation subsidies as was done by DINEPA in Haiti, and begin with a sanitation loan program to target households in the sub-segment that can afford and qualify for a loan. After the sanitation loan market stabilizes and becomes somewhat saturated, the households that still have not been able to qualify for a loan and/or invest in sanitation improvements on their own could be assisted with some form of subsidy. The assumption in this model is that if a household hasn't improved their sanitation, and is not in economic conditions to qualify for a loan, they are likely to belong to one of the lowest income market segments and would be appropriate receivers of a subsidy. One argument to this latter model is that it inherently forces the poorest of the poor, generally the most vulnerable and marginalized market segment, to wait longer for sanitation until they are identified. An argument against the former model is that it can be challenging to establish objective criteria, and poverty-based subsidy criteria could incentivize attempts at misrepresentation of socio-economic status as households try to qualify for a subsidy. Few subsidy policies are perfect, but what has become clearer is that too much subjective leeway in subsidy beneficiary selection has led in many cases to the politicization of public funds, and the application of a "blanket" or universal subsidy (by governments or NGOs) to all households in an area that does not currently have sanitation services. These practices hinder the development of healthy supply-and-demand dynamics between households and providers, erode a sense of ownership and responsibility that households should feel for managing household sanitation infrastructure, and overall lead to market distortion and numerous missed opportunities to support market growth through leveraging greater household investment in sanitation.

Sanitation Does Not End at the Household: Waste Conveyance and Treatment

While the expansion of sanitation loans in the financial sector in some parts of LAC has been primarily targeted toward household infrastructure, sanitation does not end with a household acquiring a toilet or latrine (see Sanitation Value Chain diagram further below illustrating the entire sanitation chain for on-site sanitation systems). Proper sanitation also involves appropriate conveyance (if not being treated on-site) and treatment of wastewater and fecal sludge.

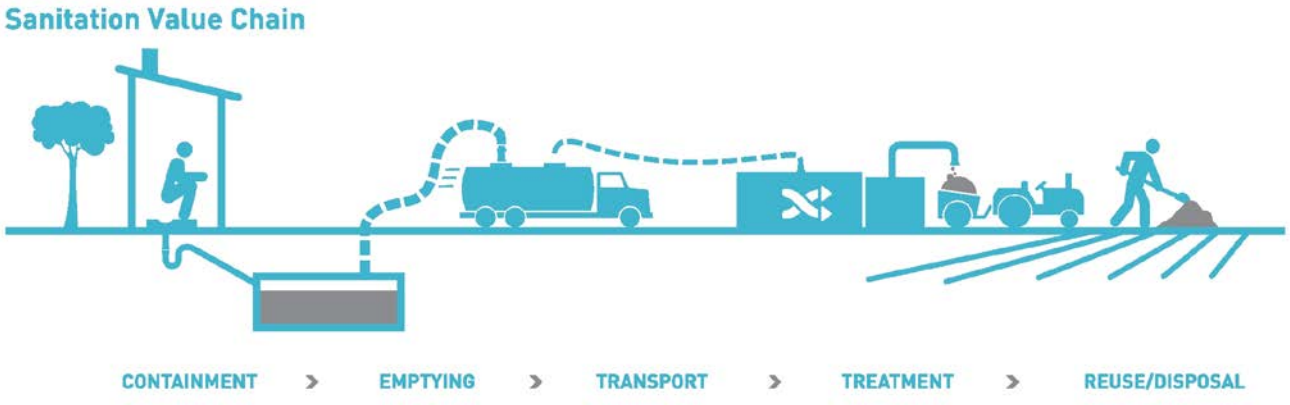

Figure 3: Sanitation Value Chain for on-site sanitation systems (image courtesy of Bill & Melinda Gates Foundation)

In many LAC urban centers, household wastewater is conveyed to treatment plants via sewer networks. These networks and treatment facilities are usually publicly run (or privately run in a concession arrangement), usually supported through a mix of subsidies and household tariffs often included within billing for water service provision.[32] In instances where the private sector plays a role in wastewater collection and/or treatment, it is usually through construction of initial infrastructure, expansion or rehabilitation of existing infrastructure, or through a concession in which a private company is managing wastewater collection and treatment services under a specified arrangement with the government. In many cases in urban areas, there is some level of public subsidization of sewer networks and if the private sector is involved, the local government or public entity responsible for managing wastewater services is the primary client, representing the collective of household consumers.

There are opportunities for private sector involvement in wastewater collection and treatment in peri-urban areas where existing sewerage infrastructure has yet to reach certain households, and potentially in rural areas under more decentralized but off-site treatment models. In some cases, such as ecological sanitation models where the household manages their sanitation facility properly, there should not be any need for waste collection or off-site treatment given that all treatment should be occurring within the ecological toilet itself. In some cases, depending on space availability, pit linings and potential for groundwater or other soil contamination, pit latrines could also be safely managed by simply covering the pit and building a new latrine over a pit in a different location. Similar to ecological sanitation, any

32 Subsidization of waste collection and treatment is often seen as less market-distortive given that subsidization of public goods is usually seen as more justifiable. Within the sanitation value chain, household sanitation infrastructure is arguably, and relatively, more of a private good, while waste collection and treatment is seen as more of a public good or service. As such, there is often more justification for government involvement through subsidies or other support mechanisms for waste collection and treatment than for financing household-level infrastructure such as bathrooms, toilets, etc. In urban sewer networks, household tariffs often go to supporting ongoing operation and maintenance expenses, while government subsidies are usually allocated to support larger-scale capital and rehabilitation expenses.

practices of covering full latrine pits and moving superstructure to a newly-excavated empty pit will likely need training and/or technical assistance to be hygienically sound and ensure against contamination. In most cases, on-site sanitation systems not connected to a sewer network will require some level of emptying at some point in time. The emptied waste would then need to be transported to a treatment facility and rendered sanitary prior to being re-introduced into the environment.

Box 6: Holistic Sanitation Service Models in Haiti and Peru

Two socially-oriented businesses, SOIL in Port-au-Prince, Haiti, and X-Runner in Lima, Peru, have initiated innovative sanitation business models that seek to respond to lower-income and traditionally underserved households living in urban and peri-urban areas. As urban centers grow and spread in LAC, water and wastewater utilities are often unable to keep up with growth, and implementation of public sanitation infrastructure (such as sewer networks) generally lags behind home construction by a number of years, if not decades, due to public resource constraints. SOIL and X-Runner are implementing innovative sanitation business models in that they are focusing not only on household sanitation infrastructure (e.g. latrines, bathrooms, etc.), but are looking at models that address demand along the entire sanitation chain, from safe containment of excreta through basic household sanitation infrastructure, to waste transport, to eventual treatment. Both businesses rely on an ecological sanitation toilet model, which are rented or leased to households. Households pay a regular service fee that covers the periodic waste collection from their toilets; waste is then transported to a more centralized location for treatment. At the treatment facility, waste is composted and rendered sanitary, and then sold for agricultural purposes. Given that the ecological toilet model and periodic waste collection processes are somewhat different from traditional sanitation models, much initial work was carried out by both businesses to generate demand and demonstrate to households that this was a viable sanitation service that was worthwhile to invest in. After a few years, SOIL is serving over 2,000 people, with X-Runner serving over 3,000 people, all using their toilets and waste collection services, with a high level of customer satisfaction and continued payment for services. While there is still work to be done to optimize and streamline business models, as well as to potentially find a more integrated role for government if possible, both SOIL and X-Runner's respective experiences to date have introduced a novel and promising sanitation business model to address needs along the entire sanitation value chain among lower-income urban populations, that could be replicable in similar contexts throughout LAC.

Over the last few years, there are some promising examples of private sector involvement in fecal waste collection and treatment.[33] These models have targeted households in low-income urban and peri-urban areas not yet reached by city sewer services. Given the time it can take for urban W&S services to keep up with growth and demand, it could be years if not decades until city utility services are extended to these target markets, which are common in urban areas throughout the LAC region. The household infrastructure provided, rented, or sold is a basic dry ecological toilet model, which is emptied on a regular (e.g. bi-weekly, monthly) basis and then transported by vehicle or truck to a centralized treatment site for processing. The processed waste, rendered sanitary, is then sold to the agriculture sector as fertilizer and/or soil improver. In this model, primary revenue streams include household payments for emptying services and/or renting or purchasing the toilet model, as well as some limited revenue generated from the sales of the composted final product as fertilizer. These business models are still being refined and, in most cases, revenue is not enough to cover all expenses and there is still outside subsidization from the development and aid sector. However, it is possible that if enough households subscribe

33 One example of this is SOIL's work in Port-Au-Prince, Haiti; another is X-Runner's work in Lima, Peru (See Box 6).

to the service and/or the market for humanure[34]-based fertilizers grows, a break-even point could be reached and the model could prove economically viable. Furthermore, eventual dissemination of the model could encourage other entrepreneurs and businesses to explore the possibility of replicating the business model elsewhere in demographically similar markets.

If the business model can be optimized and revenue generated such that expenses are covered and profit generated without outside aid support, this would be extremely encouraging for a model in which the private sector could provide not only household sanitation services, but waste transport and treatment as well. This could have applicability for waste transport and treatment not only in uncovered, peri-urban areas of large cities, but in small towns also. Given the high transport costs and coordination challenges (i.e. septic tanks and latrine pits fill at different rates), it is unlikely that a break-even point for waste transport and treatment could be reached in dispersed rural areas without much more business development and optimization around possible economies of scale to cut costs, but this remains to be seen. Regardless, there is much precedent and a stronger argument for government subsidies for waste transport and treatment. Theoretically, while household containment of waste is extremely important, the subsequent transport and treatment of this waste can arguably have just as much impact if not more on public and environmental health, and therefore be an area in which public funds could logically be applied. From a subsidy and public health perspective, it can make more sense for governments to provide more support through subsidies to waste transport and treatment services than it does to providing households with a bathroom.[35]

Urban Sanitation Business in Haiti
– *Photo Courtesy of Sasha Kramer and SOIL*

34 "Humanure," a neologism currently fashionable in the ecological sanitation sector, refers to the agriculturally-valuable end-product of human waste rendered sanitary through composting processes. Humanure is generally deemed to be a more semantically palatable term than "composted human excreta," although there are even more appealing euphemisms than humanure employed when actually marketing the product to potential consumers given the aversion to using human waste for fertilizer within many markets.

35 Many people interviewed for this study proposed that sanitation infrastructure in households was more a private responsibility and decision, while waste emptying, transport and treatment was more of a public responsibility, with each area having different corresponding justification for financial responsibilities, i.e. households should invest more in their private sanitation infrastructure, the public sector should invest more in waste transport and treatment.

Conclusions and Recommendations

There are differences between water and sanitation markets, but in both cases, there is room for the private sector to participate more and respond to consumers in lower income market segments that currently do not have access to W&S services. Some key recommendations for actions that could be taken, ideally by the public sector but also by anyone looking to facilitate private sector involvement in W&S service provision in LAC, include:

- Understand and Segment the Market: Treating all households that currently do not have access to W&S services as the same, and all of them as too poor to invest in W&S infrastructure without assistance, has caused subsidies to be applied and offered too liberally. In economic terms, a lack of market segmentation among the poorest wealth quintiles and those lacking W&S services has often caused the inclusion of households in subsidy benefits when they don't necessarily need it, while excluding those (i.e. the poorest of the poor) who do. Sub-segmenting the overall market segment currently without access will help to better target subsidies to those that really need them, and allow for the support of other financial mechanisms for those that still have resources to invest in sanitation. In addition to economic segmentation, the market can also be segmented demographically, between rural, peri-urban and urban, as different W&S technical options may be more appropriate to particular demographic contexts. Targeting different approaches and options based on the heterogeneity of the overall BoP market segment will help minimize market distortion given that subsidies will be better targeted.
- Galvanize Household Demand: Primarily due to the expectation for subsidies but also for financial reasons, demand for improved W&S services is hindered in LAC among the segment that currently doesn't have access. The public sector and local government could take some of the following steps to help generate increased demand and facilitate W&S market growth:
    - Manage the Expectations for Subsidies: Government should take steps to improve and then clarify subsidy policies, and make them more transparent and objective. The sub-segment of the market that is capable of investing in (or taking out a loan for) improved W&S services, but currently isn't due to a subsidy expectation, should be encouraged to invest their own resources. This should encourage demand as households begin to invest on their own in improved W&S services instead of waiting for an expected subsidy. Furthermore, although potentially difficult to enforce, as with DINEPA in Haiti, governments should consider instilling aid policies (such as part of initial agreements allowing International W&S support NGOs to operate legally within their countries), which restrict the practice of NGOs providing subsidized W&S infrastructure outside of country-level subsidy frameworks, specifying who should receive support and under what conditions.
    - Help Coordinate Linkages Between Private Sector, Financial Institutions, and Potential Consumers: The government can play a role to help financial institutions develop loan products that will assist households improve W&S services. In the case of water markets, government can foster a relationship between water committees and financial institutions so that committees have access to credit for water system construction, expansion, and/or rehabilitation. In sanitation markets, government can help link households to credit providers that specialize in sanitation loans. The private sector for sanitation goods and services can also take leadership in this role; with an understanding of different credit options available on the market, sanitation providers can begin marketing those products to potential consumers to encourage them to invest in sanitation.

    - Clarify and Enforce Regulations: Governments and the public sector can clarify, in their country's context, what the regulations are with respect to the basic access that households should have to W&S services, and communicate and enforce those regulations. If a household is currently not meeting regulations, there should be mechanisms in place to encourage them to resolve this issue, either through investing their own money, taking out a loan, or applying for government support through a clear, transparent process. There should be consequences, such as fines, etc., for households or communities not complying with W&S regulations. Having a clear picture with regard to W&S regulations and knowing when one is not in compliance with those regulations should push households towards engaging the private sector to improve W&S services.
    - Understand the Customer: Market segmentation can help not only identify which households would be most in need of receiving a government subsidy, but what different households aspire to regarding water and sanitation services. With an idea of household aspirations, marketing messages and product design can be tailored accordingly. It should be the private sector doing the bulk of any marketing aimed at their potential clients, but government can help facilitate this process by reinforcing a new paradigm around the heterogeneity of the current segment that does not have access to services. With recognition of this complexity, different products can be marketed to different sub-segments utilizing the most appropriate marketing messages. Government can play a role initially in linking up the private sector suppliers with households through a better understanding of these household aspirations.
- Support the Growth of Existing Supply Chains: Generally and aside from very remote areas, the supply-side for W&S services is fairly well developed in LAC. There are already a range of W&S products and services on the market. The main barriers have generally been financial constraints and hindered demand due to subsidy expectation. What is lacking is a more in-depth understanding of the different aspirations within the market segment that currently does not have access to services. With a more thorough understanding of these market sub-segments, and with financial constraints mitigated through other mechanisms, private sector providers can better tailor options and marketing strategies to individual sub-segments.
- Provide Technical Support: The public sector, instead of channeling public water, sanitation and hygiene funds to subsidize basic infrastructure, can instead work with both the supply and demand side to improve the range of W&S goods and services on offer in the market so that different market segments have a variety of different options and prices to choose from.
- Facilitate Access to Finance: Increased access to financial services such as loans or credit will help W&S markets grow due to the injection of (lent) capital from the financial sector. Government can support this process by helping to establish linkages between households and financial institutions, as well as looking for ways to assist households that aren't able to qualify for loans.
- Acknowledge the Role of the Private Sector: In many parts of LAC, it can be difficult to mention the private sector along with water and sanitation without generating images of profiteering and monopolistic tendencies. This is understandable given some of the past events in the region around W&S service privatization. However, what should be promoted is a blend of mutual participation between numerous sectors (public, private, financial, etc.) in the provision of W&S services. The private sector can play an enormous role, but like in other sectors they will have to operate within the context of public policy. Government should encourage private sector participation and provision of W&S services, while playing more of a role to ensure quality control and that situations don't develop where monopolistic tendencies create incentives that hurt consumers.

- Support Market Growth Through Continued Investment in Transportation and Communication Infrastructure: In many respects, the challenge in obtaining W&S services (primarily in rural areas) is due to poor transportation and/or communication infrastructure. Like in most markets, facilitating communication and transportation can encourage more linkages between households and private sector providers, as well as diminishing some of the costs associated with transport to dispersed areas.
- Leverage Information Technologies to Better Link Demand with Supply: Information systems and monitoring frameworks should be better utilized to understand factors inhibiting a healthy supply-and-demand dynamic between households and service providers. For example, information systems could be used to more time-efficiently link water committees with circuit riders to manage water system challenges, better coordinate waste collection and transport, and/or better understand and quantify specific financial constraints facing customers. Government could play a key role in promoting the development and uptake of these information systems.

Given all this, it becomes clearer why DINEPA has discouraged the subsidization of household toilets in Haiti, despite the large relative lack of access to W&S services there when compared with other countries. With an understanding of the potential that subsidies have to distort and hinder market growth, DINEPA is attempting to take initial steps to manage this distortion before it becomes entrenched too strongly in household expectations. A universal policy against household sanitation subsidies may not be appropriate in all LAC countries and markets, but the key takeaway is that governments and other external actors such as NGOs need to look at how they are distorting W&S markets and hindering demand through improper application of subsidies. This market distortion has a number of effects, few of them beneficial:

- Households that don't have service currently are disincentivized to invest their own resources.
- The private sector isn't strongly incentivized to market to those that don't currently have services, seeing the government or outside NGO as the primary customer acting as payer on behalf of that market segment. The private sector, like households, will wait for subsidies to be allocated and take a passive instead of active role with lower-income market segments currently without W&S service. Overall, the development of a healthy supply-and-demand market dynamic between household customers and private sector service providers is not allowed to develop effectively.
- Given the lack of private sector involvement directly with this market segment, marketing strategies and lower-cost W&S goods and services are poorly developed and distributed. W&S providers often interact with the outside payer as the primary customer, leading often to households not receiving a W&S good or service they would likely invest in, but do not complain about because it is provided for free.
- The financial sector is not encouraged to enter W&S markets to offer loan products to households given that households would rather wait for a subsidy than take out a loan.

Subsidy policies are not the only challenge, there are a number of actions governments could take in LAC to help facilitate the growth of W&S markets, and much is dependent on individual market contexts and characteristics. Generally, however, a key step that should be taken is to carry out more thorough market research and segmentation among the BoP market segment so that subsidies and other assistance activities can be better targeted. Without a shift to better understand initial market conditions so that assistance is better targeted, W&S market growth will continue to stagnate and a large source of investment (from households) will likely remain untapped. Most importantly, a huge opportunity will continue to be missed, as the multi-billion dollar market potential in the W&S sector will continue to be in large part ignored, or at least very passively observed and engaged with, by the private sector. The private sector in large part has the

know-how and financial incentives (given the market potential) to begin offering more W&S goods and services to BoP market segments, it is primarily a matter of demand being increased through the mitigation of financial constraints, marketing that is better targeted to individual market sub-segments, and a more targeted, intelligent and transparent subsidy policy based on objective criteria that does not distort markets.

There are many relatively poor people in LAC, and this is an enormous economic problem and challenge, especially given that the majority of them do not have access to adequate W&S services. To better enable W&S market growth and private sector engagement in service provision to these poorer households across LAC, it may be as straightforward as following Haiti's lead around clarifying subsidy policy at the national level so that household demand is catalyzed, or it may likely need a different or complementary approach, but continuing with the "business as usual" of applying universal subsidies without better understanding particular market details and opportunities will not resolve the problem efficiently or effectively. The private sector is able to step up, respond to household demand and engage more in this challenge throughout LAC. It is time for the public sector and other decision-makers to better acknowledge this and work to establish the market conditions for them to do so.

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