



Microfinance in the Water Supply and Sanitation Sector in Kenya

Joseph Cook

Assistant Professor, Evans School of Public Affairs, University of Washington

Joseph Onjala

Researcher and Lecturer in Environmental Economics, Institute for Development Studies, University of Nairobi

Funded with generous support from the David and Lucile Packard Foundation

EXECUTIVE SUMMARY

This report analyzes the potential for using innovative financing mechanisms to sustainably improve water supply and sanitation in Kenya. The term “sustainable” is used in the financial sense, i.e. a lack of external donor support over the long-term, and in the environmental sense, defined in terms of watershed protection, lack of surface water contamination, and protection of scarce water resources.

We conducted a desk review of existing evidence on the use of microfinance in the water supply and sanitation (WS&S) sector; held a series of meetings with 168 households in 7 villages in Kericho and Nyando Districts of Western Kenya; interviewed independent and State water providers, and other key informants. Our results should not be interpreted to be representative of Kenya, although some of the main findings are supported by other evidence and by literature in the water and sanitation sector. We also conducted a more detailed analysis of one community managing the Kapekelek water system in Kericho district.

Management capacity continues to be a problem in many small water systems in Kenya. Improved access to financing would undoubtedly be helpful to many of the better-managed systems, but lenders should extend these loans with an eye toward the types of management failures common in the WS&S sector.

Water tariffs in many rural and small-town systems are too low, and most connections are still unmetered, preventing many systems from recovering operations and maintenance costs, let alone service debt on expanded or improved systems. Unfortunately, many customers are accustomed to unrealistically low tariffs and expect government subsidies. Shifting public attitudes on tariffs is difficult but would be facilitated by requiring active community participation, which will also serve to inform communities about the true costs of water infrastructure and mobilize support for higher water tariffs.

Household “retail” loans, including group lending, appear promising for water supply. However, there are very few cases in Africa of ongoing programs that lend for improvements in water supply without external donor support.

The case for retail loans for sanitation is less clear. Most of the failures observed in microfinance have been in sanitation programs. Though simple pit latrines are inexpensive in rural areas, these households may wish to borrow for more durable, hygienic toilets however.

Community-based lending in WS&S may help predominately middle-class consumers and not the rural poor, though this is not necessarily a problem. There may well be poor rural villages which are willing and able to pay both O&M costs and debt service. These villages can identify themselves to MFIs through a well-crafted borrowing arrangement. In many cases, however, it may be relatively better-off communities or households who are most interested in using microfinance to improve their WS&S situation.

Improving access to water supply, not environmental sustainability was the predominant concern among households, NGOs and government officials. Throughout a number of meetings and interviews, environmental “sustainability” concerns were rarely raised spontaneously. Water availability, driven by seasonal rainfall patterns, was very often a concern but was rarely linked to upstream watershed protection.

Potential roles for donors interested in microfinance in WS&S

- Support communities in developing project proposals in the framework of existing programs (like the K-Rep program), or MFIs in learning how to perform “due diligence” for community-based lending.

- Support programs for household “retail” lending to extend household connections, perhaps through capital subsidies for the largest, most capital-intensive infrastructure elements (i.e. water and sewer mains). In sanitation, donor support could also be used to cover “software” costs of hygiene education programs which stimulate demand for toilets (like the Community-Led Total Sanitation program).
- Support more careful third-party program evaluations of pilot projects. Anecdotal evidence from these programs, often written by the implementing NGO or agency, does not provide sufficient evidence to design strategies for scaling up this approach.
- Rather than directly capitalize MFIs or subsidize interest rates, subsidize capital costs for projects through a coordinated approach like the Global Partnership on Output-Based Aid (as in the K-Rep program), National Challenge Funds, Water Services Trust Fund, or the Africa Water Alliance (AfDB). These capital subsidies should be scarce enough not to crowd out financing.

Tanvi Nagpal

Director, Water and Sanitation Initiatives

Global Water Challenge

May 2009

Table of Contents

Introduction.....	1
Defining terms.....	2
Environmental sustainability.....	2
Microfinance.....	4
Improvement.....	5
Kenya: sector background.....	6
Water and sanitation sector.....	6
Microfinance sector.....	7
Existing Evidence on Microfinance in WS&S.....	8
Observations from existing studies.....	13
The K-Rep program in Kenya.....	14
Measuring or scoping demand.....	14
Description of fieldwork.....	15
Key questions.....	18
Question 1. Is access to finance the main constraint to improving water and sanitation conditions in Kenya? What are some of the other major constraints that water systems are facing?.....	18
Management capacity may continue to be a constraint in community-based lending.....	18
Water tariffs in many rural and small-town systems are too low.....	20
Many connections are unmetered.....	21
Question 2. How important is “environmental sustainability” to households and communities?.....	22
Question 3. What types of “innovative financing” seem to be the most promising for the Kenya WS&S sector?.....	23
Household “retail” loans, including group lending, for water services appears promising.....	23
The picture for household “retail” loans for sanitation is less clear.....	25
Lending to communities: designing a well-crafted borrowing “deal”.....	25
Community-based lending in WS&S may help predominately middle-class consumers, but this is not necessarily a problem.....	26
ACKNOWLEDGEMENTS.....	28
REFERENCES.....	29

FINAL August 4, 2009

DO NOT CITE OR QUOTE WITHOUT PERMISSION OF AUTHORS

Introduction

One approach to improving water and sanitation conditions in developing countries that has received a great deal of interest in the past five years is the use of “microfinance” or “innovative financing”. The underlying premise is that the principal constraint to improving water and sanitation conditions is a lack of access to capital. There has been a great deal of external investment in the water supply and sanitation (WS&S) sector in developing countries over the past fifty years with only limited success. Proponents of “innovative” financing argue, however, that because much of that financing came through corrupt and inefficient national or state bureaucracies, it was wasted or poorly-invested. Microfinance, they argue, has the potential to reinforce “demand-led” development principles (where community’s preferences take precedence in planning decisions), to reduce the amount of money lost to corruption, and to open up more direct channels between savers (both foreign and domestic) and communities, households and businesses who need capital for water & sanitation improvements. These represent both “quantity” effects (opening up new pools of capital for WS&S investment) as well as “quality” effects (capital is targeted and used more effectively).

This report was commissioned by the Packard Foundation, through Global Water Challenge, a coalition of 24 firms, foundations, government agencies and NGOs. Our main objective was to analyze the potential for sustainable borrowing opportunities to improve water supply and sanitation in Kenya. We mean “sustainable” here both in the financial sense (i.e. a lack of external donor support over the long-term) and the environmental sense (defined in next section).

More specifically, we attempt to shed some light on the following questions:

- Is access to finance the main constraint to improving water and sanitation conditions in Kenya? What are some of the other major constraints that water systems are facing?
- How good is the evidence to support expanding microfinance in the WS&S?
- How important is “environmental sustainability” to households and communities?
- What types of “innovative financing” seem to be the most promising for the Kenyan WS&S sector, and what can we learn about experiences in other countries? What are the constraints to expanding the use of this innovative financing?

The report is organized as follows. We begin with a definition of terms and then review the existing literature on microfinance in the WS&S sector. We then provide a brief primer on both the WS&S sector and the microfinance sector in Kenya¹. We then describe our fieldwork and data collection for the study: over a period of five weeks, we held a series of meetings with households, water providers, and key informants, and conducted a limited number of household interviews in two districts in western Kenya (Kericho and Nyando Districts). We then present our thoughts on the questions posed above, interspersed with brief summaries of some of our fieldwork findings. The full household questionnaire used in the survey, summary data tables, photos from the projects sites, and a full writeup of the fieldwork in Kapkelek village are presented in appendices (available upon request).

¹ Throughout the report we report figures in local currency. The exchange rate in November 2008 was 1 US\$ = 80 KSh.

Defining terms

Environmental sustainability

We define environmental sustainability in the WS&S sector through three primary areas: watershed protection, surface water contamination, and water availability. Watershed protection involves managing the use of the area upstream of the water source. Many countries face increasing pressures from populations to settle in upland forested areas (see Box 1). This population growth can accelerate deforestation, either for timber or fuelwood, or to clear land for agriculture or livestock grazing. Protecting this vital part of the ecosystem can involve moving people out or arranging a system where beneficiaries of watershed protection practices pay those in upland areas for implementing those practices. This “payment for ecosystem services” approach has been successfully implemented in several places, including Costa Rica (Miranda et al. 2003) and India (Agarwal et al. 2007), and is currently being piloted in the Eastern Arc Mountains in Tanzania². Kenya is currently facing the issue of large-scale re-settlement in the Mau Forest, a large forested region that had been protected before 1990. It is one of Kenya’s five “water towers”, draining water that serves 5.5 million people and forming the headwaters for 13 rivers, including the economically-important Mara River³.

Programs that use payment-for-watershed-services deserve further attention. African countries in particular could benefit from more pilot studies of the approach, given that climate change is expected to decrease water availability across much of sub-Saharan Africa (Kurukulasuriya et al. 2006; Brown and Hansen 2008). We felt, however, that examining PWS programs in Kenya were not feasible given the time constraints of this study. The process of establishing a market for ecosystem services between upstream and downstream communities requires that a) the hydrology must be well-established scientifically and communicated to the communities by a credible third party, b) that community leaders must be allowed time to build support for the program among downstream users (who must now pay for something they have always considered free), and c) that a negotiation process identifies the proper system of practices and payments. All of these steps require time and patience on the scale of years, not months. In addition, it is not immediately apparent how microfinance would be used in a PES context. Again, though, supporting such pilot schemes could be a very useful contribution for a foundation interested in water and environmental sustainability.

The second major environmental sustainability component in water supply is one of the oldest environmental problems: surface and groundwater contamination. Water pollution impacts household water availability in that it is expensive to treat contaminated surface water. Pollution can be biological (usually from human wastes draining into streams due to open defecation, shallow pit latrines in floodplains, large tourist lodges dumping untreated sewage, or other poor sanitation practices) or chemical. In the Nyando district of Kenya where we conducted much of our fieldwork, large sugar cane refineries are thought to pollute the readily-available surface water⁴.

The third element of environmental sustainability is water quantity or availability. This is obviously difficult to generalize across east Africa, across Kenya, or even within regions as water availability is a function of the hydrology of the locality. For the most part, we suspect that improving access to safe water in rural areas or small towns will have a negligible impact on this element of sustainability: the total amounts extracted are

² See <http://www.tnrf.org/node/8852> and <http://www.worldwildlife.org/science/fellowships/fuller/VWFBinaryitem6982.pdf>

³ “Millions of lives and billions of cash are under threat in the Mau”, The Daily Nation, [November 29, 2008](#)

⁴ We should note, however, that we did not interview staff at the refineries about effluent treatment nor directly test water quality. The local perception, however, is that the river is heavily polluted downstream of sugar refineries. This would not be surprising given evidence from other countries: see 2005

probably too low (unlike large urban water systems or irrigation schemes). Nevertheless, we suggest below that metering connections and setting appropriate tariffs is still important not only to ensure the financial sustainability of providers but also to send the proper economic signal reflecting the local scarcity of water. There may also be the potential to use microfinance to fund innovative schemes for increasing water availability in arid regions using small dams and impoundments to encourage groundwater recharge. These types of schemes have been successful in arid parts of India⁵, and we met with one NGO that is implementing them in Mwingi District (see Box 2).

Box 1. Environmental sustainability pitfalls: Koisamoi Ridge

Koisamoi Ridge lies on a high plateau in Anamoi division of Kericho District with commanding views of the surrounding countryside. The Chebululu River (a year-round stream) drains the surrounding forested hills, runs through the plateau and descends as a beautiful waterfall. [The district govt is interested in the hydroelectric potential of sites like these]. The plateau has sparsely-scattered farmers growing corn and tomatoes, and many raised cattle. Unfortunately, the fields were very close to the river's edge and cattle were grazing along the banks. Furthermore, as more residents moved into the area, more forested land was being cleared for fields and grazing. These would not be considered best practices for watershed management and soil erosion control. Unsurprisingly, residents complained of siltation and decreased flow in the river.

There are already 3 small water projects in the village. All had been privately initiated by residents without outside financing. One project (a simple gravity diversion from the stream) began in 2002 and has been operational since about 2007. To finance the project, 30 households were asked to contribute 6000 KSh (1 US\$ ~80Ksh in November 2008) towards the project. The weekly savings target was 200 Ksh, and about 70% of the group managed to pay their full share of 6000, but others did not. The work of digging trenches and laying pipe was done entirely by members.

Since development in the watershed impacts many other water supply systems downstream, one might argue that the district should in fact be working out some type of payment for ecosystem services approach to limiting development or at a minimum improving management practices to move fields and cattle back from the streams as part of the bylaws of the water committee. Financing expansion and improvement of the water system at Koisamoi Ridge (as the leaders we met were eager to do) might in fact encourage more people to move the area, leading to further deforestation and less recharge. On ethical grounds, however, one might argue that existing residents should be better served but that the district should enact strong institutional mechanisms to prevent any further migration to the area.

⁵ "Sand dams: low-tech weapons against climate change". *The New Scientist*, November 16, 2006.

Box 2. Water availability: ADRA-Kenya in Mwingi District

The Adventist Development and Relief Agency (ADRA) began working in WS&S in Kenya primarily because of droughts in the arid and semi-arid regions of Kenya (mainly in Kajiado district near the Tanzanian border). They have worked in the sector for about 6 years. Although ADRA-Kenya builds some spring protection projects in wetter areas of the country like Kericho district, and some earth dams for storage, discussions with ADRA's country director at the time (George Baiden) mainly focused on projects in pastoralist semi-arid regions. In these areas, ADRA drills both shallow and deep boreholes. More interestingly, though, ADRA has been implementing projects using small-scale "check" dams, or "sand dams", which slow water enough during peak flow times to increase aquifer recharge. This in turn maintains high yields from boreholes. In addition, all ADRA WS&S projects incorporate tree planting activities in catchment areas, according to Mr. Baiden.

ADRA has used both a volumetric (per jerrican) payment mechanism (from kiosks) as well as a community-based monthly payment for their water projects. With the latter approach, the community's water management committee is in charge of collecting the monthly fee. The fee is typically levied as a certain number of cattle in pastoralist communities (which is in turn based on the number of people in a household and the total head of cattle owned by the household, making it a progressive payment system). The committee is responsible for taking cattle to market or to the abattoir to convert to cash. In either approach, water rates or monthly payments are set in a "collaborative, participatory" way with the government, the community and ADRA. Payments are used for O&M and to pay vendor operators, latrine cleaners, etc, as well as to pay for expansion. These contributions, however, do not yet fully capture operations & maintenance costs, let alone capital costs for expansion. ADRA-Kenya's operations also continue to be dependent on external support, although their goal is to move towards complete cost-recovery for project.

ADRA-Kenya has not yet used a microfinance approach for household water and sanitation projects, though they have an in-house microfinance arm. They provide loans for income-generating activities, both agricultural and non-agricultural (e.g. weaving, pressing oil, cooking stoves, etc), and reported repayment rates of 90%. Some loans have been used for agricultural water projects, though Mr. Baiden expressed interest in creating a separate microcredit "product" for water. He felt that four to five towns in Mwingi District (each with around 600-2000 residents) might be interested in borrowing to expand or improve their community water system rather than "waiting four or five years for donor money to show up". In all of these villages, though, financing would be used to "top up limited donor funds" to reticulate the system for yard taps and household connections.

Microfinance

We generally follow Mehta's (2008) categorization of microfinance activities in the WS&S sector. The first category encompasses "retail" loans to households. These can be provided as individual loans or through the group lending approach pioneered by Grameen Bank in Bangladesh. Group lending approaches typically require no collateral because each borrower in the group guarantees the loans of the others. [Group *savings* approaches leverage the accumulated savings of a group and do not require external funding: each member is required to contribute some amount of savings on a regular basis, and one member borrows money from the groups' savings pool. As this loan is repaid, another member can use the groups' savings. These are known as Rotating Savings and Credit Associations (ROSCAs) in Kenya, or colloquially as "merry-go-rounds".] The group-lending approach is most commonly targeted to women's groups. These "retail" loans have typically been used for income-generating activities like purchasing equipment for a business, buying animals, etc., although we found several respondents in Kenya who were borrowing money to pay for school fees or for home repairs. In the WS&S sector, these retail loans could be used to purchase rainwater storage tanks, build latrines or toilets, or pay for connections to an existing piped water or sewer network. Retail loans can be provided by

deposit-taking commercial or government banks and microfinance institutions (MFIs) as well as non-depository MFIs.

The second category of lending in WS&S is loans to “small and medium enterprises” (SMEs) for water supply. These “small and medium enterprises” would include water vendors (who might borrow money to purchase water tanker trucks or carts, water kiosks) or private sanitation service providers (public shared toilet operators, manual latrine cleaners, suction trucks for emptying latrines and septic tanks). The definition would also include lending to small private water supply companies, such as the Chemosit Water Company, which manages 16 rural water supply systems (described further in Box 5).

It would also include lending to public water agencies of rural systems or small towns, often called “community-based organizations”, or CBOs. The Boya water system (see Box 3) or the Kapekelek water system (see Appendix B) would be examples of this type of CBO. Small private water supply companies or communities might borrow to build new water systems as well as expand, rehabilitate, or simply maintain their existing water supply systems. Loans would be typically used for boreholes, spring protection projects, pumps, storage tanks, piped distribution networks, meters, etc. We limit our scope here to rural systems, small towns, and urban slums.

Mehta (2008) uses a third category of “urban services upgrading and shared facilities”. She describes a handful of studies so far where microfinance has been used to fund shared public toilets in Kenya and India, and slum upgrading in India, Peru and Guatemala. These programs used both household retail loans, group savings mobilization, and SME loans. As such, we prefer to focus on the former two categories of lending activities. This report will also not focus on more traditional financing activity in the WS&S sector. This would include loans to larger towns, urban systems, or national water programs. This type of financing has been common in the WS&S sector for many years as bilateral or multilateral aid (i.e. loans with subsidized interest rates) or as financing at market rates.

Improvement

Precisely because water is necessary for life, by definition everyone has access to some type of water source. A community’s or a household’s willingness to pay or borrow to improve the water supply or sanitation situation will be strongly dependent on their *status quo* condition as well the improvement being offered. This may be thought of more as a matrix of improvements with many different paths (Figure 1) rather than a simple binary “not improved” vs. “improved”⁶. For example, a community moving from situation F in Figure 1 to situation H will have a different average willingness-to-pay for improvements than a community moving from situation C to situation N.

This distinction is important when trying to understand the difficulty of measuring the scope of potential demand for microfinance in the WS&S sector. As we discuss below, the question of measuring the demand for improved water and sanitation services in developing countries is of course not new. As this earlier research has demonstrated, it may be more important to design a good set of institutional rules (or a “deal structure”) for potential loan applicants and let them self-select into the program, rather than attempt to generalize about the total aggregate size of demand for improved services. The latter – done well - requires

⁶ The Millennium Development Goals use the definition of adequate water supply from the Joint Monitoring Program (of the WHO & UNICEF, see www.wssinfo.org). An adequate supply provides a household 20 liters per capita per day, is within 1km of the house, and is from an “improved” source. “Unimproved” sources include surface water, unprotected wells or springs, vendor-provided water (including tanker trucks), and bottled water. “Unimproved” sanitation is defined as a public or shared latrine, an open pit latrine, and bucket latrines.

detailed knowledge of where households or communities are starting from in the matrix below as well as what improvements are on offer.

Figure 1. Matrix of improvements in household water supply and sanitation

	Unimproved water source (e.g. pond, river)	Unimproved water source with household-level water treatment	Improved water source <u>outside</u> the home (e.g. handpump, public tap)	Improved source delivered to household through water vendors	Improved water <u>inside</u> the home (private water connection or yard tap)
No improved sanitation	A	B	C	D	E
On-site sanitation (e.g. VIP latrine, pour flush toilet)	F	G	H	I	J
Water-sealed toilet + Neighborhood wastewater collection (e.g. small-bore or conventional sewers)	K	L	M	N	O
Water-sealed toilet + neighborhood wastewater collection + wastewater treatment	P	Q	R	S	T

Notes: Arrows show two examples of an “improvement” from a baseline status quo as illustrations. There are other imensions (namely reliability) of existing service that would also strongly determine willingness-to-pay for improvements.

Kenya: sector background

Water and sanitation sector

According to the most recent census data (1999), 76% of households in urban areas, and 36% of households in rural areas had access to improved drinking waters sources.⁷ 91% of urban households and 68% of rural households had access to adequate sanitation. A 2003 Demographic and Health Survey found somewhat higher percentages for water (79% urban, 43% rural) and sanitation (93% urban, 71% rural). Because the JMP definition of “improved” sanitation changed to exclude shared facilities, a 2008 update to the sanitation data reported that only 19% of urban households and 48% of rural households had access to private, “improved” sanitation facilities (77% of urban households use shared facilities). If the primary objective is to increase access to adequate water supply, the problem is clearly predominantly a rural one in Kenya. Lack of safe water access in urban areas is predominantly in informal peri-urban settlements. If the objective is to increase access to private, “improved” sanitation, the problem is both in encouraging the construction of latrines in rural areas as well as moving households away from shared toilets in urban areas and into private toilets connected to a centralized wastewater collection system.

The 2002 Water Act ushered in important institutional changes in the Kenyan water sector (Marcus and Onjala 2008). The overall effect was one of decentralizing management activities in the sector to move more responsibility and decision-making power to local communities. Since most of the provisions were not

⁷ <http://documents.wssinfo.org/resources/documents.html>.

enacted until 2005, however, the full impact of the reforms is not yet clear. The Act created seven regional water services boards. The Lake Victoria South Water Services Board was the relevant board for the two districts we visited for this report. Each of these seven boards is regulated by the national Water Services and Regulatory Board (a division of the Ministry of Water), which has the authority to set base water tariff structures and the responsibility for reporting the overall financial and operational performance.

To operate a water system in Kenya, a private company or community-based organization must apply to their regional board for a Service Provision Agreement. This agreement details expectations for service as well as the tariff structures, which are generally based on the structure set at the national level. Importantly, any changes to the agreed tariff structure must be approved in advance by the regional board, and must be justified. This type of public oversight of utility pricing is positive in principle, but seems to be functioning poorly now in Kenya. According to the most recent report from the national Water Services Regulatory Board (WASREB 2008), 15 of the 25 water service providers⁸ could not meet operations and maintenance costs and are “likely to get into severe financial problems if performance is not improved and/or tariffs are not adjusted.” On the revenue side, both service providers and regulators seem to be facing stiff resistance to raising water tariffs and installing more meters on existing connections⁹. On the operational side, average “unaccounted for water” (water lost through leaks or illegal connections) among the 25 service providers was 45%, with some as high as 82% (Gatamathi) and 92% (Embe) (WASREB 2008).

The Act also created a Water Services Trust Fund to finance the extension of water services to poor communities. Ownership of raw water supply remains with the state (in contrast to riparian or first-in-use water rights common in the U.S.), and water users are required to pay a fee to the national Water Resources Management Authority based on the volume extracted.

Microfinance sector

According to data from the Mixmarket website (mixmarket.org)¹⁰, there are currently 18 incorporated microfinance institutions in Kenya, with a total loan portfolio of US\$745M and 1.2M active borrowers. MFIs lending activity (as a percentage of GDP) is higher in Kenya than other East African countries (Mehta and Virjee 2003), so that Kenya may represent a special case in the region because of its well-developed MFI sector. It is small and relatively nascent, however, compared to the MFI sectors in many Asian countries.

Of the 18 MFIs, seven are non-profit NGOs, seven are non-bank financial institutions, three are banks, and one is a cooperative/credit union. The three largest MFIs are banks or are in the process of applying for depository licenses. The largest MFI listed by MixMarket is Equity Bank, with 619,000 active borrowers and US\$523M in their total portfolio, followed by Kenyan Women’s Finance Trust (total portfolio US\$85M) and K-Rep Bank (total portfolio US\$81M). There are 32 microfinance funds investing in the Kenya microfinance sector (12 based in the U.S., 11 based in the Netherlands, two based in France, and two based in Switzerland).

According to data from the Central Bank of Kenya¹¹ and the IMF, average interest rates at commercial banks were 4.86% on deposits, 1.7% on savings, and 14.8% on loans (though this is likely to be a lower bound on interest rates faced by poor, unbanked households). After falling somewhat in 2002-2004, interest rates have

⁸ According to the report, there were 12 “small” providers serving between 1000-4,999 connections, 8 “medium” providers (5k – 9.9k connection), 3 “large” providers (10k – 34.9k connection), and 2 “very large” providers (>35K connections; Nairobi and Mombasa).

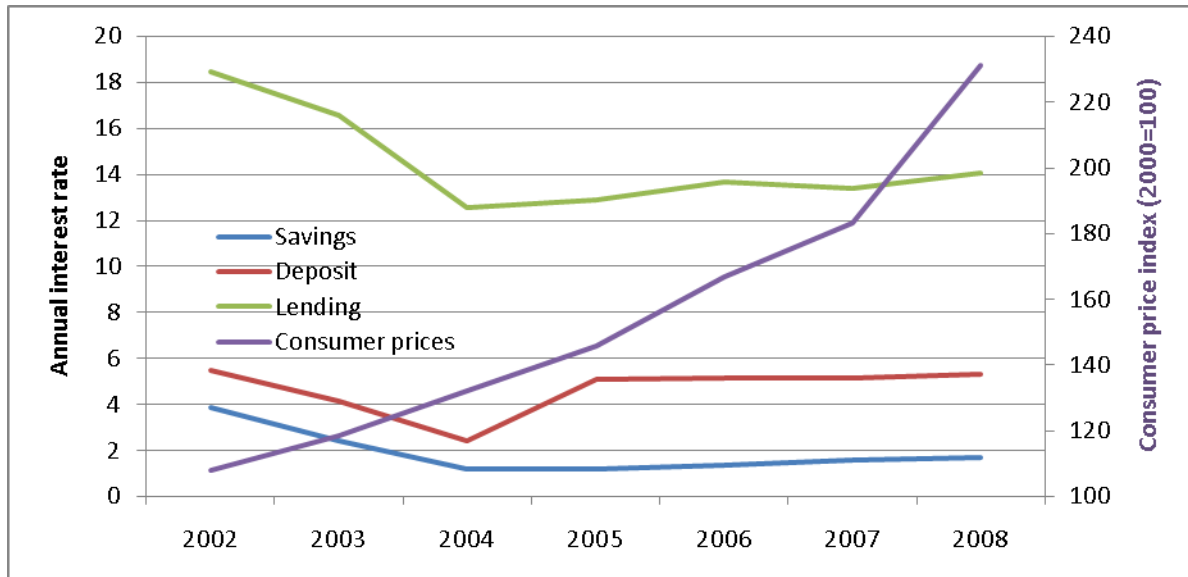
⁹ “*Rising unga and power costs are not enough, wait for your next water bill*”. The Daily Nation, December 4, 2008.

¹⁰ Accessed April 2009

¹¹ <http://www.centralbank.go.ke/> and International Monetary Fund: Int’l Financial Statistics (www.imfstatistics.org), both accessed April 2009.

been fairly steady since 2004 (Figure 2). Overall annual inflation in consumer prices, however, is currently running at 27% (as of March 2009).

Figure 2. Commercial interest rates for savings, deposits and loans, and consumer price inflation, in Kenya, 2002-2008



Source: International Monetary Fund: Int'l Financial Statistics, accessed April 2009.

Existing Evidence on Microfinance in WS&S

The best and most comprehensive source on past experiences with microfinance in the WS&S sector is Meera Mehta's (2008) report for the Gates Foundation¹². Annex 3 of the report provides a one-page description of each of 25 applications of microfinance or innovative financing in the WS&S sector, including the institutional set-ups, the loan terms, targeted groups, and external support. We abstract from Mehta's Annex 3 (Tables 3.2, 3.3 and 3.4 in the main report) and add experiences from other published sources in our Table 2 and Table 3 below, and discuss some general observations from this literature below. Examples from Africa are highlighted in yellow.

¹² The report is available at: <http://www.gatesfoundation.org/learning/Documents/assessing-microfinance-wsh-2008.pdf>

Table 1. Experience with “retail” loans to households

Country/ Program	MFI	Setting	Scale	Loan purpose	Organizational arrangement	Loan amounts	Tenure	Interest rates	External Support	Evidence of success?	Years experience	Latest info avail.	Notes	Source
Bangladesh	Grameen Bank, Bangl. Rural Advancement Committee (BRAC), ASA, Society for Social Services (SSS)	Rural	LARGE: ~1.5 M borrowers, country-wide	Boreholes & toilet construction	Loans directly from MFI to households; borrowers must belong to groups	Boreholes: US\$50-100 Toilets: US\$20	2 years	5-20%, avg. 12% for sanitation; 16% for water	None	None	12-26 (various MFIs)	1998	Boreholes since discontinued because of arsenic issues	Mehta (2008)
Vietnam	Vietnam Bank for Social Policy (govt-financed bank)	Rural	LARGE: 0.5M borrowers country-wide (3.7% of all rural households);	Water and sanitation	Borrowers must belong to savings group through Vietnam Women's Union (VWU); direct loans to households	US\$460	5 years or less	8%	None	None	3	2007		Mehta (2008)
India (Maharashtra)	Various self-help groups & district cooperative banks	Rural	LARGE: 640,000 borrowers (est)	Total Sanitation Campaign	Borrowers must be members of self-help groups or co-op banks	US\$30 (avg loan)			Capital subsidies from federal and state govt	None	5	2005	Very little documentation	Mehta (2008)
India (Ahmedabad)	SEWA Bank (co-op bank)	Urban	MEDIUM: 7000 borrowers (est.)	Water connections; bathroom or toilets	Borrowers need 2 guarantors and demonstrated savings behavior	US\$650	1 – 3 years	17%	Capital subsidies from municipal corporation?	None	5	2007		Mehta (2008), Cardone & Fonseca (2006)
Vietnam	Vietnam's Women's Union	Urban	MEDIUM: 14,000 households	Toilets; Septic tanks; communal septic tanks; sewer connections	Revolving Funds capitalized with US\$2.1M grant; borrowers must be members of savings and credit group				World Bank WSP	Found to be unsustainable once external donor funding stopped	3	2002	Demand promotion (for sanitation) in advance. Cities: Danang, Haiphong, Quang Ninh	Mehta (2008)
India	Gramalya, WaterAid; Self-help groups and commercial banks	Rural	MEDIUM: 9000 households	Toilets	Borrowers downpayment of ~US\$20; must belong to SHG				Water Aid and Gramalya; plus 12% govt subsidy per toilet	“seems to have done well in 3 of 4 locations”, difficulties in Delhi	1	On-going		Mehta (2008), Arney et al (2007)
India	Basix Bank	Rural and	MEDIUM: 5000	Water conns, toilets &	Borrower must be member of JLG				WaterPartners Int'l			On-going	Initial market	Mehta (2008)

Country/ Program	MFI	Setting	Scale	Loan purpose	Organizational arrangement	Loan amounts	Tenure	Interest rates	External Support	Evidence of success?	Years experience	Latest info avail.	Notes	Source
		urban	households	bathrooms					provided long-term financing, but no capital subsidy				research in Davis et al (2008)	
Lesotho	Lesotho Bank	Small towns, rural	MEDIUM: ~7500 households	Latrines		US\$90 (avg)			Funding from KfW, partnership with Ministry of Water and Sewerage	Many loans defaulted; Ministry stopped legal action & used a guarantee fund, worsening performance	2	2002		Mehta (2008)
Indonesia	Bank Rakyat Indonesia (BRI)	Urban	MEDIUM: 2200 households	Water connections	Borrower must place deposit (worth 3 mos. of loan payments) in savings acct	US\$250 max, US\$80 (avg)	3 years (max)	24-36%	USAID technical assistance; no capital subsidies	"Plans to scale-up countrywide"	5	2009 ongoing		Mehta (2008)
Honduras	Cooperative Housing Foundation with local NGOs and a revolving fund	Rural	MEDIUM: 1,300 households	Water & sanitation (typically water tank, wash basin & shower, toilet)	Revolving fund (capitalized with UNICEF grant); payments made to local NGOs	US\$270 (avg)			UNICEF	None		1995	Part of national program to provide loans for housing improvements	Mehta (2008), Varley (1995)
Burkina-Faso	Savings-credit initiative set up by LAGEMYAM (women's assoc)	Urban	SMALL: 28 households in initial phase, 18 households in 2nd phase	VIP latrines, soak-away pits & household solid waste collection	Loans from LAGEMYAM to households			5%	CREPA & NGO EAST helped "awareness campaign" after initial failure	Only 5 of 28 initial households repaid loans; repayment rate 80% in 2nd phase		2004?		Cardone and Fonseca (2006), Kouassi-Komlan and Fonseca (2004)
Ivory Coast	CREPA Cote D'Ivoire & SODECI (private water utility)	Peri-urban	SMALL: 300 households	Household water connections	CREPA pre-financed conn fee to SODECI; forced daily savings in partnership with a village "household committee"	US\$36			None	Repayment rate of 95%	3	2005	Funds from daily savings program used first to cover water bill, any remaining towards debt service	Cardone and Fonseca (2006), Kouassi-Komlan and Fonseca (2004)
India	Swadhaar Finaccess	Urban	SMALL; <20	Water	MFI directly lends to	US\$150			None		1	2007		Mehta

Country/ Program	MFI	Sett- ing	Scale	Loan purpose	Organizational arrangement	Loan amounts	Tenure	Interest rates	External Support	Evidence of success?	Years experi- ence	Latest info avail.	Notes	Source
(Mumbai)		slums	borrowers	connections; small toilets	borrower	for water connectio ns; \$170 for toilets								(2008)

Abbreviation key: **JLG**= joint liability group, **SHG**= self-help group, **KfW**=German Development Bank; **WSP**=World Bank Water and Sanitation Program; **GPOBA** = Global Partnership on Output-Based Aid; **AFD** = French Development Agency, **CREPA**=Centre Regional pour l'Eau Potable et l'Assainissement à faible coût.

Table 2. Experience with loans to small and medium-sized enterprises (SMEs)

Country/Program	MFI	Setting	Scale	Loan purpose	Organizational arrangement	Loan amounts	Tenure	Interest rates	External Support	Evidence of success	Years experience	Latest info available	Source
Kenya	K-Rep Bank	Small town	21 communities	Water supply	Community contributes 20% as down-payment, 40% capital subsidy from GPOBA upon completion	-US\$40K	3 yrs	16%	World Bank WSP, PPIAF, EUWI, grants for Business Development Services	Scaling up nationwide	3	On-going	Mehta and Virjee (2007), Mehta (2008), Cardone and Fonseca (2006)
Senegal	CMS (credit union)	Rural	32 communities (ASUFORS)	Water supply	Loans used by ASUFORS to meet 20% requirement for infrastructure investment	US\$200K	5 yrs		AFD	CMS reports "successful repayments"	5	2007	Mehta (2008)
Ivory Coast	Cooperative d'Epargne et Credit (COOPEC)	Rural?	1300 households	Water connections	COOPEC loans to local communities	Loans for connections at "discounted" rate of US\$40			CREPA	None	Ongoing	On-going	Mehta (2008); Cardone & Fonseca (2006)
Cambodia	Rural Infrastructure Fund by GRET	Rural	14 networks serving 18,000 persons	Water supply??	Collateral required = 200% of loan value	Approx. 15% of total \$17k - \$66k per system	3-5 yrs	14%	MIREP	None, but new project ongoing	5	2006	Mehta (2008), Cardone & Fonseca (2006)
Togo	Six MFIs in Togo	Rural	1,200 household entrepreneurs	Water Supply	Requires MoW permission for drilling; households borrow but loans made to drillers	US\$1000 - 3000		23%	None		6	2006	Mehta (2008); Kouassi-Komlan & Fonseca (2004)
Kenya	Two community institutions in Kiambu	Small town	1 (Nderu water project only)	Rehabilitate two boreholes and distr. Network	Community members (in 1992) were allowed to borrow from two schools	US\$4,500			None	Loan repaid within 6 months	1	2001	Mehta and Virjee (2003)
Benin	Various MFIs	Urban areas	Unclear, Anecdotal	Various small-scale service providers	Loans from MFIs to entrepreneurs					Interest among MFIs "for further growth", rural areas			Mehta and Virjee (2003)

Abbreviation key: **JLG**= joint liability group, **SHG**= self-help group, **KfW**=German Development Bank; **WSP**=World Bank Water and Sanitation Program; **GPOBA** = Global Partnership on Output-Based Aid; **AFD** = French Development Agency, **CREPA**=Centre Regional pour l'Eau Potable et l'Assainissement à faible coût.

Observations from existing studies

Experiences with microfinance have differed geographically. Most of the experience with household “retail” loans (Table 2) has occurred (or at least been documented) in Asia. We could find only three retail lending programs for WS&S in Africa. Globally, these retail loan programs appear to have been successful. Among the less successful projects were a revolving fund for sanitation in Vietnam, loans for latrines in Lesotho, loans for sanitation in Delhi (Gramalya/WaterAid), and loans for sanitation in Burkina-Faso (although repayment rates in this last project recovered after an “awareness campaign” by two local NGOs). It is worth noting that all four of these programs involved sanitation programs. Asian retail WS&S lending programs have also achieved a much larger scale than the few African programs, which is probably a reflection of the large scale that MFIs have achieved in Asia overall.

On the other hand, there are more documented experiences with SME or community-based lending in Africa than in Asia. Of the seven documented cases we found in this literature, six were in Africa. (There are certainly more examples of lending to small-scale private providers happening in both Asia and Africa, and some of these might be turned up with a more exhaustive search of the grey literature). In all cases, the programs were thought to be successful and were “scaling up”.

Unfortunately, most of these experiences have been described in the “grey” literature of consulting reports and background papers. There are very few studies published in peer-reviewed outlets (see Table 3). Obviously, information need not be published in academic outlets to be credible, but one should be wary of studies published with only anecdotal evidence. Surveying case study write-ups also makes it difficult to assess what conditions on the group led to success or failure (and NGOs may have less incentive to publicize failures). Indeed, a recommendation from several authors is better information-sharing about “lessons learned” (Kouassi-Komlan and Fonseca 2004; Cardone and Fonseca 2006), and the Gates Foundation hosted a meeting in June 2008 of practitioners in microfinance in WS&S with this purpose as one objective.

Table 3. Existing reports and papers on microfinance in WS&S

Author	Type*
Varley 1995	Consulting report (for USAID)
Mehta 2008	Consulting report (for Bill & Melinda Gates Foundation)
Mehta and Virjee 2003	World Bank Policy Note
Arney et al. 2007	Conference presentation
Jalvaani 1999	Newsletter
Tremolet et al. 2007	Conference presentation
Davis et al. 2008	Peer-reviewed journal
Cardone and Fonseca 2006	Background paper for report
Kouassi-Komlan and Fonseca 2004	Conference presentation

* as of May 2009; some may have been submitted to peer-reviewed outlets

Ultimately, the goal is for households and communities to be able to access financing from local MFIs and savings group without external support or concessional loans. If the business model for MFIs is sound, then evidence that they are indeed increasing their loan portfolios for WS&S would be sufficient evidence of this. It

might not necessarily be evidence, however, of whether those loans are helping the poor or are helping a region or country meet its goals (or MDGs) for water and sanitation access. MFIs may find a lucrative market in serving middle-income communities and households, a point we return to at the end. We would also point out that MFIs who are successfully serving this sector may not wish to widely publicize this fact for fear of attracting competitors.

The K-Rep program in Kenya

For our purposes, one of the most important experiences listed in Table 1 is the K-Rep pilot program in Kenya. K-Rep Bank, with external assistance from Global Partnership on Output-Based Aid (GPOBA) and the Public-Private Infrastructure Advisory Facility (PPIAF), launched a new financing facility for community-based water systems in 2005 (Mehta and Virjee 2007). The deal structure is as follows. The community (through its CBO) is required to contribute 20% of the total project costs and have an account with K-Rep. K-Rep then loans the CBO the remaining 80% to build or rehabilitate water infrastructure. Upon completion of the (pre-determined) infrastructure improvement, the GPOBA repays half of the loan balance (40% of total project costs). The final loan balance for the CBO is therefore 40% of total project costs. Loans were issued at 16% annual interest for a period of 3 years (Mehta and Virjee 2007). In addition to GPOBA's output-based subsidy, the PPIAF also provided grant (matching) funding to help CBOs develop project proposals – a key step that several authors have mentioned as a constraint to scaling up community-based funding.

After holding a series of workshops to elicit interest from CBOs, K-Rep ultimately received 43 initial applications¹³. K-Rep then did a “rapid assessment” of the communities including focus group surveys, document reviews, analysis of financial and management capacity, etc. Ultimately, 14 CBOs went to formal loan applications, and 9 are currently under implementation. All projects were under the jurisdiction of the Athi Water Services Board near Nairobi. As of December 2008, 1 project had been completed, and 4 were expected to be completed in Spring 2009. The projects ranged from a metering project (loan approx. US\$50K) to new water supply projects (the largest provided 800 new connections for approx. US\$200K). None of the systems are currently in repayment.

The program was scaling nationwide in December 2008, with money (from the European Union's Water Initiative) for approximately 60 new target projects. K-Rep was training more staff on the program and rural water project appraisal. K-Rep was planning to expand the program in Kericho District, so we carried out a series of household interviews and held a meeting in one potentially interested community: the Kapkelek water supply system. Although we were unable to conduct a rigorous stated preference study given the time constraints, we found a good deal of community support for participating in the K-Rep program to augment the water supply and expand household connections. The full details of this effort, along with results from the household survey, are provided in Appendix B.

Measuring or scoping demand

One question a donor might ask is: is there demand for these new loan products? What is the potential size of the market? The only study to our knowledge that measured household or community demand for *loans a priori* is Davis et al (2008). Through 800 household interviews in Hyderabad, India, they found significant demand for “retail” loans for both water connections and sanitation improvements from Water Partners' WaterCredit program. Mehta (2008) estimated the potential size of the market for microfinance in

¹³ This paragraph based on personal communication with Kameel Virjee

WS&S globally, but the calculations were based on assumptions of what percentage of currently “unserved” populations (defined with data from the Joint Monitoring Program) would be interested in borrowing for improvements. The estimates were not based on household survey results and provide only a very rough estimate.

In fact, household surveys such as Davis et al (2008) and the ones we conducted in Kenya are very expensive. To reliably estimate demand (or the size of the market), one needs to communicate to households precisely what improvement is being offered and the institutional “deal” that the improvement is being offered under. A donor might consider funding a number of such studies to get a better sense of demand. In fact, The World Bank funded a large number of surveys on demand for water and sanitation in the late 1980’s and early 1990’s, many of them in Africa (World Bank Demand Research Team 1993). The studies did not examine demand for loans, but rather asked households about their willingness to pay higher tariffs for improved service (e.g. boreholes) or connection fees for new connections to piped systems. They found several areas where willingness to pay was high enough to cover the costs of improvement, but also many areas where willingness-to-pay was low (either as a percentage of household income, or compared to the costs of improvement). Although this data is now over 15 years old, it is entirely plausible that after spending a large amount of money, the new studies would arrive at a similar conclusion: demand is quite heterogeneous and difficult to generalize across regions. Rather than try to “scope” demand, it is probably more important for donors to focus on how they can best contribute to institutional “deals” (which households and communities can opt into) without crowding out local finance or dampening incentives.

Description of fieldwork

Fieldwork for the study occurred in August 2008 and four weeks in November-December 2008 and consisted of several activities. During a one-week trip in August, Cook met with staff from Pamoja Trust and visited two of their peri-urban project sites in Nairobi, including one (Kosovo) which Pamoja Trust was hoping to pilot a program using microfinance to extend water connections (see Box 7, p. 24). Cook also met with George Baiden, the country director for the Adventist Development and Relief Agency (ADRA) to discuss ADRA’s work on environmental sustainability in Kericho and Mwingi districts (Box 2). He also traveled to Amhara, Ethiopia to meet with staff from the Organization for Relief and Development of Amhara (ORDA), and visited several of their field sites.

During one month of fieldwork in Kenya in November-December 2008, we conducted a series of key informant interviews, community meetings and household interviews in seven communities in two districts in western Kenya: Kericho and Nyando. The districts were not chosen at random. We chose to examine Kericho district because ADRA-Kenya was considering implementing a WS&S microfinance facility there. Because of logistical considerations and time constraints (four weeks total for fieldwork), we chose a comparison district that was adjacent to Kericho. We chose Nyando district because it has lower average incomes than Kericho and faces different hydrological conditions.

Kericho District is generally hilly, located between the Mau escarpment and the lowlands of the Nyando district¹⁴. Most of the district is at a higher elevation and generally cooler than Nyando. This upland area receives fairly abundant rainfall and is well-drained by four major rivers, some of which have large

¹⁴ The demographic and geographic information in this section is drawn primarily from the district development plans for each district for the period 2008-2012. These annual reports are prepared by the Ministry of State for Planning, National Development and Vision 2030. We obtained copies from the District Development Officers, and are available from the authors on request.

waterfalls. There are many natural springs. Tea farming is the predominant economic activity in the district with several large plantations owned by multinational corporations and many small-holder tea farmers. Many households also rely on livestock production for income. In the lower elevation areas bordering Nyando, the climate and hydrology (including seasonal water shortages) is more similar to Nyando and farmers grow cotton and sugarcane. The total population is estimated to be 345,000 people (although the most recent census was in 1999), the majority of whom are ethnic Kalenjin. The District Development report did not contain information on average incomes in the district, but reported that 41% of the population lived in “absolute poverty”.

Nyando district is located along the shores of Lake Victoria and consists of the large Kano floodplain and several more hilly areas in the northeast and south. The Nyando river runs throughout the Kano plain, and regularly floods it during the rainy season. Water becomes scarce in the dry season, however, and residents rely mainly on deep (>100m) boreholes. Sugarcane farming is the predominant economic activity, and there are two large sugar-cane refineries which dump (apparently untreated) effluent into the Nyando River. There is also small-scale subsistence farming and livestock production, though less commonly than in the Kericho district. The total population is estimated at 380,000, and is predominantly the Luo tribe. 60% of the population lives in “absolute poverty”. The government estimates that approximately 48% of households have access to piped or potable water, and 65% of households have a latrine. There are a large number of NGOs and donors working in the district. A list provided to us included 66 NGOs, including eight involved in WS&S activities.

We interviewed a total of 168 households and conducted community meetings in seven villages (three in Kericho and four in Nyando). We spent approximately one week refining our questionnaire and training 18 interviewers in the nearby city of Kisumu. We then split the interviewers into teams, where they spent approximately one week conducting interviews and running community meetings.

The villages were also not chosen at random. Because of time constraints, we were unable to develop a comprehensive sampling frame of water projects; district water offices did not have such a list. Instead we relied on district water officers (and to some extent our enumerators, who were locals to the districts) to identify water systems. We are therefore unable to generalize our findings to the rest of the district (or certainly to Kenya), though we do believe that some of our main findings are supported by other evidence and by literature in the water and sanitation sector.

We did, however, attempt to randomly select households within those villages to interview using a transect approach. Interviewers were told to first pick a central landmark in the town (e.g. school, market). They were then to walk in the direction of the sun and interview every 5th household they encountered on this transect. When they reached the edge of the village (or where houses were spread widely apart) they were instructed to turn right and continue interviewing every fifth household.

The questionnaires used in the household surveys are included in Appendix A, and details on the results of the survey are provided in Appendix C.

Finally, we spent approximately one week doing further interviews in one area in Kericho. The Kapkelek water project, originally built in the 1990s, encompasses 10 small rural villages in the upland area of the district. The current system pumps water from a borehole to a 25m³ storage tank. The system currently serves 110 households with piped connections, although service is intermittent. The water committee is seeking financing to expand the capacity of the system, including capping a nearby spring, building another, larger

storage tank, and extending the distribution lines to connect more households. Because we were told that the K-Rep/World Bank microfinance facility would be expanding into the Kericho district in early 2009, we decided to focus more on Kapkelek as a type of system which might benefit from these new community-based financing facilities. We conducted a community meeting and interviewed 95 randomly-selected households, some of whom were connected and unconnected “members” and some unconnected “non-members”. We found an encouraging level of support for the community to borrow money for expansion from both the community meeting and from household interviews. The full details of that survey effort are provided in Appendix B.

Finally, during the trip in November-December 2008 Cook also met with the country director for Water Partners International and visited a microfinance field site in Kisumu, Kenya. He also met with staff from the World Bank, Equity Bank, K-Rep Bank, and Kenya Women’s Finance Trust.

Key questions

Question 1. Is access to finance the main constraint to improving water and sanitation conditions in Kenya? What are some of the other major constraints that water systems are facing?

Management capacity may continue to be a constraint in community-based lending

This first message will come as no surprise to those in the WS&S sector. We found several instances of serious management failures in the operation of water systems (see Box 3 and Appendix C). These issues not only include the obvious (mismanagement or misappropriation of funds) but also a lack of technical training and in some cases political interference. We would caution the reader that because we were unable to do a random, systematic survey of water systems in Kenya, our results should be interpreted with care. We also found a water system very well-managed by a CBO (Kapkelek village, see Appendix B), and Mehta and Virjee (2003) describe two of what are certainly many Kenyan communities (the Kabuku project and the Gitaru self-help project) that were able to fully fund their operations as well as do some minor expansion of services from existing revenues.

Still, it seems likely that many rural and small-town systems in Kenya are hampered both by a lack of financing and by poor management; innovative financing will not eliminate the latter constraint. Improved access to financing would undoubtedly be helpful to many of the better-managed systems, but lenders should extend these loans with a wary eye towards the types of management failures common in the WS&S sector. This might be best accomplished through a partnership between MFIs/banks and WS&S sector NGOs (both local and international) which are experienced in the region and know the pitfalls to avoid. To the extent that the areas with the worst access to WS&S services may also be the areas with the worst management/corruption problems, it also means that lenders and donors should approach microfinance with “open eyes”: those most in need may be difficult to reach effectively.

Box 3. The perils of political problems: WaterCredit in Boya, Nyando District

The existing water system serving about 5000 households in the town of Boya (Nyando District) was badly in need of repair and additional capacity. It began in the 1980's with a donated borehole from a Dutch Catholic priest. The large overhead storage tank was leaking and the piped distribution network was uncoordinated and in need of an overhaul. Most of the ~ 300 households with connections were billed, but billing was erratic. Some households paid flat monthly rates while others paid volumetrically, and many had large unpaid bills. Water service from the taps was intermittent.

Through Water Partners International's (WPI) WaterCredit program, the community received a 2 million Ksh (~US\$25,600) loan to build new tanks, add a pump to the system, and expand the network of piped connections. The interest rate charged by SANA, WPI's local partner implementing the project at the time, was 13%. The community registered as an official Community-Based Organization with the Lake Victoria South (LVS) Water Utility. The village water committee went through a series of management training workshops from SANA, operations and maintenance training from Lake Victoria South, and Participatory Hygiene and Sanitation Training (PHAST). They expanded meters so that most, but still not all, households had meters as of November 2008 (although a line operator on the committee said that because of vandalism of meters and illegal connections, only about half of meters were working). The

management committee raised water tariffs, and had begun making several debt service payments to SANA (of ~50,000 Ksh per month)

The total cost estimates, however, turned out to be too low and there was not enough money to purchase the new pump. Without further financing, none of the other components of the improvements could come online. The committee turned to their local MP to apply for a Constituency Development Fund (CDF) grant to complete the project. Although the MP committed the CDF funds to the project, he demanded a new election of the water committee members. With his help, and running on a platform of lowering water tariffs, a new water committee was elected that had no experience in management of water systems and that had none of the extensive training that the first committee had. They claimed that they did not have “ownership” of the previous committee’s decision to borrow the money. As promised to voters, they lowered water tariffs (from 200Ksh per 10m³ to 150 Ksh per 10m³) and stopped making debt service payments. The system also went into arrears on the electricity bill. Furthermore, none of the management team has ever been paid salaries. Focus group participants told us the system badly needed “professional”, paid staff to manage the system effectively, but that raising water tariffs to cover these additional staff costs would be very difficult. As one focus group participant put it: “the water problem should be the government’s responsibility.”

One might see this as a problem of political “interference” by the MP, but it should be noted that the new committee was elected. This signaled a lack of participation from the broader community in the decision to take a loan to improve the system. Although it was believed that the original elected water committee adequately represented the community’s opinions and interests, households were generally unaware that the loan had been taken out on their behalf. When the MP interfered with the management of the system, there was little public understanding of the original committee’s intentions nor support for continued debt service payments. One question, therefore, is how much community-participation (beyond the local water committee) should be required for “demand-led” investment and borrowing.

Box 4. Potential for expanding a school (SWASH) project: Koru

Koru Primary School (Nyando District) is one of 200 schools in Kenya targeted with a package of improved water supply, sanitation and hygiene education through the [SWASH+ program](#). At Koru Primary, the improved water source was a new, deep protected borehole. Although we conducted no household interviews in Koru, we met with the headmaster of the school as well as the chairman of the newly-formed village water committee to discuss the potential to expand the system. Many households near the school and in the nearby market center travel to the school to use the new SWASH pump and are paying 2 Ksh per 20L jerrican. [In fact, so many households wish to use the new pump that there was some discussion of whether to limit access to avoid disrupting classes in the school]. Conditions in the market center are poor, with very few pit latrines and poor quality housing occupied by renters or squatters.

The town has, in fact, a non-functioning piped water system provided by the Catholic diocese in the 1980’s. This system pumped water out of the nearby Nyando river and distributed it to household connections throughout the town (the river water was apparently untreated). The headmaster told us that he

had had a household connection with a meter and paid about 400 Ksh per month (quite high compared to most other systems we studied in Nyando). The person within the Diocese responsible for running the system left, however, and the pump broke down shortly thereafter. Unfortunately, the Diocese showed little interest in paying to fix the pump. As a result, the piped distribution system is dry and people either travel to the SWASH pump, collect from the river, or buy water from vendors (who charge between 5 - 10 Ksh per jerrican).

The chairman of the committee was interested in financing expansion of the system, though because the Diocese owns the existing distribution system it is not clear whether the expansion could use this existing piped infrastructure. The chairman had received training from one NGO on their water financing program in 2007, and planned to seek CDF funds as supplement to the loan. The post-election violence in early 2008, however, badly affected Koru and the surrounding Muhoroni plains, which became a battleground between Kalenjins and Kikuyus. Several people were killed in Koru, and many who fled the violence were only beginning to return (as of November 2008). Plans for expansion have not progressed, and the chairman still does not have detailed engineering cost estimates.

Water tariffs in many rural and small-town systems are too low

We found several systems where customers were paying flat-rate water tariffs (or not paying anything at all) despite widespread advice in the sector for including some volumetric component to water tariffs. (In some systems we were told that the politically-connected received preferential flat rates). Most importantly, the lack of volumetric water pricing (and meters, which we address below) makes it difficult to run financially-sustainable water systems. In November 2008, a majority of municipal water systems in Kenya were not collecting enough revenue to cover operating costs (many could not pay their electricity bills (WASREB 2008)), largely because of unrealistically low tariff structures, many of them non-volumetric rates. The lack of volumetric pricing may also have an effect on environmental sustainability (through water availability) in some areas. Tariffs which reflect the true marginal cost of obtaining and distributing water send an economic signal to customers to use water efficiently. [In Kapkelek village, for example, we found one household that used water from their connection to water cattle, although a stream was 150m downhill and the system was chronically short of water.]

Unfortunately, many customers in Kenya are accustomed to such unrealistically low tariffs for water services, and expect government support in the sector. These tariffs have the well-known effect, however, of funneling government subsidies to the non-poor and sinking water utilities in the “low-equilibrium trap”. [The “low equilibrium trap” describes a situation where a lack of revenue causes the level of water service (quality, reliability) to fall, in turn prompting households to withhold support for increasing tariffs to raise the revenue needed to improve service.] Communities must be made aware that WS&S infrastructure projects they are borrowing for are expensive and that the costs must be recovered from users.

Donors and MFIs should not underestimate how difficult it may be to shift public attitudes on tariffs. [Indeed, international firms discovered this when several large-scale privatizations failed in Latin America because of political upheaval over tariff increases]. Although it may be difficult or politically impossible for lenders to dictate tariff structures, they should require (as the K-Rep/WB program does, and most good WS&S NGOs now do) a period of financial and management training to help the managers of the systems decide on fiscally responsible tariffs. To the extent that donors wish to fund projects where the full costs cannot be

recovered through tariffs, they should build capital subsidies directly into loan amounts rather than tariffs. In this way, tariffs still cover operating expenses and debt service.

Again, this process would be facilitated by requiring open and active community participation in all stages of the process (a suggestion also made by Cardone and Fonseca (2006)). Communities in US seeking to borrow funds are subject to legal requirements on the amount of debt they can carry in relation to their property tax base. To our knowledge, there are no such laws for small community systems or CBOs which are enforced in Kenya. Although one would expect that banks would not lend communities more money than they could reasonably repay, an additional safeguard is to ensure that communities are alerted to the amount of money the water committee is borrowing on their behalf. Indeed, municipalities in the US are typically required to put “large” bond issues to a public vote. This process will also serve to inform communities to how expensive water infrastructure is, and mobilize support for higher water tariffs.

Many connections are unmetered

Besides these revenue problems, a lack of metering also makes it difficult to reduce the large percentage of raw water which is “unaccounted-for” in Kenya. These rates are on the order of 50-80% in many systems (WASREB 2008). Because many systems have no meters at all (even at the source), the amount of unaccounted-for water cannot be calculated (see Box 5). Improving metering (including zonal meters), can help water systems find breakages/leaks in the system (augmenting the supply available to households) or find households with illegal connections (increasing revenue).

To CBOs and MFIs, we would repeat the advice that all new systems should require metered connections (whether private or public taps or kiosks). The cost of these meters should be included in loan amounts, and monthly tariffs should include meter rents that will cover the expected costs of repairing or replacing them. To donors, however, we would stop short of recommending that any new financing come with conditions for metering. Such a requirement may be unhelpful if communities perceive that metering is being imposed on them by outsiders, as opposed to being a necessary part of receiving a safe, reliable water supply. Because metering enhances revenue and water supply, one idea might be to develop a pool of financing that CBOs and small rural providers could access only for installing water meters in their systems (Box 5 provides an example of a small rural private provider seeking precisely such funding). Because the cost of meters is known with much more certainty, there is also less potential for misappropriation of funds than for larger projects. MFIs may, however, find this a profitable lending product on their own; donor support could be usefully applied to helping “make the market” by connecting these providers with MFIs and funding pilot studies and data collection (repayment rates, effects on revenue, water use).

Box 5. Finance for meters: Chemosit Water Company

The CHEMOSIT Water Company is a water service provider contracted (under the Water Act of 2002) by Lake Victoria South Water Service Board through a Service Provision Agreement (SPA) to run 16 water supplies within Kipkelion, Kericho, Bureti, Bomet and Sotik Districts. It was formed in 2007. We met with the managing director (Mr. Joel Langat) and one of the company's engineers (Mr. Benard Chepkwony). Mr. Langat said that the utility's main challenge is that it cannot meet operational costs (namely, their monthly power bill). The biggest system which CHEMOSIT runs (the Litein Water Supply, built in 1983) has an electric bill of 1.6M Ksh, but brings in revenues of 1.4M Ksh. We were told that this system is "doing better than the others".

CHEMOSIT's tariff structure is: 200 Ksh for the first 10m³ (2641 gallons), 20 Ksh per m³ for consumption between 10-20m³, 25Ksh/m³ for 20-30m³, and 30Ksh/m³ for 30-50m³. Their unit production costs are approximately 9 Ksh/m³, so the tariff structure in this case should actually be sufficient to cover operating costs. The difficulty, according to Mr. Langat, is the number of unmetered, flat rate connections still in use. Of the water CHEMOSIT produces from the source, only 39% goes through metered connections. The remainder is lost to illegal connections and leaks (without generating revenue) and flat rate connections. Without more zonal meters, they are unable to distinguish these two. The Litein system has a total of 7500 connections, but only 2800 are metered. The remainder pay either a flat rates (200 Ksh/mo) or an "average assessment" where CHEMOSIT staff visit the household, inspect their property, counts the number of household members, cattle, etc. and calculate an average bill for them. CHEMOSIT staff felt that these "average assessments" were almost certainly an underestimate (though it is not clear why they felt they could not change how the assessments were conducted).

The main constraint to increasing the number of meters was financing. Each meter costs about 5000 – 6000 Ksh. They said Constituency Development Funds (CDF) are difficult to get and are scarce in Kericho (because it's economically better-off than several other districts). We did a simple calculation, and with 18% interest, it would take approximately 10 years to pay off a loan on the meter with the 50 Ksh/mo meter rent. Alternatively, it could be paid off in 3 years with a meter rent of 164 Ksh/mo, but households would almost certainly object because the utility owns the meter, and there is already some resistance to metering. Vandalism and illegal connections would most likely increase, and UFW might not decrease.

CHEMOSIT feels it has the legal authority and the will to force all connections onto meters. Although it would be difficult to calculate the return on an investment in meters without more information, it seems likely that the utility could increase revenues and move towards at least operational solvency.

Question 2. How important is "environmental sustainability" to households and communities?

Throughout a number of meetings and interviews, environmental "sustainability" concerns were rarely raised spontaneously. Water availability, driven by seasonal rainfall patterns, was very often a concern, but this was rarely linked to upstream watershed protection. There may be scope for lending for WS&S projects that could improve environmental sustainability (see Box 2 on "sand dams" in Mwingi District; Box 5 on lending for meters; Box 6 on lending for rainwater catchment tanks; or lending for toilets). However, the predominant concerns among households, NGOs and government officials was in improving access to water supply, not environmental sustainability *per se*. In many cases, these objectives are well-aligned, as in the case of "sand dams" in arid regions or for rainwater catchment tanks. In some cases, however, these two objectives may be at odds with each other. Improving access can encourage further development in a region, and without institutional structures to prevent development of catchment area, it can lead to lower aquifer recharge, decreased surface water flows, and increased soil erosion. This implies a need for strong village governance to

limit development patterns and enforce good watershed management practices, which may be a challenge for many communities in Kenya. As noted in the introduction, there is little experience with payment-for-watershed services programs in Africa, though, and donor involvement in this area might be very productive. It will not necessarily improve access, however.

Question 3. What types of “innovative financing” seem to be the most promising for the Kenya WS&S sector?

Household “retail” loans, including group lending, for water services appears promising

As discussed earlier, there is a good deal of experience with household “retail” lending for water services in Asia, most of it seemingly successful. Many of these programs have also not relied on external donor support, but were led by local MFIs. In areas with highly seasonal rainfall (much of East Africa), rainwater harvesting is an important tool for managing household water supply. Lending for large-capacity rainwater tanks would appear to be a promising product, and indeed we found at least one Kenyan MFI that was already active here without any external donor support (see Box 6).

Box 6. Retail lending for rainwater catchment tanks: Kenya Women’s Finance Trust

Kenya Women’s Finance Trust was founded in 1981 and operates in seven of eight Kenyan provinces. They report having a staff of 300 and 100,000 members, and in 2002 achieved “break-even status”, where they were no longer dependent on external funding from the Ford Foundation. They are currently applying to become a depository community bank. KWFT has a range of products for its members, most notably for our purposes a rainwater-tank loan. According to staff in the Kericho KWFT office, the rainwater tank program is meant as a “benefit” to members of the women’s groups, and the Trust provided the loans interest-free. Prices for tanks (“Kentank” brand) ranged from 1,400 Ksh for a 100L tank to 75,500 Ksh for a 10,000L tank, including a cement base for larger tanks. To receive a tank, women have to be members of a group (either small groups of 7-10 or larger groups of up to 20, with minimum monthly savings of 400Ksh) for at least one month. Members then applied individually for the rainwater tanks, and KWFT installed the tank for them. Loans could be repaid over 3, 6, 9 or 12 months. Staff claimed that repayment rates had been 100% before the post-election violence, but were unsure what they were for 2008.

Group lending in urban settings for household connections also appears promising, and we found at least one partnership of a local and an international NGO (Pamoja Trust and WaterPartners Int’l) interested in this approach for two cities in Kenya (Box 7). As noted earlier, there are few examples of group lending approaches for WS&S in Africa, although they seem to have worked reasonably well in South Asia. It is an important open question as to whether the Asian success with group lending in urban areas can be replicated in Africa, and donor support for pilot studies would be useful. As others have noted, land tenure remains a key hurdle in these settings (Cardone and Fonseca 2006). In that respect, linking a water-sector NGO, an MFI, and a urban or land-tenure NGO would seem the most promising approach.

Box 7. Group Lending in Urban Informal Settlements: Pamoja Trust

The work of the Kenyan NGO Pamoja Trust “centers on developing a consensus among the inhabitants of informal settlements [in urban and peri-urban areas] around issues of land and structure entitlements, and building community capacity to address these, before negotiating with government for land and infrastructure.” (Weru 2004). Although the group has implicitly dealt with infrastructure problems in the past, it is new to thinking specifically about water and sanitation issues. They are working in two cities in Kenya on WS&S projects: Kisumu and Nairobi.

Staff at Pamoja Trust began our meeting by discussing the model for microfinance in WS&S from the city of Kisumu. There the municipal government wanted to expand connections in settlements, but were wary of dealing directly with residents. The idea was to delegate management of a water point to an individual operator, who could decide how to collect user fees and whether or not to reticulate the system to connect households (funds to expand water mains into the settlements were donated by the French government). Although this was seen as relatively successful, it gave operators monopolies. Unsurprisingly, many of these monopoly suppliers tried to extract monopoly rents through high prices and were unresponsive to needs for convenient operating hours of kiosks (Lovei and Whittington 1993; Crane 1994). This led to protests by the local users. Pamoja Trust is interested in revising this approach in Nairobi to follow the community-led process that seems integral to their organizational DNA.

The new process that Pamoja is proposing would be as follows. Communities first form an “oversight committee” to apply for water connections. The public water company deals with the oversight committee rather than a single individual. The committee then decides how to set rates, hires an operator for kiosks (on a renewable contract basis), decides operating hours, and hires someone to keep facilities clean and deal with breakages, etc. The committee reports at the Annual General Meeting of the settlement to describe progress and problems.

One of the places where they propose to pilot the approach is in the settlement of Kosovo, where per capita incomes were on the order of 100-200 Ksh/day. Residents were re-settled there about 7 years ago, and the area sits on both sides of a steep valley with a small stream/pond at the bottom. The municipal water line runs across the ridge at the top of the neighborhood (near police barracks). There are now many illegal, shallow, small-bore pipes snaking around the settlement, in many places sticking out of the ground where they can be easily ruptured. In the back alleys, a few people have flush toilets and illegal water points for washing. The wash-water trickles down through a gully, and the toilets are connected to a shallow PVC sewer line that drains into the stream at the bottom of the hill. People without access to one of the few private or public toilets (public pay toilets were 3 KSh/use) use either plastic bags or mix waste with water and dump it into gullies or streams.

In Kosovo, Stephen Waithaka of Pamoja Trust said that funding to bring water lines down the hill through the lanes (replacing the illegal, shallow lines) was already in place but that microcredit could be used to bring connections into homes or yards with meters. Pamoja Trust and Water Partners International are also implementing a similar model in the Nyalenda communities in Kisumu city.

A role for donors in these urban settings may be to support the base infrastructure which household retail lending can then expand. In the Nyalenda settlement in Kisumu, Kenya, for example, CARE and WaterPartners worked with the city water utility (KIWASCO) and WSP to fund the development of a main line into the settlement. A unique, delegated management approach has allowed the extension of distribution lines from one of five “master operators” to individual connections (WSP 2009). Although most of these connections have so far been for resellers (water vending kiosks), some households have paid for individual

households connections (WSP 2009). Household or group retail loans might accelerate the rate of connections (see Box 7).

Another interesting development in Kenya on household retail lending is the use of MPESA, a service provided by Safaricom, one of the largest wireless carriers in the country. MPESA allows Safaricom's customers to transfer money via the mobile phone. Since mobile phones are widespread even in rural Kenya, MPESA has the potential to lower the cost to MFIs of collecting payments on retail loans for WS&S (and perhaps improve repayment rates). The program appears to be threatened, however, by new regulation¹⁵.

The picture for household "retail" loans for sanitation is less clear

Because improving water connections and services may generate income through multiple "productive" uses (Renwick et al. 2007) while improved sanitation would only generate income through reduced health expenditures, there may be reason to believe that retail lending for water services is more attractive than for sanitation. Indeed, many of the failed systems in Asia were loans for sanitation, and in rural areas, simple pit latrines may be inexpensive enough that loans are unnecessary (in Amhara, Ethiopia we talked with a household that constructed their simple, shallow pit latrine completely with local materials and their own labor; the total financial cost to build the latrine was the US\$5-US\$10 for the salary of a hygiene educator).

It may be the case, however, that rural households prefer and are willing to borrow money for sturdier, more hygienic toilets with concrete sanplats, porcelain pour-flush pans, and ventilated superstructures. In some areas (like the floodplains of Nyando), sturdier and more expensive latrines are needed, and household retail loans could be useful. If one objective of a donor is to move urban households away from shared sanitation facilities to meet the JMP definition of "improvement", retail loans could be used to build private pour-flush toilets and connect them to existing wastewater collection systems. In areas without existing collection systems, like informal peri-urban settlements, these pour-flush toilets could be connected to lined septic tanks, or donor grants could be used to augment local or multilateral funding for construction of the wastewater collection mains (similar to the Nyalenda case for water connections discussed above).

Another important issue in sanitation is that demand may be driven largely by hygiene education, like the Community-Led Total Sanitation approach (Pattanayak et al. 2009). It is unlikely that any of the existing programs which loaned households money for toilets included the "software" or salary costs of running these programs. This is an area where donor grant funding could be usefully applied, leaving MFIs and NGOs to focus on lending for the "hardware" components.

Lending to communities: designing a well-crafted borrowing "deal"

The key for an MFI interested in the water sector is probably less in determining where there is demand and where is not, but rather in designing an institutional process that will weed out bad lending situations. This is a natural outgrowth of the "demand-led" process for rural water supply that the World Bank has advocated for the past decade. Set the rules for participation, market the program and rules widely, and let communities decide for themselves whether to participate (World Bank Research Demand Team 1993).

¹⁵ See "The brains, drive behind cash transfer concept", *Business Daily*, January 12, 2009, and "Unmasking the storm behind M-Pesa", *The Standard*, December 30, 2008. Also see "M-PESA: Progress and Prospects", Tonny Omwansa, Mobile World Congress 2009, <http://www.strathmore.edu/pdf/innov-gsma-omwansa.pdf>

The K-Rep program in Kenya seems to be a good example of this. Requiring a 20% contribution from the community should be a sufficiently difficult hurdle to ensure that only communities who have the interest and ability to repay the loans apply. (However, it may be that only a few wealthy individuals “advance” the money for the downpayment and then ask to be repaid – we found evidence that this occurred in both Amhara, Ethiopia and Kisumu). The involvement of a commercial bank should, in theory, allow market discipline to weed out bad loans from good loans.

What role for donors? Two key constraints to the process are the project development and due diligence steps. MFIs or local commercial banks may find the staff cost of performing these due diligence analyses very steep, and covering them with origination fees or interest rate spreads could make loans unaffordable. Furthermore, communities may not have the expertise to develop project proposals, including detailed engineering cost estimates. Donor grant subsidies might be useful in facilitating either of these processes (as the World Bank is doing by covering the cost of consultants to villages). Subsidizing the project development side might also contribute towards the development of a more robust business development services (BDS) sector in Kenya (Mehta and Virjee 2003). Due diligence costs may also go down over time as MFIs and banks learn more about appraising rural water projects. But there is a conflict here: MFIs may wish to keep their appraisal process confidential and proprietary, which could slow dissemination to other local lenders and slow mobilization of local finance for WS&S.

Finally, some areas will still find complete cost recovery too steep, and grant subsidies can be paired with loans (as the output-based grants are in the K-Rep program) in order to address affordability concerns. This is another useful contribution that outside donors in the sector could play, though aid must be “scarce but systematic”¹⁶ to avoid crowding out the nascent local finance sector¹⁷. In addition, subsidies would ideally be channeled through some coordinated strategy like national challenge accounts, the Kenyan Water Services Trust Fund, the African Development Bank’s African Water Facility, or the Global Partnership on Output-Based Aid.

Community-based lending in WS&S may help predominately middle-class consumers, but this is not necessarily a problem.

A donor interested in microfinance in the WS&S sector should assess its objectives carefully. How important is it to expand access to the poorest communities and households? How important is it to use microfinance to achieve the Millenium Development Goals?

Much of the population without “improved” access live in dispersed rural areas where incomes are very low, and the ability to repay loans is likely to be limited. There may, of course, be low-income rural communities that are willing to spend a high percentage of income for community-level infrastructure improvements, but it may still be inadequate to cover the full costs of operating and servicing debt (especially in arid regions). Other low-income communities, however, may be willing to pay an amount that would cover full cost recovery. Again, a donor should not necessarily try to identify those communities (which would be far

¹⁶ Kameel Virjee, personal communication.

¹⁷ Because the Nyando district has a large number of NGOs and a longer history with donor-funded projects, it may be that the problems we found there are stem from uncoordinated donor assistance crowding out microfinance. Microfinance may be more helpful and successful in areas where large amounts of donor assistance are less available.

too expensive), but support a process that allows them to identify themselves to MFIs and NGOs who are willing to lend to them.

In rural areas, household “retail” lending – rather than community-based lending -- could be used to finance small-scale water investments (rainwater tanks, shallow wells) or toilets, both of which could increase households’ welfare (and contribute to meeting the MDGs). The Grameen Bank experience, in particular, with its focus on the poorest rural villages and the “poorest of the poor” within them, and its group lending models, would support this. In urban areas, finance may be able to help the poorest households connect to the piped network (if land tenure issues are settled). This is supported by the experience with CREPA in 3 peri-urban slums in Ajidjan in Cote d’Ivoire (see Table 1 and Cardone and Fonseca 2006), which achieved 95% repayment rates. Learning from and expanding these types of programs would contribute towards meeting the MDG goals. It may be, however, that the relatively better-off households will be the ones taking out the household retail loans.

It may further be the case that many SME and community-based microfinance programs will be taken up by middle-class and wealthier communities who are willing and able to pay to service debt for infrastructure improvements. This is not necessarily bad. Improving services for people who are willing and able to repay loans can build infrastructure which may in the future benefit the poor. In one microcredit project in Kisumu we found that wealthier households were largely responsible for initiating a water credit program to expand their water service, and indeed were the first to benefit from new piped household connections and improved supply. Surveying these large, terraced houses of the city’s bureaucrats and business owners, one would be tempted to think that community-based lending for WS&S in the name of the poor had been co-opted for the non-poor, as is well-known in the case of water subsidies (Foster et al. 2003). The system also included a number of new kiosks available to the poor residents of the area, however, which greatly reduced the distances residents travelled to fetch water – a considerable benefit. As the Kenyan economy grows and those households’ incomes increase, the microfinance program has invested in infrastructure that may someday allow them household connections as well.

ACKNOWLEDGEMENTS

- Ms. Tanvi Nagpal, Global Water Challenge
- Mr. George Asiyo, Kericho District Water Officer, and Mr. Ngetich in the district water office
- The Kapkelek Water council, and in particular Mr. Joseph Kitur and Mr. George Kemei
- Our interviewers: Mr. Abenego Ouko, Mr. Andrew Kiptum, Ms. Brenda Bill, Ms. Carolyne Onyango, Mr. Chris Rutto, Ms. Cynthia Chepkirui, Mr. Daniel Kiptum, Mr. Dann Asika, Mr. Edwine Awinda, Ms. Everlyne Ounga, Ms. Lillian Oyolla, Ms. Lily Samich, Mr. Nicholas Guda, Mr. Okaka Opande, Ms. Olewe Perez Kola, Ms. Picoty Koskei, Ms. Sabina Achiengo, and Ms. Sophia Nafula Olem.
- Mr. Patrick Alubbe and Mr. Richard Thorsten, WaterPartners Intl
- Mr. George Baiden and Ms. Edna Osono, ADRA International
- Mr. Stephen Waithaka, Mr. Jack Maku, Mr. Joseph Kimani, and Ms. Satma Sheba, Pamoja Trust (Kenya)
- Mr. Muluken Emagnu Teshager, Mr. Wuletaw Hailemariam, Mr. Mulalan, and Mr. Tesfay ORDA (Ethiopia)
- Mr. Moturi, Nyando District Water Officer
- Mr. Philemon Agulo, Nyando District Development Officer
- Ms. Sharon Chepkirui, Mr. Ruben Rutto, and Mr. Jude Onyango, K-Rep Bank
- Mr. Kameel Virjee, World Bank
- Mr. Joel Langat and Mr. Benard Chepkwony, CHEMOSIT water company
- Ms. Winnie Imanyara, Director of Corp. Social Responsibility and Development, and Dr. Gukuru, Equity Bank (Kenya)

REFERENCES

- Agarwal, C., S. Tiwari, et al. (2007). Fair deals for watershed services in India. Natural Resources Issues. London UK, International Institute for Environment and Development.
- Arney, H. M., M. O. Meckel, et al. (2007). Creating access to credit for water and sanitation improvements: A case study of women's self-help groups in Tiruchirappalli, India. IWA Young Water Professionals Conference. Berkeley, CA.
- Brown, C. and J. Hansen (2008). Agricultural water management and climate risk, International Research Institute for Climate and Society.
- Cardone, R. and C. Fonseca (2006). Experiences with innovative financing: small town water supply and sanitation service delivery. Background paper for UN-HABITAT's "Meeting Development Goals in Small Urban Centers: Water and Sanitation in the World Cities 2006", IRC Water and Sanitation Center.
- Cheesman, O. (2005). Environmental impacts of sugar production, CABI.
- Crane, R. (1994). "Water Markets, Market Reform, and the Urban Poor: Results from Jakarta, Indonesia." World Development 22(1): 71-83.
- Davis, J., G. White, et al. (2008). "Improving access to water supply and sanitation in urban India: microfinance for water and sanitation infrastructure development." Water Science and Technology 58(4): 887-891.
- Foster, V., S. Pattanayak, et al. (2003). Do current water subsidies reach the poor? Water Tariffs and Subsidies in South Asia. C. Brocklehurst. Washington DC, World Bank and PPIAF. **Paper 4**.
- Jalvaani (1999). Flush with loans: Micro credit for rural sanitation. Jalvaani: a newsletter on rural water and sanitation in India. New Delhi, INSDOC. 2 (3).
- Kouassi-Komlan, E. and C. Fonseca (2004). Microfinance for water and sanitation in West Africa. 30th WEDC International Conference. Vientiane, Lao PDR.
- Kurukulasuriya, P., R. Mendelsohn, et al. (2006). "Will African Agriculture Survive Climate Change?" World Bank Econ Rev 20(3): 367-388.
- Lovei, L. and D. Whittington (1993). "Rent-extracting behavior by multiple agents in the provision of municipal water supply: A study of Jakarta, Indonesia." Water Resources Research 29(7): 1965-1974.
- Marcus, R. R. and J. Onjala (2008). "Exit the state: Decentralization and the need for social, political and economic considerations in water resource allocation in Madagascar and Kenya." Journal of Human Development 9(1): 23-44.
- Mehta, M. (2008). Assessing microfinance for water and sanitation: Exploring opportunities for scaling up. Ahmedabad, India, for the Bill & Melinda Gates Foundation.
- Mehta, M. and K. Virjee (2003). Financing small water supply and sanitation service providers: Exploring the microfinance option in sub-Saharan Africa. Water and Sanitation Program. Washington, World Bank.
- Mehta, M. and K. Virjee (2007). Microfinance for rural piped water services in Kenya. Policy Note. Nairobi Kenya, World Bank Water and Sanitation Program. 1.
- Miranda, M., I. T. Porras, et al. (2003). The social impacts of payments for environmental services in Costa Rica: A quantitative field survey and analysis of the Virilla watershed. Markets for environmental services #1, IIED.
- Pattanayak, S. K., J.-C. Yang, et al. (2009). "Shame or subsidy revisited: social mobilization for sanitation in Orissa, India." Bulletin of the World Health Organization **in press**.
- Renwick, M., D. Joshi, et al. (2007). Multiple use water services for the poor: Assessing the state of knowledge, Winrock International, IRC Water and Sanitation Centre, International Water Management Institute.
- Team, T. W. B. R. D. (1993). "The demand for water in rural areas: determinants and policy implications." The World Bank Research Observer: 47-70.

- Tremolet, S., R. Cardone, et al. (2007). Innovations in financing urban water and sanitation. Financing Shelter, Water and Sanitation, Center for Sustainable Urban Development.
- Varley, R. C. G. (1995). Financial services and environmental health: Household credit for water and sanitation. Environmental Health Project, for Bureau for Global Programs, Field Support, and Research, US Agency for International Development. **Applied Study No. 2.**
- WASREB (2008). Impact: A performance report of Kenya's water services sub-sector. Nairobi, Kenya, Kenya Water Services Regulatory Board.
- WSP (2009). Improving water utility services through delegated management. Water and Sanitation Program Field Note, World Bank Water and Sanitation Program.