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**SUSTAINABLE WATER AND SANITATION SERVICES
FOR ALL IN A FAST CHANGING WORLD**

**Increasing private sanitation investments:
the Urban Affordable Clean Toilets (U-ACT) project**

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The goal of the Urban Affordable Clean Toilets (U-ACT) project was to determine the effectiveness of subsidies, extended payback periods, and targeting in stimulating households' investment in non-sewered sanitation systems. Between 2010 and 2013 we implemented a randomized controlled trial (RCT) with 1,200 households in 40 slums in Kampala. Vouchers, which allowed house owners to purchase a Ventilated Improved Pit (VIP) at different price levels and with different payback options were randomly offered to tenants and house owners. Our results indicate that increasing the payback period and adequate targeting are almost as effective in increasing take-up rates as halving VIP prices. Overall, the U-ACT project resulted in the construction of over 150 VIP latrines for over 1,500 people in Kampala slums.

Background

An estimated 2.5 billion people—more than a third of the world population—lack access to improved sanitation facilities. Coverage is especially low in Sub-Saharan Africa (30%), and most countries in the region will miss the MDG target to halve the number of people without access to proper sanitation (United Nations, 2013). Inadequate sanitation is of particular concern in the fast growing cities of sub-Saharan African where densely populated low-income settlements dramatically increase the public health hazards of lack of hygiene and improper disposal of human waste (Mulenga, 2011; Konteh, 2009; Moore et al., 2003; Sclar et al., 2005).

Given the current lack of centralized sewage systems, water-scarcity, and urban sprawl in sub-Saharan African cities, so called “on-site” sanitation technologies, such as (ventilated improved) pit latrines or septic tanks, are considered the best-adapted technologies available (Trémolet, 2012; Tilley et al., 2008; Grimason et al., 2000). The majority of these technologies rely on private investment by the user households. However, with prices beyond the reach of many poor families, sanitation coverage remains low (Trémolet, 2012; Trémolet et al., 2010; Water and Sanitation Program, 2012, Günther et al., 2011). A recent study based on six country case studies argues that “households are key investors in on-site sanitation, and careful project design and implementation can maximize their involvement and financial investment” (Trémolet et al., 2010). Although a plethora of behaviour-change programs have been implemented with varying degrees of success (Peal, Evans et al. 2010), the impact of investment costs and payment modalities in motivating households to become said investors, remains unknown.

The Urban Affordable Clean Toilets (U-ACT) project led by the Centre for Development and Cooperation at the Swiss Federal Institute of Technology Zurich (NADEL-ETHZ) was a three-year applied research project that studied the sanitation situation and demand of slum dwellers in Uganda's capital city Kampala. It was conducted in collaboration with the Department of Water and Sanitation in Developing Countries of the Swiss Aquatic Research Institute (Sandec-Eawag), the Civil Engineering Department at Makerere University in Uganda, and the Ugandan NGO Sustainable Sanitation and Water Renewal Systems (SSWARS).

Applying a randomized control trial (RCT), U-ACT empirically tested different price levels, payback periods, and targeting mechanisms to evaluate their effect on household sanitation investment in urban

slums. To our knowledge, this is the first experimental research on household-level sanitation demand using an RCT, conducted in a poor, urban context.

Methods

To determine the effectiveness of subsidies, extended payback periods, and targeting in stimulating households' investment in non-sewered sanitation systems, a randomized controlled trial (RCT) with 1,200 households in 40 slum communities in Kampala was conducted between 2011 and 2013. The communities chosen were not adjacent to each other, so as to prevent "spillovers", i.e. the distance between the different intervention areas was sufficiently large so that information would not travel between communities and influence the experiments.

The design of the interventions tested in the RCT was based on the baseline survey results which found the following: First, comparable to other cities in the developing world, the majority (70 %) of Kampala's slum dwellers are tenants (they rent, not own the house in which they live). However, despite similar preferences and demand for sanitation, tenants are much less likely to have access to improved sanitation than house owners (5% versus 39%), due to differences in property rights. Second, the local construction cost of one Ventilated Improved Pit (VIP) latrine is high: about US\$750, or about 45% of the sample's median annual household income. Third, the average household willingness-to-pay for improved sanitation is low compared to the actual costs but significant in relation to annual household income. Last, households' stated valuation of improved sanitation increases significantly when households are offered extended payment periods.

Given these findings and considering the existing RCT literature, U-ACT tested the effect of different subsidies for VIPs on sanitation investments in urban slums. The VIPs constructed were constructed of brick and mortar, and the concrete slab was raised to avoid flooding, which is common during the rainy season. We offered VIPs at three different price levels ("high" 1.3 Mill UgSh, "medium" 0.5 Mill UgSh, and "low" 0.25 Mill UgSh) with a one-time payback option. All offered prices were below the market price of 1.5 Mill UgSh. The toilet size or type never varied, irrespective of the price paid. Additionally, we tested the option of smoothing the payment over 18 months (with a 20% interest rate) through a microcredit scheme. Specifically, U-ACT handed out individualized vouchers stating a randomly assigned price and payback period to 1,200 eligible households. The vouchers could then be redeemed with the partner NGO who would build the sanitation facility.

It is important to note that only house *owners* can make the investment decision to redeem the voucher and have the toilet built on their property. Tenant households (i.e. the families who rent from the owners) have no land rights to the property they live on. Thus, tenants cannot request the construction of a sanitation facility. Hence, tenants were asked to hand the project voucher to their house owner (or landlords), who could then decide whether to redeem the voucher and buy a project sanitation facility: we refer to this intervention as "indirect targeting" in contrast to the "direct targeting" of house owners. Hence, in addition to the effect of different price levels and the microcredit payback option, we were also able to test the impact of targeting on sanitation uptake.

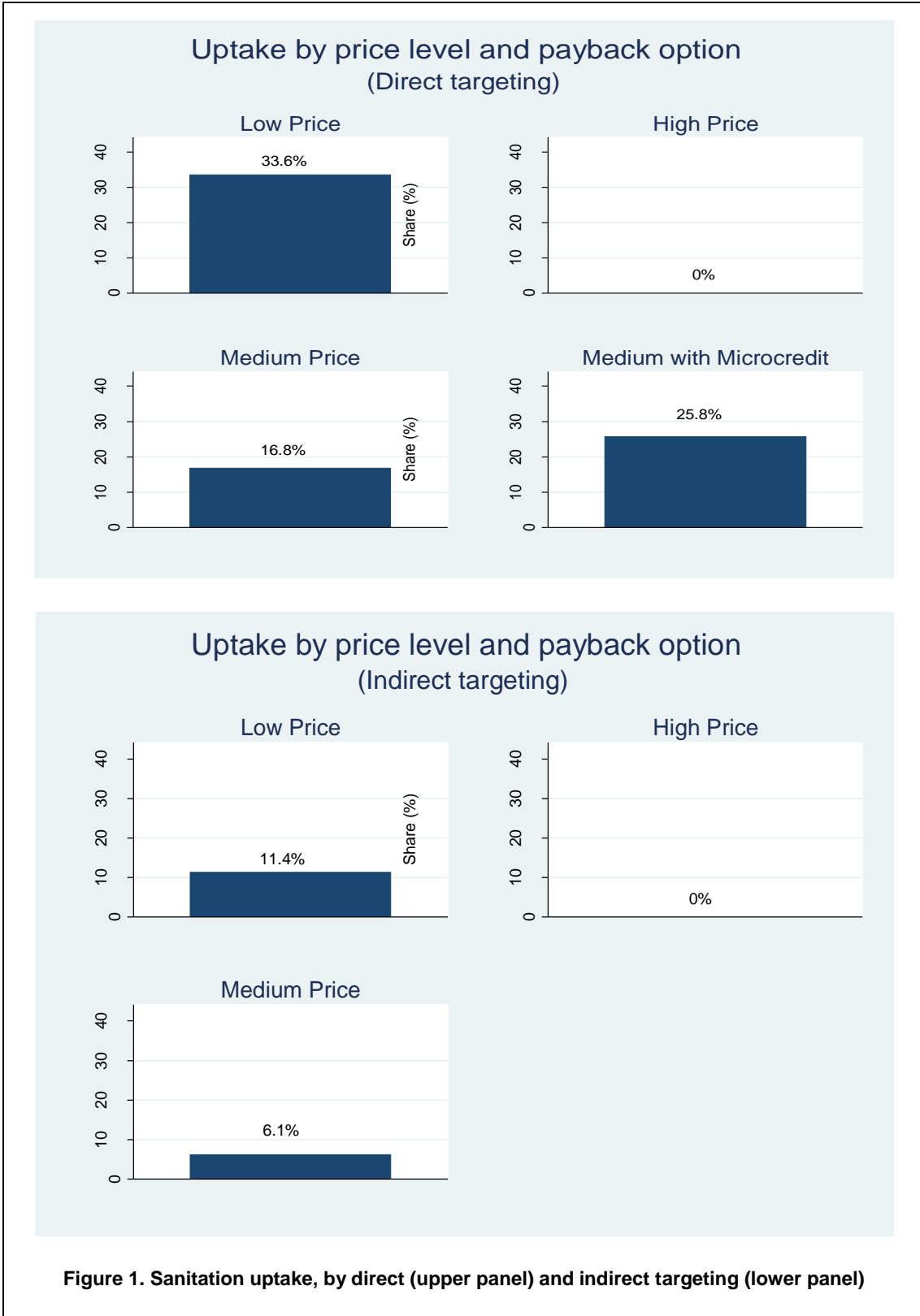
Results

The implementation of the U-ACT randomized control trial resulted in the construction of over 150 ventilated improved pit latrines for more than 1,500 people throughout 40 slums in Kampala (as shared toilets are common in Kampala; each toilet was used by approximately 10 people).

Figure 1 displays the percent of households that purchased a U-ACT toilet. The results show the proportion (share) of vouchers that were redeemed (vertical axis) and are disaggregated by price level (low, medium, high) and the microcredit payback option (microcredit and no microcredit at the medium price level). The upper panel shows the results for directly targeted house owners and the lower panel for indirectly targeted house owners (i.e. the owners that were given the voucher by their tenants). The results confirm that price is a major determinant of the poor's sanitation investment: at the high price level, no project sanitation facility was bought, while uptake was highest at the lowest price. Most interestingly, regression analyses (not displayed) reveal that offering the microcredit payback option had the same effect on uptake as a 40% price reduction. The effect of direct targeting on uptake is even larger.

In order to evaluate the effect of the various interventions on sanitation conditions, U-ACT also conducted a follow-up survey in spring 2013. U-ACT toilets were significantly cleaner than non-project facilities, and reported user satisfaction was higher. However, no differences in the number of users per facility were

found, which indicates that entire groups of households switched to the new toilet and that old toilets were abandoned. Finally, we found no evidence that housing rents for tenants increased after a project toilet was built (at least not during the timeframe of 16 months), which puts to rest the concern that sanitation investments by house owner will lead to massive increases in rents and a crowding out of poorer tenants.



Conclusions

Working with a high-quality, local NGO, and offering well-built sanitation facilities enabled us to construct over 150 VIP latrines for 1,500 people, which, as can be seen in Photograph 1 and as indicated by our regression results, are a significant improvement over the currently available facilities.



Photograph 1. Example of a U-ACT toilet (right) next to the old facility (left)

Overall, the results of the U-ACT project provide evidence-based recommendations of direct relevance to the Government of Uganda and other governments as well as development agencies for improving household sanitation coverage in urban slums. Specifically, policies aimed at increasing sanitation coverage should focus on measures that allow poor households to smooth sanitation payments over time.. Given the high investment costs of a toilet and the limited availability of formal credit (especially for non-business related purchases), micro-credit appears to be an important tool for smoothing the up-front costs, and helping the urban poor buy a toilet. Also, the issue of targeting plays a large role: at all price levels, directly targeted house owners were almost three times more likely to purchase a project sanitation facility compared to indirectly targeted house owners. This finding calls for targeted sanitation promotions with households who have investment decision power instead of general social marketing campaigns that mostly reach tenants in urban areas. A full-scale program based on these findings would require the involvement of a Microfinance institution (MFI) to disperse the loan and collect the payment, as well as an external donor to provide seed funding and partial subsidies. MFIs do not typically lend money for projects that are not income generating and would likely require some type of security, at least initially, until micro-credit for sanitation is proven to be a viable portfolio.

Private sanitation provision in slums is possible and needs not to be fully subsidized if households' credit constraints and land-tenure are taken into account and integrated into sanitation policies.

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Notes

More information is available on our project website (<http://www.nadel.ethz.ch/forschung/u-act>), where you can find two policy briefs and a project video (www.youtube.com/watch?v=qJn7oFnSQWA) with relevant project results, and a technical factsheet on the project's sanitation facilities.

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