Sanitation and User Charges in Indian Slums
Who Pays and How Does It Matter?

INDRANIL DE

Despite the efforts of successive governments, sanitation coverage remains low in India. While several studies have explored the impact of user financing on the improvement of sanitation facilities, this article looks at the conditions of housing, infrastructure and the surroundings of slums, under which different sanitation arrangements are made. The sanitation arrangements considered are of various types of ownership and cost-sharing arrangements. The findings provide useful insights that challenge one of the basic motivations for user financing: increased accountability in service delivery.

Indranil De (*indranil@irma.ac.in*) teaches at the Institute of Rural Management Anand, Gujarat, India.

The coverage of sanitation in India is low in spite of efforts made by successive governments. According to the 2011 Census of India, around 69% rural and 17% urban households do not have a toilet (Office of the Registrar General and Census Commissioner 2011). Political manipulations, connections and clientelism further aggravated the need for services for minorities and weaker sections (Contractor 2012). Government policies have been emphasising on private participation and user financing in sanitation for additional resource mobilisation and greater accountability in service delivery.[1] The National Urban Sanitation Policy, 2008 focused on public–private partnership, cost sharing and community planning for improved provision, maintenance and management of sanitation facilities (Ministry of Housing and Urban Affairs 2008).

Worldwide, the privatisation of public services received momentum in the late 1970s for more efficient service delivery and to restrain the growth of the public sector (Pack 1987; Poole and Fixler 1987). However, scholars did not find any concrete and significant evidence of lower costs in private production.[2] Nevertheless, co-financing and cost recovery was advocated by scholars for urban public services, including sanitation in developing nations (Rondinelli 1990; Mehta and Pathak 1998). This article investigates the conditions associated with user-financing arrangements for sanitation in Indian slums. Where does the government prefer to provide services through user charges? Does it improve sanitation conditions in slums?

R Parker (1976) identified five main purposes for charging social services: raising revenue; reducing demand; shifting priorities; checking abuse, and a symbolic purpose. The dependence on user charges vis-à-vis taxes has been gradually increasing over time (Jung and Bae 2011; Bailey 1994; Downing 1992) as user charges may reduce the expenditure of the municipality substantially (Sun and Jung 2012). In addition to resource mobilisation, user charges, if applied, are also likely to improve the control of the poor over essential services. The World Development Report, 2004 elucidated a complex set of relationships and accountability between the state (politicians/policymakers), service providers and citizens as clients (World Bank 2003). Weakness in any of these relationships can lead to delivery failure (Devarajan and Reinikka 2004).

One way to strengthen the relationship between citizens and providers is co-payment or user charges or cost sharing for services that incentivise the citizens to monitor the provider. S Devarajan and S Shah (2004) argued that there are evidences in favour of the argument in various services worldwide.

However, any single institutional arrangement may not always generate desired results—user financing may work or fail in different circumstances (Devarajan and Shah 2004). The deleterious impact of cost sharing has been observed in health and education services throughout the world (Johnstone 2004; Jaglin 2002; Nabyonga et al 2005; Sepehri et al 2005; Birch 1986).

The government may find no incentive to provide services on its own, and rather pass on the buck to the poor citizens. D Mahadevia et al (2016) found that in the resettlement sites of Ahmedabad city, the cost and management burden of services had been shifted to resident welfare associations with no financial capacity, time, and sense of belonging due to a lack of security of tenure. The cost-sharing arrangements might not have followed an institutionalised process.[3] These may rather be an effort to satisfy citizen demands in poorer, unsecured and relatively newer urban settlements.

This article, instead of looking into the impact of user financing, attempts to look into the conditions under which different sanitation arrangements are made in the slums of India. These conditions are of housing, infrastructure and surroundings which provide a fair idea about the economic conditions, tenure security and complementary services such as water supply. The sanitation arrangements considered are of various types of ownership and cost-sharing arrangements: private toilets, public toilets without payment and public toilets with payment (user-financing or cost-sharing arrangement). The findings provide useful insights that challenge one of the basic motivations for user financing: increased accountability in service delivery.

Sanitation in Slums

The cities in developing nations are divided between the well-served elite and the underserved poor localities, including slums, as observed by M Gandy (2006) in Lagos and V S Saravanan (2013) in Ahmedabad. Slums are informal settlements that are typically underserved with regard to basic services, including water supply and sanitation. According to C J Stokes (1962: 121),

> The distinctive feature of slums is not appearance as such, then, but the relation between the slum and its inhabitants and that neighbourhood and its inhabitants which the city regards as having met minimum livability standards.

Both private and government apathy for investment is attributable to low-living standards (de Soto 2001; De 2017). The government is obliged to invest in slum upgradation only after the recognition or notification of settlements by the government. Notification and other forms of occupancy rights provide security of tenure, which in turn greatly enhance land value and private investment (De 2017; Nakamura 2014, 2015; Kundu 2004).

In India, the government has made attempts to improve living conditions in slums through the implementation of different schemes from time to time. In 1972–73, the central government launched a scheme for the Environmental Improvement of Urban Slums to provide services, including water supply, sewage, drainage and street pavements in 11 cities of India (Sawhney 2013). In 2005, the Basic Services to the Urban Poor (BSUP)

programme was launched under the Jawaharlal Nehru National Urban Renewal Mission, to provide the security of tenure at affordable prices, improved housing, water supply, sanitation, education, health and social security (Government of India 2009). The BSUP was converted to Rajiv Awas Yojana in 2013 and further to Housing for All in 2015. The latter two schemes are meant for the holistic improvement of living conditions in slums. In addition, the Government of India launched the Swachh Bharat Mission (Clean India Mission) in 2014 under which different types of flush or pour-flush (FOPF) toilets were built with the help of government subsidies (Government of India 2014).

Production of Sanitation

Sanitation is a public good which includes improved toilets for safe disposal of human urine and faeces and other hygiene services such as sewerage, drainage, garbage collection and water supply. Usage of toilets is a private activity with some of the greatest public impacts (McGranahan 2015). The other services improve public health and hygiene and thus consolidate public health benefits of using toilets. As the social benefits of sanitation are much higher than individual benefits, the provision of sanitation through markets may fail to reach a socially optimal level. Market failures need to be resolved through government intervention. Nevertheless, due to competing claims for fiscal resources, governments cannot cover all the poor who are unable to construct their own toilets. The alternative is the provision of services through cost sharing between the government and citizens.

A citizen is likely to contribute to public good only if all other citizens do the same; otherwise individuals will free-ride (Olson 1965). The transaction cost of organising citizens may be reduced by forming an association.[4] It is also required to develop mutual trust and reciprocity between the government and its citizens, which can be improved through public investment for slum upgradation.[5] Hence, public investment appears to be necessary for collective action of the community. Sole investment by the government may make it possible to produce a public good such as sanitation, but the production would be suboptimal. Contributions of citizens are essential to produce a public good up to the optimal level (Olson 1965).

As far as the physical installation of toilets is concerned, finances are easily substitutable: it does not matter who among the government or the citizen contributes. But again, the same does not hold true for planning, design and management of services, as inputs from the government and citizens would be qualitatively different and hence not perfectly substitutable. However, this difference cannot be observed over very small changes of the latter types of inputs; it would be observed only after substantial changes. Hence, the rate of substitution is fixed over a range but changes after certain thresholds.

E Ostrom (1996) illustrated a strictly convex isoquant for public goods (services) where inputs, contributed by the government and citizens for financing, planning, designing and management of services, are not perfectly substitutable. Hence, the rate of substitution varies over different combinations of

Figure 1: Production of Sanitation
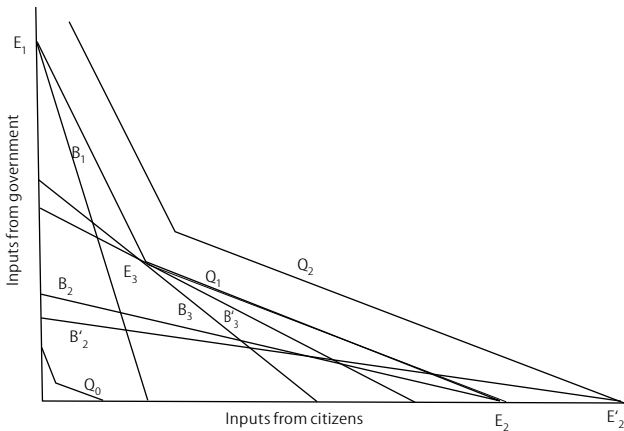
Lines denoted by Q are isoquants; lines denoted by B are budget lines and lines denoted by E are input combinations.

Source: Based on Ostrom's (1996) isoquant.

inputs. If finance is the predominant input and the influence of other inputs is observable only after substantial changes, then the isoquant would be weakly convex rather than strictly convex, as observed by Ostrom (1996). Under such circumstances, the isoquant for public good would be a straight line with breaks as illustrated in Figure 1. The isoquants Q_0, Q_1 and Q_2 in Figure 1 have multiple kinks with straight lines in between.

The opportunity cost of the government and citizens would pose as a constraint for achieving the maximum output. The opportunity cost of the government is the cost of diverting resources from other sectors; it is less if negative welfare effect or political loss of withdrawal of resource from other sectors is low. On the other hand, political benefits reduce the opportunity costs. Political benefits are higher in larger and denser localities and legally recognised habitations.[6] The cost to the citizens is the opportunity cost of diverting resources from other basic household needs. The maximum affordable opportunity cost of the government and citizens is represented by the intercept of the budget line B_1, B_2, B_3, etc, with respect to government input (vertical axis) and citizen input (horizontal axis) respectively (Figure 1). The marginal or unit opportunity cost of the government or citizens' inputs is the shadow price.[7]

The slopes of budget lines depend on the relative shadow prices of citizen input and government input. The lower the shadow price, the higher the incentive for citizens or the government to provide inputs for production. If the shadow price of citizen input is higher as compared to the government, then budget lines would be steeper as in the case of B_1. With B_1 as the budget constraint, maximum Q_1 output can be obtained by E_1 input combination. The government is the sole producer of the public good in this case. If the shadow price of citizens is lower than the government, as in the case of B_2, the same Q_1 output can be produced by input combination E_2. In this case, only citizens contribute in the production of public good. In case the shadow price of both the government and citizens are similar, as in the case of B_3, then Q_1 output can be produced by the input combination E_3. In this case, public good is produced by cost-sharing arrangements. The rate of substitution at E_3 is indeterminate, implying that various combinations of shadow

prices of the government and the citizens may find E_3 to be optimal input combination.

The improvement of economic conditions of citizens is likely to reduce the shadow price of sanitation for citizens. The government may find its own investment in sanitation less necessary as citizens have become better off. As a result, the shadow price of the government will increase. Should citizens be the initial sole investors in sanitation (as in point E_2), the fall in the relative shadow price of citizen vis-à-vis government input leads to the improvement of sanitation from Q_1 to Q_2. This is represented by a shift in input combination from E_2 to E'_2 as the budget line rotates from B_2 to B'_2.

On the contrary, if government be the initial sole investor in sanitation (as in point E_1) and if the economic conditions of citizens become worse and the importance of government investment increases (due to national and international focus on sanitation), then the relative shadow price of the citizen vis-à-vis government input is likely to rise, leading to higher government spending on sanitation with no contribution from citizens. However, should both the government and citizens be initial investors in sanitation as in point E_3, then aforementioned changes in the relative shadow prices of government vis-à-vis citizen inputs can leave the output unchanged at E_3. The budget line is likely to rotate with the optimum input combinations remaining fixed at E_3. Incentives for the individual or the government do not change sufficiently to bring about a change in the output of sanitation. Improved sanitation is possible only if the shadow price or incentive of either the government or citizens changes by a high magnitude.

Data and Methodology

The empirical analysis is based on slum-level data on conditions of basic services in the slums of India. Data was collected by the National Sample Survey Office (NSSO 2012), Ministry of Statistics and Programme Implementation, Government of India between July and December 2012. This survey provides slum-level information on ownership, area type, structure, availability of basic services, including toilets, drinking water, sewerage, drainage and garbage disposal. Improvements in these services over the last five years have also been reported. In all, 881 sample slums were selected through the stratified multistage sampling method. The first stage units (FSUs) were selected by the simple random sampling without replacement method from the 2007–12 phase Urban Frame Survey (UFS) blocks, which NSSO earmarked as compact area units consisting of 80–200 households. These blocks have been further divided in two substrata: all UFS blocks having area type "slum area" and other blocks. The total number of sample FSUs were allocated to the states and union territories in proportion to their population according to the 2011 Census. In this article, the empirical analysis has been done on slum-level data only.

Survey Results

In 36% slums, majority of the residents do not have access to a toilet. In other slums, majority of slum dwellers use different types of toilets with varied ownership and operational

arrangements. These different types of toilets are FOPF, pit and other types of toilets. These toilets are public or community-owned, shared with other households and self-owned. Public or community-owned toilets are referred to as public toilets in this article. In 26% of slums, public toilets are used by a majority of dwellers (Table 1). Moreover, in 47% of total slums, the majority use FOPF toilets, of all types of ownership and cost-sharing arrangements. These slums account for 73% of slums where the majority use a toilet. The following sections analyse the characteristics of slums and access to different basic services (related to public health), by slums categorised according to the majority of slum dwellers' use of FOPF toilets of different ownerships and cost-sharing arrangements. These slum categories are slums where the majority use public FOPF toilets without payment, public FOPF toilets with payment and own FOPF toilets.

Figure 2: Slum Characteristics by Usage of FOPF Toilets by Majority of Slum Households

Source: NSSO (2012).

Table 1: Distribution of Slums by Type of Latrine Used by Most of the Residents

(%)

| Type of Toilets Used by Majority		Distribution of Latrine Type Used by Most Residents	Improvement of Latrine Condition during Last Five Years	Source of Improvement				
				Govern-ment	NGO	Residents	Others	Total
Public/community latrine (without payment)	Dry pit	2	17	100	0	0	0	100
	FOPF	11	59	87	2	11	0	100
	Others	2	64	89	0	11	0	100
Public/community latrine (with payment)	Dry pit	1	0					
	FOPF	9	39	97	0	3	0	100
	Others	1	43	100	0	0	0	100
Shared latrine	Dry pit	1	33	0	0	100	0	100
	FOPF	3	36	60	0	30	10	100
	Others	1	22	100	0	0	0	100
Own latrine	Dry pit	6	52	37	4	59	0	100
	FOPF	24	42	59	0	39	2	100
	Others	4	32	50	0	50	0	100
No latrine facility		36	9	8	0	32	0	100
All types		100	30	69	1	29	1	100

Source: NSSO (2012).

Characteristics of Slums and Toilets

On an average, the slums are inhabited by around 1,000 households. The public FOPF toilets are built primarily in larger slums and slums surrounded by centres of industrial and commercial activities. The average number of households is highest for slums where the majority use public paid FOPF toilets, followed by slums where the majority use public FOPF toilets without payment (Figure 2). Slums where the majority do not use toilets are the smallest with respect to the number of households. The slums where the majority use their own FOPF toilets are more present in areas surrounded by authorised residential areas (not slums). The slums where the majority use public FOPF toilets (both with payment and without payment) are more present in areas surrounded by industrial or commercial areas (Figure 2). Higher public investments for sanitation in these slums could be due to the economic importance of these slums.

A higher security of tenure leads to better access to sanitation (FOPF toilet): from no sanitation to public toilets and finally to own toilet. The percentage of notified[8] slums (implying *de jure* security) is least when the majority use no toilets. It increases
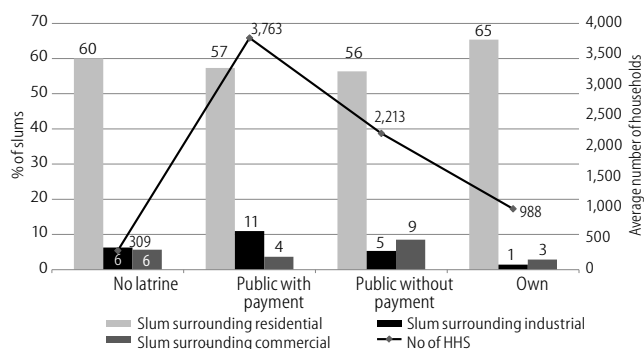
Figure 3: Institutional Intervention, Tenure Security and Housing of Slums Where Majority Use FOPF Toilets
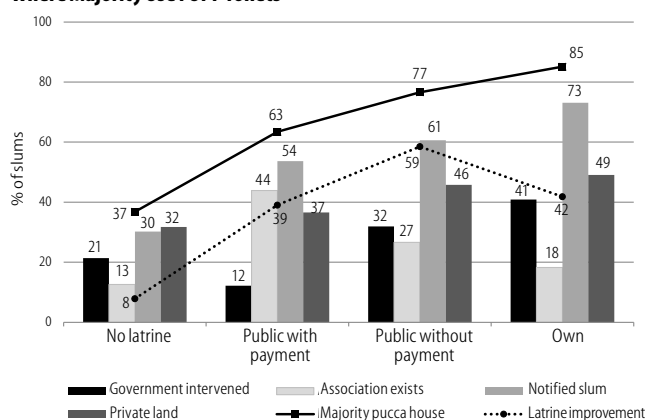
Source: NSSO (2012).

as the majority use public paid toilets, further increases as the majority use public toilets without payment, and is highest in slums where the majority use their own toilets (Figure 3). Private ownership of land also provides *de jure* security of tenure. The percentage of slums located on private land, in a similar way, increases gradually as we move through the slum categories: the majority use no latrine to public latrine with payment, further to public latrine without payment and finally to their own latrine. Lastly, a similar pattern has been observed again with regard to slums having improved housing (*pucca*[9] house) for the majority of dwellers (Figure 3). Better housing is associated with better economic conditions of households and de facto security of tenure (De 2017).

The government and slum-level associations contribute to the overall slum upgradation. Government intervention in slum improvement is not uniform;[10] the percentage of slums receiving benefits of the government slum improvement programme is highest when the majority use own toilets and lowest when the majority use public paid toilets (Figure 3). Higher government intervention may have increased the security of tenure and improved the living conditions in slums that probably have induced dwellers to invest for own sanitation.[11] In case of lack of government intervention, associations of slum dwellers take charge (Figure 3). Percentage of slums having associations are highest when the majority use public paid toilets and lowest when majority do not use sanitation.

The improvement of latrines during the last five years differs across slum categories. The percentage of slums reporting an improvement in latrine conditions is highest when the majority use public toilets without payment and least when the majority do not use toilets (Figure 3). Improvement is marginally higher for slums where the majority use their own toilets as compared to slums where the majority use public paid toilets. The improvement of toilets is slowest in slums where the majority use public paid toilets. The improvement in toilet conditions in slums is attributable to government interventions (69% of slums) followed by those of residents (29% of slums). The improvement in toilet conditions is attributable to government efforts in 87% of slums where the majority use public FOPF toilet without payment and 97% of slums where the majority use public FOPF toilets with payment (Table 1). Residents have caused improvements in more than 30% of slums where the majority use shared and own FOPF toilets, and also in slums where the majority does not have toilets.

Regression Analysis

This section looks into the determinants of different types of toilets used by a majority of slum dwellers. Toilets in slums may be the direct or indirect outcome of slum improvement schemes launched by the government. Toilets may be constructed under government programmes. Slum improvement programmes of the government may improve housing, drainage and sewerage, which in turn may lead to the construction and improvement of toilets. Residents of these slums, too, are likely to contribute towards the construction, improvement, and maintenance of toilets. If residents are grouped under slum-level associations then the development of community or public toilets is likelier. These associations are likely to play a critical role in the cost sharing of public sanitation. Moreover, the collective bargaining strength of these associations could prioritise sanitation in government programmes related to slum improvement.

Tenure security and economic conditions of households are important determinants of toilet construction. Higher the tenure security, more likely is the household to build its own toilet. The *de jure* tenure security is captured by the number of years since slum notification; higher the number, better is the security. The government is also more likely to invest in sanitation once a slum is notified as a legal settlement. Better economic conditions of households are likely to make own toilet construction more affordable. The housing condition of the majority of households is considered as a proxy for both economic conditions and de facto security of tenure. Housing conditions of households are deemed to be better if a majority of the houses are pucca and worse if a majority of the houses are *kutcha* (not made of strong, durable material).

Three types of toilets have been considered in the analysis, along with the non-availability of toilet facilities. The regression equations are mentioned below. The description of variables is provided in Table 2.

$$NT = \beta_0 + \beta_1\ tap + \beta_2\ association + \beta_3 govern\_schm + \beta_4 yrs\_notification \quad \ldots (1)$$

$$PTWOP = \beta_0 + \beta_1\ tap + \beta_2\ association + \beta_3 govern\_schm + \beta_4 yrs\_notification \quad \ldots (2)$$

$$PTWP = \beta_0 + \beta_1\ tap + \beta_2\ association + \beta_3 govern\_schm + \beta_4 yrs\_notification \quad \ldots (3)$$

$$OT = \beta_0 + \beta_1\ tap + \beta_2\ association + \beta_3\ govern\_schm + \beta_4 yrs\_notification + \beta_5 pucca\_struc + \beta_6 kutcha\_struc \quad \ldots (4)$$

$$IML = \beta_0 + \beta_1\ tap + \beta_2\ association + \beta_3 govern\_schm + \beta_4 yrs\_notification + \beta_5 asso\_govt \quad \ldots (5)$$

$$IML = \beta_0 + \beta_1\ PTWOP + \beta_2\ PTWP + \beta_3\ NT + \beta_4\ OT \quad \ldots (6)$$

Determinants of the source of improvement of latrine facilities has been modelled as the following:

$$source\_imp = \beta_0 + \beta_1\ tap + \beta_2\ association + \beta_3 govern\_schm + \beta_4 yrs\_notification + \beta_5 asso\_govt \quad \ldots (7)$$

The dependent variables of models (1)–(6) are binary. Hence, a logit model has been used to estimate the coefficients of these models. The dependent variable of model (7) is multinomial and, hence, the parameters of model (7) will be estimated through multinomial logistic regression. There are three categories in the dependent variable source_imp. The last category, no (source of) improvement is considered as the base category. To estimate equation (6), two separate regression models have been constructed. Model (6) provides the estimates of the chance of improvement of latrines for different sanitation arrangements.

Table 2: Description of Variables

Variable	Description
NT	majority use no latrine facility = 1, else = 0
PTWOP	majority use public FOPF toilet without payment = 1, else = 0
PTWP	majority use public FOPF toilet with payment = 1, else = 0
OT	majority use own FOPF toilet = 1, else = 0
IML	improvement of latrine facility in the slum = 1, else = 0
tap	tap as major source of drinking water in slum = 1, else = 0
association	association for improving the condition of the slum exists = 1, else = 0
govern_schm	slum benefited from slum development programme = 1, else = 0
yrs_notification	number of years passed after notification
pucca_struc	majority house pucca structure = 1, else = 0
kutcha_struc	majority house kutcha structure = 1, else = 0
asso_govt	association exists in slums which are also benefited from slum improvement programme = 1, else = 0
STF	majority use shared FOPF toilet = 1, else = 0
source_imp	source of improvement: government; residents, NGO and others; no (source of) improvement

Source: Description of variables used by the author for data analysis.

Regression Results

The maximum likelihood estimates of the coefficients of equations (1)–(5) and equation (7) are presented in Table 3 (p 43). All the models make more than 70% correct predictions. The results imply that the tap as a major source of drinking water increases water availability and hence, makes usage of toilet easier. As a result, the majority of slum dwellers are more likely to access FOPF toilets irrespective of ownership and management. The condition of toilets also improved during the last five years due to more availability of water. The existence of slum-level associations for slum improvement increases the chances of the majority using public FOPF toilets with payment. The

non-existence of such associations, on the other hand, decreases the chances of having latrine facilities in place.

Government interventions regarding slum improvement increase the chances of individual construction of latrines along with the chances of improvement of latrine facilities. Public FOPF toilets with payment are likelier to prevail in slums where the government has not intervened for slum improvement. The earlier the slums are notified the higher the chances of individual latrine construction, improvement of latrine conditions, and the construction of public toilets without payment. This could be due to the political compulsion of public investment in a notified slum and the earlier the notification, more is the compulsion. In addition to *de jure* security, de facto security and economic conditions of households, captured by housing conditions of the majority, increases individual investment in toilets. An improvement of latrine conditions is likelier if a government programme is delivered in slums where an association for slum improvement exists.

The maximum likelihood estimates of coefficients of model (7) when source_imp is the dependent variable are represented in Table 3. The regression model is able to make 71% correct predictions. The results imply that the government is

likely to improve toilet conditions if government programmes of slum improvement are launched. The presence of associations in the slums where the government has intervened also increases the chances of government-backed improvement of toilets. This could be due to the bargaining power of the associations with the government, for the latter to prioritise toilet improvement. The higher the number of years since slum notification, the greater the chances of government intervention. The government and residents take more interest in the improvement of toilets in slums where tap water availability increases.

The marginal effects of slums characterised by different sanitation arrangements on improvement of latrine conditions is presented in Table 4. The models make more than 70% correct predictions. The results imply that the chances of slums reporting improvement of sanitation is 42% in slums where the majority use public FOPF toilets without payment. This is much higher than a 23% chance of sanitation improvement in slums where the majority use public FOPF toilets with payment. The variable identifying slums where the majority use public paid toilet (PTWP) is not robust, as it is not statistically significant in one of the two models represented in Table 4.

Table 3: Regression Results

Variables#	NT	PTWOP	PTWP	OT	IML	Source of Improvement (source_imp)	
						Government	Residents, NGO, Others
tap	-1.21***	0.46*	1.33***	0.33*	0.65***	0.66***	0.66***
	(0.16)	(0.24)	(0.34)	(0.18)	(0.18)	(0.21)	(0.29)
association	-0.74***	0.22	1.21***	-0.3	0.02	0.03	0.01
	(0.21)	(0.23)	(0.24)	(0.19)	(0.23)	(0.27)	(0.36)
govern_schm	-0.08	0.02	-1.39***	0.50***	0.34*	0.39*	0.25
	(0.18)	(0.22)	(0.34)	(0.17)	(0.19)	(0.22)	(0.3)
yrs_notification	-0.05***	0.02**	0.01	0.02***	0.01***	0.02***	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
pucca_struc				0.83***			
				(0.19)			
kutcha_struc				-1.58***			
				(0.49)			
asso_govt					0.76**	0.93**	0.13
					(0.38)	(0.42)	(0.66)
constant	0.83***	-2.37***	-3.33***	-1.65***	-1.64***	-2.16	-2.51
	(0.15)	(0.22)	(0.33)	(0.21)	(0.17)	(0.21)	(0.27)
% correct prediction	71	86	89	67	70	71	

Description of variables provided in Table 2.
* Significant at 10% level, ** significant at 5% level, **** significant at 1% level
Numbers in the parenthesis are standard errors.
Source: Author's analysis.

Table 4: Marginal Effects of Slums with Different Sanitation Arrangements

Variables#	Latrine Improvement (IML)	
	Model 1	Model 2
PTWOP	0.42***	0.16***
	(0.05)	(0.05)
PTWP	0.24***	-0.01
	(0.06)	(0.05)
OT	0.25***	
	(0.04)	
NT		-0.34***
		(0.03)
% correct prediction	72	71

Description of variables is provided in Table 2.
* Significant at 10% level, ** significant at 5% level, **** significant at 1% level
Source: Author's analysis.

Discussion and Conclusions

This article argues that citizen contribution through user charges for sanitation is observed more in slums which are poorer and lack security of tenure. The percentage of slums where the majority have pucca houses (an indicator of economic well-being and tenure security) is lesser in case the majority use paid toilets, as compared to other slums where the majority use other kinds of arrangements for sanitation. The percentage of slums located on private land and percentage of slums notified are also lesser when the majority use paid toilets. The majority use public toilets without payment in slums where the number of years since slum notification is higher, meaning no user charge for public toilets in slums which are older and having more secured tenure.

It is less likely that slums where the majority use public paid toilets would be beneficiaries of government programmes for slum improvement. As the government is the major source of improvement of sanitation, the lack of government attention has profound implications. The chances of improvement are less likely in these slums. The chances of improvement are almost half in slums where the majority use public paid toilets, as compared to slums where the majority use public toilets without payment. Lack of incentives for the government to improve slums where the majority use public pay toilets could be the reason for the above. The lack of improvement of other services in these slums corroborates that incentives and efforts for improvement of services in these slums are low. Therefore, the argument of increasing accountability through user charges is questionable.

The government is likely to make an investment in sanitation when sufficient political gains or incentive are envisaged. It is likely to provide sanitation in larger, poorer and legally recognised slums, as well as in slums surrounded by industrial and commercial areas. Hence, in these slums the majority use public toilets. On the other hand, economically better-off residents, having higher security of tenure and surrounded by residential areas, would prefer to have their own toilets. This is because they can afford to, and have better tenure and better exposure. User charges for sanitation are more prevalent in slums where the association for slum improvement exists. Associations may influence the government to take initiatives for the improvement of sanitation. The bargaining power of association might have helped prioritising sanitation within slum improvement programmes of the government.

The formation of associations for slum upgradation is an essential policy imperative, especially in the context of cost sharing or user financing of public services such as sanitation. The results demonstrate that user charges for sanitation are levied on public toilets more in poorer, unrecognised or newly recognised slums, where the need of upgradation is higher but the government is reluctant to invest. It is essential to develop slum-level associations for the improvement of services, which may fill the deficit of government efforts. In addition, tap water supply in slums and the notification of slums or tenure security are essential prerequisites for better sanitation facilities; both can be promoted through government intervention. Associations, coupled with the government, should take the lead for better sanitation, especially in the context of cost-sharing arrangements. User financing alone may not necessarily increase accountability.

NOTES

1 Under the Slum Sanitation Programme (SSP) in Mumbai, implemented over 1996–2005, more than 5,100 toilet seats were constructed and handed over to the community on the premises of "partnership," "participation," and "cost recovery" (Water and Sanitation Programme 2006; McFarlane 2008).

2 See Bel et al (2010) for their study on water distribution and solid waste collection services.

3 Joshi and Moore (2004) suggested institutionalised co-production to include regular, long-term relationships between state agencies and organised groups of citizens for public service provision.

4 See Coase (1937) and Williamson (1999) for detailed explanations.

5 Ostrom (2010) explains how trust and reciprocity is crucial for collective action. Mahadevia et al (2016) argue that the development of trouble-free physical infrastructure in the resettlement colonies of Ahmedabad (India) is likely to have developed trust among the resettled households.

6 Benefits of the government drive the political will for providing sanitation. The lack of political will is argued to be the reason for lack of sanitation in India (Chaplin 2011) and cause of development of slums in sub-Saharan Africa (Fox 2014).

7 The "shadow price of a commodity is defined as its social opportunity cost, i.e., the net loss (gain) associated with having one unit less (more) of it" (Drèze and Stern 1990: 4).

8 Slum notification in India provides for the formal recognition of slums as settlements by the government. It increases the *de jure* security of tenure.

9 Walls and roofs are made of stable materials including cement, concrete, oven burnt bricks, hollow cement/ash bricks, stone, stone blocks, jack boards (cement plastered reeds), iron, zinc or other metal sheets, timber, tiles, slate, corrugated iron, asbestos cement sheet, veneer, plywood, artificial wood of synthetic material and poly vinyl chloride materials.

10 Programmes exclusively for slum development, and also as a part of urban development, have been launched by the government: Jawaharlal Nehru National Urban Renewal Mission, Rajiv Awas Yojana, etc.

11 Tenure security may improve due to infrastructural development in slums (Handzic 2010). Higher security of tenure may lead to higher private investment.

REFERENCES

Appadurai, A (2001): "Deep Democracy: Urban Governmentality and the Horizon of Politics," *Environment and Urbanization*, Vol 13, No 2, pp 23–43.

Bailey, S J (1994): "User-charges for Urban Services," *Urban Studies*, Vol 31, Nos 4–5, pp 745–65.

Bel, G, X Fageda and M E Warner (2010): "Is Private Production of Public Services Cheaper than Public Production? A Meta-Regression Analysis of Solid Waste and Water Services," *Journal of Policy Analysis and Management*, Vol 29, No 3, pp 553–77.

Birch, S (1986): "Increasing Patient Charges in the National Health Service: A Method of Privatizing Primary Care," *Journal of Social Policy*, Vol 15, No 2, pp 163–84.

Chaplin, S E (2011): "Indian Cities, Sanitation and the State: The Politics of the Failure to Provide," *Environment and Urbanization*, Vol 23, No 1, pp 57–70.

Coase, R H (1937): "The Nature of the Firm," *Economica*, Vol 4, No 16, pp 386–405.

Contractor, Qudsiya (2012): "Quest for Water: Muslims at Mumbai's Periphery," *Economic & Political Weekly*, Vol 47, No 29, pp 61–67.

De, Indranil (2017): "Slum Improvement in India: Determinants and Approaches," *Housing Studies*, Vol 32, No 7, pp 990–1013.

De Soto, H (2001): "Why Capitalism Works in the West but Not Elsewhere," *International Herald Tribune*, 5 January, http://www.cato.org/publications/commentary/why-capitalism-works-not-elsewhere.

Devarajan, S and R Reinikka (2004): "Making Services Work for Poor People," *Journal of African Economies*, Vol 13 (suppl 1), pp i142–66.

Devarajan, S and S Shah (2004): "Making Services Work for India's Poor," *Economic & Political Weekly*, Vol 39, No 9, pp 907–19.

Downing, P B (1992): "The Revenue Potential of User Charges in Municipal Finance," *Public Finance Quarterly*, Vol 20, No 4, pp 512–27.

Drèze, J and N Stern (1990): "Policy Reform, Shadow Prices, and Market Prices," *Journal of Public Economics*, Vol 42, No 1, pp 1–45.

Dupont, V (2008): "Slum Demolitions in Delhi since the 1990s: An Appraisal," *Economic & Political Weekly*, Vol 43, No 28, pp 79–87, 12 July.

Fox, S (2014): "The Political Economy of Slums: Theory and Evidence from Sub-Saharan Africa," *World Development*, Vol 54, pp 191–203.

Gandy, M (2006): "Planning, Anti-planning and the Infrastructure Crisis Facing Metropolitan Lagos," *Urban Studies*, Vol 43, No 2, pp 371–96.

Government of India (2009): "Modified Guidelines for Sub-mission on Basic Services to Urban Poor (BSUP)," Ministry of Housing and Urban Poverty Alleviation, Government of India, New Delhi.

— (2014): "Guidelines for Swacch Bharat Mission (SBM)," Ministry of Urban Development, Government of India, New Delhi.

Handzic, K (2010): "Is Legalized Land Tenure Necessary in Slum Upgrading? Learning from Rio's Land Tenure Policies in the Favela Bairro Program," *Habitat International*, Vol 34, No 1, pp 11–17.

Jaglin, S (2002): "The Right to Water versus Cost Recovery: Participation, Urban Water Supply and the Poor in Sub-Saharan Africa," *Environment and Urbanization*, Vol 14, No 1, pp 231–45.

Johnstone, D B (2004): "The Economics and Politics of Cost Sharing in Higher Education: Comparative Perspectives," *Economics of Education Review*, Vol 23, No 4, pp 403–10.

Joshi, A and M Moore (2004): "Institutionalised Co-production: Unorthodox Public Service Delivery in Challenging Environments," *Journal of Development Studies*, Vol 40, No 4, pp 31–49.

Jung, C and S Bae (2011): "Changing Revenue and Expenditure Structure and the Reliance on User Charges and Fees in American Counties, 1972–2002," *The American Review of Public Administration*, Vol 41, No 1, pp 92–110.

Kundu, A (2004): "Provision of Tenurial Security for the Urban Poor in Delhi: Recent Trends and Future Perspectives," *Habitat International*, Vol 28, No 2, pp 259–74.

Mahadevia, D, N Bhatia and B Bhatt (2016): "Decentralized Governance or Passing the Buck: The Case of Resident Welfare Associations at Resettlement Sites, Ahmedabad, India," *Environment and Urbanization*, Vol 28, No 1, pp 294–307.

McFarlane, C (2008): "Sanitation in Mumbai's Informal Settlements: State, 'Slum', and Infrastructure," *Environment and Planning A*, Vol 40, No 1, pp 88–107.

McGranahan, G (2015): "Realizing the Right to Sanitation in Deprived Urban Communities: Meeting the Challenges of Collective Action, Coproduction, Affordability, and Housing Tenure," *World Development*, Vol 68, pp 242–53.

Mehta, D and P Pathak (1998): "Financing of Urban Services in India: A Case for Appropriate Pricing and Cost Recovery," *Habitat International*, Vol 22, No 4, pp 487–502.

Ministry of Housing and Urban Affairs (2008): "National Urban Sanitation Policy," Government of India, New Delhi, http://mohua.gov.in/upload/uploadfiles/files/NUSP_o.pdf.

Nabyonga, J, M Desmet, H Karamagi, P Y Kadama, F G Omaswa and O Walker (2005): "Abolition of Cost-Sharing is Pro-poor: Evidence from Uganda," *Health Policy and Planning*, Vol 20, No 2, pp 100–108.

Nakamura, S (2014): "Impact of Slum Formalization on Self-Help Housing Construction: A Case of Slum Notification in India," *Urban Studies*, Vol 51, No 16, pp 3420–44.

— (2015): "Tenure Security Premium in Informal Housing Markets: A Spatial Hedonic Analysis," World Bank Policy Research Working Paper, No WPS 7526, World Bank Group, Washington, DC.

NSSO (2012): "69th Round NSSO Dataset," National Sample Survey Office, Government of India, New Delhi.

Office of the Registrar General and Census Commissioner (2011): "2011 Census Data," http://censusindia.gov.in/2011-Common/CensusData2011.html.

Olson, Mancur (1965): *A Theory of Groups and Organisations, The Logic of Collective Action, Harvard Economic Studies*, Cambridge: Harvard University Press.

Ostrom, E (1996): "Crossing the Great Divide: Coproduction, Synergy, and Development," *World Development*, Vol 24, No 6, pp 1073–87.

— (2010): "Analyzing Collective Action," *Agricultural Economics*, Vol 41, No s1, pp 155–66.

Pack, J R (1987): "Privatization of Public-sector Services in Theory and Practice," *Journal of Policy Analysis and Management*, Vol 6, No 4, pp 523–40.

Panda, G R and T Agarwala (2013): "Public Provisioning in Water and Sanitation," *Economic & Political Weekly*, Vol 48, No 5, p 25.

Parker, R (1976): "Charging for the Social Services," *Journal of Social Policy*, Vol 5, No 4, pp 359–73.

Parkinson, J (2003): "Drainage and Stormwater Management Strategies for Low-income Urban Communities," *Environment and Urbanization*, Vol 15, No 2, pp 115–26.

Poole Jr, R W and P E Fixler Jr (1987): "Privatization of Public-sector Services in Practice: Experience and Potential," *Journal of Policy Analysis and Management*, Vol 6, No 4, pp 612–25.

Rondinelli, D A (1990): "Financing the Decentralization of Urban Services in Developing Countries: Administrative Requirements for Fiscal Improvements," *Studies in Comparative International Development*, Vol 25, No 2, pp 43–59.

Saravanan, V S (2013): "Urbanizing Diseases: Contested Institutional Terrain of Water and Vector-borne Diseases in Ahmedabad, India," *Water International*, Vol 38, No 7, pp 875–87.

Sawhney, U (2013): "Slum Population in India: Extent and Policy Response," *International Journal of Research in Business and Social Science*, Vol 2, No 1, pp 47–56.

Sepehri, A, R Chernomas and H Akram-Lodhi (2005): "Penalizing Patients and Rewarding Providers: User Charges and Health Care Utilization in Vietnam," *Health Policy and Planning*, Vol 20, No 2, pp 90–99.

Stigler, G J and G S Becker (1977): "De Gustibus Non Est Disputandum," *The American Economic Review*, Vol 67, No 2, pp 76–90.

Stokes, C J (1962): "A Theory of Slums," *Land Economics*, Vol 38, No 3, pp 187–97.

Sun, R and C Jung (2012): "Does User-charge Financing Reduce Expenditure Levels for the Charge-financed Services?" *The American Review of Public Administration*, Vol 42, No 2, pp 170–85.

WHO (2014): "Preventing Diarrhoea through Better Water, Sanitation and Hygiene: Exposures and Impacts in Low- and Middle-income Countries," World Health Organization, Geneva.

Williamson, O E (1999): "Public and Private Bureaucracies: A Transaction-cost Economics Perspective," *Journal of Law, Economics and Organization*, Vol 15, No 1, pp 306–42.

World Bank (2003): "World Development Report 2004: Making Services Work for Poor People," World Bank, https://openknowledge.worldbank.org/handle/10986/5986 License: CC BY 3.0 IGO.

Water and Sanitation Programme (2006): "The Mumbai Slum Sanitation Program: Partnering with Slum Communities for Sustainable Sanitation in a Megalopolis," World Bank, http://documents.worldbank.org/curated/en/620841468041130033/pdf/384560INoMumbaioslum01PUBLIC1.pdf.