Getting on the Grid: A Field Experiment on Bottom-Up Political Pressure and Access to Essential Public Services[*]

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September 24, 2024

Abstract

Water is essential for human life, yet governments frequently leave vulnerable citizens to rely on informal channels for access. What can motivate governments to provide public services such as water to citizens trapped in informality? We theorize how accessing state services is a multi-stage process involving distinct strategic interactions between citizens, bureaucrats, and politicians at different stages of the service delivery process. A large factorial field experiment in Mumbai's informal settlements reveals that a bureaucratic facilitation drive significantly improved citizens' ability to access municipal water connections in policy-eligible settlements, but only when combined with a bottom-up political coordination campaign targeting elected officials. While bureaucratic assistance helped citizens through the initial stages of the formalization process, political pressure was needed to ensure "last mile" service delivery. Our findings illuminate how specific citizen empowerment campaigns reshape the incentives of otherwise reluctant bureaucrats and politicians to provide marginalized groups their basic human rights.

Although the United Nations recognizes access to clean drinking water "as a human right that is essential for the full enjoyment of life and all human rights," (United Nations 2010), citizens across the globe and especially in the developing world struggle to secure enough water to meet their daily needs (Herrera 2019). As previous studies on the politics of service delivery highlight (Raffler 2022; Thachil 2014; Auerbach 2019), water insecurity is not solely a matter of natural scarcity but one that is fundamentally shaped by government decisions. Bureaucrats and politicians—entrenched in vested interests and burdened with competing priorities—often deny essential services to large swathes of marginalized citizens. These groups are in turn forced to rely on informal channels to access water, leaving them with a supply that is often expensive, intermittent, and filled with contaminants (Post and Ray 2020). Water in this regard is emblematic of a broad class of public services failures: Citizens remain "off-the-grid," thus disrupting their fiscal contract with the government, rendering them illegible to the state, and inhibiting political responsiveness toward ameliorating their condition (Holland 2017; Weigel 2020).

How can governments be incentivized to provide essential public services to citizens trapped in informality? Previous arguments highlight the importance of the principal-agent dynamic between elected politicians and bureaucrats (Raffler 2022; Hassan 2020; Pepinsky, Pierskalla and Sacks 2017; Bhavnani and Lee 2018; Brierley 2020) in shaping service delivery outcomes. However, existing studies have paid inadequate theoretical attention to public service provision as a *multi-stage process* requiring different degrees of citizen effort, bureaucratic discretion, and political influence at distinct points. Moreover, while previous work has highlighted the importance of a multiplicity of claim-making strategies in shaping state responsiveness (Auerbach and Thachil 2020; Kruks-Wisner 2018), it has not sufficiently illuminated which specific citizen-led strategies are most effective in engendering responsiveness at particular rungs of the public service formalization ladder.

Theoretically, we bridge these gaps by highlighting how in contexts where bureaucratic

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discretion shapes such provisioning, securing public services requires both tackling bureaucratic hurdles to "first-mile" formalization as well as political barriers to "last-mile" access. Formalization—gaining legal access to state services via established rules and procedures—proceeds through several stages. In the status quo, citizens face constraints in navigating the bureaucracy and collectively conveying their demands to elected representatives. When citizens overcome first-mile hurdles of demonstrating eligibility for services, bureaucrats who are rewarded for following the rules that require granting state services to eligible citizens are spurred to action. Thus, receiving citizen-initiated requests for services should trigger a lower-level bureaucratic response. However, securing last mile delivery typically requires coordination among multiple bureaucratic agencies, which in turn leaves greater room for bureaucratic discretion and opens the door to political influence. Achieving last-mile access therefore depends on politicians' incentives to intervene in the process. When citizens increase politicians' perceived electoral and reputational costs of denying them state services, politicians should be incentivized to facilitate last mile delivery.

This theory implies a potential role for two types of interventions to supply public utilities. First, intervening to reduce citizens' costs of interfacing with the bureaucracy should, we argue, help citizens overcome hurdles to demonstrating their eligibility for state services and incentivize bureaucrats to initiate the process of service delivery. However, as the scope for bureaucratic discretion increases, this process will hit roadblocks unless politicians intervene. Thus, achieving last-mile access will depend on a second set of interventions that help citizens apply coordinated pressure on politicians, in turn shaping politicians' incentives to put pressure on municipal governments to deliver services.

To test these theoretical predictions, we implemented a large, cluster-randomized controlled trial across close to 7,000 households in marginalized communities throughout Mumbai, one of the world's largest cities. Our focus is on Mumbai's vast informal settlements, where inadequate water access bedevils millions of residents. For a long time, residents of

so-called illegal settlements were prevented from linking up to the city's well-functioning water supply system (Björkman 2015; Anand 2017). That was until a 2014 ruling of the Bombay High Court afforded slums full rights to access, regardless of legal status. However, pervasive legal and policy roadblocks remained to realizing the formal rights that were made available on paper to settlement dwellers. Mumbai thus represents an ideal setting to probe potential strategies to surmount the considerable constraints that citizens face in accessing municipal water.

Working with local NGOs, we implemented two intensive interventions designed to boost communities' prospects for acquiring piped water. In a bureaucratic assistance arm, partners helped citizens navigate the bureaucratic hurdles required to establish eligibility for formal services. The second treatment arm focused on political coordination. NGO workers (i) convened public events on water access targeting elected officials as their audience; (ii) mobilized group visits to politicians' and bureaucrats' offices; and (iii) organized petitions demanding access to municipal water. The purpose was to signal to elected leaders the community's willingness to rally on water access. The interventions began in 2018 and were staggered: political coordination was fielded five months after bureaucratic assistance. We cross-randomized the two interventions in a multi-level factorial design, enabling us to assess both the individual effects of the treatments as well as potential interactions. To evaluate trajectories and short- and long-term impacts, we implemented two survey waves: a midline survey in 2019 (approximately one year after the interventions began) and an endline survey in 2023, around five years after the beginning of the interventions.

To what extent were the interventions effective in shaping citizens' likelihood of securing a municipal water connection, the primary outcome of interest? The answer, we find, hinges on whether informal settlements were excluded by existing policy from attaining formalization. Based on pre-registered results, we find that once we restrict attention to those informal settlements that were not subject to such policy exclusions, bureaucratic assistance when

combined with political coordination markedly increased citizens' likelihood of attaining formalized water access at endline. Moreover, the magnitude of this joint effect is substantial. We find that in the presence of political coordination, bureaucratic assistance increased the likelihood of citizens receiving a municipal water connection in the post-intervention period by a statistically significant 19 percentage points, which is about 45% of the control mean.

We conduct several exploratory analyses to examine mechanisms. Consistent with our theory, we first show that while bureaucratic assistance alone was effective in moving citizens along the formalization ladder, political coordination was crucial in complementing this effect to spur last mile service delivery. Second, this modifying impact of the political coordination intervention was most apparent in the run-up to the next scheduled municipal elections, thus highlighting the importance of political incentives in shaping the provisioning of formal state services in the final stages. Third, our analyses indicate that the combined interventions resulted in piped water even in migrant-dominant settlements represented by nativist politicians indicating that bottom-up pressure can incentivize politicians to allow or facilitate services even in communities that do not form part of their traditional constituencies.

While the claim that the successful delivery of public services entails jointly tackling bureaucratic hurdles as well as political incentives is not new, existing empirical studies have thus far neither been able to isolate how and why these strategies complement each other nor identify their joint causal impact. Thus, we have been left with an inadequate grasp of whether and how citizen empowerment interventions that combine these strategies actually work. Indeed, while previous research has examined the effectiveness of interventions that separately target either bureaucratic hurdles (e.g., Devoto et al. 2012) or politicians' incentives (e.g., Grossman and Michelitch 2018), ours is the first study to experimentally examine these two types of interventions operating in tandem and to show that together they are substantially more powerful and effective in engendering responsiveness and service delivery than either kind of intervention working alone.

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Our findings contribute to advancing knowledge of the factors that influence public service provision (e.g., Lake and Baum 2001; Harris and Posner 2019; Baldwin 2019; Harding and Stasavage 2014; Kramon and Posner 2013). Previous research highlights the role of political factors—notably electoral incentives (Bussell 2019; Min 2015; Herrera 2017), partisanship (Jensenius and Chhibber 2023; Dunning and Nilekani 2013), and community characteristics (Auerbach and Kruks-Wisner 2020; Kruks-Wisner 2018; Cruz, Labonne and Querubín 2020)—in influencing public service provision. We focus here on constraints that could potentially be overcome through citizen empowerment. A growing body of evidence highlights the limitations of citizen messaging campaigns and community monitoring as tools for improving service delivery (e.g., Habyarimana et al. 2007; Grossman, Platas and Rodden 2018; Raffler, Posner and Parkerson 2020). We home in on a different mechanism for bottom-up pressure—organized political mobilization targeting elected representatives—for citizens to collectively articulate demands for services, revealing an important role for such campaigns when they are introduced in conjunction with bureaucratic assistance.

Existing research on citizen-state engagements in urban environments has focused heavily on clientelism and brokerage (e.g., Auerbach and Thachil 2020; Auerbach and Kruks-Wisner 2020; Stokes et al. 2013; Rains and Wibbels 2023). By contrast, given that civil society organizations often bear much of the burden for improving the well-being of poorer citizens in the developing world (Bueno 2018), we focus on their role in helping citizens embrace bottom-up collective mobilization efforts to goad elected politicians and bureaucrats into plugging delivery gaps. Moreover, as we touch on in the conclusion, these civil society organizations may complement rather than replace the role of brokers.

Theory: Bureaucratic Hurdles and Political Resistance

In our stylized framework theorizing the barriers to public service delivery, citizens gain formalized access to state services in three stages. The first stage is citizen-initiated: citizens

approach local governments in a bid to prove their eligibility for a particular service (e.g., by documenting their income level as part of a means test).[1] The next stage entails an evaluation of that claim by a low-level bureaucrat. If judged valid, then state officers grant the necessary approvals, allowing the process to move forward. We jointly label these two stages the first mile of service delivery. In the final stage (the last mile) high-level bureaucratic and political coordination ensures the actual delivery of infrastructure on the ground. Achieving access to formal public services by passing through these stages is then, we posit, a product of the decisions of three primary actors: citizens, bureaucrats, and politicians.

Citizens. We begin with the premise that to get state-sanctioned connections to services, citizens need to complete a set of bureaucratic requirements; and that under-resourced citizens are disproportionately constrained in their ability to break through this red tape. It follows that externally furnished assistance with these early-stage administrative hurdles will boost the chances of access, especially among poorer, less advantaged citizens.

Citizens who haven't interacted with the bureaucracy before may lack the know-how and confidence with which to approach the bureaucracy and respond to subsequent follow-up requests. They may also be under-documented, and so unable to furnish items such as birth certificates or proof of residence necessary to complete applications. Bureaucratic assistance with these processes—such as form-filling, obtaining supplementary identification documents, liaising with bureaucrats, and troubleshooting roadblocks—thus hold significant promise (Devoto et al. 2012; Gaikwad and Nellis 2021). By effectively subsidizing the costs of dealing with the administrative state, such bureaucratic assistance interventions should increase the propensity of citizens to embark on the application process. Meanwhile, properly filed applications should evoke a response from the officials charged with processing, as we now discuss.

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[1]Thus, our theory applies to formal state services that procedurally require citizens to undertake steps to demonstrate their eligibility to the bureaucracy on an individual basis.

Bureaucrats. From the perspective of individual bureaucrats, the expansion of formal public services takes time and effort, generates surplus work on which they may be evaluated, and threatens to limit opportunities for bribes and rent-seeking from vested interests. Thus, in the status quo, bureaucrats often fail to provide formal public services to deserving citizens.

How and when might government officials overcome this status quo? We argue that government officials face different incentives at different stages of the formalization process, which vary in their bureaucratic complexity and the degree of bureaucratic discretion they entail. In the first mile, procedures are relatively simple and clearly laid out and what bureaucrats must do is straightforward. If bureaucrats' career prospects hinge at least in part on carrying out their job duties in a Weberian fashion, officials should be motivated to process applications for public services objectively (e.g., Evans 1995; Pepinsky, Pierskalla and Sacks 2017). Bureaucrats who decline to process applications objectively—whether due to shirking or incompetence—would be exposed to career setbacks. Thus, when citizens are able to demonstrate their eligibility for formalization, bureaucrats should have an incentive to initiate first mile service delivery.

However, the process of ensuring last mile service delivery is typically much more elaborate. It involves obtaining approvals from multiple agencies that may have competing priorities and mandates, securing the buy-in from a plethora of private and public stakeholders, and pushing through the implementation of often complex public infrastructure. This thicket of conflicting interests leaves ample room for bureaucratic discretion. Absent intervention by external actors, inertia and even paralysis may ensue.

When there is either formal or informal political oversight of the bureaucracy, politicians play a potentially important role in helping to overcome bureaucratic inaction. Politicians in patronage-based state systems have the power to exert influence over the careers of bureaucrats through promotions or transfers (Iyer and Mani 2012). More informally, bureaucrats who juggle multiple priorities often rely on politicians' local embeddedness

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to help resolve information asymmetries and implementation holdups. Politicians also have party networks and resources that help them simultaneously exert pressure on multiple bureaucratic authorities at different levels of government and overcome coordination problems (Thomas 2018). Thus, final stage access should depend on politicians' incentives to facilitate state services.

Politicians. Our argument about the role of politician oversight dovetails with growing awareness in the development literature that public goods provision is at least as much a political process as a technocratic one (Raffler 2022; Gulzar and Pasquale 2017). Thus, while bureaucratic assistance might be sufficient to motivate a limited bureaucratic response, the effort and coordination required to ensure last mile service delivery is unlikely to materialize in the absence of intervention by, or support from, incumbent politicians.

Incumbent politicians' uppermost objective is re-election. In the status quo of informality, politicians do not perceive electoral payoffs from provisioning services. In fact, some may even have incentives to oppose formalization if they are influenced by groups that benefit from the status quo, such as actors involved in the private delivery of services, officials who collect rents, or alternate electoral coalitions seeking to curb informal settlements by denying them services.

How, then, can politicians be convinced to expend time and effort on helping "off-the-grid" citizens secure services? Politicians receive a plethora of signals about which issues matter to voters. Discerning which issue preferences should be acted on and which can be ignored is a vexing information problem for politicians. The social movements literature underscores the importance of bottom-up collective mobilization for credibly conveying citizens' preferences for government action. Because of collective action costs, such signals should lead politicians to update their beliefs about the dimensions on which voters will score them (Grossman and Michelitch 2018; Gause 2022; Lohmann 1994). Well-publicized protests also carry the threat of negative reputational externalities in the event of inaction.

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If existing legal or policy exclusions prohibit certain groups of citizens from accessing formal state services, politicians can easily justify inaction. However, in the absence of such exclusions, citizen pressure campaigns for formalization should alter politicians' perceptions of their electoral calculus of withholding formal services. If the anticipated electoral gains outweigh the costs of ignoring the influence of those with a vested interest in thwarting formalization, politicians should face incentives to influence bureaucrats to grant formal services. It follows that facilitating collective action by voters to articulate demands for a given service should tilt elected politicians toward granting that service. Their incentives to do so should be particularly prevalent when electoral pressures are heightened, such as in the run-up to elections.

For citizens to be able to apply such pressure, however, political coordination constraints—factors that impede citizens' ability to mobilize collectively to communicate their demands to elected representatives—need to be addressed.
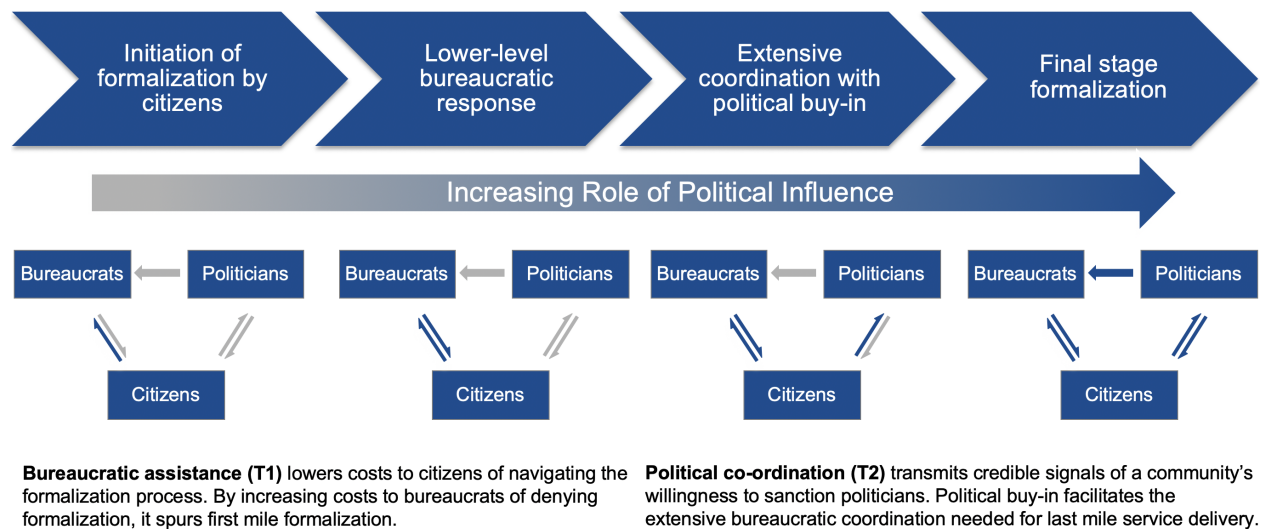

Figure 1: Constraints and Pathways to Formalization.

Strategic Interactions and Pathways to Formal Public Services. Figure 1 illustrates how citizens' actions elicit various reactions from bureaucrats and politicians over the course

of the formalization process, mapping our theoretical framework to our study's experimental interventions (which are elaborated in subsequent sections). Moving from left to right, it shows how assistance in interfacing with the bureaucracy (Treatment 1 or "T1") helps citizens overcome bureaucratic navigation constraints and initiate formalization claims with the state. Citizen petitions, in turn, generate responses from low-level bureaucrats tasked with processing and evaluating citizens' claims in a procedural manner by increasing bureaucrats' costs of inaction. This represents the first mile of service delivery.

The buy-in of elected politicians is needed, however, to facilitate the extensive bureaucratic coordination involved in the last mile stages of service delivery. In such cases, bureaucratic assistance to citizens is insufficient to spur formal service delivery as it does not alter the incentives and strategies of elected representatives. Helping citizens overcome political coordination constraints and put bottom-up pressure on their politicians (Treatment 2 or "T2") signals citizens' collective willingness to impose electoral and reputational costs on representatives for inaction, motivating politicians in turn to put pressure on bureaucracies to deliver final mile services.

The right-most panel holds that final stage formalization requires the joint activation of politicians' and bureaucrats' incentives. We term this the "bureaucrat-politician complementarity" hypothesis. Intuitively, inputs that solve the constraints that citizens encounter in formally petitioning the state for services will be ineffective in engendering the bureaucratic action required for final stage service delivery without supportive local political leadership. By the same token, the presence of well-motivated and strongly-incentivized politicians will fall short of inducing service delivery if citizens and low-level bureaucrats fail to fulfill their obligations up front. It is by altering the incentives of both bureaucrats and politicians that final stage formalization materializes.

The Mumbai Context

We study the case of Mumbai, India's commercial capital and home to over 20 million people. If Mumbai were a country, it would be the 61st largest in the world.

Mumbai's Municipal Government.   Mumbai boasts an expansive state apparatus. The Brihanmumbai Municipal Corporation (BMC) employs 108,000 workers and has an annual budget of INR 310 billion (Gaikwad and Nellis 2017). The BMC has both an elected wing as well as an administrative wing whose water department is responsible for providing connections to the city's residents.

The BMC's elected wing consists of directly-elected city councillors or 'corporators' who are elected for five-year terms. The elected arm has been dominated by the Shiv Sena (SS) for much of its history. The SS and other nativist parties such as the Maharashtra Navnirman Sena (MNS) have long waged campaigns denigrating Mumbai's vast internal migrant population (Weiner 1978; Katzenstein 1979; Gaikwad and Nellis 2017).

For most of the study period, the mayor of the BMC was from the SS and governed with support from the Bharatiya Janata Party (BJP), which received the second largest number of seats in the 2017 BMC elections. The next BMC elections, originally scheduled to take place in February 2022 were postponed that month and did not take place during our study's duration. After March 2022, the council was run by an appointed administrator and other bureaucrats.[2] The SS has also been part of the ruling coalition of the BJP state government of Maharashtra—the state in which Mumbai is located—for the entire study period, though it underwent a party split in 2022.

The BMC's administrative wing is headed by a municipal commissioner—an officer belonging to the Indian Administrative Services (IAS) who is chosen by the Maharashtra

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[2]Acharya, P., & Bose, N. September 20, 2023. "BMC Completes 18 Months Without Corporators; No Elected Reps in 24 Municipal Bodies in the State." *The Indian Express.*

state government. The BMC water department, overseen by the chief hydraulic engineer, is responsible for providing water connections to the city's 24 administrative wards. The BMC administrative wing is subject to both formal and informal forms of political influence. One important formal channel stems from the Maharashtra Chief Minister's authority to transfer IAS officers, which in practice allows politicians affiliated with the state ruling party to hold sway over the careers of officials at the apex of the BMC bureaucracy. More informally, engineers in the BMC water department typically depend on BMC corporators to approve their budgets and tenders for a range of projects (Anand 2011, 552) and rely on corporators' local networks for information needed to verify eligibility and deliver services effectively (Anand 2011, 553). Our qualitative interviews, described more fully in Appendix Section H, corroborate previous studies in suggesting that that corporators play a key role in facilitating water access (Anand 2017; Björkman 2015).

Water Access. Water connectivity is a far-reaching problem in Mumbai. The problem is especially acute in informal settlements or slums where many residents lack safe drinking water even though most accounts suggest that there is abundant supply (Björkman 2015; Anand 2017). This means that—in the absence of formalized water access—citizens living in non-notified slums are left to rely on informal providers (some of whom form part of a "water mafia") paying prices as much as 250-times higher than the municipal rate for water from tanker trunks that pay periodic visits to settlement communities.[3] Others must wait in long lines at community pipes or purchase water from vendors at exorbitant prices.

The BMC provides water connections to slum residents in groups of 5–15 households in the form of a common standpost. Group applications are filed online along with proof of residency documentation, a licensed plumber's approval, and payment of a joint application fee of approximately USD 7. Following submission, a BMC officer visits the applicant

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[3]Raju Vernekar. May 28, 2016. "BMC and Slum Dwellers in a Tug of Water War!" *Afternoon Dispatch and Courier.*

households to verify details and inspect the site. Subsequently, the BMC issues a "P-form" indicating approval for a water connection, and then a "C-form" once roadworks permissions are finalized for laying pipes. Applicants assume the costs of installing the pipes in the immediate vicinity of their homes, and of mounting the water-meter (approximately USD 36 per household, which is about one-fifth of the median respondent's monthly household income in our baseline sample).

Mumbai's Water Policy: Mumbai's slums differ in terms of their legal status and thus the rights of their inhabitants to access government services. Slums established prior to 2000 have largely achieved legal recognition by the city. But most of those established after this date are considered to be illegal. Our study was fielded following a 2014 Bombay High Court judgment stating that Mumbai denizens could no longer be excluded from the municipal water grid on the grounds that they occupy slums that were deemed to be illegal. The ruling directed the municipal corporation to formulate a policy to immediately broaden access to the water system. However, there continued to be several exceptions in practice. First, the ruling itself allowed for exceptions when there were prior Bombay High Court orders restricting access for slums on certain types of land. Second, the policy that the municipal corporation drafted in 2015 and put into effect in 2017 left multiple exceptions and created additional hurdles for many types of settlements. These exceptions created significant barriers to formalized water access for settlement residents.

Ineligible Land Types: While settlements on many types of land faced significant bureaucratic hurdles when it came to obtaining legal water supply from the BMC, there were settlements on three specific types of land—footpaths, forest, and salt pan land—that faced *legal and policy* barriers that made it impossible for them to get official municipal connections without a change in the existing policy or legal framework. First, settlements on footpaths were explicitly and summarily excluded from the 2017 BMC policy of granting water connections to slums. Second, settlements on forest and salt pan lands were excluded

on the basis of prior court orders that denied the right of slum-dwellers on these types of land from gaining access to a BMC water connection. Appendix Section G documents this policy and legal framework in further detail based on our fieldwork and archival research. We discuss the implications of these policy exclusions for our research design in the next section.

Experimental Research Design

Informed by our theoretical framework, we designed two intensive interventions to overcome barriers to formalization frequently observed in developing-country cities: the complexities of the formal application process and politicians' inertia. The interventions—described further in Appendix F—were implemented through the joint efforts of our local partner NGOs, Youth for Unity and Voluntary Action (YUVA) and Pani Haq Samiti (Association for the Right to Water; PHS). Figure 2 provides photographs illustrating our intervention activities.

(a) Bureaucratic Assistance (T1)   (b) Political Coordination (T2)

Figure 2: Examples of Intervention Activities (*faces are blurred to preserve anonymity*).

Treatment 1 (T1): Bureaucratic Assistance

Securing a water connection through the BMC involves a complex application process. For T1, trained NGO workers made repeat visits to each participant household over a 10-month period to help with five core elements of the application process:

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- *Informing* slum residents regarding their eligibility for a municipal water connection, the costs and benefits of applying for a connection and the formal procedures involved.

- *Forming* groups of five to ten neighboring households who would collectively sign up for a municipal water pipe.

- *Gathering* required documents such as proof-of-address certification, a licensed plumber's approval, and evidence of the slum's legal status, which typically prove thorny for slum dwellers to procure.

- *Submitting* residents' applications online through smartphones, tablets, or laptops, devices to which few households had access.

- *Liaising* with authorities to negotiate eligibility rules and documentation requirements, and to obtain ancillary permissions.

Treatment 2 (T2): Political Coordination

In the second treatment arm, our NGO partners mounted collective mobilization campaigns in slum communities, crafted to capture the attention of elected elites and officials around the issue of water connectivity and to credibly signal to local politicians communities' willingness to mobilize around the issue. This political coordination intervention was multi-pronged. NGO workers assisted with:

- *Publicizing* efforts to promote water access in the locality by putting up banners and distributing information pamphlets to residents, brokers and elected politicians.

- *Networking* settlement residents by creating WhatsApp groups to facilitate organizing.

- *Convening* delegations of residents to visit the offices of BMC bureaucrats as well as elected politicians at multiple levels of government—local corporators, state-level Members of the Legislative Assembly (MLAs), national-level Members of Parliament (MPs), as well as state and central government ministers.

- *Sending petitions* signed by settlement residents to elected officials as well as to government agencies with the authority to grant ancillary permissions required by the BMC.

- *Advertising* community mobilization efforts by collaborating with traditional media outlets and utilizing social media to ensure that knowledge about these campaigns reached a wider audience.

- *Assembling* community gatherings aimed at politicians and BMC officials. There, advocacy groups trumpeted the problems afflicting water-scarce communities using the language of "rights."

Empirical Strategy

We implemented a cluster-randomized controlled trial to examine the efficacy of the interventions detailed above. Here, we recount the technical design of the experiment. A timeline of the study is provided in Appendix D. Ethical considerations are discussed in Appendix I.

Sampling and Measurement. Our interventions operated at two different community levels. The evaluation was based on data gathered from a sample of households taken within those communities. The sampling protocol was three-staged, involving the selection of (a) slums, (b) household clusters within slums (or "slum clusters"), and (c) households within those clusters. Additional details about our study setting and sample are provided in Appendix E.

We first generated a list of densely-populated informal settlements (also known as "bastis") in the Mumbai metropolitan area drawing on the intimate contextual knowledge of our partner NGOs and survey teams as well as information from the 2011 Census of India, academic reports, and various government documents. To enter into the final sample, settlements had to meet four criteria: (i) a majority of households had to lack a functioning BMC water connection; (ii) the boundaries of the slum had to fall within one kilometer of a main municipal water pipe; (iii) our NGO partners could not have previously carried out significant work in the settlement; and (iv) the slum had to have been in continuous existence for at least three years. Applying these criteria resulted in a list of 76 eligible slums spread across the city of Mumbai (see Figure 3).
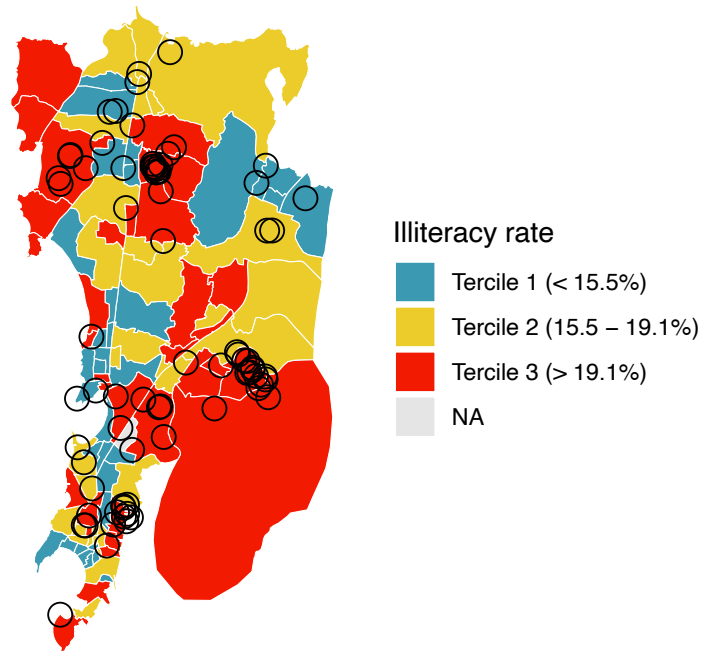
Figure 3: Map of sampled settlement colonies in Mumbai.

Since the selected settlements varied greatly in size, with some having as many as 10,000 households, we additionally divided up the larger slums in the sample into slum clusters: groups of 50–200 nearby households. Our experimental sample comprises 153 slum clusters, which were demarcated during a mapping exercise carried out before the baseline survey. When multiple clusters were drawn from a single large slum, we maximized the distance between clusters to reduce potential treatment spillovers (See Appendix E for additional details on our mapping exercise.)

Measures were taken using household surveys. For the baseline survey, we interviewed between 30 and 50 respondents in each of the 153 clusters, chosen using a random walk method. We excluded from consideration households that already had a BMC water connection, had applied for a BMC water connection within the past year, or had been living in rented accommodation for less than two years. We asked to interview the adult in the household with the next upcoming birthday.

Randomization. Block-randomization occurred in two steps. First, we divided slums into four groups according to the number of slum clusters they contained. We then constructed blocks using a greedy matching algorithm based on covariates we expected would correlate with the likelihood of attaining water access. Settlements within these 'randomization blocks' were then assigned to either receive or not receive the political coordination intervention (T2). For the second step, clusters within slums were assigned to either receive or not receive the bureaucratic facilitation treatment, using complete randomization (T1). Appendix C visualizes the full randomization scheme. There was one cluster (part of a two-cluster slum) that was dropped from the randomization to T1 in the second step. Our main analyses exclude this cluster, but we examine the robustness of our main results to assigning alternative codings of T1 for this cluster (see Appendix O).

Estimation. Estimation was pre-specified and is performed using weighted least squares regression. We first represent the average marginal component effect of T1 on individuals (i) in slum clusters (j) using $\beta 1$:

$$Y_{ij} = \alpha + \beta 1 * T1_{ij} + \delta_1 + u_{ij} \tag{1}$$

We then estimate the interaction between T1 and T2 on individuals in slums (k):

$$Y_{ik} = \alpha + \beta 1 * T1_{ij} + \beta 2 * T2_{ik} + \beta 3 * T1_{ij} * T2_{ik} + \delta_2 + u_{ik} \tag{2}$$

In each of the equations, Y is the dependent variable, α is a constant term, β are the intent-to-treat parameters of interest, and δ_1 (δ_2) denotes 'randomization block' dummies for T1 (T2).[4] Because of variability in the number of subjects recruited into the baseline sample in each cluster, as well as differences in the number of clusters in each slum, we reweight

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[4]See Appendix C for a full description of these randomization blocks.

respondents such that all clusters contribute equally in the estimation of Equation 1, and all slums contribute equally in the estimation of Equation 2. We appropriately adjust the standard errors to account for cluster-randomization at either the level of the slum cluster (in the case of specifications involving just $T1$) or at the level of the slum (in the case of specifications involving $T2$).

Following our pre-analysis plan, we present results both without covariates in the main text and with covariates in Appendix N. We report nominal p-values for our primary hypotheses and p-values corrected using the Benjamini and Hochberg method to account for multiple comparisons for our secondary hypotheses. Analyses that were not pre-registered are marked as exploratory.

We present two sets of pre-registered analyses: the first set using our entire sample of 76 slums, and the second set using our "eligible lands" sample which excludes those slums (28 slums in total comprising 36 clusters) that were located on lands rendered ineligible for formalization by the existing policy and legal framework—i.e., forest, footpath, and saltpan lands. The second set of analyses is based on an amendment to our pre-analysis plan that was filed in July 2019, prior to the completion of our midline survey (which was completed in August 2019, about a year after our interventions began) and approximately four years before the beginning of the data collection for our endline survey (which occurred in 2023, about five years after our interventions began).

As indicated in our pre-analysis plan and its amendments, discussed further in Appendix J, we measure intermediate outcomes using our midline survey and final outcomes pertaining to final stage formalization using our endline survey. Appendix A provides summary statistics of the variables used in our analyses, while Appendix B provides descriptions of the variables.

Internal Validity. We experienced attrition largely because of slum demolitions as well as temporary or permanent migration to rural areas that occurred between our baseline survey and our endline survey fielded five years later. In the case of demolished slums, we

sought to contact original respondents via their cellular phone numbers provided at baseline and administered a survey questionnaire to them over the phone. The respondents to the phone call survey accounted for 1.5 percent (103 respondents) of our total sample of endline respondents. In total, we were able to successfully recontact 61.5 percent of the original baseline subjects at endline. A regression analysis, presented in Appendix L, reveals no evidence that asymmetric attrition occurred as a function of assignment to either treatment condition either for the full sample or for the eligible lands sample. To enable more precise estimates of the cluster-level outcomes (paralleling the strategy pursued in Green, Wilke and Cooper 2020), we sampled an additional 2,444 households at endline (what we term the "replacement sample").[5] Our analyses in this paper include this replacement sample in addition to the original sample (i.e., those respondents at baseline who were re-contacted).

Appendix K reports balance tests showing that treated and untreated individuals look statistically similar with respect to 17 pre-treatment, baseline covariates across our two treatments for both our full sample as well as the eligible lands sample.[6]

Manipulation Checks Table S7 examines manipulation checks of our interventions based on responses to our midline survey for both the full sample as well as the eligible lands sample. We find either significant or marginally significant evidence that assignment to each intervention increased the likelihood that citizens reported receiving the relevant encouragement from NGOs. While these effects may be under-estimates due to imperfect recall and the high level of NGO activity in this space in both the treatment and control groups, we present exploratory analyses (see Table S8 and Table S12) showing that assignment to bureaucratic assistance (T1) did increase the likelihood of actually submitting an application

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[5]For the analyses with covariates, missing baseline covariates for this sample were imputed (See Appendix Section J).

[6]As we might expect by chance when considering a set of statistical comparisons this large, one pre-treatment variable is significant at the 5% level for each of the treatments.

for a water connection. Similarly, Table S7 Column 6 shows in an exploratory test that assignment to T2 significantly increased the likelihood of subjects in the eligible lands sample reporting that they *in fact* participated in community actions to "put pressure on the BMC to provide this slum with municipal water connections." This test is not significant however in the full sample indicating perhaps that residents on settlements located on ineligible land types may have viewed such collective action as futile.

Descriptive Findings

Our focus is on slums in which the majority of residents do not have formalized access to piped water. The study sample thus comprises citizens who are marginalized along multiple dimensions. Figure 4 characterizes the sample in terms of baseline access to services, socio-economic status, political engagement, and ascriptive and subjective identity.
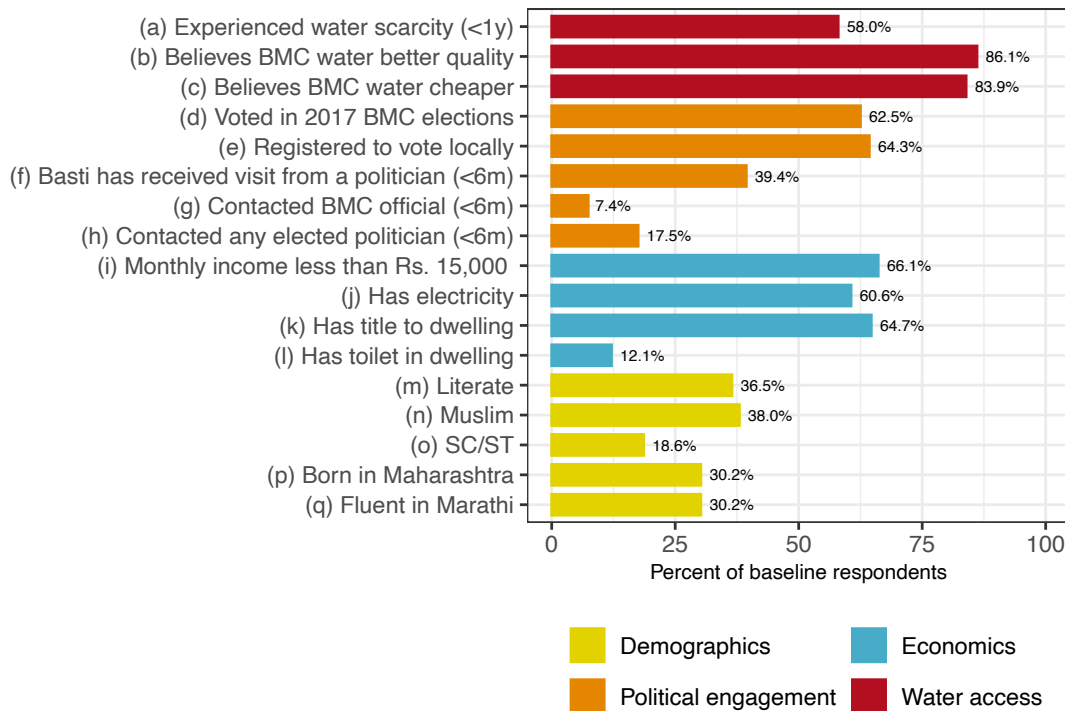
Figure 4: Descriptive statistics. Percentages are based on unweighted observations of all respondents who completed the baseline survey.

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The group is economically disadvantaged; 66% of respondents earned less than USD 215 a month and just 12% reported having toilets in their dwellings. Religious and caste minorities are overrepresented relative to their all-India population shares. Most study participants acknowledged that their household experienced water scarcity at least for a month over the previous year. Participants reported relying on a variety of different sources for getting non-municipal water, including community stand pipes, borewells, and private tankers. Notably, an overwhelming majority believed that municipal water is cheaper and of better quality than their existing source of water. Levels of political participation are fairly high. Over 60% of our sample are registered to vote and a similar proportion report having voted in the most recent municipal elections.

Experimental Results

What are the key constraints to garnering public service access and how can they be overcome? Table 1 reports the estimated effect of our interventions, as well as their interaction, on final stage formalization. The outcome in Table 1 is a binary indicator denoting whether "final stage" formalization—that is, access to a verified municipal water connection—was achieved in the period after our interventions began.

Figure 5 displays the marginal effects based on Columns 2 and 4 of Table 1 for the full sample and the eligible lands sample respectively. Overall, the figure shows little support for the idea that bureaucratic assistance interventions *by themselves* are sufficient to help citizens meaningfully improve their likelihood of achieving formalized water access either in the full sample or in the eligible lands sample. In particular, the figure shows that the marginal effect of T1 on final stage formalization when T2 is not present is not statistically significant at conventional levels in either sample. Similarly, Appendix Figure S3 shows that political coordination by itself did not on average significantly increase the likelihood of final stage formalization in either sample.

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Table 1: Estimated interaction between bureaucratic assistance and political coordination interventions. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses.

Outcome	DV: Formalized (Full Sample)		DV: Formalized (Eligible Lands)	
	(1)	(2)	(3)	(4)
Bureaucratic assistance (T1)	0.02	−0.04	0.04	−0.03
	(0.03)	(0.06)	(0.03)	(0.07)
Political coordination (T2)		−0.08		−0.06
		(0.06)		(0.07)
T1*T2		0.11		0.22**
		(0.08)		(0.10)
Nominal p-value	0.26	0.19	0.08	0.04
Control mean	0.43	0.33	0.54	0.42
Test type	One-sided	Two-Sided	One-sided	Two-Sided
Unit of weighting/clustering	Cluster	Slum	Cluster	Slum
Covariates	No	No	No	No
Pre-registered	Yes	Yes	Yes	Yes
R^2	0.33	0.23	0.23	0.24
Num. obs.	6652	6652	5251	5251

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

We now turn to examining support for our "bureaucrat-politician complementarity" hypothesis in which T1 and T2 should work in tandem to increase formalization. Our pre-registered analyses based on our full sample show no evidence that T2 modifies the effect of T1 on final stage formalization (Table 1 Column 2); Figure 5 confirms that the marginal effect of T1 when T2 is assigned is also not distinguishable from 0 in the full sample. However, the results based on the eligible lands sample (Table 1 Column 4) show strong evidence in favor of our complementarity hypothesis when it comes to final stage formalization. Specifically, we find that for settlement dwellers in this sample, T1 was significantly more likely to result in final stage formalization when T2 was also assigned. In particular, the interaction term is substantively large (over half the control mean) and statistically significant in a two-tailed test, with a p-value of 0.04. Moreover, as shown in the marginal effects plot displayed in Figure 5, we find that T1 raises the likelihood of final stage formalization by a statistically significant 19 percentage points (p-value=0.001) when T2 is also assigned, an increase which amounts to a substantial 45% of the control mean. Thus, we find strong

Figure 5: Estimates of marginal effect of bureaucratic assistance (T1) from pre-registered analyses of interaction of bureaucratic assistance (T1) and political coordination (T2) interventions on the binary indicator for final stage formalization. See Table 1 for results in tabular form.
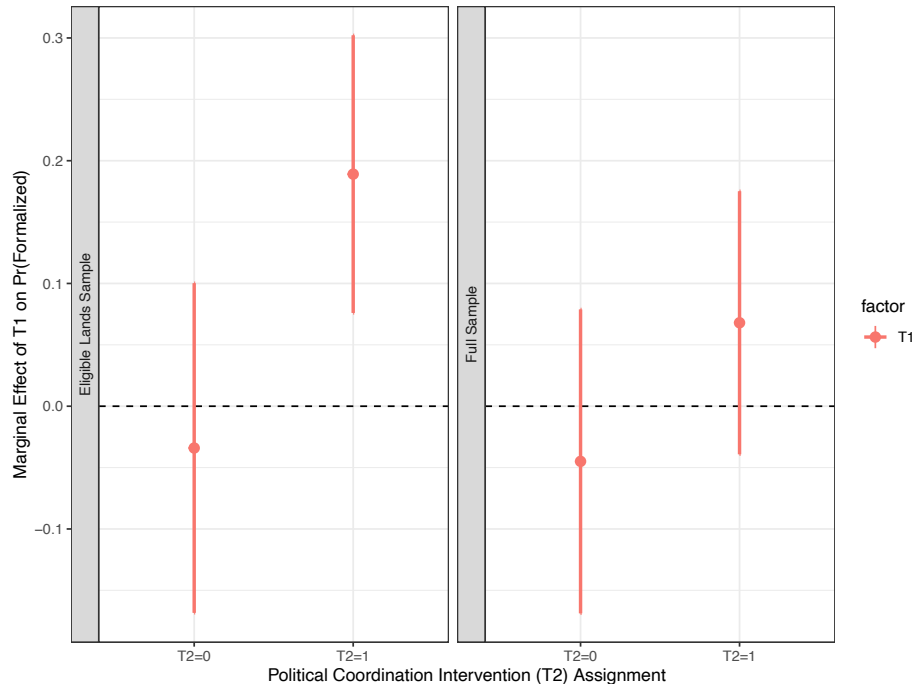
support for our complementarity hypothesis' prediction that both "first-mile" and "last-mile" constraints need to be solved together for access to materialize, but only in cases where the policy and legal framework prior to our interventions did not preclude formalization.

In Appendix Section N, we present the results of additional analyses that include pre-specified covariates (see Tables S10 and S11) and those that consider the joint impact of our interventions on citizens' progress up the formalization ladder (see Table S15 and Figure S2). We observe that the sign and magnitude of the main results remain similar in these analyses, thus providing confidence in the robustness of our results.

Mechanisms

Thus far, our results have shown that bureaucratic assistance and political coordination—when combined—had a potent effect on settlement dwellers' ability to access to a municipal water

connection in our eligible lands sample. We now probe four key questions that help shed light on *why* and *how* these interventions worked. First, at what stage of the formalization process did our interventions have the most impact? Second, how did political coordination succeed in engendering responsiveness from politicians to facilitate access to piped water? Third, how long after the interventions did their effects emerge and how did this timing relate to the electoral cycle? And last, how did the political environment shape the effectiveness of our interventions? This section provides additional analyses as well as qualitative insights to shed light on these questions. Appendix H provides further details on the sources of these qualitative insights.

Bureaucratic Assistance by Itself Impacted Only the Initial Stages of Formalization

We start by exploring whether and how bureaucratic assistance helped citizens move up the formalization ladder. Specifically, we conduct exploratory analyses of data from our midline survey to assess the impact of T1 on the intermediate outcomes in the formalization process. Figure 6 (and Table S8) presents the results based on the eligible lands sample; the full sample results for the same analyses are available in Table S12.[7]

Examining Figure 6, we find that bureaucratic assistance significantly raised the average reported likelihood of households submitting a formal application for a BMC water connection (Row 1) and reports of receiving an initial official visit from a BMC engineer (Row 2). We find no evidence, however, that T1 on average significantly increased the likelihood of residents reporting that they received a P-form indicating official permission to receive a water connection (see Row 3). Additionally, Row 4 shows that this intervention, on average, has no impact on final stage formalization in the short-term.[8]

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[7]See also [Reference Redacted], which reports results from our midline survey.

[8]Table S12 shows similar results for the full sample.
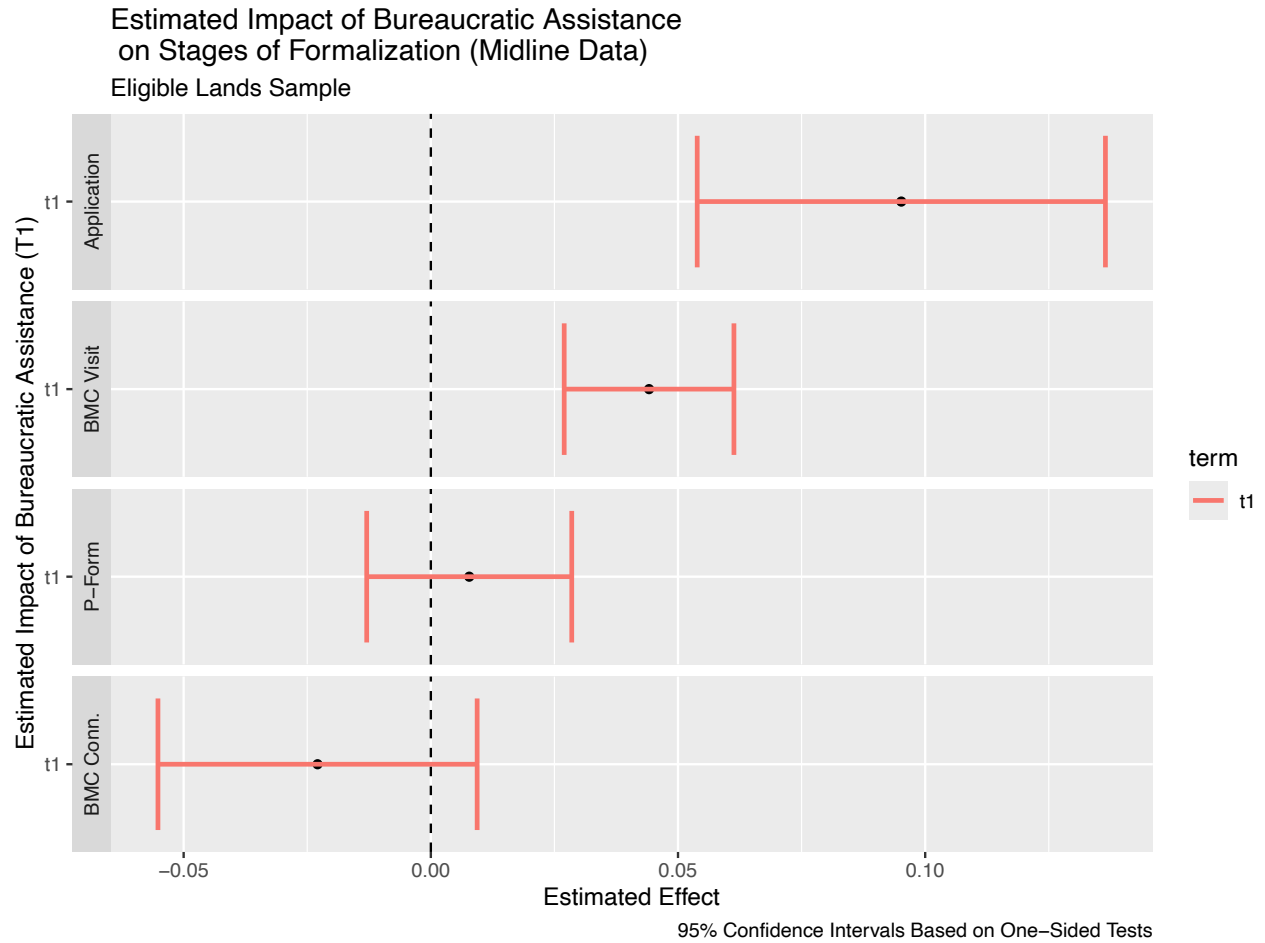
Figure 6: Stages of Formalization.

Bureaucratic assistance thus advanced citizens up the formalization ladder, helping them submit application forms and even helping them garner a lower-level bureaucratic response in the form of a visit from the BMC. However, this intervention on average failed when it came to helping citizens receve an official permission for a water connection and, in the last mile, when it came to helping them procure an actual water connection from the BMC.

Why was bureaucratic assistance insufficient by itself in achieving last-mile service delivery? Our qualitative interviews suggest that this stage of formalization requires coordination and obtaining approvals—known as "No Objection Certificates (NOCs)"—from multiple authorities and agencies who have jurisdiction over the land. Thus, politicians who

are sufficiently motivated to facilitate water access may use their influence to help settlement dwellers overcome or circumvent these hurdles.[9] In turn, when asked why bastis that had submitted applications did not receive water connections, a NGO worker said, "the main reasons is the interference of the politicians; it is in their hands. If we talk about NOC, it is up to them whether they will give it or not."[10] Thus, the stage of last mile delivery leaves the most room for political discretion which could be used to either facilitate or deny water access depending on politicians' incentives.

Political Coordination Did *Not* Increase the Efficacy of Bureaucratic Assistance in Shaping the Initial Stages of Formalization

We next turn to examining an interactive model presented in Table 2 to ascertain whether political coordination modified the impact of bureaucratic assistance on the initial stages of formalization. Interestingly, we do not find any evidence that T2 significantly modified the impact of T1 on the likelihood of the initial stages of formalization at midline, such as submitting an application, receiving a visit from the BMC, or receiving a P-form. Indeed, the interaction term falls far below conventional levels of significance for all three outcomes. We find similar results when we consider the full sample of settlements as well (see Table S13). Thus, while T1 on average did increase the likelihood of the initial steps of formalization, our results show that the greatest impact of T1 combined with T2 was in spurring the very last mile of service delivery—the receipt of municipal water connections—after the initial procedural requirements were met. Moreover, we find that the combination of bureaucratic assistance and political coordination increased the likelihood of final stage formalization only over the long run at endline (see Table 1 and Figure 5) and not at midline (see Table 2 Column 4). We probe this result further in our discussion below concerning the timing of formalization.

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[9]Interview, NGO Respondent 4.

[10]Interview, NGO Respondent 4.

Table 2: Estimated interaction between bureaucratic assistance and political coordination interventions on stages of formalization. Weighted least squares regression estimates. Sample is based on informal settlements on eligible land types. Models include block fixed effects. Clustered standard errors in parentheses. Estimates based on responses to midline survey conducted one year after our interventions began.

	Form Submitted	BMC Visit	P-Form	BMC Connection
	(1)	(2)	(3)	(4)
Bureaucratic assistance (T1)	0.13*	0.04*	0.03*	−0.02
	(0.06)	(0.02)	(0.01)	(0.04)
Political Coordination (T2)	0.05	−0.00	0.00	0.06
	(0.05)	(0.02)	(0.02)	(0.06)
T1*T2	−0.05	0.00	−0.04	−0.02
	(0.08)	(0.02)	(0.02)	(0.07)
Nominal p-value (T1*T2)	0.57	0.84	0.12	0.78
Test type	Two-sided	Two-Sided	Two-sided	Two-Sided
Control mean	0.34	0.42	0.03	0.10
Unit of weighting/clustering	Cluster	Slum	Cluster	Slum
Covariates	No	No	No	No
Pre-registered	No	No	No	No
R^2	0.07	0.05	0.03	0.08
Num. obs.	5010	5010	5010	5010

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Politicians Respond to Bottom-up Pressure by Facilitating Piped Water

Our qualitative interviews and reports from NGO staff help shed light on how our political coordination intervention—and the resulting political pressure it generated—engendered responsiveness from politicians.

First, the menu of activities included in T2 made politicians cognizant of the collective nature of citizens' demands and willingness to mobilize on the issue of water access. For example, an MLA who previously had avoided requests for meetings with NGO workers responded to a letter containing collective signatures from basti residents in a "very positive" manner and "even agreed to give funds for the pipeline for the water connections."[11] Similarly, a corporator who was initially "completely neutral" about helping slum residents obtain a NOC reversed course after receiving a collectively-signed letter and meeting with a contingent of slum residents; "ultimately, the basti was provided with the water connections" after the corporator succumbed to bottom-up pressure.[12] Another NGO worker described how "pressure from the people also played a major role" in successful connections; "when they wouldn't give us the P-Form we [would] tell them that if they don't give us the P-Form then 200 people would be standing outside the ward office."[13] Such strategies worked, underscoring how mass mobilization shifted politicians' willingness to engage with the bureaucracy to facilitate water connections.[14]

Our qualitative interviews, discussed further in Appendix H, also shed light on a) how electoral considerations incentivized politicians to act on citizens' bottom-up political pressure and b) how politicians observing the possibility of electoral payoffs put pressure on bureaucrats

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[11]Interview, NGO Respondent 1.

[12]Interview, NGO Respondent 4.

[13]Interview, NGO Respondent 5.

[14]Importantly, we find no evidence that our interventions triggered backlash from vested interests (see Table S16.

to provide water connections and facilitated service delivery by sharing information, liaising across various departments and stakeholders, and overcoming roadblocks and c) how elected representatives could point to existing policy exclusions as a basis on which to deny requests for formalization from settlements even in the face of political pressure.

The Interventions' Impact Emerged Most Strongly in the Run-Up to the Scheduled Municipal Elections

We next turn to the question of *when* the effects of bureaucratic assistance combined with political coordination emerged. Figure 7 (along with Appendix Section R and Table S18) sheds some light on this question using exploratory analyses. We find that the greatest combined impact on full formalization appeared to occur in the years between 2020 and 2022, which was the period just prior to the city-wide BMC elections that were scheduled to take place in 2022, but that were—as we describe in the context section—subsequently put on hold due to a dispute over ward boundaries. We interpret these results as indicating that politicians had a heightened incentive to respond to political pressure from settlement communities who had initiated the bureaucratic process of formalization in the run-up to this election, an incentive that subsided once the elections were put on hold.

A report from our local research staff concerning a specific settlement assigned to both T1 and T2 illustrated how bureaucrats and politicians failed to respond to both bureaucratic assistance and political coordination in the absence of the pressure of an upcoming election. Specifically, our local staff described how the BMC refused to approve the settlement dwellers' applications for water connections saying that they needed an NOC from another agency; despite the "people's protesting in large numbers", only a small number of NOCs were granted.[15] Consequently, in early 2020—a full two years before the next scheduled elections—this settlement had just 10 water connections. However, we observe that when elections were imminent, water connections in this settlement materialized on large scale

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[15]WhatsApp Message from Local Research Staff, April 2020.
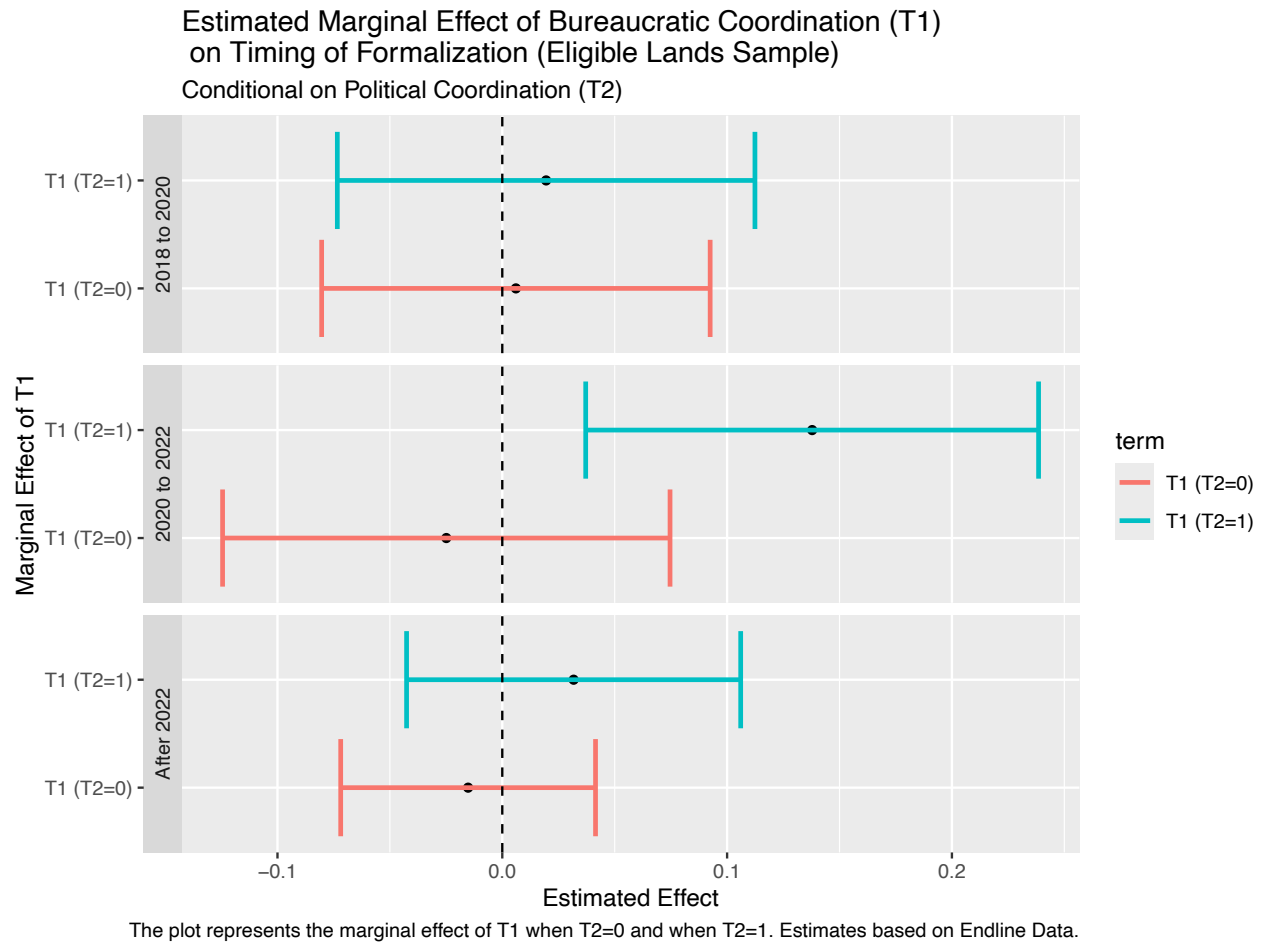
Figure 7: Timing of Formalization.

suggesting that the bureaucratic assistance and political coordination primed this settlement for extensive responsiveness. This dynamic resonates with one NGO worker's description of the lengths that politicians and party workers go to to facilitate water access for settlement dwellers in the pre-election period: "the political leaders/karyakartas [party workers] are only active at the time of elections... At the time of elections, they will fill the forms for people and if a licensed plumber charges 5000 they ask they people to pay 2000 and the rest they will manage."[16]

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[16]Interview, NGO Respondent 6.

T1 and T2 Helped Migrants 'Get on the Grid'

A final question is whether and how our interventions were shaped by the broader political context and, in particular, by the nativist parties and anti-migrant sentiments prevalent in Mumbai's city politics. Figure 8 presents the results of exploratory analyses probing how the combined impact of our interventions varies based on the partisanship and identities of elected corporators and based on the native/migrant status of individual respondents and the shares of migrants in slums.[17]

Estimated Marginal Effect of T1 when T2=1 on Full Formalization (Eligible Lands Sample)
Conditional on Modifying Variables
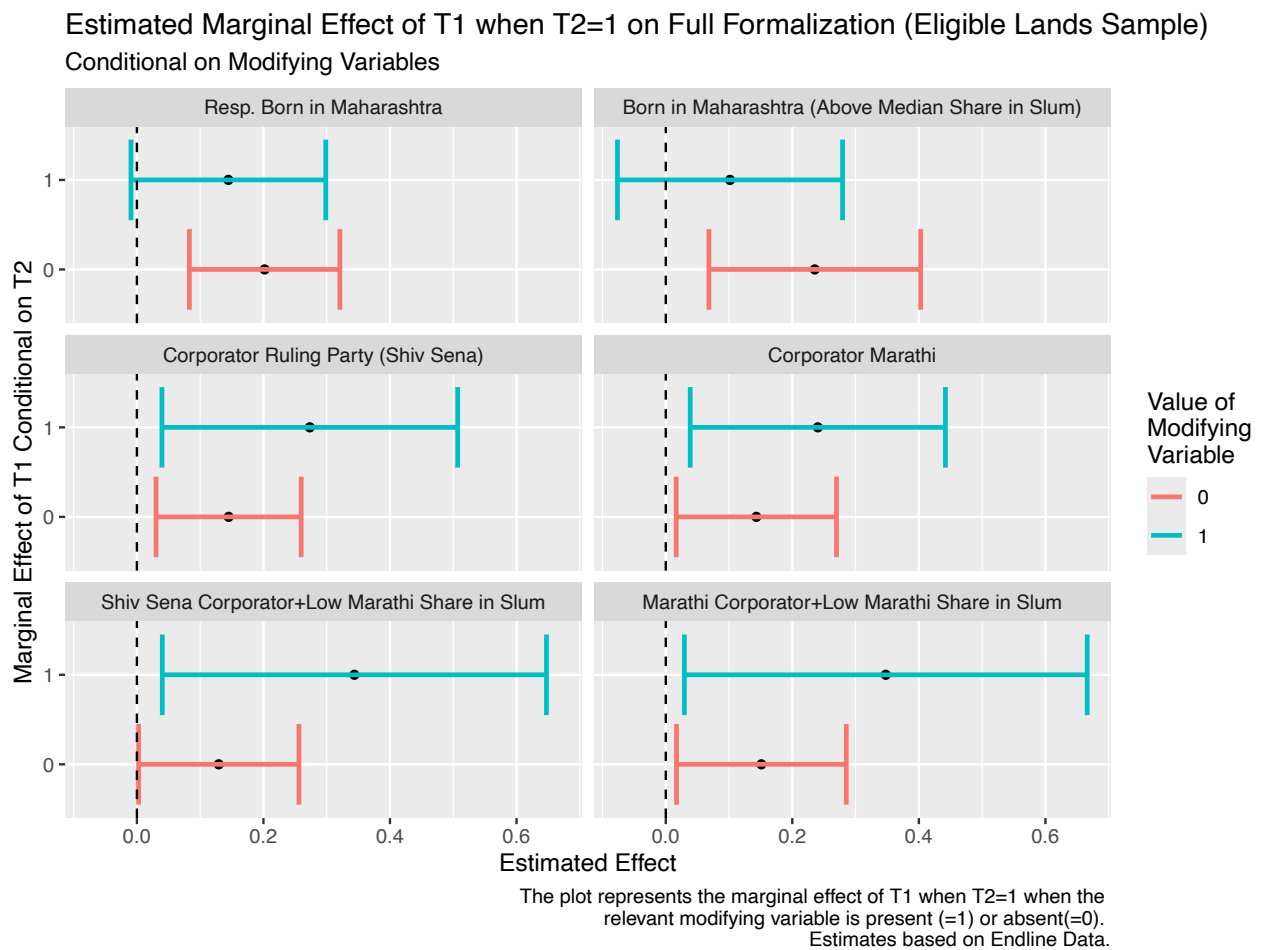
Figure 8: How Anti-Migrant Politics Shapes the Combined Impact of T1 and T2 (Tabular Results in Table S9)

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[17]Specifically, as shown in Appendix Table S9, we interact $T1$ and $T2$ and the relevant binary modifying variable. We then examine how the marginal effect of $T1$ when $T2$ equals 1 varies when the condition specified by the modifying variable is present and absent.

Overall, the figure shows little evidence that the effectiveness of our interventions was significantly modified by the migrant status of informal settlement dwellers or by the nativist identities or partisan affiliations of the elected corporators. These results suggest that bottom up political pressure can incentivize politicians to reach outside their core constituencies and use service delivery as a channel to expand their electoral coalitions.

External Validity

How generalizable our our findings, which are based on a particular sample and formalization context? First, our detailed mapping exercise and sampling strategy ensured that subjects in our study are drawn from a broad cross-section of Mumbai's informal settlements that lack access to state-provided water; Mumbai resembles other megacities in the Global South in terms of having large segments of its population residing in informal settlements. Second, we ask how the results from our sample generalize to citizens with different demographic profiles—what Egami and Hartman (2022) refer to as "X-validity" concerns. The lack of heterogeneous effects within our sample (see the discussion of pre-registered results in Appendix Q) provide suggestive evidence that the treatment would have similar effects for individuals with different demographic profiles and may thus generalize to other types of samples elsewhere.

Third, we consider "C-validity" concerns, which pertain to generalizing results from our specific context to other contexts (Egami and Hartman 2022). Several contextual factors may moderate the effects of bureaucratic assistance and political coordination, either independently or jointly, on formalization. For example, the presence of onerous bureaucratic hurdles and application procedures that impose non-negligible costs on citizens might be a necessary scope condition for our complementarity argument; in cases where citizens need not officially petition bureaucrats or where interfacing with the bureaucracy is relatively easy, political advocacy

might be sufficient to spur formalization.[18] Additionally, our results hinge upon a sufficient degree of state capacity to ensure the feasibility of providing the infrastructure required for last-mile service delivery. In low capacity contexts, governments struggle to provide services regardless of bureaucrats' and politicians' incentives to do so. Finally, our argument likely applies only to contexts in which bureaucrats have discretion in the provisioning of services and bureaucracies are either de jure or de facto (or both) uninsulated from political influence. It is in contexts where multi-actor incentive problems operate simultaneously to make informality the status quo that our findings likely generalize.

Discussion

We marshal evidence from a large-scale field experiment in one of the world's megacities to enhance our understanding of what drives formalized access to public services for poor urban citizens. Our focus is on interrogating how citizen-state interactions, facilitated by civil society organizations, shape access to Mumbai's municipal water grid. Theoretically, we demarcate the stages of public services provisioning and develop a bureaucrat-politician complementarity framework in which bureaucratic and political obstacles must be jointly solved for last-mile access to materialize. We find that door-to-door assistance with navigating bureaucratic procedures was helpful in helping citizens move up the formalization ladder, but alone failed to bring piped water to the communities in which we worked. Conversely, our complementarity hypothesis receives strong support in the sample of settlements that were eligible for formalization. When bureaucratic assistance was combined with encouragements to apply public pressure on politicians, it had an appreciable impact on the likelihood that citizens received final-stage municipal water connections. Highlighting the importance of political incentives, we show additionally that this complementary impact of our interventions

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[18]In this light, our argument would apply to state services like electrification, sewage disposal and trash collection, or low-income housing but not to services such as public roads.

emerged not immediately after the interventions, but subsequently in the run-up to the next scheduled municipal elections.

We note that our study emphasizes the importance of formal state actors—politicians and bureaucrats—for the achievement of service access. What of the nexus of informal actors, especially local brokers, who have been central to recent debates in the literature (Auerbach and Thachil 2020; Bussell 2019; Stokes et al. 2013)? We view these sets of arguments as non-rival, in the sense that there are multiple possible paths to interfacing with the state and availing benefits from it. Nevertheless, our study design gives us some traction on the role played by intermediaries. In a pre-registered test in Table 3 we find marginally significant evidence in our overall sample that citizens in these settlements who had made contact with a broker in the six months prior to the baseline survey were more likely to have attained water access at endline as a result of one or both of our interventions (Column 1). This lends some credence to the idea that brokers are adept performers capable of "getting things done" amid intricate and often exclusionary state procedures and that the efforts of brokers can complement those of NGOs. Future work might seek to more directly evaluate how the contributions of various types of informal actors dovetail or conflict when it comes to helping citizens access state services.

Many developing democracies across the globe find themselves trapped in a vicious cycle: the state fails to deliver goods that citizens want, leading disillusioned citizens to stop demanding them (Ahmad et al. 2004). In this light, the informal sector is an equilibrium outcome based on expectations that citizens have about the probable bureaucratic response to formalization requests. In a strategic interaction, a treatment that pushes only one set of actors (e.g., citizens) to change strategy without changing the incentives of other sets of actors (i.e., bureaucrats and politicians) is unlikely to yield meaningful change. Our results on the independent effects of T1 support such a contention.[19] Efforts to help citizens overcome

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[19]These results are consistent with an emerging set of studies that document that

Table 3: Estimated effect of either intervention (T1 or T2) on final stage formalization conditional on reliance on broker at baseline. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses.

	DV: Formalized (Binary)	
	Full Sample	Eligible Lands Sample
	(1)	(2)
T1 or T2	−0.05	−0.00
	(0.06)	(0.06)
Relies on broker (baseline)	−0.07	−0.04
	(0.05)	(0.06)
T1orT2*Relies on Broker	0.14*	0.14
	(0.08)	(0.09)
Nominal p-value	0.10	0.14
Test type	Two-sided	Two-Sided
Control mean	0.34	0.42
Unit of weighting/clustering	Slum	Slum
Covariates	No	No
R^2	0.23	0.22
Num. obs.	6652	5251

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

bureaucratic hurdles to request formalization spurred citizen action, but did not result in last mile service delivery. Conceivably, state responses such as these are what lead citizens to accept informality in the first place.

Yet our findings on the joint effects of T1 and T2 provide a pathway forward for efforts to overcome informality. Interventions that recalibrate the incentives of state actors to respond to citizen petitions—in this case, by reshaping the electoral incentives of political elites who influence bureaucrats—can make citizens more legible to the state and motivate governments to follow through and formalize service delivery. In the aggregate, scaleable interventions that reduce citizens' inconvenience costs and give them political voice do succeed in securing access to municipal services when administered in tandem. Thus, our results suggest that

interventions to promote formalization that only target one set of actors are largely unsuccessful in prompting formalization (Grady et al. 2020; Gottlieb, LeBas and Magat Forthcoming).

the ground-level initiatives being rolled out by civil society groups throughout the Global South to improve citizens' access to state services must pursue bureaucratic and political pathways simultaneously in order to successfully deliver formal public services.

Are there other types of civil society interventions that could bring about public service formalization more expeditiously and even amidst legal and policy obstacles? Do settlement dwellers who "get on the grid" elicit greater political responsiveness, especially during periods of crisis or scarcity? And, how does public service formalization shape the future political engagement of marginalized citizens? Our findings pave the way for future research examining these questions.

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ONLINE APPENDIX

"Getting on the Grid: A Field Experiment on Bottom-Up Political Pressure and Access to Essential Public Services"

Table of Contents

A Summary statistics

Table S1: Summary statistics. Question wordings and recodes are described in Appendix Table S2.

Measure	Variable Type	N	Mean	St. Dev.	Min.	Median	Max.
Formalization level	Outcome (Endline)	6,652	1.62	1.39	0.00	2.00	3.00
Formalized	Outcome (Endline)	6,652	0.47	0.50	0.00	0.00	1.00
NGO Visit	Outcome (Midline)	6,268	0.42	0.49	0.00	0.00	1.00
Collective Action Encouraged	Outcome (Midline)	6,268	0.22	0.42	0.00	0.00	1.00
Collective Action Taken	Outcome (Midline)	6,268	0.19	0.39	0.00	0.00	1.00
Submitted form	Outcome (Midline)	6,268	0.26	0.44	0.00	0.00	1.00
BMC visited	Outcome (Midline)	6,268	0.08	0.27	0.00	0.00	1.00
P-Form received	Outcome (Midline)	6,268	0.05	0.21	0.00	0.00	1.00
Formalized	Outcome (Midline)	6,268	0.08	0.28	0.00	0.00	1.00
T1: Bureaucratic Assistance	Treatment indicators	6,652	0.50	0.50	0.00	1.00	1.00
T2: Political Coordination	Treatment indicators	6,652	0.49	0.50	0.00	0.00	1.00
Female	Covariates	6,652	0.62	0.49	0.00	1.00	1.00
Age	Covariates	6,652	37.32	8.92	2.00	37.00	90.00
Literacy	Covariates	6,652	0.37	0.48	0.00	0.00	1.00
Income	Covariates	6,652	12623.24	5518.47	1000.00	12000.00	250000.00
Assets	Covariates	6,652	2.54	2.13	0.00	3.00	9.00
Patta	Covariates	6,652	0.69	0.46	0.00	1.00	1.00
Renter	Covariates	6,652	0.14	0.35	0.00	0.00	1.00
Has electricity	Covariates	6,652	0.62	0.49	0.00	1.00	1.00
Voted	Covariates	6,652	0.85	0.36	0.00	1.00	1.00
Native	Covariates	6,652	0.87	0.33	0.00	1.00	1.00
Hindu	Covariates	6,652	0.60	0.49	0.00	1.00	1.00
Politician visit	Covariates	6,652	0.52	1.00	0.00	0.00	3.00
Water scarcity	Covariates	6,652	0.37	0.48	0.00	0.00	1.00
Water bill	Covariates	6,652	0.03	0.18	0.00	0.00	1.00
Fetch time	Covariates	6,652	8.85	11.64	0.00	7.50	150.00
Forest/Footpath Land	Covariates	6,652	0.19	0.40	0.00	0.00	1.00
Relies on Tanker water	Covariates	6,652	0.03	0.16	0.00	0.00	1.00
Resp. Born in Maharashtra	Moderators	6,652	0.28	0.45	0.00	0.00	1.00
Born in Maharashtra (Above Median Slum Share)	Moderators	6,652	0.40	0.49	0.00	0.00	1.00
Marathi Corporator	Moderators	6,652	0.67	0.47	0.00	1.00	1.00
Shiv Sena Corporator	Moderators	6,652	0.50	0.50	0.00	0.00	1.00
Marathi Corporator + Low Marathi Share	Moderators	6,652	0.43	0.50	0.00	0.00	1.00
Shiv Sena Corporator + Low Marathi Share	Moderators	6,652	0.37	0.48	0.00	0.00	1.00
Relies on Broker	Moderators	6,652	0.04	0.20	0.00	0.00	1.00

B Variables description and recodes

Table S2: Variables description and sources.

Variable	Survey question/data source	Response options [recodes]
Outcomes		
• Formalized	A. Does your household currently have a BMC water connection for which you are required to regularly pay fees to the BMC? B. Please can you show me your household's BMC water pipe, water coming from that pipe, and the BMC water meter attached to the pipe? [Enumerator: verify whether water is owing from the pipe and that there is a BMC meter attached to the pipe] C. When did you receive your BMC water connection?	Coded 1 if (i) response to Question A is "yes", AND (ii) response to Question B is "Yes, respondent shows BMC water connection, meter, and water is flowing" or "Yes, respondent shows BMC water connection, meter, but water is not flowing", AND (iii) response to Question C is *not* "more than five years ago" or "Don't Know"
• Submitted form	Did you submit an official application for a BMC water connection within the last one year?	Yes [=1]; No [=0]

Variable	Survey question/data source	Response options [recodes]
• P-form received	Have you received a P-form from the BMC in the last one year? (You may have received it individually or as part of a group of households.)	Yes [=1]; No [=0]
• Formalization level	Constructed from responses to the three preceding survey questions.	Answers "yes" to *Submitted form* [=1]; Answers "yes" to *P-form received* [=2]; Answers "yes" to *Formalized* [=3]; Otherwise [=0]
• BMC visited	Has an official from the BMC water department come to visit you in the last one year?	Yes [=1]; No [=0]
• NGO Visit	"Over the past one year, has an NGO worker come to your home to offer help in obtaining a BMC water connection"	Yes [=1]; No [=0]
• Collective Action Encouraged	"Over the past one year, has anyone encouraged or helped you to join with other residents in this slum to put pressure on the BMC to provide this slum with municipal water connections?"	Yes [=1]; No [=0]
• Collective Action Taken	"Over the past one year, did you or any members of your household do anything to put pressure on the BMC to provide this slum with municipal water connections?"	Yes [=1]; No [=0]
Treatment indicators		
• T1: Bureaucratic Assistance	Randomization and implementation data.	
• T2 Political Coordination	Randomization and implementation data.	
Covariates		
• Female	"What is your gender?"	Female [=1]; Male [=0]
• Age	"How old are you?"	Integer >= 18.
• Illiterate	"What is the highest level of education you have attained?"	No formal education (cannot read and write) [=1]; No formal education (can read and write) [=0]; Primary school [=0]; Secondary school [=0]; Senior secondary school [=0]; Graduate; Postgraduate [=0]
• Income	"What is your total monthly household income in Rupees?"	
• Assets	"Do you own any of the following items?"	Pressure Cooker; Fans; Bicycle; Sewing machine; Radio/transistor/cassette player; TV; Motorcycle/moped/scooter; Car; Cell-phone; Computer; Camera
• Patta	"Do you or someone in your household have title (patta) or papers to the land on which your current dwelling sits?"	Yes [=1]; No [=0]
• Renter	Do you, or does someone in your family, rent the house you are currently living in?	Yes [=1]; No [=0]
• Has electricity	"Do you currently have a metered electricity connection (you receive a bill)?."	Yes [=1]; No [=0]
• Voted	"Which party did you vote for in the BMC elections of February 2017?"	Did not Vote[=0]; Other Responses [=1]
• Native	"Do you consider your family to be native to Mumbai?"	Yes [=1]; No [=0]
• SC/ST	"What is your caste group?"	SC [=1]; ST [=1]; OBC [=0]; Forward Caste [=0]; Other [=0]
• Hindu	"What is your religion?"	Hindu [=1]; Muslim [=0]; Sikh [=0]; Christian [=0]; Jain [=0]; Buddhist [=0]; Parsi [=0]; No religion [=0]; Other (please specify)
• Politician visit	"Have any of the following politicians has visited your basti in the last year? Corporator [Yes/No] MLA [Yes/No] MP [Yes/No]"	Response to Any Politician is Yes [=1], Otherwise[=0]

| Variable	Survey question/data source	Response options [recodes]
• Water scarcity	"In the past one year, how often did you feel that your household didn't have enough water?" 1.Always 2.Quite often year round (once a month or more) 3.Sometimes year round (less than once a month) 4.Quite often in the summer months only 5.Never	"Always" or "Quite Often"[=1], Otherwise[=0]
• Water bill	Has your household ever paid a water bill for a metered BMC water connection in the past five years?	Yes [=1], No[=0]
• Fetch time	"On average, approximately how much time per person do the following types of people in your household spend fetching water each week, including the time it takes waiting in line for water? [Enter average number of minutes spent for each type of person]" 1.Adult women 2.Adult men 3.Girls under 18 4.Boys under 18	This variable sums all wait time for individuals in each of the four categories
• Tanker water	Which of the following sources of water do you use? [Check each that applies]	Coded as 1 if 'Tanker Truck' was checked
Moderators		
• Resp. Born in Maharashtra	In which state were you born?	Coded as 1 if 'Maharashtra' was checked
• Born in Maharashtra (Above Median Slum Share)	The proportion of Marathi respondents (defined by the variable above) in the slum	Coded 1 if the proportion is above the median in sample slums.
• Marathi Corporator	The corporator in whose electoral ward the given slum cluster is located. The ward location of the slum cluster is determined through geo-locating the slum cluster within the BMC ward boundaries using 2017 ward shapefiles. The corporator information is obtained from data on 2017 BMC election winners.	Coded as 1 if 2 independent coders assessed the name as Marathi.
• Shiv Sena Corporator	Same as Above.	Coded as 1 if the corporator's party is the Shiv Sena.
• Relies on brokers	Which of the following officeholders have you contacted at some point in the past 6 months	Coded as 1 if 'Dalal/Broker/Middleman' was checked

C   Randomization Scheme
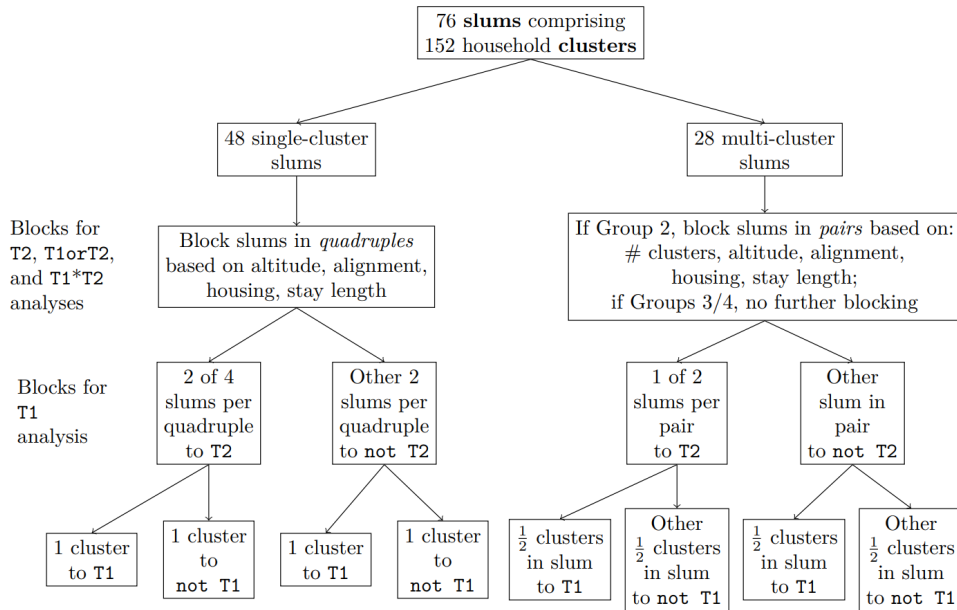
Figure S1: Intervention Activities

D   Study Timeline

Our study involved four key phases: a community mapping survey to select the slums for inclusion in our sample, a baseline survey conducted prior to the interventions, activities associated with each intervention (T1 and T2), a midline survey and an endline survey The study timeline is as follows:

Time Period	Activity
November 2017 to February 2018:	Community Mapping Survey
February 2018 to April 2018:	Baseline Survey
May 2018 to March 2019:	Intervention Activities (T1 and T2)
May 2018:	*Beginning of T1*
October 2018:	*Beginning of T2*
June 2019 to August 2019:	Midline Survey
May 2023 to September 2023:	Endline Survey

E   Study Setting and Sample

The site selection and sampling protocol was multi-staged, involving the selection of slums, clusters of households within slums, and then individual households to be interviewed.

No definitive list of Mumbai slums exists, and slum-level administrative data on municipal water connections are unavailable. Thus, we developed a list of slums by compiling information on slum sites from an array of sources—including the 2011 census, NGO reports, and government lists—in addition to snowball sampling techniques implemented over the course of several months of detailed ethnographic fieldwork. We therefore ended up with a non-probability convenience sample, albeit one we believe is representative of the population of Mumbai's slums in which existing access to services is poor. To enter into the final sample, a slum had to meet the following criteria: (i) A majority of slum households should not have a functioning BMC water connection. (ii) The boundaries of the slum must be within reasonable proximity (1km) of a main municipal water pipe and must not be located on top of a hill. (iii) Our NGO partners should not have previously carried out significant work in the slum, or a large part thereof. (iv) The slum must have been in continuous existence for at least three years, so as to minimize the chance of its removal over the course of the project.

We identified these criteria using a mapping survey that was carried out between November 2017 and February 2018 prior to the baseline survey. Its goals were threefold: (a) to gather information on slum-level attributes, which were used to characterize our sample and gauge representativeness; (b) to divide slums into household clusters (referred to as slum clusters); and (c) to determine which clusters were eligible for inclusion in the final sample.

The mapping survey involved enumerators visiting each slum on our initial list and gathering information on the above-mentioned criteria by interviewing five residents in the slum each belonging to different households from different parts of the slum. Enumerators also obtained GPS coordinates of the slum by walking around the slum, and gathered other basic information about each slum such as the number of households and the nature of the dwellings. Our initial list comprised 88 slums ranging in size from 36 dwellings to 20,000 dwellings. Applying the above-mentioned, we ended up with a list of 76 slums. Figure 1 in the main text displays the location of the slums within the city. As shown in the Figure, they are spread across multiple wards that vary substantially in terms of their socioeconomic status (as indicated by the ward illiteracy rate).

The chosen slums varied greatly in size. Some slums contain as few as 50 dwellings; others contain 10,000 dwellings or more. For tractability, we specified our primary analytical unit to be the *slum cluster*. Slum clusters are plots of 50-200 households that are geographically contiguous and compact, and fall within the boundaries of a larger slum area. The target experimental population was 140 slum clusters, though we ended up being able to identify 153 such clusters.

The clusters were identified using the aforementioned mapping survey during which enumerators mapped the GPS coordinates of the individual clusters. The criteria for a cluster's inclusion were analogous to those for the slum as a whole—clusters with fewest water connections were preferred, as were those closest to the water main—along with two further considerations: 1) In places where a slum comprised fewer than ca. 200 households, the slum in its entirety was considered one cluster. 2) For very large slums, we selected multiple clusters for entry into the sample. This was done to boost the total number of clusters and thereby increase statistical power.

While our political coordination intervention (T2) was randomized at the level of the slum, the inclusion of more than one cluster per slum raises the potential issue of treatment spillovers for our bureaucratic assistance intervention (T1). To minimize this possibility, we only took multiple clusters from the geographically largest slums. We also selected clusters that were geographically as far apart as possible (subject to clusters meeting other eligibility criteria).

Measures were taken using surveys conducted at the household level. For the baseline survey, we sought to interview 50 respondents in each of the 153 slum clusters. We used a random walk method to select respondents within slum clusters. Every 2nd, 5th, or 10th household was selected to be interviewed, depending on the number of households in the cluster. The opening section of the baseline survey comprised a set of screening questions. We

excluded from the sample households that already possessed a BMC water connection, had applied for a BMC water connection within the previous year, or had been living in rented accommodation for less than two years. The birthday method was used to select individual adults to be interviewed.

Due to attrition of respondents between our successive survey waves, we included an additional 'replacement sample' of 1466 respondents in our midline survey wave and a separate replacement sample of 2,444 households in our endline survey wave. For both survey waves, the replacement sample was constructed as follows. If no-one in the originally (i.e. at baseline) sampled household was available for an interview, enumerators were instructed to select a different household from the same slum cluster using a random walk method. After verifying that this household was not part of the original sample, the enumerator was then instructed to collect basic demographic information about this respondent and then to proceed with the regular survey.

F   Interventions

Our interventions were designed in close partnership with our two Mumbai-based partners: Yuva (Youth for Unity and Voluntary Action) and Pani Haq Samiti (Association for Right to Water). Established in 1984, Yuva has been heavily invested in helping Mumbai's slum residents gain access to municipal water in Mumbai through a multi-pronged approach including community based intervention and advocacy, research, and legislative intervention. Yuva has partnered with Pani Haq Samiti (PHS)—an organization that has been on the forefront of the movement for universal water access in Mumbai since its inception in 2007—for many of its initiatives. Our interventions build on the work that Yuva and PHS had already been doing in informal settlements in Mumbai, allowing these organizations to expand their activities into slums in which they were not already working.

Our interventions took place over a period of ten months beginning in May 2018 after the completion of the baseline survey with a total of approximately 25 community workers working over this period. Many of these workers hailed from Mumbai's informal settlements and had experience conducting grassroots work in these contexts. The workers were trained and supervised by managers and coordinators at Yuva and PHS. Mayur Helia, our Mumbai-based research assistant, was responsible for conducting site visits and liaising with Yuva and Pani Haq Samiti to ensure that the research goals were carried out. In addition, Yuva staff provided detailed monthly reports regarding the progress of the intervention activities in each community and the challenges faced.

After multiple training sessions spanning several weeks, NGO workers began visiting the slum clusters selected for the bureaucratic assistance intervention (T1) in May 2018. The visits to the cluster began with conducting door-to-door visits and organizing meetings within the cluster to inform cluster residents of their eligibility for a municipal water connection and of the procedures involved to obtain the connection. Following this, NGO workers assisted in the formation of water committee groups of roughly six to seven households were formed who would apply for the water connection together. The workers then maintained close contact with the residents in these groups to assist them with gathering the necessary documentation required for the application and helping residents submit the forms using the required online portal. In particular, NGO workers helped residents obtain required signatures from a licensed plumber and also filed "Right to Information Act'' requests to identify and address gaps in applications that were initially denied. NGO workers also helped negotiate with authorities regarding the types of documents that would fulfil the proof-of-residence requirements and to obtain permissions from ancillary authorities and landlords.

NGO workers commenced the activities involved in the political coordination intervention (T2) in the designated slums in October 2018, about five months after the commencement of T1. T2 also began with the formation of community groups within the designated slums, this time designed to spread awareness and develop strategies around the advocacy activities. NGO workers also worked to spread awareness and generate mobilization around the issue of water connectivity by putting up banners, distributing pamphlets, and forming groups on WhatsApp to coordinate and share information. Workshops, street plays, and poster organizations around the issue of water access were also organized within designated slums. The advocacy activities also involved organizing delegations of residents from the designated slums to visit the offices of their elected representatives at different levels of government as well as the offices of BMC officials, state and central ministers, and officials of related government agencies. Media collaborations were harnessed to elevate the visibility of these activities. Finally, petitions were circulated amongst residents of the designated slums and then delivered to the offices of elected representatives, ministers, and bureaucrats.

G   Ineligible Land Types: Legal and Policy Barriers

The Brihanmumbai Municipal Corporation (BMC)'s water policy, that came into force in August 2002, denied drinking water supply in slum areas that had come up post-1995. Challenging that notification, Mumbai-based NGO 'Pani Haq Samiti' filed a PIL in the Bombay High Court. In its judgement, the Bombay High Court stated that "As the right to life guaranteed under Article 21 of the Constitution of India includes right to food and water, the State cannot deny the water supply to a citizen on the ground that he is residing in a structure which has

been illegally erected."[1]. The Court, however, clearly stated that it did not legalize those structures and that the authorities should take measures, in due course, to demolish them. The Court directed the BMC to draft a policy to implement the ruling saying "It is for the Municipal Corporation to evolve a policy for supply of water to the persons occupying such illegal slums." (Section 18, PIL Judgment).

The policy drafted by the BMC in 2015 and then implemented in 2017 introduced several exclusions and caveats to the 2014 Bombay High Court ruling. First, as detailed further below, the draft policy in 2015 and then the finalized policy excluded settlements on footpaths from being granted water connections. Second, it stipulated that citizens residing in informal settlements on Central Government land must obtain clearance in the form of a "No Objection Certificate (NOC)" from the central agency that owns the land before approaching the BMC for water supply. While there were different types of land belonging to the central government including railway land and Coastal Regulation Zone land, this policy created significant legal barriers especially for settlements on forest land and salt pan land since these specific land types were subject to court orders preventing "encroachments" on these areas.

Mumbai's water policy saw a major change in 2022 when the BMC rolled out 'Water for All' Policy. As per the policy, water will be provided to all unauthorized slum dwellers, assuming that a connection is not prohibited by a court order. At the same time, the policy still emphasized the government's stance on the legality of these structures and that the authorities are obliged to take actions to destroy them. As described below, the 2022 policy eased the restrictions for settlements on footpaths and on salt pan lands, but affirmed the restrictions for those on forest land.

Footpath: Despite the 2014 court order, the BMC, in 2015, formed a policy that clearly excluded unauthorized hutments on footpaths from receiving a water connection even if they met other criteria mentioned in the same policy.[2] Finally, in 2016, the BMC gave its nod to water connections to these unauthorized slums[3] that resulted in the 2017 policy. However, slums on footpaths were still excluded outright in the 2017 policy and the BMC's website clearly stated "Following slum Hutments erected after 01.01.2000 are excluded From policy of granting Water connection: 1. Hutments existing on footpath and roads."[4]. The justification was the difficulties to build and the safety of infrastructures to supply water on footpath. The 2022 Water for All policy eased these restrictions and provided that categories of settlements that qualified for an official connection included those on footpaths in addition to those on Coastal Regulation Zone (CRZ) areas and those on private areas as long as "the pressure of supply is adequate to allow such extension of the stand post connection" (MCGM 2022).

Forest Land: When it came to forest land, the 2014 Bombay High Court order itself makes reference to the fact that "some slums have been erected on the forest lands about which there are binding prohibitory orders of this Court". (Section 9, PIL Judgment). Moreover, despite the 2014 Bombay High Court ruling that slums could not be denied water on account of their illegality, the same ruling also recognized that "If there are binding orders of this Court preventing supply of water to the slums constructed in a particular area, obviously the policy will not apply to slums in such areas" (Section 18, PIL Judgment). Thus, the forest department could - and arguably was compelled to - rely on these existing court orders to deny water supply to settlements on forest lands. During our intervention activities, our NGO partners approached the Chief Forest Conservation Officer of one of the forest areas in which some settlements in our study were located. According to our NGO staff report, they explained to him "the entire court order of "Water for All" and BMC water policy and our campaign, but in response he said, he is helpless due to the 2005 court order of not to provide water connections to those who are living on central government land."[5] The afore-mentioned 2022 Water for All policy re-affirmed that settlements on forest and mangrove land would be "subject to Court Orders".[6]

Salt Pan Land: When it came to Salt Pan land, Salt Commissioner Office, a central government agency, also relied on the existing court orders from 2005 to deny water supply to slums on salt pan land. An application for a standpost connection from one of the settlements in our study on salt pan land a few years before our study began was summarily rejected by the central government's Office of the Superintendent of Salt citing judgments

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[1]Section 11, PIL Judgment, Pani Haq Samiti & Ors. vs. Brihan Mumbai municipal ... (n.d.). https://www.ielrc.org/content/e1407.pdf.

[2]Brihanmumbai Mahanagarpalika Hydraulic Engineer's Department Water Charges Rules, 2015 BMC Web Portal.

[3]Parab, B. (2016, June 18). Illegal slums to get water supply. The Asian Age. https://www.asianage.com/mumbai/illegal-slums-get-water-supply-817. Accessed February 14, 2024.

[4]https://aquaptax.mcgm.gov.in/aqua/citizenportal/openNewWaterSlumDISCLAIMERpage. Accessed July 24, 2019.

[5]NGO Staff Report, September 2018.

[6]MCGM Draft Policy for Water Supply to All Residential Households, MCGM Website, Accessed February 16, 2024.

from previous Bombay high court cases and a previous letter from the Deputy Salt Commissioner.[7] Early on in our intervention period, our NGO partners worked again to obtain an NOC for salt pan lands by filing right to information (RTI) requests with the Salt Department. According to our NGO staff: "The reply we got was that the policy stated that in Saltpan land there is no question for NOC because settlements are unequivocally not allowed."(NGO Progress Report, July 2018.). The above-mentioned 2022 Water for All policy, however, eased restrictions for settlements on salt pan land providing that an NOC would be inherently assumed to be issued unless the authorities objected to it.[8]

H Qualitative Insights

Our qualitative insights come from a range of primary as well as secondary sources. Our primary sources consist of (a) reports provided by our local partners and project staff based on their own field observations and meetings with project staff and (b) in-depth semi-structured interviews with NGO workers who participated in intervention activities as well as interviews with an elected local representative (corporator) and a BMC engineer (bureaucrat). In the main text, we utilize some of the qualitative information from the above sources to provide support for the mechanisms of our causal logic. In this section, we provide additional information to supplement our discussion in the main text.

H.1 NGO and Research Staff Reports

A key component of the monthly progress reports provided by our NGO partners during the intervention phase of our study involved describing the challenges faced with implementing the activities involved in each of our interventions. In addition, our local research assistant also kept us apprised of such challenges via email and WhatsApp. Excerpts from the progress report are provided in the main text with the names of participants and specific study sites withheld to preserve anonymity.

H.2 Interviews

We utilized in-depth semi-structured interviews with a convenience sample of key stakeholders. Specifically, interviews with six NGO workers, one BMC engineer, and one local elected corporator were conducted between September and December of 2021 in Mumbai by our local research assistant. An additional interview with another BMC engineer was conducted in May 2023. The purpose of these interviews was to shed further light on our quantitative findings pertaining to the impacts of our interventions on securing municipal water connections for informal settlement dwellers. Our interviews with the NGO workers focused on understanding their experiences with implementing the interventions and, specifically, on their interactions with settlement dwellers, bureaucrats and politicians. Our interviews with the BMC engineers focused on understanding the process followed by the BMC when provisioning piped water connections to informal settlements, the constraints they faced in doing so, and on their interactions with citizens and NGOs on the one hand and elected representatives on the other. Finally, depite repeated efforts to interview multiple corporators, we were only able to secure an interview with one. This interview focused on understanding the corporator's role in facilitating piped water in the settlements in her ward and on her interactions with constituents, NGOs, and BMC engineers. Excerpts of the above interviews are provided in the main text and below to illustrate how and why our interventions unfolded on the ground.

Our qualitative interviews and reports from NGO staff help shed light how our political coordination intervention—and the resulting political pressure it generated—engendered responsiveness from politicians. For example, an NGO volunteer described a situation where a corporator who was initially 'neutral' eventually succumbed to the pressure facilitated by our NGO partners: "...the corporator here [name redacted] when we spoke to them, they appeared a bit supportive on the matter with the BMC. Like they were not supportive but they would not oppose us also, they were completely neutral about the situation. ....We approached them through a letter after that we contacted them through their contact numbers and later, we had a meeting with them. Ultimately, the *basti* (settlement) was provided with the water connection."[9] Another NGO volunteer described his experiences leading a delegation of settlement dwellers to visit a local state legislator or MLA:"We had visited the MLA in the P-North ward, when we went to give a letter to him, first he said that his health is not good, so we dropped the letter in his office, and later when we speak to him in a meeting. He was very positive and even agreed to give funds for the pipeline for the water connections."[10]

Second, electoral considerations incentivized politicians to act on citizens' bottom-up political pressure. When asked what determined politicians' efforts on securing water access, an NGO worker stated that "it depends on how

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[7]Letter from Office of the Superintendent of Salt (Bhandup) to the Assistant Engineer Water Works S Ward stamped January 24, 2012.

[8]MCGM, 2022.

[9]Interview, NGO Respondent 4.

[10]Interview, NGO Respondent 1.

much population is involved in this issue."[11] Terming the process "vote bank politics," this interviewee said that "if they [corporators] are getting votes on the basis of water connections, then they readily make those connections available. The only things that matter is number of votes." Another interviewee was even more direct and described politicians' efforts in quid pro quo terms: "Basically, their frame of mind was they would help us providing the water connection but the bastis we were working in had to vote for them in the elections."[12] In this manner, the collective political mobilization of citizens in T2 slums conveyed to politicians the possible electoral benefits of delivering water connections and, correspondingly, the threats of electoral sanctions in the case of inaction.

Third, once politicians observed the possibility of electoral payoffs, they in turn put pressure on bureaucrats to provide water connections and facilitated service delivery by sharing information, liaising across various departments and stakeholders, and overcoming roadblocks. A corporator whom we interviewed hinted at the complementarity hypothesis when she said: "People who have filled applications earlier, I made sure they also got water without extra paperwork. I was meeting people every day until the water work was completed."[13] Such "almost daily" interactions between corporators and bureaucrats, along with corporators' roles in problem-solving, was corroborated by a BMC bureaucrat whom we interviewed.[14] Politicians also spurred water connections by facilitating the bureaucratic coordination needed to ensure last mile service delivery. A MP, for example, "called for a meeting of all concerned [bureaucratic] departments under one roof" and appeared to have a "positive" impact on water connections after meeting delegations of slum residents demanding water access.[15]

Finally, we also uncovered instances in which elected politicians actively opposed the efforts of our NGO partners to assist citizens in obtaining formalization. One such instance occurred in the case of a settlement on forest land—one of the land types legally excluded from receiving a municipal water connection. A report from our NGO staff revealed a possible reason why political pressure, even when combined with bureaucratic assistance, did not succeed in improving citizens' chances of receiving formalized water access on land that was excluded by the existing policy framework. According to the report, a local corporator "proceeded to interrogate the [NGO] team. ....He asked to get more detailed proofs as he questioned the group about the fact that the basti was on forest land, so how could they get the NOC to get the legal water connection. He immediately called [name] who is the MLA for the zone. [Name of NGO worker] proceeded to give her the reference of Yuva, [Name of NGO head] and [Other name] on the phone. She responded in the affirmative recognising all of them. But the Corporator still would not budge." NGO Progress Report, June 2018. In the face of political pressure, elected representatives could point to these exclusions as a basis on which to deny requests for formalization from settlements, despite our NGO partners' best efforts.

I   Research Ethics

Careful consideration was given to the ethics involved in this study, which was approved by IRB committees at [University Names Redacted], as well as by a local India-based IRB committee. We worked closely with our partners to minimize the potential risks that participants might face, to ensure that the benefits of the program flowed to participants, and to protect participants' informed consent (Teele 2014) (Humphreys 2015).

Ethical Considerations in Study Design   While designing our project, we paid significant consideration to the ethics of the study. We were mindful of the general obligation of researchers "to anticipate and protect participants from trauma stemming from participation in research'' (APSA Committee on Human Subjects Research 2019). Our treatments were designed based on ethical considerations. Our goal as researchers was to scientifically evaluate efforts by our NGO partners that were already underway in many of Mumbai's slums (Humphreys 2015).

The first treatment arm (bureaucratic facilitation drive) built on insights provided by our NGO partners regarding what activities they had found most impactful in helping slum residents gain access to municipal water. It also built on findings of previous research in other contexts; for example, a study in Morocco that found that households are much more likely to take up a water connection when they are given administrative at-home assistance, thus underscoring the important role that bureaucratic challenges play in affecting consumer demand for water, hygiene and sanitation services. In our second treatment arm, we sought to mitigate a second variety of costs tied to formalization, namely social capital costs. The encouragements were administered by our NGO partners, YUVA and Pani Haq Samiti (PHS). These NGOs had been conducting similar interventions in Mumbai for several years. The political constraints to securing water connections had also been extensively discussed in the literature. Case-study evidence from Mumbai, as well as the broader political-economy literature, suggested that surmounting bureaucratic obstacles is necessary but insufficient for attaining reliable access to state benefits. This work suggested that a key impediment facing slum dwellers seeking formalization is securing buy in from local political elites.

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[11]Interview, NGO Respondent 2.

[12]Interview, NGO Respondent 4.

[13]Interview, Elected Corporator.

[14]Interview, BMC Engineer.

[15]Interview, NGO Respondent 3.

Informed consent was obtained first during the baseline survey, and then (in shortened form) at the start of the evaluation survey. Data was stored on a secure, password-protected data management service. Additionally, we implemented a number of steps to ensure that participants' privacy would be safeguarded during the survey-components of the research. Surveys were conducted in private households, so non-household members were not able to hear any survey responses. We hired 50% female and 50% male enumerators in order to ensure that the gender of the respondent was matched with the gender of the enumerator. Our survey firm also allowed respondents to take the surveys in private, if so requested.

Potential Risks We anticipated several possible risks to subjects. Working with our implementation partners and evaluation partner, we went to considerable lengths to mitigate these risks.

1. We considered the risk that slum leaders were in cahoots with providers of illegal/informal water, and may thus have wanted to resist the efforts of slum residents to obtain formal government-provided water connections. To mitigate this risk, we only worked in slums where we had secured agreement from slum leaders. This followed existing practice of our implementing partner (Pani Haq Samiti) in its prior work to broaden connectivity, and had proven to stave off any potential conflict with existing water providers.

2. We considered the risk that some households within the slum will be offered assistance and take up municipal water connections, stoking jealousy on the part of other slum households. To mitigate this risk, the intervention was phased within treated slum colonies: selected "evaluation" plots within treatment slums received the interventions first. After first-round interventions had been completed, our NGO partners committed to work elsewhere in the slum to provide assistance to all households in the settlement who wanted connections. Thereby intra-slum jealousies and perceptions of exclusion from a beneficial social program was avoided.

3. We considered the risk of disappointment on the part of subjects in the situation that hoped-for water connections either did not arrive. This may have fed into adverse perceptions about the municipal government and perhaps the state more generally. To mitigate this risk, our interventions were intended to maximize the probability that connections would be secured from the municipal corporation. At the same time, it was made clear to subjects at the outset of the study that connectivity could not be guaranteed and that there was a non-negligible chance that submitting an application would not lead to a connection. Moreover, our results in Table S16 probing possible backlash to our interventions show no evidence that our interventions increased the propensity of state or non-state actors to obstruct subjects' access to water.

4. We considered the risk that residents in other slums neighboring treatment slums would seek to access NGO services and the benefits these entail—requests that we might not have been able to fulfill due to funding and logistical constraints. Conceivably, this might have fostered disappointment among individuals in neighboring slums. Various contextual factors made us believe this was unlikely to be a major concern. Mumbai is home to abundant NGOs who are highly active in slum communities. No NGOs are active in all slums and this is well-accepted by residents: resources are limited and not all can be served at the same time. Nevertheless, we fully supported our NGO's efforts to expand their work in other settlements following the conclusion of the study.

5. Finally, we did not anticipate any special risks arising from the cultural specificities of the Indian context. India in general, and Mumbai in particular, has highly competitive elections, and open discussion of "political" topics such as lax service delivery and government under-performance is common. Moreover, citizens are asked to participate in surveys on a very regular basis and the country is one of the biggest producers of sample survey data on the lives of the poor. It should also be noted that NGOs are commonplace in India, especially in the informal settlements in which we were working. We expected few if any subject to find the interventions in any sense out of the ordinary. Indeed, we built on interventions that our partner NGOs have been engaged in for some time.

Potential Benefits At the same time, we foresaw several sets of benefits from this study.

1. First, there were potentially direct benefits to subjects themselves. We, in effect, provided citizens two types of subsidies—free assistance with completing complex forms, and help build collective action in the event that bureaucratic responsiveness was not forthcoming—that, we strongly hoped and expected, would lead to subjects obtaining piped water connections. As indicated in our pre-specified outcome measurements, we expected connectivity to have far-reaching and uniformly positive effects: cheaper and better water supply, with major implications for health and particularly the health of children; less time spent waiting for water deliveries, with upshots for women's empowerment; less money spent on expensive substitutes to municipal piped water; deepened integration into world of formalized service provision, and lesser dependence on informal and illegal channels for getting water; and increased state capacity. To be sure, we did not anticipate that all these beneficial hypothesized consequences would manifest themselves. Yet the possibility of a shift along even some of these dimensions suggested that the benefits to subjects would easily outweigh any inconvenience associated with participating in a voluntary research study.

2. Second, the study was designed to increase our understanding and knowledge about the constraints that marginalized populations face in accessing public services in developing democracies. This promised to have major ramifications for scholarship and for policy. The efficacy of the bureaucratic treatment promised to bolster arguments for simplifying application processes and transitioning toward an automated model for

connecting households. If, however, assistance with the bureaucratic aspects of applying for water connections was only effective in conjunction with interventions to reshape the social and political context, then we would need to pursue collective-action based reforms to ameliorate access to core services. These are vital considerations, for policymakers and voters alike.

3. Our study also aimed to make several scholarly contributions. Most crucially, this was not a standalone study. Rather, it was one of six pre-coordinated field experiments that were carried out across the world, each investigating how various types of subsidies affect formalization of access to state services and citizen tax compliance. This cluster of studies forms the [Omnibus research program name reduced] initiative, overseen by [Institution name redacted] at [University name redacted]. The goal was to draw generalizable insights from experimental studies. Next, literature to date has tended to consider the bureaucratic and collective action impediments to public service access in isolation. By contrast, we theorized a more unified model of the determinants of formalization, offering novel theoretical and empirical additions to several active debates in political economy.

References

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J Pre-Analysis Plan

Our study was pre-registered through the filing of a pre-analysis plan in EGAP's registry in March 2018 after the completion of our mapping exercise and baseline survey, but prior to the completion of our intervention activities. The analyses reported in this paper follow the specifications in the pre-analysis plan described under "Paper 1'' on the causes of formalization. The results of all the pre-registered analyses described in the pre-analysis plan pertaining to "Paper 1'' are omitted due to space constraints but available upon request.

Our original pre-analysis plan was silent on whether the sample of respondents in the second and third wave surveys would be the same as the sample of respondents in the baseline survey. However, due to attrition between the survey waves, our second and third wave surveys incorporated a "replacement sample" described in the main text and specified in our second amendment. Our analyses in the main paper include this replacement sample in addition to our "original sample" (i.e. those respondents at baseline who were re-contacted). Missing baseline covariates for the additional subjects were imputed by inputting the within-cluster mean of non-missing values of that covariate (for continuous variables), or by drawing at random from the distribution of non-missing values of that covariate (for binary, ordinal, and categorical variables).

Based on reports from our NGO staff and local research staff while the intervention was underway, we subsequently filed an amendment in July 2019 to the pre-analysis plan to supplmenent the originally specified analyses with models that excluded slums on the three types of land that were not eligible to receive water connections under the BMC policies. This amendment was filed prior to the completion of our midline data collection and approximately four years prior to our endline data collection.

Subsequently, we filed a second amendment in February 2024 prior to the analysis of data from our endline survey. The key purpose of this amendment was to account for the impacts of the coronavirus pandemic that led to an unforeseen delay of approximately three years in the implementation of our endline survey. This delay coupled with the pandemic's unforeseen impacts on our study population, and new opportunities that the pandemic created to investigate additional research questions, formed the motivation for this second amendment to our pre-analysis plan. The key aspects of the amendment that are relevant to the current paper were (1) clarifying our procedures for diagnosing and dealing with attrition; (2) articulating our strategies for dealing with imperfect recall and (3) introducing the possibility of measuring outcomes and intermediate stages of formalization at multiple points in time. Importantly, the hypotheses reported as pre-registered in the main tables in the paper are those articulated in (1) our pre-analysis plan and (2) the first amendment to our pre-analysis plan described above.

K Balance tests

Tables S3 and S4 show the results of balance tests for the full sample and the eligible lands sample respectively.

L Attrition tests

Tables S5 and S6 show results of attrition analyses for both the endline survey and the midline survey respectively. Results are shown for both the full sample as well as the eligible lands sample.

Table S3: Assessing experimental balance - Full Sample.

Baseline covariate:	T1: Bureaucratic Assistance		T2: Political Coordination	
	Coefficient	P-value	Coefficient	P-value
Female	0.008	0.574	0.008	0.722
Age	-0.307	0.337	-0.029	0.931
Lieracy	-0.015	0.403	0.027	0.156
Income	62.107	0.784	-471.473	0.017
Asset index	0.222	0.006	0.050	0.722
Title deed to dwelling	0.039	0.064	-0.041	0.187
Rents	-0.010	0.536	-0.006	0.763
Electricity	0.009	0.818	0.046	0.655
Voted	-0.013	0.311	-0.021	0.187
Native	0.003	0.818	0.023	0.304
Hindu	-0.031	0.380	-0.060	0.560
Politician visits	-0.042	0.471	0.014	0.765
Scarce water	-0.010	0.754	0.047	0.202
Ever paid water bill	0.010	0.206	-0.001	0.913
Average fetch time	-0.570	0.363	0.183	0.807
Footpath/Forest land	-0.032	0.153	0.071	0.112
Relies on tanker	-0.015	0.355	-0.024	0.567

Table S4: Assessing experimental balance (Eligible Lands Sample)

Baseline covariate:	T1: Bureaucratic Assistance		T2: Political Coordination	
	Coefficient	P-value	Coefficient	P-value
Female	0.007	0.634	0.013	0.567
Age	-0.442	0.206	0.040	0.912
Lieracy	-0.015	0.390	0.028	0.140
Income	-83.045	0.707	-365.310	0.050
Asset index	0.205	0.002	0.101	0.495
Title deed to dwelling	0.030	0.127	-0.025	0.359
Rents	-0.017	0.336	0.002	0.928
Electricity	0.009	0.815	0.054	0.652
Voted	-0.020	0.135	-0.032	0.051
Native	0.000	0.983	0.024	0.334
Hindu	-0.012	0.745	-0.082	0.488
Politician visits	-0.063	0.315	0.012	0.788
Scarce water	-0.005	0.862	0.061	0.113
Ever paid water bill	0.004	0.640	0.005	0.494
Average fetch time	-0.571	0.334	-0.145	0.843
Relies on tanker	-0.006	0.685	-0.033	0.498

Table S5: Attrition analysis at endline. Dependent variable is a binary indicator for whether the subject attrited at endline. Models include block fixed effects.Heteroskedastic-consistent clustered standard errors in parentheses.

	Full Sample		Eligible Lands Sample	
	(1)	(2)	(3)	(4)
Bureaucratic assistance (T1)	0.02		−0.00	
	(0.02)		(0.02)	
Political Coordination (T2)		−0.03		0.02
		(0.04)		(0.06)
Nominal p-value	0.34	0.43	0.94	0.71
Control mean	0.37	0.40	0.43	0.44
Test type	Two-sided	Two-Sided	Two-sided	Two-Sided
Unit of weighting/clustering	Cluster	Slum	Cluster	Slum
Covariates	No	No	No	No
R^2	0.05	0.03	0.16	0.09
Num. obs.	6860	6860	5937	5937

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table S6: Attrition analysis at midline. Dependent variable is a binary indicator for whether the subject attrited at midline. Models include block fixed effects. Heteroskedastic-consistent clustered standard errors in parentheses.

	Full Sample		Eligible Lands Sample	
	(1)	(2)	(3)	(4)
Bureaucratic assistance (T1)	−0.00		−0.04	
	(0.02)		(0.02)	
Political Coordination (T2)		−0.03		0.03
		(0.03)		(0.05)
Nominal p-value	0.92	0.37	0.15	0.55
Control mean	−0.00	−0.03	−0.04	0.03
Test type	Two-sided	Two-sided	Two-sided	Two-sided
Unit of weighting/clustering	Cluster	Slum	Cluster	Slum
Covariates	No	No	No	No
R^2	0.09	0.04	0.17	0.09
Num. obs.	6863	6863	5845	5845

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

M   Tabular Results for Figures in Manuscript

Tables S7, S8, and S9 present the tabular results of the specifications depicted graphically in the main text.

Table S7: Manipulation Checks. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses. Outcomes measured based on citizen responses in the midline survey.

Outcome:	NGO Visit		Collective Action Encouraged		Collective Action Taken	
	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Full Sample	Eligible Lands Sample	Full Sample	Eligible Lands Sample	Full Sample	Eligible Lands Sample
Bureaucratic assistance (T1)	0.05** (0.02)	0.04* (0.03)				
Political coordination (T2)			0.04* (0.02)	0.08** (0.03)	0.03 (0.02)	0.05** (0.02)
Nominal p-value	0.02	0.09	0.06	0.02	0.13	0.03
Test type	One-sided	One-sided	One-Sided	One-Sided	One-Sided	One-Sided
Control mean	0.39	0.39	0.19	0.18	0.15	0.15
Unit of weighting	Cluster	Cluster	Slum	Slum	Slum	Slum
Unit of clustering	Cluster	Cluster	Slum	Slum	Slum	Slum
Covariates	No	No	No	No	No	No
Pre-registered	Yes	Yes	Yes	Yes	No	No
R^2	0.04	0.03	0.02	0.04	0.03	0.04
Num. obs.	6268	5010	6268	5010	6268	5010

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table S8: Estimated effect of bureaucratic assistance on stages of formalization in the sample of settlements on eligible land types. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses. Estimates based on responses to midline survey.

	Form Submitted	BMC Visit	P-Form	BMC Connection
	(1)	(2)	(3)	(4)
Bureaucratic assistance (T1)	0.10*** (0.03)	0.04*** (0.01)	0.01 (0.01)	−0.02 (0.02)
Nominal p-value (T1)	0.00	0.00	0.27	0.88
Test type	One-sided	One-Sided	One-sided	One-Sided
Control mean	0.21	0.06	0.04	0.10
Unit of weighting/clustering	Cluster	Slum	Cluster	Slum
Covariates	No	No	No	No
Pre-registered	No	No	No	No
R^2	0.06	0.04	0.05	0.12
Num. obs.	5010	5010	5010	5010

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

N   Pre-Registered Analyses Including Covariates

Tables S10 and S11 present the results of the pre-registered specifications in the main text including pre-specified covariates.

Table S9: Estimated heterogeneous effects of T1*T2 on binary formalized indicator based on endline data. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses. (Eligible Lands Sample)

	DV: Formalized (Eligible Lands Sample)					
	(1)	(2)	(3)	(4)	(5)	(6)
Bureaucratic Assistance (T1)	−0.13	−0.15*	−0.02	0.11	−0.14*	−0.12
	(0.08)	(0.08)	(0.08)	(0.09)	(0.07)	(0.07)
Political Coordination (T2)	−0.11	−0.16*	−0.09	−0.10	−0.07	−0.11
	(0.08)	(0.07)	(0.07)	(0.10)	(0.07)	(0.07)
T1*T2	0.27**	0.30**	0.22*	0.13	0.27**	0.27**
	(0.10)	(0.10)	(0.11)	(0.12)	(0.10)	(0.11)
T1*Marathi Corporator		0.23*				
		(0.12)				
T2*Marathi Corporator		0.20				
		(0.13)				
T1*T2*Marathi Corporator		−0.14				
		(0.18)				
Marathi Corporator		−0.28**				
		(0.09)				
Shiv Sena Corporator	−0.15					
	(0.13)					
T1*Shiv Sena Corporator	0.26					
	(0.15)					
T1*T2*Shiv Sena Corporator	−0.13					
	(0.22)					
T2*Shiv Sena Corporator	0.15					
	(0.15)					
Resp. Born Maharashtra			−0.11*			
			(0.05)			
T1*Resp. Born Maharashtra			−0.00			
			(0.07)			
T1*T2*Resp. Born Maharashtra			−0.05			
			(0.10)			
T2*Resp. Born Maharashtra			0.12			
			(0.07)			
High Slum Share Marathi				−0.07		
				(0.10)		
T1*High Slum Share Marathi				−0.21		
				(0.12)		
T1*T2*High Slum Share Marathi				0.08		
				(0.18)		
T2*High Slum Share Marathi				0.14		
				(0.15)		
SS Corp.+Low Marathi Share					−0.05	
					(0.13)	
T1*SS Corp.+Low Marathi Share					0.39**	
					(0.13)	
T1*T2*SS Corp.+Low Marathi Share					−0.17	
					(0.20)	
T2*SS Corp.+Low Marathi Share					0.02	
					(0.18)	
Marathi Corp.+Low Marathi Share						−0.20
						(0.16)
T1*Marathi Corp.+Low Marathi Share						0.27*
						(0.14)
T1*T2*Marathi Corp.+Low Marathi Share						−0.08
						(0.22)
T2*Marathi Corp.+Low Marathi Share						0.06
						(0.18)
Unit of weighting/clustering	Slum	Slum	Slum	Slum	Slum	Slum
Covariates	No	No	No	No	No	No
Pre-registered	No	No	No	No	No	No
R^2	0.25	0.25	0.25	0.25	0.26	0.25
Num. obs.	5251	5251	5251	5251	5251	5251

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table S10: Manipulation Checks using responses from midline survey. Weighted least squares regression estimates. Models include block fixed effects and pre-specified covariates. Clustered standard errors in parentheses.

	NGO Visit		Collective Action Encouraged		Collective Action Taken	
	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Full	Eligible	Full	Eligible	Full	Eligible
Bureaucratic assistance (T1)	0.04**	0.03				
	(0.02)	(0.03)				
Political Coordination (T2)			0.06**	0.08**	0.04*	0.04*
			(0.02)	(0.03)	(0.02)	(0.02)
Nominal p-value	0.02	0.12	0.01	0.02	0.05	0.05
Test type	One-sided	One-sided	One-Sided	One-Sided	One-Sided	One-Sided
Control mean	0.39	0.39	0.21	0.18	0.18	0.15
Unit of weighting/clustering	Cluster	Cluster	Slum	Slum	Slum	Slum
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Pre-registered	Yes	Yes	Yes	Yes	No	No
R^2	0.09	0.09	0.04	0.06	0.05	0.06
Num. obs.	6268	5010	6268	5010	6268	5010

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table S11: Estimated interaction between bureaucratic assistance and political coordination interventions on binary formalized variable using responses from endline survey. Weighted least squares regression estimates. Models include block fixed effects and pre-specified covariates. Clustered standard errors in parentheses.

	DV: Formalized (Full Sample)		DV: Formalized (Eligible Lands)	
	(1)	(2)	(3)	(4)
Bureaucratic assistance (T1)	0.01	−0.03	0.04	−0.02
	(0.03)	(0.05)	(0.03)	(0.06)
Political Coordination (T2)		−0.02		−0.06
		(0.05)		(0.06)
T1*T2		0.05		0.20**
		(0.07)		(0.08)
Nominal p-value	0.38	0.44	0.09	0.04
Control mean	0.43	0.33	0.54	0.42
Test type	One-sided	Two-Sided	One-sided	Two-Sided
Unit of weighting/clustering	Cluster	Slum	Cluster	Slum
Covariates	Yes	Yes	Yes	Yes
Pre-registered	Yes	Yes	Yes	Yes
R^2	0.35	0.29	0.25	0.29
Num. obs.	6652	6652	5251	5251

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

O   Additional Exploratory Analyses

Tables S12 and S13 present the results of exploratory analyses of the effects of our interventions on the intermediate stages of formalization based on responses from our midline survey. While the main manuscript includes the results from the eligible lands sample, the aforementioned tables include the results for the full sample.

Table S12: Estimated effect of bureaucratic assistance on stages of formalization in the full sample. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses. Estimates based on responses to midline survey

	Form Submitted	BMC Visit	P-Form	BMC Connection
	(1)	(2)	(3)	(4)
Bureaucratic assistance (T1)	0.10***	0.04***	0.01	0.00
	(0.02)	(0.01)	(0.01)	(0.02)
Nominal p-value	0.00	0.00	0.15	0.44
Test type	Two-sided	Two-Sided	Two-sided	Two-Sided
Control mean	0.20	0.06	0.04	0.09
Unit of weighting/clustering	Cluster	Slum	Cluster	Slum
Covariates	No	No	No	No
Pre-registered	No	No	No	No
R^2	0.06	0.03	0.05	0.10
Num. obs.	6268	6268	6268	6268

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table S13: Estimated interaction between bureaucratic assistance and political coordination interventions in the full sample. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses. Estimates based on responses to midline survey

	Form Submitted	BMC Visit	P-Form	BMC Connection
	(1)	(2)	(3)	(4)
Bureaucratic assistance (T1)	0.13***	0.06***	0.03**	0.04
	(0.04)	(0.02)	(0.01)	(0.04)
Political Coordination (T2)	0.02	0.02	0.00	−0.01
	(0.04)	(0.01)	(0.01)	(0.04)
T1*T2	−0.04	−0.03	−0.02	−0.02
	(0.05)	(0.02)	(0.02)	(0.05)
Nominal p-value (T1*T2)	0.42	0.23	0.39	0.69
Test type	Two-sided	Two-Sided	Two-sided	Two-Sided
Control mean	0.15	0.04	0.02	0.10
Unit of weighting/clustering	Cluster	Slum	Cluster	Slum
Covariates	No	No	No	No
Pre-registered	No	No	No	No
R^2	0.06	0.03	0.02	0.04
Num. obs.	6268	6268	6268	6268

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

P   Robustness Checks

Table S14 presents the results from robustness checks that assigns alternative treatment codings for one slum cluster that was dropped from the second step of randomization.

Table S14: Robustness Checks Including Dropped Cluster in the Sample. Interaction Effects of T1 and T2 on formalization. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses.

	T1 as 0			T1 as 1		
Sample:	Full	Restricted	Restricted	Full	Restricted	Restricted
Dependent Variable:	Binary	Binary	Ordinal	Binary	Binary	Ordinal
	(1)	(2)	(3)	(4)	(5)	(6)
Bureaucratic assistance (T1)	−0.05	−0.03	0.03	−0.04	−0.03	0.02
	(0.06)	(0.07)	(0.20)	(0.06)	(0.07)	(0.20)
Political Coordination (T2)	−0.09	−0.07	0.04	−0.08	−0.07	0.04
	(0.06)	(0.06)	(0.20)	(0.06)	(0.06)	(0.21)
T1*T2	0.12	0.23**	0.34	0.11	0.21**	0.32
	(0.08)	(0.09)	(0.28)	(0.08)	(0.10)	(0.28)
Nominal p-value	0.17	0.03	0.25	0.21	0.05	0.28
Control mean	0.33	0.42	1.45	0.33	0.42	1.45
Unit of weighting/clustering	Slum	Slum	Slum	Slum	Slum	Slum
Covariates	No	No	No	No	No	No
Pre-registered	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.23	0.24	0.20	0.23	0.23	0.20
Num. obs.	6682	5281	5281	6682	5281	5281

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Note: Columns 1-3 show the results for $T1 = 0$ which is the actual treatment assigned for the relevant cluster. Columns 4-6 show the results for $T1 = 1$ which is the intended treatment according to the randomization scheme. The dependent variable for Columns (1), (2), (4), and (5) is the binary indicator for final stage formalization. The dependent variable for Columns (3) and (6) is the ordinal variable for the formalization level. Columns (1) and (4) show the results for the full sample while the rest of the columns show the results for the sample including only eligible land types.

Q   Additional Pre-Registered Analyses

Table S15 presents the results of pre-registered analyses examining the joint effect of our interventions on citizens' progress along the formalization ladder. The outcome here is a four-point ordinal variable describing progress up the formalization ladder; specifically, it quantifies whether subjects at endline did not (0) or did submit an official application form for a BMC water connection (1); whether they received a P-form (2); and whether they ultimately received a verified BMC water connection in the post-intervention period (3). We do not find any evidence that T2 significantly modified the impact of T1 on citizens' progress up the formalization ladder in either the overall sample (Column 2) or in the eligible lands sample (Column 4). We also do not find any evidence that T1 on average was effective in that regard in either sample (Columns 1 and 3). However, Figure S2 shows that T1 when combined with T2 results in a statistically significant average increase of 0.39 points along the ordinal four-point formalization scale (p-value=0.046).

Additionally, Table S16 shows the results of pre-registered results examining whether our interventions resulted in backlash by vested interests as measured by the question in the endline survey asking: "Over the past five years, have any groups or individuals sought to prevent you from applying for or obtaining a BMC water connection?". We find no evidence of such backlash.

Finally, we examine the results of the pre-registered hypotheses concerning the heterogenous effects of the political coordination intervention. We do not find evidence that the effect of T2 on formalization is more positive for citizens who share the religion or ethno-linguistic background of the local corporator, or for citizens in slums that previously voted for the ruling party, have higher voter registration rates, or have corporators belonging to the ruling party. We also find no evidence to support the pre-registered hypothesis that the effect of T1 is more positive for individuals who are less educated, lower income and from subaltern communities. While we do not report the tables here due to space constraints, these results are available upon request.

Table S15: Estimated interaction between bureaucratic assistance and political coordination interventions on the degree of formalization. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses.

	DV: Formalization Level (Full Sample)		DV: Formalization Level (Eligible Lands)	
	(1)	(2)	(3)	(4)
Bureaucratic assistance (T1)	0.09	−0.03	0.11	0.03
	(0.08)	(0.19)	(0.09)	(0.20)
Political coordination (T2)		−0.22		0.04
		(0.19)		(0.21)
T1*T2		0.27		0.34
		(0.24)		(0.29)
Nominal p-value	0.15	0.28	0.11	0.26
Control mean	0.43	0.33	0.54	0.42
Test type	One-sided	Two-Sided	One-sided	Two-Sided
Unit of weighting/clustering	Cluster	Slum	Cluster	Slum
Covariates	No	No	No	No
Pre-registered	Yes	Yes	Yes	Yes
R^2	0.34	0.22	0.22	0.20
Num. obs.	6652	6652	5251	5251

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table S16: Estimated effect of T1 or T2 on backlash by vested interests. Weighted least squares regression estimates. Models include block fixed effects. Clustered standard errors in parentheses.

	Full Sample	Eligible Lands Sample
T1 or T2	0.01	0.01
	(0.01)	(0.01)
Nominal p-value	0.11	0.30
Control mean	0.01	0.01
Unit of weighting/clustering	Slum	Slum
Covariates	No	No
Pre-registered	Yes	Yes
R^2	0.03	0.04
Num. obs.	6652	5251

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

R   Timing of Formalization

Table S17 and Table S18 investigate the timing of our interventions - essentially, they probe the question of *when* our interventions had the greatest impact relative to the timing of the intervention. In each of the tables, the dependent variable for Column (1) is an ordinal variable that is coded 0 if a verified connection was not received or received prior to 2018 (before the interventions began), 1 if a verified connection was received between 2018 and 2020, 2 if a verified connection was received between 2020 and 2022, and 3 if a verified connection was received after 2022. The dependent variable in Column (2) for both tables is a dummy variable coded 1 if formalization was received between 2018 and 2020 and 0 otherwise. The dependent variable in Column (3) for both tables is a dummy variable coded 1 if formalization was received between 2020 and 2022 and 0 otherwise. Finally, the dependent variable in Column (4) for both variables is a dummy variable coded 1 if formalization was received in 2022 or after and 0 otherwise.

S   Marginal Effect of Political Coordination (T2)

Figure S3 show the marginal effect of political coordination (T2) on full formalization when bureaucratic assistance (T1) is also assigned for the full sample and the eligible lands sample.

Figure S2: Estimates of marginal effect of bureaucratic assistance (T1) from pre-registered analyses of interaction of bureaucratic assistance (T1) and political coordination (T2) interventions on the ordinal variable measuring levels of formalization. See Table S15 for results in tabular form.
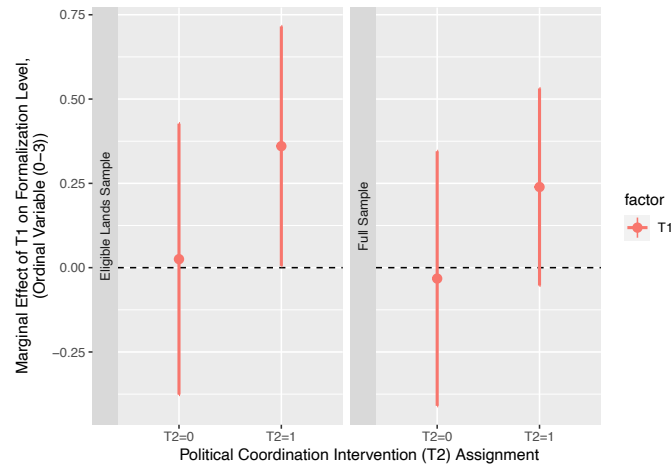

Figure S3: Estimates of marginal effect of political coordination (T2) from pre-registered analyses of interaction of bureaucratic assistance (T1) and political coordination (T2) interventions on the binary indicator for final stage formalization. See Table 1 in the main text for results in tabular form.
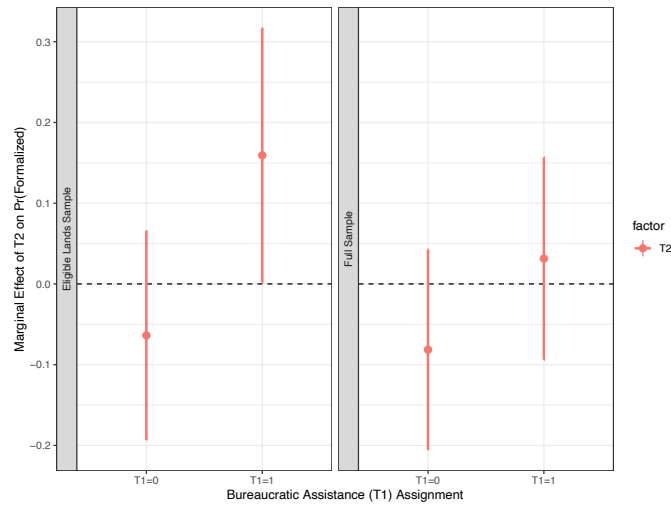
Table S17: [Exploratory] Dependent variable timing of formalization relative to intervention. Weighted least squares estimates. Models include block fixed effects. Heteroskedastic-consistent clustered standard errors in parentheses (Full Sample).

	(1) Ordinal Timing [0-3]	(2) 2018 to 2020	(3) 2020 to 2022	(4) 2022 or After
Bureaucratic Assistance (T1)	−0.13	0.03	−0.06	−0.01
	(0.12)	(0.03)	(0.05)	(0.02)
Political Coordination (T2)	−0.24*	0.04	−0.10**	−0.03
	(0.12)	(0.04)	(0.04)	(0.02)
T1*T2	0.29*	−0.05	0.14**	0.02
	(0.16)	(0.05)	(0.06)	(0.03)
Nominal p-value	0.07	0.33	0.02	0.52
Control mean	0.62	0.11	0.16	0.06
Test type	Two-sided	Two-Sided	Two-sided	Two-Sided
Pre-Registered	No	No	No	No
Unit of weighting/clustering	Slum	Slum	Slum	Slum
Covariates	No	No	No	No
R^2	0.26	0.07	0.15	0.12
Num. obs.	6652	6652	6652	6652

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table S18: [Exploratory]Dependent variable timing of formalization relative to intervention. Weighted least squares estimates. Models include block fixed effects. Heteroskedastic-consistent clustered standard errors in parentheses (Eligible Lands Sample).

	(1) Ordinal Timing [0-3]	(2) 2018 to 2020	(3) 2020 to 2022	(4) 2022 or After
Bureaucratic Assistance (T1)	−0.09	0.01	−0.02	−0.02
	(0.13)	(0.04)	(0.05)	(0.03)
Political Coordination (T2)	−0.21	0.04	−0.06	−0.04
	(0.13)	(0.05)	(0.05)	(0.03)
T1*T2	0.48**	0.01	0.16**	0.05
	(0.19)	(0.07)	(0.07)	(0.05)
Nominal p-value	0.03	0.84	0.04	0.36
Control mean	0.78	0.13	0.21	0.08
Test type	Two-sided	Two-Sided	Two-sided	Two-Sided
Pre-Registered	No	No	No	No
Unit of weighting/clustering	Slum	Slum	Slum	Slum
Covariates	No	No	No	No
R^2	0.26	0.08	0.17	0.11
Num. obs.	5251	5251	5251	5251

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$