Artículo Científico

Sanitation dynamics: toilet acquisition and its economic and social implications in rural and urban contexts

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ABSTRACT

This paper uses primary micro-data from Indian households residing in rural villages and poor urban neighbourhoods to shed light on household sanitation decision-making. We use a theoretical economic model to reduce the dimensionality and complexity of this process. Beyond the most commonly analysed motivator, health, we consider economic and non-pecuniary benefits. We provide empirical evidence that each of these margins matter, and do so in both rural and urban contexts, and discuss how our findings can be explored in sanitation policy and programme design.

Key words | economic drivers, household investment, India, sanitation, WASH

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HIGHLIGHTS

- Health is but one motivating factor for households to invest in sanitation in the context of India.
- Households that own sanitation exhibit higher consumption expenditures.
- An increase in productive asset ownership and a shift in time allocation are potential drivers behind increased consumption expenditures.
- Sanitation shifts children's time allocation within the household away from domestic chores and collection of water.
- Sanitation seems to serve as a pre-marital investment strategy.

INTRODUCTION

Safe sanitation, a means of isolating human waste, has been recognised as an indispensable element of disease prevention and primary health care programmes (e.g. the Declaration of Alma-Ata, 1978). The worldwide consensus of its importance led to 'access to adequate and equitable sanitation' becoming part of the Sustainable Development Goals (UN 2015). Yet, with an estimated 1.3 billion people lacking basic sanitation, the scale of the problem is huge (Mara & Evans 2018).

An important challenge to increasing sanitation coverage is its costly provision. According to the World Bank, an estimated US$19.5 billion a year is needed globally to meet nationally defined WASH targets (Hutton & Varughese 2016). An under-acknowledged contributor to investments is households themselves: based on survey responses by 35 national governments in 2018/2019, households contribute an estimated 66% of US$52 billion of annual WASH expenditures (WHO 2019). These figures have triggered calls for a stronger emphasis on research that enables a better understanding of household investment in WASH (Danert & Hutton 2020). Novotný *et al.* (2018) highlight that research aimed at understanding how contextual factors and

motivations affect different sanitation outcomes is currently underdeveloped and that the current programmatic focus provides a narrow understanding of sanitation dynamics.

In this paper, we respond to this identified gap. We use primary micro-data from households residing in two Indian states to shed light on household sanitation decision-making, exploring the association of household characteristics with revealed preference for toilet uptake as well as outcomes resulting from the acquisition choice. Since such sanitation dynamics are characterised by complex human–environment interactions (Novotný *et al.* 2018), we present and structure our analysis around a theoretical economic model, which helps to reduce dimensionality and complexity. In addition to health and non-pecuniary benefits, the model highlights the importance of economic factors as motivators, a category that Novotný *et al.* (2018) identify as under-represented in the sanitation literature.

Our data include two survey rounds implemented in both rural villages and poor urban neighbourhoods, allowing us to provide a rich picture of the main correlates with, and potential outcomes of, sanitation uptake in different environmental contexts. We clarify the distinct socio-economic-cultural contexts and resulting differences in motivations for, and impacts of, toilet construction throughout our analysis but do not intend to use aggregates to inform policy or programming.

India is a particularly apt context to study household investment in sanitation, having contributed over 50% of the close to 700 million people who defecate in the open globally in 2017 (UNICEF and WHO 2019). The Government of India has shown a significant commitment to achieving SDG 6 of clean water and sanitation for all by 2030, including its ambitious Clean India Movement.

METHODS

Data and study population

We use data collected as part of an evaluation effort for a sanitation intervention. The original study's baseline and endline reports (Augsburg & Rodríguez-Lesmes 2015) provide detailed information on the selection of study communities and respondents and on survey instruments,

attrition, etc. Data collection followed *The Netherlands Code of Conduct for Scientific Practice*. Clearance to collect data was given by the United Nations University-MERIT, The Netherlands. Approval for the second round in Tamil Nadu was separately given by UCL IRB (project code 2168/010). Two rounds of data were collected in 2009/2010 and 2013/2014. We include in our analysis those households that were interviewed twice, allowing us to apply panel data models with household fixed effects in our analysis. We worked with a sample of 1,035 households in 39 poor urban neighbourhoods, 764 households in 17 peripheral rural villages of Gwalior city, Madhya Pradesh and 869 households in 46 GPs (GPs constitute the smallest administrative unit in India) in Thiruvarur, Tamil Nadu (henceforth we refer to peripheral villages and GPs combined as 'rural villages/areas' and to the poor urban neighbourhoods, which are characterised by substandard housing and infrastructure, as 'slums'). Appendix A1 provides further information on survey locations and data collection (timings and sample sizes). The main survey instruments were a general household survey and an individual survey with the head of household, if female, or the spouse, if male and married (whom we refer to as the 'main woman'). Apart from household general characteristics, the survey instruments include detailed information on living standards, assets, consumption expenditures (including 21 food items), income, risk perceptions, credits, savings and insurance and demand for health care. A distinguishing feature of the data is an extensive module on sanitation and hygiene facilities, practices and perceptions. The interview with the main woman of the household covered information on time utilisation, hygiene practices and knowledge, cultural background and measures of empowerment. The women were also asked about children in their household, particularly providing information on their health status, time utilisation and nutrition. Survey questions were consistent across contexts with respect to variables used in this analysis, with response options covering both contexts; the Gwalior survey included additional modules on time use and detailed distance data.

Table 1 provides a set of descriptive statistics of study households. Descriptive statistics on further variables, including outcomes considered in the subsequent analysis,