Behavioral Indicators of Household Decision-Making and Demand for Sanitation and Potential Gains from Sanitation Marketing in Ghana

Marion W. Jenkins[1] and Beth Scott[2]

June, 2006

[1] Asst. Research Engineer, Dept. of Civil and Environmental Engineering, University of California-Davis, one Shields Ave, Davis, CA 95616, USA. Email: mwjenkins@ucdavis.edu

[2] Research Fellow, The Hygiene Centre, DCVB Unit, Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, Keppel St., London WC1E 7HT, UK. Email: beth.scott@lshtm.ac.uk

Abstract

Household demand for improved sanitation in developing countries is an important social and behavioral process with implications for public health, sanitation policy and planning, and sanitation design and technology development. This paper develops a behavioral approach to assess household demand for improved sanitation in Ghana. Adoption decision stages of preference, intention, and choice to install a toilet in Ghana are defined, measured in a survey and used to estimate sanitation demand, identify factors affecting demand at each stage, and classify households by adoption stage to identify targeted demand-stimulation strategies. Results from a representative national sample of 536 households indicate that of 74% of households without any home sanitation, 31% have some likelihood of installing a toilet within the next year, but only 6% are very likely to do so; 62% had not considered the idea. Motivating and constraining factors are compared at each adoption stage and strategies likely to increase toilet installation in Ghana discussed. The approach is useful for assessing behavioral indicators of sanitation demand in developing countries and suggesting where marketing approaches can and cannot work to accelerate adoption of household sanitation improvements.

Introduction

Good sanitation is a foundation for health that affords protection from a wide range of infections including diarrhea, a leading cause of child deaths, yet 2.6 billion people still do not have a safe means of excreta disposal at home (WHO and UNICEF 2004). A target to halve this number by 2015 was added to the Millennium Development Goals in 2002. The enormity of the challenge, however, comes with the acknowledgement that public resources

alone are unable to solve this global problem and new demand-oriented approaches are needed (Mehta and Knapp 2004; WSSCC and WHO 2005).

Few large investment programs have been effective in increasing household sanitation in developing countries, yet people in these countries continue to install household toilets on their own without subsidy (Cairncross 2004; Jenkins and Sugden 2006). Using public funds to stimulate households to adopt improved sanitation through market-based promotion is increasingly advocated to leverage household and community resources for sanitation and may hold great promise for sustainably closing the sanitation gap (Mehta and Knapp 2004; Cairncross 2004). Such an approach parallels the use of social marketing in public health to achieve large-scale changes in health-related household and personal behaviors, where market research, audience segmentation, commercial marketing practices, and targeted products and interventions are fundamental components of program design (Kotler et al. 2002). However, often other tools are needed to stimulate and support private behaviors to achieve public goals. With this wider perspective in mind, Rothschild (1999) developed a framework for the strategic use of marketing along with two other primary tools for behavior change - education and law - to achieve public social or health goals. The degree to which a target population is prone, resistant or unable to adopt a new behavior derives from the presence or absence of self-interest (motivation), opportunity, and ability to voluntarily adopt the sanitation behavior (Rothschild 1999). Marketing can enhance awareness of self-interests and create opportunities to act, and can sometimes overcome lack of ability. When the target's self-interests are not served regardless of opportunities or abilities, the law may be needed to gain compliance, particularly when large negative externalities from non-adoption exist as they typically do for sanitation.

Recognizing where and how marketing can affect household sanitation decisions is the first of several challenges for sanitation managers wanting to use marketing approaches to increase demand for and access to improved sanitation. Where marketing is likely to be effective, a second challenge is to understand existing household sanitation behaviors and adoption decisions in ways that inform development of cost-effective strategies to increase adoption. In this study, a model of household sanitation adoption decision-making that accounts for motivation, opportunity, and ability was developed and applied in Ghana to allow sanitation managers to better measure, understand and predict behavioral determinants of demand for sanitation and strategically plan interventions based on marketing principles. The approach is broadly applicable where household sanitation coverage is low, but can also be adapted to areas where sanitation coverage might be high, but toilets (or latrines) unsafe or in poor condition. The model and survey tool serve three major purposes:

- Measure baseline household sanitation adoption and demand patterns
- Predict changes in demand for sanitation improvements by mapping the decision-making process into behavioral stages, classifying households within this process, and understanding barriers to adoption at each stage.
- Identify actions and policies to increase sanitation demand among households in different adoption stages.

A study of the decision to install a home toilet among households in Ghana illustrates how this assessment approach achieves these purposes. We label households who have already installed a toilet or latrine in Ghana 'adopters', while new demand is approximated by the portion of 'non-adopter' (without sanitation) households projected to pay for and build a new home toilet in the next 12 months. We describe our model of sanitation adoption stages

and how the survey was conceptualized and applied nationally in Ghana. Then we present and discuss the survey results related to estimating new household demand for sanitation in Ghana. Finally, we examine the segmentation of households by adoption stage and how this information can be used to design demand stimulation strategies based on marketing principles in the Ghanaian context.

Few studies have assessed consumer demand for sanitation in developing countries, and most of these have applied economic contingent valuation methods to approximate demand with willingness-to-pay bids (Wittington et al. 1993; Altaf 1994; Altaf and Hughes 1994). WTP estimates provide a measure of the hypothetical monetary value people place on what is often a narrowly prescribed sanitation change (crucial for bid accuracy) but are unable to provide time-bound predictions of demand. WTP studies typically ignore the transaction costs and constraints households encounter in real life and the tradeoffs they face when deciding to adopt and purchase new sanitation systems for the first time in developing countries. Yet these features emerge as important determinants of household demand for sanitation in this and other studies (Jenkins 1999, 2004). Contingent valuation studies also offer limited insight into weak demand, apart from price and income, and minimal guidance on ways to stimulate demand and change behavior.

Applying decision making models to estimate new sanitation demand draws from cognitive psychology and consumer purchase decision behavior to explain and predict changes in individual sanitation behavior over time by observing past and future sanitation adoption decisions, measuring their behavioral determinants, and mapping population into categories useful for understanding behavior change. Of particular interest are the individual attitudinal and structural determinants of preferring and choosing different competing

behavioral outcomes, rather than on socio-economic characteristics, to explain and predict household demand. Although commonly applied in WTP and other surveys, socio-economic characteristics typically lack explanatory power and provide poor predictors of individual changes in behavior for strategic planning and policy evaluation.

Sanitation Change Adoption in Developing Countries

A model is developed of the household decision to adopt a sanitation change, focusing on the process, observable stages, and households' logic behind each decision stage.

Adoption Decision Process

For a household without adequate sanitation in a developing country, deciding to improve sanitation by installing a toilet (e.g., pit latrine, bucket latrine, flush toilet, water closet or another excreta disposal facility) for the first time, changing to a new toilet system, or connecting to a sewer, can be a complicated and lengthy process. To first contemplate this decision, a household must be aware of the personal benefits of the sanitation change and the availability of products and services. Consumer theory and empirical evidence suggests that with sufficiently strong interest, a household will actively seek information about options, perhaps discuss with family members and technical specialists how and when to make a change. An adoption plan might mean choosing a sanitation technology (or service level) to fit the household's budget and lifestyle, picking a site, finding a mason and supplier of construction materials, negotiating costs, saving money, and acquiring a building permit in some settings. Viewing the adoption decision as a progression of evolving attitudes, knowledge, and actions provides a more detailed causal understanding of what generates demand for sanitation, and where sanitation coverage is low, factors that may constrain it.

Broadly speaking, non-adopter households can be categorized by whether or not they have thought about making a change to home sanitation, and if so, how far they have taken such thinking. While some may have considered a change, for example, installing a latrine, others will have little awareness of options or meaningful benefits of having a latrine and therefore never considered adopting. Among those who have considered installing a latrine, intention to actually build it will vary with priority given to the outcome and with the time frame and level of planning and preparations. Some may want a latrine but have ruled it out as unobtainable or "wishful" thinking. Perceived lack of ability to control arises from personal context or resources, or from absence of local information and opportunities, making the choice to build improved sanitation unavailable or beyond reach.

Preference, Intention and Choice Stages

Drawing from behavior change models and cognitive theories of individual decision-making, particularly the theories of reasoned action (Fishbein and Ajzen 1975) and planned behavior (Ajzen 1985) and empirical study of household sanitation choices in Benin (Jenkins 1999, 2004; Jenkins and Curtis 2005), we develop a simplified model of three progressive stages of the decision to adopt a sanitation change called preference, intention, and choice. Figure 1 illustrates the key theorized determinants of progression at each stage.

Preference

The adoption decision starts with development of 'preference' for a sanitation improvement over one's present defecation practice. Preference captures purchase motivation and the expected relative advantages, benefits and reasons (perceived utility gain) for wanting a sanitation improvement. Motivation to change sanitation arises from dissatisfaction with current household defecation or excreta management practices coupled with sufficient

awareness of advantages of new options (Jenkins and Curtis 2005). In this stage, households are interested in and have considered a sanitation change but have not necessarily begun to plan it.

Intention

Households in the intention stage have begun to plan a sanitation change, but vary in their degree of plan development. For many behavior changes, once awareness and motivation are sufficient, change is within the voluntary control of the individual or household. This is the case for example with hand washing, when soap, water, and technical knowledge usually exist within the household. However, changing sanitation infrastructure for the first time requires more than awareness and motivation, including new and unfamiliar materials, products/services, technical knowledge and skills, much of which must be acquired outside the home. These less controllable inputs often entail uncertainty and risks for households without prior sanitation experience. Even do-it-yourself latrine construction usually requires special materials and new technical knowledge. Starting a plan to change home sanitation technology or practice ('intention' in Figure 1) depends directly on the availability, quality, and cost of opportunities to acquire materials, products, construction services, financing, skills, and knowledge, and on the personal resources, experience, and abilities of individual households to take advantage of these opportunities. Commitment to changing sanitation reflects the priority given to this change compared to expected outcomes from alternative uses of limited savings, time, effort, and other household resources. If required abilities or opportunities are perceived to be lacking, or priority low, a household is likely to form a very weak or no intention to adopt a sanitation change (Azjen and Madden 1986).

Choice

Choice, the last stage of a successful adoption process, involves the individual's *actual* ability to use and control opportunities to carry out their intention to adopt (Azjen 1985). This stage carries a very high likelihood of adopting a sanitation change within a short time. Choice requires a well-developed intention and concrete actions consistent with a strong imminent intention to change sanitation practice, including acquisition of relevant knowledge (e.g., cost), saving money, and site and toilet technology or service provider selection. Observed sanitation choices are the outcomes of this decision process, and collectively generate new demand for a sanitation change (in general and for specific technologies, services and products).

Role of Constraints

Perceived inabilities, inadequate resources, and lack of opportunities are different kinds of 'constraints' to adoption (Figure 1). In Benin, 13 constraints were found related to construction problems, individual situations, and psychosocial factors that blocked the choice to build a home toilet (Jenkins 1999, 2004). Similar constraints have been reported elsewhere (Jenkins and Sugden 2006). Increasing absence of perceived constraints, or 'perceived behavioral control' in the theory of planned behavior, similar in function and concept to to self-efficacy in the Health Beliefs Model (Ajzen 2002), directly strengthens intention to change sanitation practice while actual behavioral control determines whether the intended behavioral choice is achieved (Ajzen and Madden 1986).

Constraints vary in their effects on sanitation decisions. Those perceived as unchangeable (permanent) are thought to act early in the decision process to block progression from preference to intention, while constraints perceived as removable

188 (temporary) are expected to act later in the decision process to delay preparations and final
189 choice (Jenkins 1999). The differential effects of constraints on adoption are explored in the
190 Ghana study.

191 *Adoption Stage Indicators, Determinants and Question Formats*

192 Indicators were developed and questions constructed in a survey format to measure the
193 three decision stages and their determinants (Table 1). Sanitation demand in Ghana was
194 assessed by the number of non-adopter households at each stage of preference, intention, and
195 choice, and new demand estimated by households in the last stage of 'choice' who expressed
196 a 'high' likelihood of building a home toilet within 12 months.

197 While the household is our unit of analysis, dynamics of intra-household decision-
198 making are beyond this research. To capture a household's adoption decision behavior in an
199 interview format, the household member most responsible for making decisions about
200 changes in home sanitation infrastructure should be interviewed. In our experience, this has
201 consistently been the head of household in non-tenant households but is less clear who this
202 should be in tenant households in developing countries where tenancy is often informal and
203 takes many different forms under complex occupancy patterns (see Gilbert (1983), UNCHS
204 (1996) and Rakodi (1995)).

205 ## Methods and Materials

206 A questionnaire based on the indicators in Table 1 was developed to achieve the
207 following objectives:

208 - measure baseline household sanitation coverage levels,
209 - estimate new demand for household toilets among those without adequate sanitation,

measured by a high likelihood of installing a toilet within 12 months,

- classify households by adoption stage to assist in designing marketing strategies, and
- examine predictors at each stage, related to awareness, dissatisfaction, motivations, and constraints,
- quick and easy to implement in developing countries.

Ghana Questionnaire and Survey Execution

Table 1 shows the question formats used in the Ghana survey to measure the three adoption stages and their determinants. The questionnaire was divided into five sections:

1. Description of current defecation places and technologies, satisfaction with current situation, and most and least appreciated features of present defecation place.
2. Information related to ownership, age, decision-making, cost, and trigger reason for installed toilet asked of adopter households, identified from section 1.
3. Expected benefits of installing home sanitation, asked to all households.
4. Perception of constraints and awareness of toilet technologies asked to households without home sanitation, consideration of home toilet installation and strength of intention within 12 months.
5. Socio-economic and demographic characteristics.

Thirty-four structured questions (15 on socio-demographics) were included in a larger baseline survey for the National Handwashing Promotion Program (www.globalhandwashing.org) under the Ghana Community Water and Sanitation Agency. Coded responses were initially informed by an in-depth qualitative study in one town. Question formats and coding were refined following pre-testing of the survey in late July 2003 and field work conducted from 29th August through 22nd September 2003. Trained

enumerators conducted one-on-one interviews under the management of Research International, an international market research agency with offices in Accra.

Study Site

Ghana has a population of about 21 million. Most urban and peri-urban households use public latrines while a near majority of rural households defecate in the open. Private sanitation coverage is low (about 30 % urban and lower in rural areas) (Ayee and Cook 2003). Public toilets are run mostly by local governments, charging a fee of about 1.25 cents US. They are often in poor condition and lack privacy. Public toilets are commonly non-water based and include cesspit, ventilated improved pits (VIP) and Kumasi VIP latrines (KVIP) designed as a double vault composting toilet, but rarely operated this way in public settings. Bucket latrines in public and private use, while previously common, are being phased out. In some cases, flush toilets (water closets or WCs) have been installed in public toilets. Much confusion exists around the terms KVIP and VIP in Ghana. While technically distinct, they are commonly misunderstood as the same technology in Ghana, with the term KVIP used for public toilets and VIP in domestic settings.

Sampling and Sample Description

A sample of 536 rural and peri-urban households was selected following a sampling approach used by professional market researchers in Ghana for a representative national sample. A subset of regions, including Greater Accra, Ashanti, Eastern, Western, and Northern, was selected to represent the three socio-ecological zones of Ghana. Within each region, ten Census Enumeration Areas (EAs) were randomly selected from the list of all EAs. Within each EA, 10-11 households with children under five years were selected using the random route walk technique, for a total sample of 536 households. Screening ensured that

only households with a mother of young children were interviewed as this was the primary target audience of the National Handwashing Promotion Campaign.

Descriptive characteristics of the sample are reported in Table 2. Mothers had a mean age of 30, were mostly Christian, predominantly Akan, living in compound houses and more than 50% were not educated beyond primary school. In most cases (86.4%) the father of the child lived with the mother. Less than one fourth of these men were educated beyond junior secondary school and a quarter of them worked in agriculture. Almost three quarters of all households earned 500,000 cedes/month (about $55 US) or less, with one third earning less than 250,000 cedis/month ($39).

Data Analysis

Descriptive statistics were computed. Chi-squared values for the likelihood ratio were used to test for significance differences in satisfaction levels, motivations, constraints and other hypothesized determinants at each stage of the adoption model.

Results

Existing Household Sanitation

Adults in over half (58.2%) of sample households used public toilets while 14% practiced open defecation. Only one quarter (25.6%) can be described as household toilet *adopters*, possessing a private toilet either in their individual household (11.0%) or shared compound (14.6%). Those with compound toilets are included as household *adopters* as compound houses composed of multiple households represent a common living arrangement in Ghana; half of this sample lived in compound houses (Table 2). Children under five years predominantly used potties (82.0%), while the toilet habits of children above this age broadly

reflected those of their parents, particularly in adopter households. Among non-adopters, a higher percentage of older children (25.2%) than adults (14.0%) practiced open defecation.

Five household toilet technologies presently exist in Ghana – the flush toilet (WC) (15%), bucket latrine (20%), traditional pit latrine (21%), and KVIP/VIP latrine (44%). Among the 137 household toilet adopters, two thirds were able to recall when their current toilets had been constructed. Less than 5% of adopter households had built their toilet prior to 1990, with adoption accelerating in the late 1990s.

In over half of cases (56.2%), landlords (generalized term for compound owner) were reported to have decided to build the household latrine (consistent with shared compound living), while household heads were the decision-maker in one in four adopter households. It was extremely rare (1.5%) for tenants to decide to install a toilet. Where household heads had taken the decision, the perception of ownership was sometimes more broadly defined. In over a third of these cases, women stated that it was the whole household, not just the head, who 'owned' the toilet.

Although rarely making the decision themselves, nearly 80% of respondents were able to cite motives for constructing the facility. The most common reasons given were:

- for sick or old relatives (23.2%)
- to offer safety at night (18.8%)
- for convenience (12.5%)
- to make it easier to keep the facility clean (9.8%)

Non-adopter Households - Satisfaction Levels

Non-adopters were 74.4% of sample households, reflecting the general population in Ghana. Among these, 65.2% were dissatisfied with their current place of defecation. The two

most disliked attributes of current defecation places were that they were smelly (27.1%) and dirty (26.6%). Other cited dislikes included the distance to toilet facilities (8.3%), lack of comfort (7.0%), having to pay to use them (6.0%), and having to share with others (5.8%).

A third of non-adopters could cite no positive attributes for their place of defecation. Among those that could, the most liked attributes were that toilets were convenient (26.6%) and clean (17.8%). Dissatisfaction with one's defecation facility was significantly associated with being unable to cite any positive attributes, with citing privacy as the most positive attribute, and with disliking its dirty state (Table 3). Conversely, satisfaction was significantly associated with valuing its cleanliness and safety.

Non-adopter Households - Motivating Reasons for Toilet Installation

All non-adopters were asked to give three top reasons for building a household toilet. The most heavily cited reasons were convenience (51.4%), that they are easy to keep clean (43.1%), good health (41.9%), and general cleanliness (27.8%). Presently non-adopters travel to open defecation sites and public latrines, and in the latter case, join long queues in the morning or evening. Public latrines in particular tend to be dirty and squalid, with feces lying around squat holes which emit heat, gases and bad odors, believed to cause ill-health (Obika et al 2002). Indeed, while 41.9% of respondents cited good health as a key reason to build a household toilet, only one third said that germs were the cause of ill-health, two thirds believing illness to be caused by heat, smell, feces or dirt. Thus toilets need to be clean to protect health, but further, in Ghana, people have a particular need or desire to be neat, clean and not smell, reflecting not just physical but mental and moral purity (van der Geest 1998).

Non-Adopter Households - Constraining Factors Blocking Adoption

Respondents also were asked about the constraints to constructing household toilets.

The major constraints cited by non-adopters were limited space (48.4%), high costs (33.6%), no one to build (32.3%), competing priorities (31.8%), and savings and credit issues (30.1%). These constraints were also commonly cited in in-depth qualitative research conducted in a small Ghanaian town broadly representative of peri-urban Ghana (Obika et al. 2002). Households are densely packed into tight areas, compound housing common and spare space highly limited, existing toilet technologies are expensive to install apart from the bucket latrine, and there is limited knowledge of their operation and of masons to construct them. School fees are a priority for limited savings and few if any formal credit mechanisms exist for home improvements (Obika et al. 2002). The influence of these motivations and constraints on sanitation adoption decisions and new demand is examined next.

Determinants of New Demand in Ghana

Among non-adopter households, most (61.7%) had never considered installing a household toilet and therefore not yet entered the adoption process (Figure 2). Among those with preference for installing a toilet (38.3%), rate of advancement to the intention stage was high (81.7%), as measured by some likelihood of building a toilet in the next year. However, of the sample of 399 non-adopter households, only 5.8% expressed a high likelihood of building within the next 12 months, resulting in a low rate of new demand. The next sections explore factors contributing to preference for toilet installation and to the likelihood of toilet building in Ghana.

Households With Preference

Households who had considered installing a home toilet were less satisfied with their current defecation place and stated significantly more reasons for building household toilets than those who had not considered installing one. Such households were more likely to

mention six reasons: good health, ease of cleaning, cleanliness, privacy/dignity, safety/security, and avoid sharing with others. Differences in dissatisfaction and their tendency to cite reasons related to good health, privacy/dignity, and safety/security were significant ($p \leq 0.05$), while the others were nearly so (Table 4). Those who had considered installing sanitation *and* stated good health as a reason were significantly ($p \leq 0.05$) more likely to say that feces was the cause of ill health than those stating good health who had not considered installation.

Households With Intention

The likelihood of building a latrine, rated as 'no chance, low, medium or high', was measured for the 153 non-adopter households who had considered installation. Of these, nearly 4 of 5 expressed some positive intention to build within 12 months. No significant differences in either satisfaction levels or motivation were found between those with and without intention to build (Table 4) except for the statistically greater number of reasons for building stated by intenders. As hypothesized in the adoption stages model and consistent with planned behavior theory, significant differences between the two groups were only found for constraints and priority. Those with no intention to build within 12 months were 2-2.5 times more likely to mention limited space (71% to 33%), competing priorities (55% to 25%), savings/credit issues (50% to 27%), and tenancy issues (50% to 20%) than those with positive intention, showing these constraints block the formation of intention.

Households Who Have Chosen to Build a Toilet

Only 1 in 6 of the 122 households with some intention to build in the next year said they had a high likelihood of completing construction. The remaining 5 of 6 intender households expressed medium or low likelihoods of completion. Satisfaction levels,

motivating reasons, and stated constraints of these two groups were compared (Table 4). Those with a high likelihood of building were twice as likely to be very dissatisfied with their current defecation place as those with medium or low likelihood. Choosers were also statistically less likely to give good health and comfort as top reasons for installation, but were otherwise motivationally similar to those with medium or low intentions, although convenience, cleanliness, and visitors/guests were more commonly mentioned as top reasons.

Constraints blocking final choice to build included high costs, no one to build, water table/soil conditions, and technical complexity. These constraints were positively correlated with progression from preference to intention stages (Table 4). Their statistically significant, or nearly so, relative absence among choosers suggests these four factors are important barriers to new demand that operate late in the decision process after intentions take shape, to block implementation by postponing or delaying construction.

Three of the four factors blocking early intention relate primarily to structural factors associated with the individual household's situation, abilities, and resources (i.e., tenancy, savings/credit, limited space). Difficult to change in the near to medium term and perceived early in the decision process, these would make it futile to explore plans to build. Conversely, all four factors that later block choice relate to the nature, quality and availability of opportunities to build a toilet which are external to the household, but essential for adoption (i.e., high cost, no one to build, water table/soil conditions, technical complexity).

Preferred Toilet Types

No statistically significant preferences for toilet type emerged for any adoption stage. Slightly more households with positive intention chose KVIP/VIP than those with preference but no intention, while slightly more households with a high likelihood of building within the

393 year picked flush toilet than those stating medium and low likelihoods, but these differences
394 were not significant.

395 Discussion

396 The survey results, summarized in Table 5, support a model of three adoption stages
397 of preference, intention and choice as a practical tool for assessing demand for sanitation
398 among households in Ghana. *Preference* for changing sanitation is largely created by
399 dissatisfaction with current practices and good awareness of the benefits of home toilets in
400 Ghana. *Intention* to build is determined by positive preference, prioritization, and the absence
401 of structural constraints related to individual situational factors or abilities that may appear
402 insurmountable to the household. The final *choice* to install a toilet depends on the additional
403 access to appropriate opportunities to build, related to product choices, cost, building services,
404 soil conditions and access to good technical information and support.

405 High levels of dissatisfaction with one's current defection place in the choice stage
406 suggest added urgency to put an existing plan into action. Trigger events such as an
407 embarrassing accident or missing an important school or work event due to queues at the
408 public toilets (Obika et al. 2002), or sudden sickness or deteriorated health of an aged parent,
409 may increase dissatisfaction with the household's present defecation situation and raise
410 priority for a home toilet above other demands on household resources.

411 *Strategies to Increase Sanitation Demand in Ghana*

412 Strategically designed and targeted marketing and market-based interventions could
413 remove or reduce some barriers to adoption identified in Ghana. We discuss strategies to
414 increase demand for household toilets in Ghana at each adoption stage and examine where

415 marketing approaches are unlikely to change decision behavior. In such cases, approaches
416 involving legal mechanisms and educational/informational campaigns may be needed as
417 complementary tools (Rothschild 1999).

418 *Increasing Preference*

419 Significant determinants at each stage of toilet adoption in Ghana show that
420 awareness, dissatisfaction, and motivation are needed to start the decision process. Large-
421 scale marketing communications using advertising and consumer information dissemination
422 methods to enhance awareness of options, highlight benefits, and arouse motivation offer a
423 promising strategy to stimulate non-adopter households in Ghana who have not considered
424 toilet installation (>60%) to do so. The campaign should focus on the salient benefits of
425 installing household toilets in the Ghanaian context – convenience, safety and cleanliness –
426 and increase awareness of negative aspects of current defecation practices associated with
427 dissatisfaction, specifically their dirty and smelly state. Motivations for adopting sanitation in
428 Ghana appear largely unrelated to the fecal-oral transmission of disease, confirming similar
429 findings elsewhere (Cairncross 2004; Jenkins 2004). Reasons to change sanitation have been
430 shown to vary considerably across households as a function of lifestyles, local environment,
431 and socio-cultural aspects of excreta handling and defecation practices, but typically have
432 little to do with preventing fecal-oral diseases (Jenkins and Curtis 2005; Frias and Muhkerjee
433 2005; Obika et al. 2002; Muhkerjee 2001). In Ghana, cleanliness and neatness are
434 particularly salient motivations for a wide range of hygiene behaviors. Neatness is culturally
435 tied to notions of moral and social purity, while diseases associated with feces are believed to
436 be transmitted via sighting feces and by fecal heat and odor produced in open latrines (Scott et
437 al. 2003; Obika et al. 2002; vander Geest 1998).

Increasing Intention to Build

In Ghana, household situational constraints related to limited space, tenancy, and savings were the main factors preventing households with positive preference for a home toilet from forming an intention to build one. Tenant households in Ghana have little or no control over the sanitation infrastructure where they live. Only two of the 76 tenant adopter households said they had made the decision to build and only one indicated some claim to ownership of the latrine. This explains the disproportionately higher fraction of non-adopter households stalled at the preference stage who are tenants (55%) compared to the intention stage (20%). Interestingly 100% of tenant households stated competing priorities as a main reason for not building a toilet compared to just 5.6% of other non-adopter households. Investigation of the variety of tenant occupancy patterns, tenant priorities, and how different kinds of landlords make sanitation installation decisions in Ghana is warranted to understand the unique sanitation access problems of non-owner households and identify strategies for this distinct population segment. Tenancy in tenant-only houses is likely to create a housing situation where marketing is ineffective in achieving sanitation improvements without legal action to encourage landlords to add sanitation facilities to their properties.

Limited space is also a more complex constraint to overcome - it may require development of new sanitation technologies and services before marketing can be applied. Expression of this constraint is symptomatic of lack of pit emptying services in poor urbanizing areas and of sanitation technologies that require excessive amounts of space, relative to the cost and opportunity value of space in poorer dense neighborhoods and over-crowded slums. The bucket latrine with frequent and regular emptying service was a product-service package that worked well for decades for hundreds of thousands of Ghanaian

461 households who lacked space and capital, until national policy called for phasing them out
462 and public conservancy labor arrangements ended in many towns. In Tanzania, the
463 importance of pit emptying services for sustaining on-site urban sanitation has emerged as a
464 critical factor for adoption and maintenance of household toilets (Jenkins and Sugden 2006).
465 The savings constraint reflects two structural problems: real poverty and a lack of
466 financing and credit options for home improvement. Marketing is unlikely to be able to fully
467 address either of these and laws, public policies, and other mechanisms are required.
468 However, work in Vietnam is finding that development of flexible payment schemes can help
469 reduce savings difficulties related to the high initial cash cost of sanitation installation (Frias
470 and Mukherjee 2005).
471 *Increasing Final Choice*
472 Approximately 30% of non-adopter households in Ghana have begun planning to
473 install sanitation as shown by their positive intention to build. However 5 of 6 are stalled in
474 the process, failing to carry through their intention. Major reasons for failure to progress are
475 perceived high costs of toilet options, no one to build, the complexity of building related to
476 lack of information, and water table and soil problems. These constraints to new demand
477 could be addressed by actions to improve the quality, range, and costs of toilet technologies
478 offered in the market place, innovative ways and incentives to extend the private sector supply
479 chain of these products and related services (e.g. vault or pit emptying) needed to build,
480 operate, and maintain toilets closer to these households, and sales promotion and product
481 education and marketing to reduce households' transaction time and effort costs involved in
482 searching for good information about technologies and how to get them built; product, place,
483 price and sales promotion comprising the four basic 'Ps' of a marketing plan (Kolter et al

2003).

Sanitation Gains using Marketing Strategies

Projections to 2015 were made for Ghana to examine sanitation access scenarios in light of development goals and the potential gains from marketing strategies emerging from this national demand assessment. Assuming a uniform annual rate of new household toilet adoption at 5.8% of non-adopter households, 100% maintenance of installed household facilities, phasing out bucket latrines by 2010, current housing patterns, and a population growth rate of 1.9%, calculations indicate home toilet access in Ghana would rise from 25.6% of households in 2003 to 54.3% by 2015 (Figure 3) without additional action. How much would proposed marketing strategies to reduce blockages at the preference and choice stages be expected to increase adoption rates and coverage?

2015 projections for two marketing scenarios were compared to the "no action" base case. Scenario 1 assumes a national advertising and communications campaign raises household awareness and interest in home toilet installation and increases the rate of preference (those who have considered installing a toilet) by 50% (from 38.5% to 57.8% of non-adopter households). No actions to change the base rates of intention and choice are assumed. Scenario 1 increases adoption rates to 8.7% per year and achieves 65% projected sanitation access by 2015. Scenario 2 adds a mix of marketing strategies to scenario 1 to reduce barriers and increase the rate of choice in the last stage of adoption by 50% (from 18.5% to 27.8% of intenders). Again, no change is made to the intention rate, determined largely by constraints which marketing may be ineffective at addressing. Combining the changed rates of preference and choice, Scenario 2 yields a 13.1% annual rate of adoption and projected 77% sanitation access by 2015, achieving an estimated 1.2 million more households

or 5.8 million more people with home sanitation by 2015 over the baseline in Ghana. Although these projections reflect the simplified assumptions of a static adoption rate and instantaneous effects, they illustrate the causal pathways by which marketing strategies work to accelerate adoption rates above baseline trends.

Segmenting Households

This analysis reveals how population sub-groups blocked at the intention stage would remain without access to a home toilet unless other non-market-based actions and policies were developed to address constraints of extreme poverty and tenancy that block home toilet installation in Ghana. Consumer segmentation is a fundamental planning tool in marketing, whereby the target population is divided into more manageable homogenous segments for which a specific mix of marketing activities can be developed. A core implication of our sanitation adoption decision model and this analysis is the need for different interventions at different stages in the adoption process. Programs may choose to design a set of strategies that target only one adoption stage, or all of them, but one blanket intervention for everyone is unlikely to work. Using a behavioral approach to assess demand allows managers to work out where most of their target population lies in the adoption process and how vulnerable sub-groups compare to the majority, enabling development of actions that target barriers at each adoption stage for any population segment of interest.

Limitations and Recommendations

Response rates and reliability for some questions in the Ghana survey would have been improved by interviewing the person in each household responsible for decisions about building or improving housing facilities. One third of the women respondents in this survey were unable to say when their toilets were built and over twenty percent unable to say why

530 they had been built because they were not the decision-maker. Nonetheless, the results
531 indicate that mothers in Ghana in most households participate in infrastructure decisions
532 sufficiently to be able to answer many of the questions related to future toilet acquisition and
533 demand.

534 Prior to adapting the survey for another setting or context, a small qualitative study
535 using in-depth interviews or focus group discussions is required to establish sensible codes for
536 questions related to motivations, constraints, toilet types and preferred attributes. We were
537 able to draw from a recent qualitative study of these issues and supplement it with pilot-
538 testing.

539 Overall, the survey was relatively straightforward to conduct and took about 20
540 minutes to administer. It required no additional training or skills beyond those of personnel
541 trained and experienced in quantitative household survey methods and sampling techniques
542 and familiar with the project population. An experienced market research agency was able to
543 conduct the field work with oversight developing the questionnaire and coding schemes, and
544 pilot testing.

545 Conclusions

546 Findings from a national survey to assess sanitation demand in Ghana fit a preference-
547 intention-choice behavioral decision model of household sanitation adoption. Results show
548 how satisfaction with existing defecation practices, motivations for improving sanitation,
549 priority over competing household concerns, situational and implementation-related
550 constraints affect preference for and likelihood of household toilet installation and create new
551 demand for sanitation in Ghana. This survey-based behavioral approach provides a quick and

552 effective method to assess and understand what drives household demand for improved
553 sanitation, segment households by adoption stage, and pinpoint focused strategies to stimulate
554 increased rates of preference, intention and choice to improve sanitation. In the Ghana case,
555 categorizing the target population in terms of the adoption stages that generate new demand
556 for home toilets provides useful information to identify policies and design interventions to
557 stimulate higher rates of demand. In particular, marketing strategies aimed at the preference
558 and choice stages are promising ways to increase household sanitation demand and coverage
559 in Ghana.

560 ## Acknowledgements

561 Nana Garbrah-Aidoo and Research International, Ghana managed the survey field work and
562 data entry and designed the sampling approach. Steven Sugden, Sandy Cairncross, and Jay
563 Lund provided suggestions and comments on earlier drafts.

564 ## References

565 Ajzen, I. (1985) "From intentions to actions: A theory of planned behavior." In J. Kuhl & J.
566 Beckman (Eds.) *Action control: From cognition to behavior*. Springer, Heidlburg.
567 Ajzen, I. (2002) "Perceived behavioral control, self-efficacy, locus of control, and the theory
568 of planned behavior." *J. Applied Social Psychology*, 32:1-20.
569 Ajzen, I. and T. J. Madden (1986) "Predicting of goal-directed behavior: Attitudes, intentions,
570 and perceived behavioral control." *J. of Experimental Social Psychology*, 22:453-474.
571 Altaf, M.A. (1994) "Household demand for improved water and sanitation in a large
572 secondary city." *Habitat International*, 18(1):45-55.

573 Altaf, M.A. and J. A. Hughes (1994) "Measuring the demand for improved urban sanitation
574 services: Results of a contingent valuation study in Ouagadougou, Burkina Faso." *Urban*
575 *Studies* 31:1763-76.
576 Ayee, J. and R. Crook (2003) "'Toilet wars: urban sanitation services and the politics of
577 public-private partnerships in Ghana." IDS Working Paper No. 213. Institute of
578 Development Studies, Brighton, Sussex, UK. December 2003.
579 Cairncross, S. (2004) *The case for marketing sanitation*. Field Note, Sanitation and Hygiene
580 Series. Water and Sanitation Programme – Africa. The World Bank, Nairobi, Kenya.
581 August 2004.
582 Fishbein, M., and I. Ajzen (1975) *Belief, attitude, intention, and behavior: An introduction to*
583 *theory and research*. Reading, MA: Addison-Wesley.
584 Frais, J. and N. Muhkerjee (2005) *Harnessing market power for rural sanitation*. Field Note.
585 Water and Sanitation Programme – East Asia and Pacific. Jakarta, Indonesia.
586 Gilbert, A. (1983). "The Tenants of Self-help Housing: Choice and Constraint in the Housing
587 Markets of less Developed Countries." *Development and Change*, 14: 449-447.
588 Jenkins, M.W. (1999) *Sanitation promotion in developing countries: Why the latrines of*
589 *Benin are few and far between*. PhD dissertation. Dept. of Civil and Environ.
590 Engineering, University of California, Davis, California.
591 Jenkins, M.W. (2004) *Who buys latrines, where and why?* Field Note, Sanitation and
592 Hygiene Series. Water and Sanitation Programme – Africa. The World Bank, Nairobi,
593 Kenya. September 2004.
594 Jenkins, M.W. and V. Curtis (2005) "Achieving the 'good life': Why some people want
595 latrines in rural Benin." *Social Science and Medicine*, 61(11): 2446-2459.

Jenkins, M.W. and S. Sugden (2006) "Rethinking Sanitation: Lessons and Innovation for Sustainability and Success in the New Millenium." Sanitation Thematic Paper, UNDP Human Development Report 2006. UNDP HDRO, New York. January 2006.

Kotler. P., G. Armstrong, J. Saunders and V. Wong (2002) *Principles of Marketing*. Prentice Hall Press, 3rd Edition, NY.

Metha, M and A. Knapp (2004) *The challenge of financing sanitation for meeting the Millennium Development goals*. Commissioned paper for the Commission on Sustainable Development. Norwegian Ministry of the Environment. Water and Sanitation Programme – Africa, The World Bank, Nairobi, Kenya. March 5, 2004.

Mukherjee, N. (2001) *Achieving sustained sanitation for the poor: Policy lessons from participatory assessments in Cambodia, Indonesia and Vietnam*. Field Note. Water and Sanitation Program - East Asia and the Pacific, Jakarta, Indonesia.

Obika, A., M. Jenkins, V. Curtis, G. Howard, and TREND (2002) *Social marketing for urban sanitation: Review of evidence and inception report*. Water, Engineering and Development Centre, Loughborough University, Lourghborough, UK. October 2002.

Rakodi, C. (1995) "Rental Tenure in the Cities of Developing Countries." *Urban Studies* 32(4-5):791-811.

Rothschild, M. L. (1999) "Carrots, Sticks, and Promises: A Conceptual Framework for the Management of Public Health and Social Issue Behaviors." *J. of Marketing*, 63:24-37.

Scott, B., V. Curtis, T. Rabie, N. Garbrah-Aidoo, and Research International (2002) *What Motivates Handwashing in Ghana? A Re-analysis of the Results of the Formative Research*. Available at:

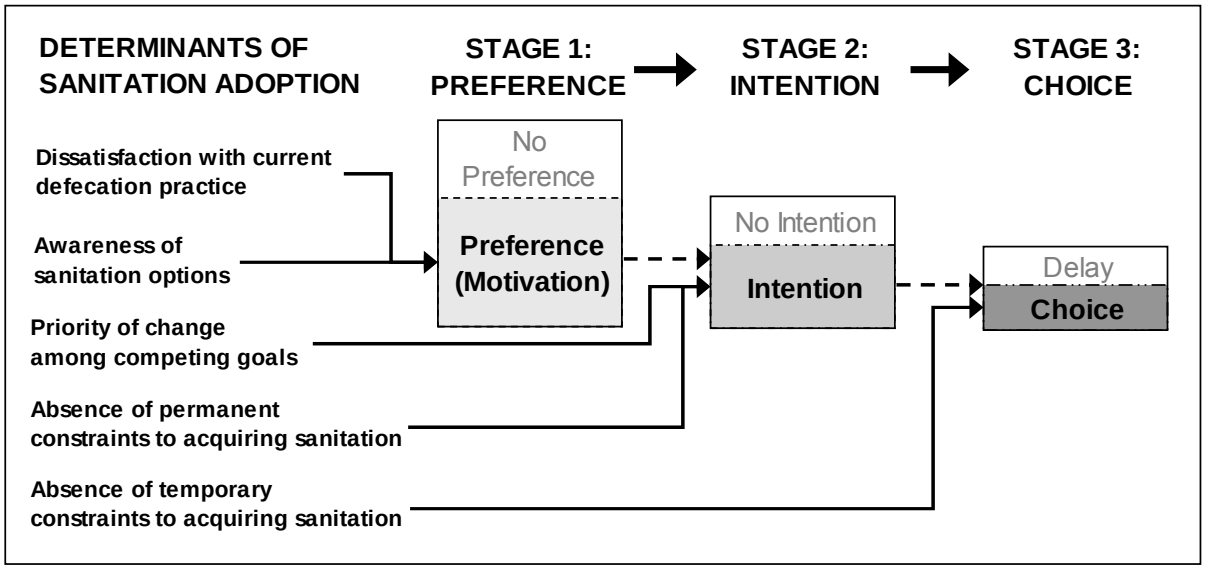
UNCHS (1996) *An Urbanizing World: Global Report on Human Settlements 1996*. Oxford:

Oxford University Press.

vander Geest, S.J. (1998) "Akan Shit: Getting Rid of Dirt in Ghana." *Anthropology Today,* 14(3): 8-12.

WHO and UNICEF (2004) *Meeting the MDG drinking water and sanitation target: A mid-term assessment of progress, 2004*. WHO/UNICEF JMP for Water Supply and Sanitation, The World Health Organization, Geneva, Switzerland.

Wittington, D., D.T. Lauria, A.M. Wright, K. Choe, J.A. Huges, and V. Swarma (1993) "Household demand for improved sanitation services in Kumasi, Ghana: A contingent valuation study." *Water Resources Research*, 29(6): 1539-1560.

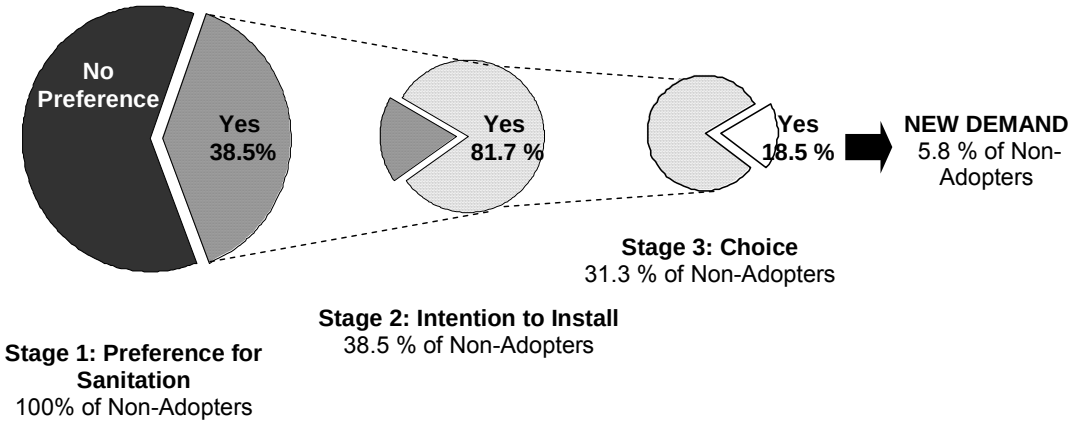


628

629 **Figure 1. Adoption Decision Stages and Determinants of New Sanitation Demand**

630

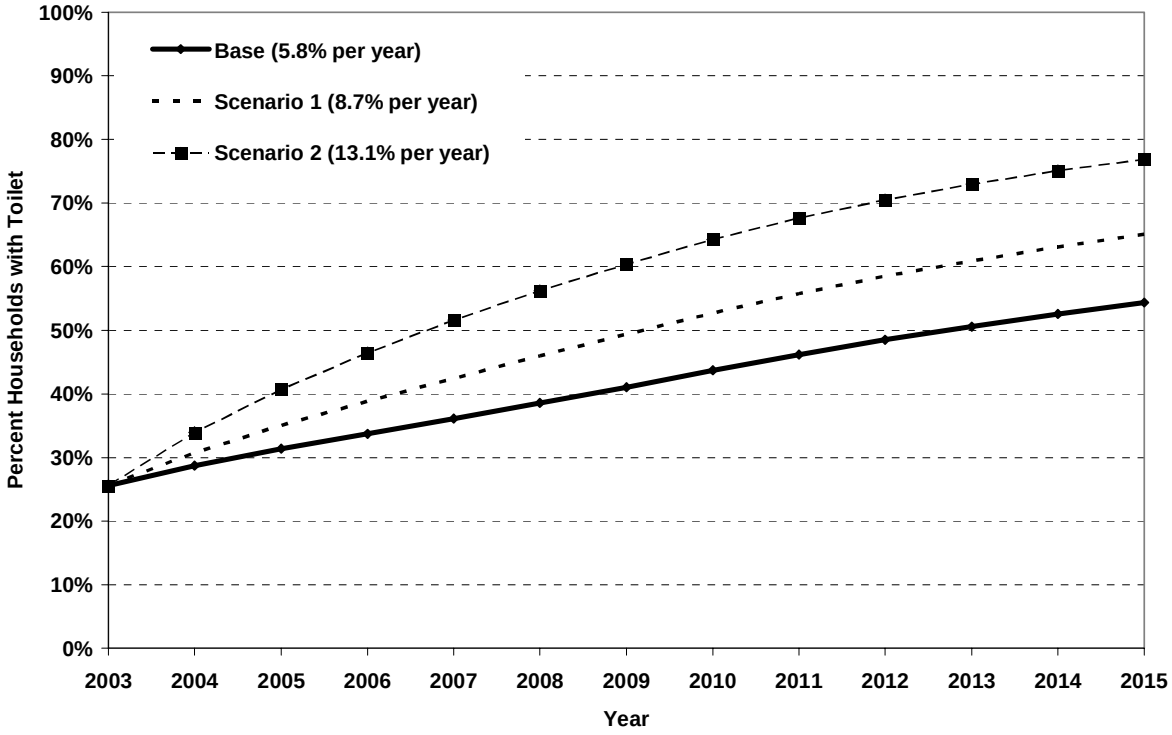
631



632

633 **Figure 2. New Sanitation Demand and Adoption Stage Rates in Ghana 2003.**

634



635

636 **Figure 3. Projected Household Toilet Coverage Rates in Ghana**

Table 2. Sample Description

Socioeconomic Category	Characteristic N=536	
Respondent's Age	Range: 17-68 Mean: 30 (SD 6.51)	
Region	Greater Accra	21.9%
	Ashanti	27.3%
	Eastern	15.7%
	Western	16.3%
	Northern	18.7%
Ethnicity	Akan	53%
	Ga/Adangbe	17%
	Ewe	6%
	Mole-Dagbani	16%
	Other	8%
Respondent's Education	None	27.1%
	Primary	28.4%
	Junior Secondary	31.9%
	Senior Secondary	11.8%
	University	0.9%
Dwelling Type	Compound	(50.8%)
	One Family	(26.2%)
	Flat/Apartment	(3.4%)
	Room(s)	(20.2%)
Father's Occupation	Professional	(20.1%)
	Sales/Commerce	(12.5%)
	Services	(17.7%)
	Trader	(4.1%)
	New Trade	(4.1%)
	Agriculture	(24.8%)
	Unemployed	(1.9%)
	Father Absent	(14.6%)
Income	<250k Cedis	(34.7%)
	251-500k	(35.1%)
	501-900k	(20.0%)
	901k +	(11.2%)

Table 3. Most and Least Liked Attributes of Current Defecation Place (Non-Adopter Households)

	Satisfied N=139 (34.8%)	Unsatisfied N=260 (65.2%)	
Most Valued Attribute	(% citing)		
Nothing	7.2	47.7	(0.00)*
Cleanliness	41.0	5.4	(0.00)
Privacy	2.2	6.9	(0.03)
Safety	5.0	1.5	(0.05)
Good Health	7.9	3.8	(0.10)
Comfort	4.3	1.5	(0.10)
Convenience	28.8	25.4	(ns)
Get to work/school on time	3.6	5.0	(ns)
Least Liked Attribute			
Dirty	14.4	33.1	(0.00)
Pay to use	12.9	2.3	(0.00)
Distance	12.9	5.8	(0.02)
Share with others	9.4	3.8	(0.03)
Hard to maintain	0.7	3.1	(0.10)
Lack of comfort	4.3	8.5	(0.11)
None	7.9	5.0	(0.25)
Smell	25.9	27.7	(ns)
Queuing	5.0	3.5	(ns)
Fills up quickly/difficult to empty	2.2	2.7	(ns)

* chi-squared p-value for log likelihood ratio comparing “Satisfied” with “Unsatisfied”

Table 5. Households Without Home Sanitation by Adoption Stage in Ghana

Decision Stage	Factors Blocking Decision to Adopt Improved Sanitation
Preference	lack of awareness of benefits of household toilet weak or few motivations satisfaction with existing defecation practice
Intention	lack of preference lack of priority or competing priorities permanent constraints related to individual situation, including: limited space, tenancy issues, credit and savings difficulties
Choice	lack of preference and intention satisfaction with existing place temporary constraints related to opportunities: high cost, no one to build, water/soil conditions, and technical complexity

Table 1. Question Formats, Stage Indicators and Determinants for Measuring Sanitation Demand

	Example Survey Question Formats	Decision Stage Indicator			Decision Stage Determinant			Included in Ghana Survey
		P	I	C	P	I	C	
1	Have you considered installing a household toilet? "YES" /"NO"	x						yes
2	Have you ever discussed the idea of building a toilet with members of your household? "YES"/"NO"	x						no
3	Reason stated for never considered: "SATISFIED WITH CURRENT PLACE"				x			yes
4	How satisfied are you with your current place of defection? "VERY SATISFIED, SATISFIED, UNSATISFIED, VERY UNSATISFIED"				x			yes
5	What are the top three reasons for building a household toilet/latrine?				x			yes
6	Reason stated for starting a plan to build?		x					no
7	Reason stated for no plan: "NEVER CONSIDERED"	x						no
8	For those who have considered, what is the likelihood that if I come back in a year you will have a latrine built? "HIGH, MEDIUM, LOW vs. NONE"		x					yes
9	What are the three biggest constraints to your installing a household toilet/latrine? (absence of most permanent constraints, e.g., don't have space, tenancy issues, poverty)					x		yes
10	Mention in answer to Q9: "COMPETING PRIORITIES"					x		yes
11	Mention in answer to Q9: "SATISFIED WITH CURRENT DEFECTION PLACE"				x			yes
12	What types of latrines do you know of?		x					yes
13	Of those who have considered, likelihood HIGH that if I come back in a year you will have a latrine built			x				yes
14	Have you started saving? Have you chosen type of toilet to build?			x				no
15	What are the three biggest constraints to your installing a household toilet/latrine? (absence of permanent and most temporary constraints)						x	yes
16	How much will it cost you? Have you found a mason?			x				no

Notes: P = Perference, I = Intention, and C = Choice

Table 4. Non-Adopter Households Differences at Preference, Intention and Choice Stages

Variable	Preference (N=153 of 399)		NO Preference (N=246 of 399)	Preference & Intention (N=122 of 153)		Preference but NO Intention (N=28 of 153)	Intention & Choice (N=20 of 122)		Intention but NO Choice (N=102 of 122)
Satisfaction with current defecation place									
dissatisfied	71.2%	**[a]	61.4%	72.1%		67.9%	75%		71.6%
very dissatisfied	16.3%		15.4%	18%		10.7%	35%	**	14.7%
Top three reasons for building:									
Convenience	52.9%		50.4%	54.9%		50%	65%		52.9%
Good health	51.6%	**	35.8%	50.0%		53.6%	30%	**	53.9%
Cause germs[c]	36.7%		29.5%						
heat[c]	19.0%		20.5%						
smell[c]	16.5%		26.1%						
dirt[c]	13.5%	*[b]	5.7%						
feces[c]	7.6%	**	1.1%						
pests[c]	3.8%		6.8%						
Easy to keep clean	48.4%	*	39.8%	50.8%		42.9%	45%		52%
Cleanliness	33.3%	*	24.4%	32.8%		39.3%	35%		32.4%
Privacy/dignity	27.5%	**	17.1%	26.2%		32.1%	15%		28.4%
Safety/security	26.8%	**	17.1%	25.4%		32.1%	15%		27.5%
Visitors/guests	24.2%		23.6%	24.6%		25%	30%		23.5%
Avoid sharing with others/strangers	18.3%		13.8%	16.4%		28.6%	10%		17.6%
Comfort	13.1%		11.4%	11.5%		14.3%	0%	**	13.7%
Prestige/pride; don't have to pay to use; old age/illness; for children to use	≤2.6%		≤4.1%	<=3.3%		<=1%	<=5%		<=2.9%
Constraints:									
High costs	45.1%	**	26.4%	50%	**	28%	30%	**	53.9%
No one to build	39.9%	**	27.6%	45%	**	21%	25%	**	49%
Water table/soil conditions	22.9%	**	10.6%	25%		14%	15%		27.5%
Technical complexity	11.1%	**	4.1%	13%	*	3.6%	0%	**	15.7%
Savings, credit issues	30.7%		29.7%	27%	**	50%	30%		26.4%
Competing priorities	30.1%		32.8%	25%	**	55%	30%		25%
Tenancy issues	25.2%		29.3%	20%	**	50%	30%		18.6%
Limited space	39.2%	**	54.1%	33%	**	71%	30%		33%
Permit problems	6.5%	*	11.8%	6.6%		7.2%	5%		6.9%
Satisfied with toilet	5.9%		8.5%	6.6%		3.6%	5%		6.9%
Lack decision making	2.6%		4.9%	3.1%		0%	5%		2.9%
Poor options	1.3%		0.8%	1.6%		0%	0%		2%

[a , b] ** p<0.05, * p< 0.10 chi-square value likelihood ratio for difference in prevalence between two groups. [c] Asked only of those mentioning 'good health'.