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ABSTRACT

Where the state is weak, traditional authorities control the local provision of public goods. These leaders come from an older, less educated generation and often rule in an authoritarian and exclusionary fashion. This means the skills of community members may not be leveraged in policy making. We experimentally evaluate two solutions to this problem in Sierra Leone: one encourages delegation to higher skill individuals and a second fosters broader inclusion in decision-making. In a real-world infrastructure grants competition, a public nudge to delegate lead to better outcomes than the default of chiefly control, whereas attempts to boost participation were largely ineffective.

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I. Introduction

Rural communities in poor countries often fall beyond the reach of the formal central state and must provide a variety of essential public goods and services for themselves. Such provision requires fundraising external capital, usually from (other) government agencies or non-governmental organizations, and then managing technical aspects of project implementation. The traditional authorities who typically govern this process tend to be quite old and have thus not benefited from the substantial recent investments in education. In addition, they often rule in a largely autocratic and exclusionary fashion, which means the varied skills of community members may not be reflected in local development policy choices. As the challenge of economic development becomes more complex, so do the costs associated with decision-making dominated by a narrow set of traditional elites, who typically lack the requisite technical skills. This naturally raises the question of whether attempts to encourage delegation to higher skill individuals or to promote broader inclusion in local decision-making—either on their own or in combination—could be an effective solution to these challenges.

These are major concerns in Sierra Leone, our empirical setting, which sits squarely at the bottom of international rankings of government effectiveness, public services, and economic development.[1] Public goods provision, land distribution and local justice decisions are dominated by traditional chiefs who face no direct electoral pressure and regularly make decisions without soliciting broad-based input from the community (Baldwin 2016, Bulte, Richards and Voors 2018). There is evidence that the more politically powerful these chiefs are, the worse are long-run development outcomes (Acemoglu, Reed and Robinson 2014). While local governance

[1] For example, Sierra Leone is in the 10th percentile of government effectiveness according to the World Bank (http://info.worldbank.org/governance/wgi/#reports), and ranks 179th out of 188 in the United Nation's Human Development Index (http://hdr.undp.org/sites/default/files/rankings.pdf).

arrangements in rural Sierra Leone have changed little since Independence, social and economic opportunities have changed dramatically. In particular, after decades of profound neglect—fully 71% of Sierra Leoneans in 1985 had never been to school—the government and its donor partners have achieved universal primary enrollment since the end of the country's civil war (1991-2002).[2] We explore how traditional authorities respond to this sharp increase in the human capital stock: do they harness these skills for the more technical aspects of development, or do they sideline the new talent, who are by definition not part of the elder ruling elite and thus a potential political threat?

In this paper, we overlay two experiments to evaluate whether attempts to encourage delegation to high skill individuals, on the one hand, or to increase voice by fostering broad participation of community members, on the other, help unlock development opportunities.

The first intervention we study aims to leverage human capital by encouraging communities to delegate technical tasks to those best able to complete them. In particular, we study a low-cost, two-pronged approach to improve the skill level of managers in charge of local development projects. One component of this first intervention uses a combination of community nominations and objective written tests to identify high skill local residents, and implements a public nudge to delegate the planning and implementation of public infrastructure projects to them. A second component then provides practical training to these "technocrats" in the nuts and bolts of project management. This focus on technocrats relates to long-standing arguments about the importance of state capacity and the competence of public sector workers (Huntington 1968), which could be particularly impactful in poor countries (Finan, Olken and Pande 2017). The

[2] Data source is Central Statistics Office (1985) for the educational attainment among those five years and older in 1985, and World Bank (2017) for current school enrollment rates. There have also been substantial gains in other dimensions of human capital, including child health and nutrition.

emphasis on delegation is motivated by the theoretical insights of Alesina and Tabellini (2007, 2008) who identify conditions under which it may be optimal to allocate tasks away from politicians and instead give them to bureaucrats.[3] The technical nature of many aspects of development projects—including infrastructure costing, contracting and engineering—combined with the relatively low education level of chiefs, makes their management a prime candidate for delegation in settings like Sierra Leone. Technical demands also suggest that practical training in project management might be useful in further facilitating local development.

We compare the push to delegate to a second experimental intervention that aims instead to promote popular participation in local decision-making. Giving citizens greater voice in development initiatives has many objectives (White 1999, Mansuri and Rao 2013), but it in part offers a way to leverage the opinions and skills of the wider community.[4] We study a commonly deployed version of this participatory approach, called community driven development (CDD), which provides funding for local public goods construction and requires communities to make planning and implementation decisions in an inclusive and democratic manner. The World Bank, for one, dedicates 5 to 10 percent of its global portfolio to CDD projects, with over $17 billion in active investments.[5] Within this type of aid, the specific project considered in Sierra Leone represents an upper bound on the intensity of resources dedicated to facilitating broad-based participation (Casey 2018, pg. 145). It operated over two phases, an early intense round of intervention from 2005 to 2009 (evaluated in Casey, Glennerster and Miguel 2012) and a second, lighter round of support that commenced in 2010 and remained active, at least nominally, until

[3] A similar tradeoff between reliance on bureaucratic capacity and affording citizens greater voice has been shown to be important for the introduction, and subsequent undermining, of Chinese local elections (Martinez-Bravo et al 2017).
[4] Another prominent objective of increasing citizen voice is to check the unconstrained authority of chiefs. In a companion paper, Casey et al (2021), we evaluate this and other long run impacts on governance and social capital outcomes in this setting. In the current paper, we test a more modest goal that efforts to broaden participation in local decision-making helps communities tap into a wider range of skills and deliver a better project.
[5] Independent Evaluation Group (2017): https://ieg.worldbankgroup.org/Data/reports/lp_genderincdd_01272017.pdf

2018.

We evaluate these two distinct approaches—delegation versus broad participation—and compare them to the default reality of chiefly dominance, in the context of an infrastructure grants competition run by the district government. This type of formal competition for infrastructure resources is found in many low- and middle-income, and even some high-income, countries, while virtually all countries experience informal lobbying over limited infrastructure budgets. The low-cost test we study quickly identified community members with significantly stronger project management skills than local chiefs. In a main finding, we show that putting these technocrats in charge of the community's application for the grants competition dominates both the default of chiefly control and the long-run CDD program. In particular, we find large positive effects of technocratic selection on objective measures of proposal quality, as well as the likelihood of being awarded an infrastructure grant. Offering training to these high skill individuals generates additional gains in performance. In contrast, outcomes for the CDD communities are statistically indistinguishable from the controls, despite the closeness of our test to the activities undertaken as part of the CDD project and the intervention costing an order of magnitude more than the technocratic selection approach.

We then explore the mechanisms that appear to explain why technocratic selection and training were successful and why the emphasis on participation largely failed in these regards.

First, we find that when left to their own devices, chiefs fail to delegate complex project tasks to high skill community members, even when it appears to be in the community's interest to do so. Our setting provides a particularly stark illustration of this misallocation of human capital, given that basic literacy and numeracy are clearly valuable in drafting a successful proposal, which many chiefly elites do not possess; and in light of the considerable financial resources that high quality proposals could unlock in the government's infrastructure competition. This suggests that the "political Coase theorem" may fail to hold in this setting: while delegation would appear to increase local output, some of which the chiefs could redistribute to themselves, they instead make the potentially inefficient choice to retain control of the process (Acemoglu 2003).

This finding has implications beyond this specific experiment, as it suggests that traditional authorities may not be optimally adapting to the large positive shock to human capital that has occurred in recent decades. The skills of younger, more educated cohorts thus appear underutilized in the prevailing approach to local (and some would argue national) development. While this project focuses on the fairly narrow, though critical, task of securing external funding, the general point may hold for a range of other local governance tasks that rely on technical skill, including budgeting and planning, tax collection, and interfacing with the formal state as it decentralizes (a process launched in 2004), all of which fall under the purview of traditional rural authorities.

Second, we find that the light touch selection intervention may help to correct this failure to harness local skill. Specifically, technocratic selection worked in this environment because community members—including many, though not all, chiefs—on net responded positively to objective information about which local individuals were high skill, and were willing to delegate project management to them when publicly encouraged to do so.

An immediate concern is that technocrats, even with supplemental training, may falter at project implementation since they lack the chief's political authority and experience. Counter to this view, however, data from physical assessments of all infrastructure built through the grants competition reveal no statistically significant differences in the quality of projects managed by technocrats versus chiefs.

Third, CDD communities were, by contrast, largely unsuccessful at bringing high skill individuals into local public service. We do find that chiefs in CDD villages are somewhat more likely to delegate to a high skill resident than in the controls, consistent with CDD enhancing participation. However, this small shift does not meaningfully affect performance in the grants competition. This modest impact echoes analysis of several additional governance and social capital indicators in our more comprehensive assessment of the long run effects of CDD (Casey et al 2021). Together these studies suggest that CDD communities in this setting are not substantially more inclusive or effectively governed relative to control villages.

II. Context and Experimental Design

This research was designed around a real-world economic development opportunity. In 2016, the elected district governments (called Local Councils) in our Sierra Leone study areas ran a competition to award grants for small-scale infrastructure construction. Entering the competition required a detailed project proposal and budget (three pages in length), submitted to the district government office. A committee of elected Local Councillors evaluated and ranked all proposals, blinded to the name of the submitting village, and awarded implementation grants each worth $2,500 to the top twenty proposals. While proposal competitions are only one of several ways in which governments allocate public funds, inter-village competition is a feature of many large scale CDD programs, including those in Indonesia (Olken 2007, Voss 2012) and the Philippines (Labonne and Chase 2009), among other countries. More broadly, in the United Kingdom, central government support for large scale urban regeneration projects was allocated through a "City Challenge" competition, and in the United States, the "Race to the Top" program encourages competition among school districts for central government support for educational reforms.[6]

[6] Arguably all central government infrastructure spending is allocated based on local areas' ability to effectively make the case that their road or bridge is more important than other infrastructure priorities, i.e. is effectively a competition.

Communities were informed about the number of winning proposals, but not about the pool of eligible villages nor the likelihood that other communities would apply (which we ourselves could not know *ex ante*), which suggests there was considerable uncertainty about the odds of success. A $2,500 grant is sufficient to fund the construction of a community center, grain storage house or multiple latrines in one of these communities, which are meaningful projects. As we show later, 98% of villages entered the grants competition, which provides revealed preference evidence that communities found this a worthwhile opportunity.

Local Councils are relatively new in Sierra Leone, created by the Local Government Act of 2004. Prior to that, rural communities received little support from the central state—which has been characterized as highly corrupt, incompetent and authoritarian (Reno 1995)—and were instead governed largely by traditional authorities. At the community level, the village headman, who occupies the most local tier of the chiefly hierarchy, remains the most influential leader over matters of land, labor and justice. Some scholars claim that the chiefs' exclusive leadership style, combined with vulnerability to coerced labor and capricious fines, was a key driver for young men to take up arms during the country's civil war (Richards 1996). More recent evidence suggests that the least constrained chiefs perform worse on local development, while simultaneously enjoying greater legitimacy, a combination that Acemoglu et al. (2014) interpret as evidence that "more dominant chiefs have been better able to mold civil society and institutions of civic participation in their villages for their own benefit and continued dominance" (pg. 323). This suggests that it might be difficult for community members, particularly those who are not part of the ruling elite, to assert themselves in matters of local development (either by participation or delegation), including the district government grants competition.[7]

It is worth considering reasons why a traditional chief might not be the best person to manage the community's entry into the district government grants competition. Alesina and Tabellini (2007) argue that it is socially optimal to delegate tasks to independent bureaucrats instead of elected politicians if the task is difficult, politician capability to execute is uncertain, or monitoring performance requires expertise. By these metrics, the grants competition would seem to sit squarely in the bureaucrat's purview. Developing a detailed proposal is technically demanding, involving planning, writing text, and budgeting. It is unclear if most traditional village headmen, as the top local politicians, have the requisite skills to complete it. Moreover, given the long-standing lack of educational opportunities in Sierra Leone, it will be difficult for most adults in the village to assess the quality of the proposal generated. We thus examine whether there are other community members, outside the chiefly elite, whose skills might be a better match for this task but are currently underutilized.

We evaluate the effectiveness of two distinct interventions in allowing communities to avail themselves of the grants opportunity, and benchmark both against the default of traditional chiefly authority. We use a cross-randomized design that overlaid a new technocratic selection intervention over the sampling frame of a long-term CDD experiment, and tracked how all communities performed in the grants competition (see Figure 1 for description of the study design).

IIA. Common Intervention Elements

In 2016, field teams visited all 236 communities in the study sample. Half of these villages had

[7] The village headman is selected by a council of representatives of so called "ruling" families. The CDD program had no impact on the way headmen are selected (and was not designed to do so). The central state is characterized by majoritarian politics dominated by two major political parties.

been participating in a CDD program since 2005 (described in detail below). Regardless of the CDD treatment status of the community, during these day-long visits enumerators did three things: i) publicized the local government grants competition, ii) led community members through a process designed to identify individuals with the appropriate skills to lead a successful grant proposal, and iii) collected data on an array of local development indicators.

More specifically, to identify potential technocrats, the project used a combination of community nominations and objective tests. Our field team supervisors first convened a public meeting of local leaders and residents in all study communities, focused on publicizing the grants competition. The supervisor explained the size of the grants, how the competition worked, and encouraged communities to enter. Then he or she went through the standardized application form and explained what was required in each section, emphasizing the skills needed to develop a successful submission, and asked the group to think of people in their community who had the appropriate skills. As an example, when the supervisor explained the budget template, she asked the group to think of people who are good with numbers and have experience costing project inputs like cement and iron sheets. Other skills emphasized include writing a persuasive project plan, time management, and the ability to get things done (see Appendix A for the implementation script). The supervisor asked the gathered community members to deliberate and nominate five individuals, other than the local chief, who possessed the requisite skills, and then stepped aside to allow the community to generate their list of nominees.

To complement this local knowledge, the project asked all five nominees as well as the village chief (or "headman") to then take an objective written test in private. We designed the test to capture the skills associated with managerial capital, which scholars have found to be important for the profitability of firms in India (Bloom et al. 2013, 2020), performance of public agencies in

Nigeria (Rasul and Rogger 2016), and implementation of NGO-sponsored projects in Sierra Leone (Voors et al. 2018). The test included questions that measure basic literacy and numeracy; experience implementing development projects; ability to cost a standard infrastructure project (specifically a 10 foot by 10 foot cement floor for drying agricultural goods, a common project in rural areas); and past community leadership roles. The test runs to 121 points and generated wide dispersion in scores: the range across all test-takers was 1 to 108, with a mean of 42 and standard deviation of 26. Field enumerators scored the tests on site and the highest score amongst the five (non-chief) nominees was designated as the local technocrat in the treatment communities (discussed further below). Up to this point, all 236 villages saw the same activities implemented during the 2016 field visit.

IIB. Technocratic Selection Experiment

To evaluate the efficacy of technocratic selection, we randomly assigned communities to one of three treatment arms: i) chiefly default; ii) technocratic selection; and iii) technocratic selection plus training. The main lever we use to drive differences in the delegation of project authority across communities is via a public "nudge."

Specifically, after scoring the managerial capital tests, the field supervisor reconvened the community meeting. She explained that she would unlock a lottery which would determine whether the person with the highest score (of the five non-chief nominees) should be put in charge of managing the project challenge submission, or whether the community should rely on the chief as usual. The supervisor then held up a tablet device with a rolling dice visual lottery image that broke apart into the assignment screen, which read either "Highest scorer" or "Headman leader." The nudge towards delegation to the highest scorer is our technocratic selection treatment, while the reversion to the chief as usual is the default condition. Neither condition publicly announced any of the individual test scores. The supervisor then made a display of writing the assigned person's name at the top of the project challenge application, handing the application over to that person, and giving him or her a voucher to subsidize their transport to deliver the community's submission to the relevant district government office.

Note that while the announced nudge was public, there is nothing binding about the encouragement to delegate to the technocrat. There are, moreover, several reasons to believe that a nudge to delegate would have little effect on the nature of project development. First, the communities were informed that the grants competition was run by the local government (and not the research team, see Appendix A for the supervisor script), so there was no obvious need to comply with the suggested delegation nudge. Second, if traditional authorities recognize that technical skills matter for project success, and they have good information about local citizens, chiefs may already be delegating project management efficiently in the status quo. In other words, if chiefs know which local residents can read and write and have project experience, they may willingly choose to delegate complex tasks to these high skill individuals. And moreover, if they learn something about local skills from the community nomination process, they might become more willing to delegate even in the default condition, suggesting the estimates would represent a lower bound on the impact of technocratic selection.

On the other hand, technically competent managers might lack the authority or political influence of traditional leaders, leading them to fail at project management. For instance, the younger cohorts who benefited from educational expansion and the teachers hired to staff local schools may not be able to mobilize labor and financial contributions from other community members as effectively as chiefs, or even determine which project is needed. This could lead communities to choose chiefly authorities to manage the project regardless of the nudge they received from the research team. Or, if the traditional chiefs see these high human capital managers as a political threat, they may try to sideline them from the process or sabotage their efforts. Any combination of these factors would work against finding a treatment effect of the technocratic selection nudge on performance in the grants competition.

A further concern is that the selected technocrats, while possessing greater general human capital, may not yet have the specific skills needed to write a strong grant proposal or manage a public project. This suggests that training could be valuable in this setting, and particularly so if they are fast learners, i.e., there is complementarity between the training and underlying human capital. Outside of frontline service providers (for instance, teacher training), there is limited rigorous evidence on the effectiveness of public sector management training in low-income countries (Finan, Olken, and Pande 2017). There is some evidence that managerial practices can be effectively taught in formal private sector firms (Bloom et al. 2013), but results for training small-scale entrepreneurs are more pessimistic (see McKenzie and Woodruff 2014).

To examine the impact of training individuals, we subsidized the cost of attending one of several all-day, small-group courses focused on basic project management skills. The courses covered budgeting, accounting, planning, and grant writing, and were run by the respective ward development committees (the head of which is an elected member of district government) in partnership with a local consultant, as part of the broader grants competition. To evaluate their efficacy, the research team offered an attendance subsidy to a randomly chosen half of the selected technocrats (no subsidy was offered to chiefs in the default condition, see Figure 1). In these subsidy communities, the field supervisor concluded the community meeting by providing the date and location of the nearest training, informed the community that the travel costs of the selected manager would be reimbursed, and encouraged that person to attend the training.

IIC. Community Driven Development Experiment

The technocratic selection arms cross the experimental frame of an existing long-run community driven development (CDD) study, see Figure 1. The CDD project, called GoBifo (which means “move forward” in the local Krio language), was funded by the Government of Sierra Leone and the World Bank, and comprised of two main elements: block grants provided to communities to fund public infrastructure; and intensive social facilitation to promote broad-based participation in local governance and development programming. Project activities began by establishing a village development committee (VDC), mandated to include representatives of marginalized groups, which was trained and encouraged to make the selection, planning and implementation of community projects in an inclusive and democratic manner. The VDC was then given an opportunity to learn-by-doing in managing a series of small-scale public projects funded by the grants. We test whether the chiefs and other community leaders who have thereby been encouraged over several years to manage development projects in a more inclusive way are more likely to delegate, or otherwise better leverage local talent, in the new infrastructure grants competition.

The first intense phase of GoBifo project implementation ran from 2005 to 2009 and included roughly $5,000 dollars in block grants per community (amounting to approximately $100 per household) for the construction of small scale infrastructure (like latrines, midwife huts, grain drying floors), agricultural inputs, and small business training and start-up capital. GoBifo also provided six months of dedicated organizing in each community (spread out over these first few years) to establish new institutional structures to facilitate collective action (i.e., the VDC) and put in place participation requirements to elevate historically marginalized groups—most notably women and young men—to positions of authority. The facilitation component was relatively expensive: costing between 63 and 100 cents per dollar provided in block grants, which serves as further motivation for the technocratic selection intervention, as the latter is far less expensive and more immediate. To formally link project activities to higher tiers of government, the VDCs were required to submit their village development plans to the appropriate ward development committee for review, endorsement and onward transmission to the elected district councils for approval (GoBifo Project 2007).

A second less intensive phase of GoBifo began in 2010 with additional grant support to 60 of the 118 treatment communities. These communities each received $1,300 to support youth empowerment activities ("youth" is defined by the government as individuals under 35 years of age); once again, no activities were implemented in the GoBifo control communities. Project staff were employed full time throughout this second period, and continued some facilitation activities in treatment villages.[8]

In data collected in 2009, shortly after the intense first phase of project activity concluded, we found evidence for substantial positive effects of these investments on the stock and quality of local public goods, accompanied by improvements in material welfare, as captured by household assets and market activity (Casey, Glennerster and Miguel 2012). At that time, we found no evidence of CDD impacts on a rich set of measures designed to capture institutional change and social capital. Short-run results from other large scale experiments in Afghanistan (Beath, Christia and Enikolopov 2013), the Democratic Republic of Congo (Humphreys, Sanchez de la Sierra and van der Windt 2019) and Liberia (Fearon, Humphreys and Weinstein 2015) are broadly consistent, and together provide little support for institutional transformation.

[8] Our impression is that the level of support for treatment villages was minimal post-2012, although we lack reliable data on the frequency of these interactions.

The overarching crossed research design in Figure 1 allows us to evaluate the pure performance effect of technocratic selection in the district government grants competition (treatment arm 2) in comparison to that of autocratic chiefs in the default condition (arm 1), and to chiefs who have been encouraged to govern more inclusively through several years of CDD programming (arm 4). It also gauges the efficacy of basic management training for high skill community members (arm 3), and captures potential interaction effects between technocratic selection, training and CDD (in arms 5 and 6).

III. Empirical Results

We first examine the impacts of technocratic selection and CDD on community performance in the project challenge grants competition, estimating the following model:

$$Y_c = \beta_0 + \beta_1 TS_c + \beta_2 CDD_c + \beta_3 (TS_c \times CDD_c) + W'_c \Psi + X'_c \Gamma + \varepsilon_c \qquad (1)$$

where outcome Y (e.g. proposal quality, winning a grant) is measured for each community c; TS is an indicator variable equal to one for assignment to technocratic selection (with or without training) and zero otherwise; CDD is an indicator for participation in the long-run GoBifo program; W_c is a vector of stratification fixed effects for geographic wards; X_c are balancing variables used in the original CDD randomization (community size and distance to nearest road); and ε_c is an idiosyncratic error term. The first tests of interest compare technocratic selection and CDD, respectively, to the default of chiefly dominance ($\beta_1 = 0, \beta_2 = 0$). The next test captures the relative efficacy of technocratic selection versus CDD ($\beta_1 = \beta_2$). We also test for interaction effects between the two interventions ($\beta_3 = 0$), noting that we are somewhat underpowered statistically for this test unless effects are quite large. All estimates are intention-to-treat effects. Appendix Tables A1 and A2 show that the randomizations achieved reasonable balance across treatment arms for key baseline characteristics. Appendix C includes our pre-analysis plan with annotation that links each specification therein to the relevant table in the main text and appendices.

Outcomes of interest include three distinct measures of proposal quality, all based on blinded review by different sets of local development professionals in Sierra Leone, and the probability of winning an implementation grant. The first quality assessment, labeled "technical score" in Table 1, is a simple coding of proposal completeness. Local research assistants rated several binary indicators of whether the submission includes items specified in the application form (e.g., if the instructions for project description ask for four items, does the proposal contain all four?). The second, "expert score," was completed by two Sierra Leonean development practitioners not affiliated with the GoBifo project or the district governments. These experts comprehensively scored the quality of the submission with reference to the scoring guidelines used by the district governments. Third, we have the official scores for all proposal submissions and grant award decisions made by the district governments themselves. Note that we do not examine effects on entry into the competition as we originally intended, as nearly all study villages (232 out of 236) submitted a proposal, affording minimal variation to examine.[9]

Table 1, Panel A reports the first set of results. Estimates in the first column compile the three different expert evaluations into a single equally weighted index. The treatment effect estimate is 0.397 standard deviation units (standard error 0.164) for technocratic selection, indicating that communities nudged to delegate to a high skill manager submitted proposals of substantially higher quality than those in the default condition of chiefly control (that did not participate in CDD). Estimates for each of the three distinct quality assessments are all positive in

[9] Submission rates are statistically balanced across treatment arms and range from 97 to 99 percent.

sign and two are significant at 95% confidence.[10] Estimates in column 5 suggest that technocratic selection increased the probability of winning an implementation grant by 10 percentage points, a large and highly significant effect, as compared to traditional chiefly dominance.

The five analogous treatment effect estimates of CDD are much smaller in magnitude and none are statistically distinguishable from zero at conventional levels, indicating that the multi-year participatory intervention did not substantially alter community ability to access a new funding opportunity. Estimates in the third row provide no evidence for significant interaction effects between technocratic selection and CDD. (For alternative specifications, see Appendix Table A5 for the fully interacted model and Table A6 for a simple two-way comparison of CDD to technical selection with no interaction terms. In Table A6, the *F*-test strongly rejects that the coefficients on the quality index are the same under technocratic selection versus CDD.)

We next separately estimate effects of management training beyond technocratic selection alone. In light of the null results for CDD above, we pool these treatment arms across the CDD experiment to bolster statistical power and do not include interactions. We estimate the following model:

$$Y_c = \delta_0 + \delta_1 TS_c + \delta_2 TR_c + W'_c \Psi + \varepsilon_c \quad (2)$$

where variables remain as defined in Equation (1), save the new *TR* term that is an indicator for assignment to management training and captures the marginal effect of training beyond the effect of technocratic selection, and W_c, the vector of stratification fixed effects for geographic wards, is now interacted with CDD assignment (thus controlling for any CDD effects).[11]

[10] Missing scores for the four communities that did not submit a proposal are imputed at treatment arm mean. Appendix Tables A3 and A4 present imputation bounds that instead use the lowest (highest) observed score, which have little effect on the estimates.

[11] This deviates from our PAP and is a correction to control for CDD assignment while estimating technocratic selection effects. As treatment assignment is balanced within these blocks, it makes little difference for the results.

Results are presented in Table 1, Panel B. The estimated treatment effect for technocratic selection alone is a 0.315 standard deviation units improvement in the proposal quality index (standard error 0.138), as compared to project management under the default of chiefly control. There is also a positive and significant marginal effect of management training. Estimates suggest that the training course increased the quality of the proposals generated by these technocrats by 0.339 standard deviation units (standard error 0.133).[12] Taking the two effects together, project proposals in villages that received the nudge for selecting the high skill individual and the travel subsidy to attend the management training scored 0.65 standard deviation units higher than control villages, a very large and highly significant effect (the *F*-test rejects that both estimates are equal to zero at 99% confidence). This pattern of results is consistent across the various types of proposal evaluations: all six point estimates are positive and five are at least marginally significant. While the technocrats' proposals were of higher quality, this did not significantly affect whether or not communities won an implementation grant in this regression specification: estimates in column 5 (of Table 1, Panel B) are positive but not statistically distinct from zero (0.067 with standard error 0.044).

Focusing on the actual threshold for winning a grant estimates effects above the 90th percentile of the score distribution. This threshold is quite competitive and somewhat arbitrary, as it is determined by the government's budget, so it is therefore informative to look for potential shifts in other parts of the score distribution. Figure 2 presents the cumulative density of government proposal evaluations for technocratic managers and chiefs, where it is clear that the distribution of technocrats' scores dominates, as it is shifted to the right over the entire distribution (a Kolmogorov-Smirnov test rejects equivalence at p-value = 0.03). The vertical line demarcates

[12] These are intention-to-treat estimates, where in total, two people assigned to receive the travel subsidy did not show up to any training and four people not assigned were trained.

the score cut off that determined which proposals were actually funded. If we relax this, e.g. explore what would happen if the government had had more funds to allocate, we see that there are strong positive effects on winning a grant at other simulated thresholds, like the 50th percentile (see the *F*-tests in Appendix Table A7).

Figure 3 summarizes these results by plotting the mean proposal score index for each of the six experimental treatment arms. Scores are standardized with respect to chiefs in the default condition without CDD exposure (Arm 1 from Figure 1), where the mean score by construction is zero. The narrower bracket above the point estimates compares scores in Arm 2 to Arm 1 to capture the "pure" effect of technocratic selection in the absence of CDD. Here the positive and marginally significant difference in means suggests that technocrats outperform chiefs by 0.35 standard deviation units (where the associated *p*-value from a *t*-test of equivalence across arms rejects at 90 percent confidence). Comparing Arm 3 to Arm 1 reveals a positive and highly significant combined effect of selecting and training technocrats, who outperform chiefs by 0.50 standard deviation units (*p*-value = 0.02). By contrast, the three brackets below the point estimates do not find much evidence for a CDD effect. The first two estimate are null, suggesting that neither chiefs nor technocrats perform any better in CDD versus control communities. While the rightmost comparison suggests that the training of technocrats had a larger effect in CDD communities, the relevant interaction term in the regression counterpart of these estimates is not significant (in Appendix Table A5, which further includes the randomization strata and balancing variables). Moreover, the *F*-test at the bottom of Table A5 cannot reject that the three CDD-related coefficients are jointly equal to zero (*p*-value = 0.23). By contrast, the *F*-test for the four coefficients related to technocratic selection and training rejects at above 99 percent confidence.

These differences raise the question of why communities do not do more to seek out technically competent managers to improve their chances of winning outside funds, an issue we explore below. It is also striking that the intense CDD program was not successful in encouraging appropriate delegation, despite its high cost and focus on facilitating broad participation in development programming, including for tasks not dissimilar to what was required in the government grants competition. The direct facilitation costs per community for the first intense phase of GoBifo (2005 to 2009) was $3,072, and adding project oversight and management brings this figure up to $5,325, a figure that excludes the substantial value of infrastructure grants; adding facilitator wages over the second less intense period (2009 to 2016) roughly doubles this cost. In contrast, implementing technocratic selection involves field visits and administering written tests, which cost just $231 per community, while the one day of basic management training costs $68 per participant, leading to a combined total of $299 per community in villages that received both. Thus CDD's facilitation cost alone is a full order of magnitude greater than the technocratic interventions, and took years to implement, in contrast to a few days.

While our objective in this study was to test whether communities allocate tasks to those best able to deliver them, we can also ask whether this particular version of technocratic selection is cost effective in its own right for this specific grant opportunity. For winning a grant at the actual threshold, the expected value of selection and training combined does not quite cover its cost (e.g. from Table 1, column 5 the expected value is 0.102*$2,500 = $255 < $299). This calculation would reach break-even for slightly larger grant awards ($2,960) or for lower winning thresholds (e.g. at the simulated 50th percentile threshold, the value well exceeds the costs, as 0.146 *$2,500 = $365 > $299).

The primary cost comparison between the technocratic approach versus CDD warrants two important observations. First, technocratic selection is viable in part because donors and the Sierra

Leone government have spent millions of dollars educating young Sierra Leoneans since the end of the civil war in 2002, creating a local pool of high skill young people and making technocratic selection relatively cheap. In settings where universal education has not been established, large human capital investments would be required. Second, the GoBifo CDD project may have many other benefits beyond performing well in the infrastructure grants competition, which are not considered here. In a companion paper, Casey et al (2021), we analyze long-run CDD effects on other development outcomes, and find, for example, large persistent impacts on the stock and quality of local public goods.

Section IV: What the Impacts of Technocratic Selection Imply

To better understand why the nudge toward technocratic selection had positive impacts, we consider links in the underlying causal chain.

First, the community nomination process together with written tests demonstrates that it is relatively straightforward to successfully identify high skill individuals even in very poor communities. Comparing technocratic selection to the default of chiefly control, the highest scoring manager nominated by the community strongly outperforms the village headman, by 1.4 standard deviation units on average (standard error 0.10), on the written management test. This large difference substantiates the hypothesis that there is a reserve of human capital located outside the traditional chiefly elite.[13]

Second, the written test scores are informative of performance in the district government grants competition. There is a positive correlation between the score of the selected project

[13] Note that we estimate a null result on whether management training further enhanced the technocrats' scores (equal to -0.001 standard deviation units with standard error 0.112), which provides a placebo test and "sanity check" on the research design, as the randomly assigned training took place after the tests were administered.

manager (whether chief or top scorer) and outcomes in the competition: a one standard deviation increase in test score improves measured proposal quality by 0.29 standard deviation units (standard error 0.05) and increases the probability of winning a grant by 4.1 percentage points (standard error 1.8). We can break out these correlations for each of the eight core competencies covered by the test. Of these, local infrastructure experience, literacy and numeracy have the most predictive power for proposal quality.

The high skill individuals differ substantially from traditional chiefs along observable dimensions. As presaged by the discussion of educational expansion, Table 2 shows that they are younger than chiefs (by twenty years on average), better educated (with 98 as compared to 35 percent likelihood of having some formal education), more likely to be from outside the village (by 19 percentage points), and more likely to be a teacher than a farmer. Gender is not typically a difference between the two groups: notice that very few of the women put forward in the set of community nominees (which was one in four) came out with the highest test score, so nearly all of those identified in the technocratic selection nudge are men, and nearly all traditional chiefs are also men.

Third, a public nudge is sufficient to substantially change the likelihood that a high skill individual is put in charge of managing the community's entry into the grants competition and the subsequent project. To verify delegation in practice, we stationed field enumerators at the district government offices to survey people who submitted a proposal from any of our study communities. To allay concerns about social desirability bias, we asked for the names and local leadership positions of people that were involved in specific aspects of the proposal process: who selected which type of project to apply for, developed the budget, and set the implementation timeline. We avoided any priming references to the lottery or public nudge, and matched the submitted names to the testing data *ex post*. Even with these safeguards in place, however, we cannot rule out that social desirability bias may inflate the degree of reported conformity with the public nudge.

These survey reports about who was in charge of proposal generation differ markedly across treatment arms. In analyzing these differences, we group together reports for an array of chiefly authorities to account for the fact that chiefs have their own coterie of administrators, like the village secretary, whom they can rely upon for tasks involving literacy and numeracy. Table 3 shows that, under technocratic selection, chiefly authorities were significantly less likely to choose the project (by 35 percentage points), write the description (by 14 points), compile the budget (by 15 points) and set the implementation timeline (by 12 points). Appendix Table A8 breaks these delegation effects out for trained versus untrained technocrats, and finds comparable results, suggesting that it is the selection nudge as opposed to training that drives delegation.

Figure 4 delves further into the question of who exactly was put in charge under delegation, by linking the name of the person reported to have had the "most say" in choosing the project back to the community nominations and managerial capital testing data. Panel A shows that in the technocratic selection arm, 49 percent of communities delegated to the individual with the highest score on the managerial capital test, and 8 percent delegated to another community nominee with a lower score. In 18 percent, the village headman chose the project, and in the remaining 25 percent, it was someone outside the nomination and testing set. By contrast, under the chiefly default relatively few communities selected any of the community nominees (3 percent chose the top scorer and 8 percent another nominee) and instead a clear majority (71 percent) relied on the village headman to choose the project. The contrast is sharp, with roughly four times more communities choosing the village headman in the default option compared to the delegation nudge.[14] Appendix Figure A1 presents analogous graphs that include the proportion of missing observations, which does not vary systematically with assignment to technocratic selection.

Note the presence of substantial two-sided non-compliance with the delegation nudge: Table 3 shows that in 20 percent of communities in the default condition, someone outside the traditional chiefly elite chose the project; and conversely in 45 percent of technocratic selection nudge communities, a chiefly authority still chose the project. Similar patterns are apparent in Figure 4. Even so, the substantial differences in process are themselves perhaps surprising given that nothing about the public lottery and community nudge was binding: while the field supervisors explicitly encouraged communities to put the highest scorer in charge in treatment communities, there was no meaningful constraint on communities reverting to chiefly authority as soon as the research team left. If we use the compliance rates for delegating project choice to effectively capture the first stage of the intervention, this would inflate the estimated effect on proposal quality in Table 1, Panel A to a one standard deviation unit treatment-on-the-treated effect.[15]

We cannot rule out that the technocratic selection intervention also relieved an information constraint regarding the existence and identity of high skill community members. Note a subtle asymmetry in our research design: while the chiefs in the default arm could always choose to delegate to any of the five community nominees, they were not informed about which of the five scored the highest on the written management test. So it could be the case that the chiefs always wished to delegate but were at an informational disadvantage in the default condition. This,

[14] Appendix Table A9 provides additional checks by showing that i) the likelihood of matching names across datasets does not vary by treatment assignment; and ii) managerial capital test scores and education levels of those chosen under delegation are higher than that for the chiefly default, suggesting that the nudge did indeed select local "technocrats." The measured differences in human capital in Tables A9 and 2 are in fact so large that it seems likely that they dwarf the effects from other plausible channels, such as motivational or effort responses to being recognized by one's peers in the community nomination process.

[15] In other words, if we take the estimated coefficient and divide by the difference in treatment take up rates in treated and control arms, we have: 0.397/(0.55-0.20) = 1.13 standard deviation units, a very large effect.

however, seems unlikely to fully account for the observed effects given the reported differences in who was in charge of the management process documented in Table 3. Moreover, the chief would have done fairly well by picking any one of the five nominees at random: for instance, 40% of the nominees had a test score of at least 60 points, which is twice the average score of chiefs. Even so, the information conveyed by revealing the top scorer may have been useful for hastening delegation, and since it comes at essentially zero marginal cost once the written tests are administered, seems worth retaining in any related future selection interventions. In a similar vein, the public nature of the nomination process may have provided the top scorer with some communal protection against chiefs wishing to renege on the delegation nudge, so also seems worth retaining.

Next consider reasons why the management training (offered to half of the technocrats) also appears to have been effective. Training materials were developed by a local expert and implemented in partnership with the district governments. They were designed explicitly to help communities develop successful submissions to the grants competition and covered topics like eliciting community needs, budgeting, and time management. We can leverage the fact that topics covered in the training curriculum do not perfectly coincide with the questions on the application form to assess the extent to which any observed training effect reflects "teaching to the test." Table A10 does not find evidence for a purely mechanical "copycat" effect: estimates in Panel A suggest that trainees were not more likely to extraneously include topics in their proposals that were covered by the training but not called for on the application. At the same time, we do not find evidence that the skills taught during the training were applied to topics beyond its core curriculum: in Panel B, trainees were not more conscientious in how they responded to application questions on topics that were not covered by the training. Together, these patterns suggest that the training effect is unlikely to be purely mechanical, but the extent to which the skills taught are broadly applicable beyond the grants competition is unknown.

We next examine whether there is a downside to technocratic selection in terms of the quality of project implementation for those communities that were awarded grants. In other words, conditional on winning, do chiefs do a better job at actually translating project funding into a functional project, perhaps due to their local political influence and ability to marshal labor and other funding? If so, this could provide a rationale for why chiefs are often chosen for project leadership in the first place.

To assess this, field teams visited all twenty communities awarded grants in July 2018 (over a year after the grants were disbursed) to inspect the existence and construction quality of funded projects. Overall, 70% of the projects were deemed functional on the day of the visit; the mean quality score assessed by the team was 6.8 out of 10 points; communities contributed on average US$218 of their own funds on top of the grants; and 40% of projects were located near the chief's compound (Table A11). Taken together, there is no decisive evidence that project implementation is substantially better or worse under technocratic selection, as there are no statistically significant differences in these outcomes across treatment arms. While the rates of functionality, quality and contributions are higher for the default condition, note that this is based on the 4 chiefs who made it into the top 20 awards, who are likely positively selected and not representative of chiefs in general. Indeed, these 4 winners scored 22 points higher on the managerial capital test than the mean for all chiefs, an increase of 70 percent, indicative of strong positive selection.

Several caveats are worth noting about these infrastructure assessments. Importantly, the small sample size provides limited statistical power, which is unfortunate because these measures relate most closely to the ultimate outcome of interest, namely the quality of public goods and services provided. This means we have little precision with which to evaluate more subtle tradeoffs that might undercut the value of delegation, for example, if technocrats are less effective in managing many of the nontechnical aspects needed to monitor and maintain these projects over time. Moreover, the competitive nature of the grant allocation process further implies these outcomes are observed only for the top of the proposal quality distribution, so may not generalize to communities with lower performing project leaders (where for example, the average ability of chiefs versus technocrats would be what matters). Competition also raises the stakes of potential failure, which could encourage chiefs to delegate more than they would have otherwise in order to provide political cover and have someone to blame for an unsuccessful proposal.

Overall, the data indicate that high skill "technocrats" perform better than traditional authorities in taking advantage of a development funding opportunity, and they respond well to training in the nuts and bolts of management practices. There are clear parallels between identifying the right people for these jobs and selection issues in personnel economics applied to public sector work. Besley and Ghatak (2005) argue that match quality with organizational mission can compensate for low-powered incentives, which are pervasive (where incentives even exist) in development programs. There is further evidence that higher pay attracts more competent workers to the public sector (Dal Bo, Finan and Rossi 2013), and thereby bringing in more competent teachers increases student learning (Alva et al. 2017). Even without pay differentials, the way in which jobs are advertised attracts different types of applicants who then perform differently on the job (Ashraf, Bandiera and Lee 2016, Deserranno 2019). Most closely related to our work here, He and Wang (2017) show that placing young college graduates into village government in China improves the targeting and implementation of social assistance programs. These results, together with our findings, indicate that there is substantial scope to attract high human capital individuals into local development projects to achieve positive public outcomes.

Section V: Why CDD Was Largely Ineffective in the Grants Competition

We explore the links in the same underlying causal chain outlined above to understand why the CDD experience failed to improve community performance in the grants competition.

First, deliberation in CDD communities did not generate a set of technocratic nominees that differ measurably on observable characteristics or test scores (Table 2, panel B). For example, the group of five nominees was no more likely to include a woman: 24 percent of nominees were women in both control and GoBifo communities. Similarly, CDD communities were no more likely to put forward younger people (if anything, they are slightly older on average), better educated people (70 versus 68 percent had been to school) or people from outside the village (20 versus 24 percent). Importantly, the nominees put forward by GoBifo communities did not perform any better on the management test: average test scores for the five nominees differ by fewer than two points (on a test that runs to 121 points in total) across CDD and control communities.[16] This further suggests that the learning-by-doing in implementing public infrastructure projects over several years did not durably improve the stock of managerial capital in GoBifo villages, or the ability to identify people with these skills, at least as measured by this process.

Second, chiefs in CDD communities were slightly more likely to delegate project management to high skill individuals, but by less than is the case for the technocratic selection treatment group. In the full sample, chiefly authorities in CDD communities chose which project to enter into the competition 51% of the time, compared to 64% in controls (*p*-value on the difference is 0.08 in Table 3, panel B). This modest increase in the willingness to delegate is

[16] There is also no statistically significant difference in the scores of chiefs, or in the scores of the individual manager (top scorer or chief) assigned by the on-site lottery.

mirrored in Figure 4, panel B, where we see that CDD communities are somewhat more likely to let one of the five community nominees chose the project. Limiting consideration to the technocratic selection treatment arms, chiefs were more likely to comply with the assignment to delegate project choice by 18 percentage points, which is significant at 95% confidence (Table 3, panel C). Yet for the other three proposal activities (project description, budget and timeline) there are no statistically significant CDD impacts in either the full sample or in the technocratic selection subsample.

There is also no evidence from textual analysis that proposals from CDD villages were any more likely to contain variants of the phrase "inclusion" that was a focus of CDD training or to reference democratic community institutions like the VDC that had been put in place by GoBifo (see Table A12). This suggests that the CDD project's emphasis on inclusive leadership had only modest long-run impacts on local chiefs' willingness to delegate, and that the resulting reallocation of project work towards high skill community members was not sufficiently large to meaningfully affect performance in the grants competition (cf. modest improvements in leadership capital in the Liberian CDD study, Fearon et al 2015 page 467).

One might be concerned that having previously benefited from CDD hurt a community's chances of receiving a grant, perhaps because the government prioritized communities that had not previously received assistance, or because GoBifo communities, who have a stronger infrastructure stock, had less demand for new funding or proposed different types of projects. We find little evidence to support these concerns. Recall that the government selection committee reviewed proposals with the village names redacted. To verify that this was not somehow subverted, Figure A2 plots the distribution of the government scores against the scores of unaffiliated development practitioners who used the same grading rubric, for communities under different treatment assignments. The two sets of scores are highly positively correlated (correlation coefficient of 0.87) and there is no apparent bias against GoBifo communities by government raters (e.g. there are not systematically more circles than triangles below the 45 degree line). What comes through clearly is that technocratic selection villages, from both GoBifo treatment and controls, score higher on both metrics (e.g. there are more shaded than hollow shapes in the upper right quadrant of the graph).

The near universal take up of the grant proposal, for both CDD control and treatment communities, provides revealed preference evidence for the intense demand for additional infrastructure investment, and argues against any potential crowd out emanating from previous GoBifo-funded projects. In terms of type of project proposed, while GoBifo communities were marginally less likely to propose a community center (in Table A12), which was the most popular type of project funded, Table A13 shows that the main results from Table 1 are robust to including fixed effects for the type of project proposed. Table A12 also shows that the type of project proposed does not vary systematically under technocratic selection.

Section VI: Conclusion

We find that encouraging communities to identify high skill residents and delegate technical aspects of local economic development projects to them holds promise as an effective and affordable strategy. In contrast, a long-running attempt to enhance participation in local governance and development projects yields little in the way of impacts on communities' ability to compete in the external grants competition that we study. Given that the CDD approach to broadening participation cost an order of magnitude more, these findings indicate that technocratic selection, accompanied by practical training in project management, may be a more viable, affordable and immediate strategy in Sierra Leone.

The district government grants competition studied here provides a proof of concept for the idea that efforts to encourage delegation could unlock underutilized human capital, which could generalize to other areas of local governance. The "proof" lies in how clear the value of delegation seemed in this setting: grant writing is technical, requiring literacy and numeracy that members of the chiefly elite generally do not possess, and choosing to delegate increases the odds of securing financial resources. That a majority of chiefs still failed to delegate in the status quo outlines the depth of the problem; and the high degree of responsiveness to objective information about skill and a nudge that encourages delegation illustrates the potential. In rural Sierra Leone, other tasks that could be amenable to delegation to technocrats include securing funding and overseeing construction to build out the rest of the local infrastructure stock that is badly needed, managing recurrent budgeting and development planning efforts, and interpreting and applying government ordinances. Against a backdrop of a nationwide decentralization effort, the skills and talents of local managers will become increasingly important as greater authority transfers down from central government to local administrators.

This study has several limitations. The technocratic selection intervention features delegation to a single activity (the grant competition), and while this particular task is important, the experiment does not shed light on other dimensions of local decision-making. It is possible that chiefly authority status quo or CDD treatment villages would have performed better in appropriately utilizing local skills in other activities. The research design also does not allow us to assess whether the technocratic selection process generates development projects that are any more reflective of local popular demand than other study arms. While incorporating higher skill individuals into the grant competition certainly represents a broadening of participation beyond the traditional rural political elite, it may simply reflect a shift to an alternative (and still overwhelmingly male) local educational elite, and thus it remains an open question whether the public goods selected by these technocrats are any more effective at addressing the needs of non-elite citizens than those selected by chiefs or under CDD.

In assessing external validity, note that impacts may have been quite different even if carried out in the same country just a decade earlier. When the CDD program we study was launched in 2005, only 15% of adults had completed primary education and only 4% had completed secondary,[17] which would have greatly limited the scope for recruiting high skill residents in many villages. After the massive expansion of primary education in post-war Sierra Leone bolstered the human capital stock, there are many more skilled managers for communities to choose from, so long as local leaders are willing to consider younger, non-elite residents. As most low-income countries in Africa and Asia have considerably better educated populations than Sierra Leone, similar forms of technocratic selection appear to be viable strategies in much of the world.

We are not able to directly test whether making local institutions more inclusive improves development outcomes, as institutions proved quite resistant to a long-running reform effort in this setting (although see Casey et al 2021 for evidence of persistent positive impacts of CDD on local public infrastructure). In places where local democratization and other institutional reforms are not feasible, the question becomes moot from a policy perspective, and what we show here is that there exists a promising low cost alternative.

[17] Source is Casey et al. (2013) baseline household survey data collected in 2005, and estimates refer to the highest education level attained by household members (age 15 years and above).

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Figure 1: Experimental Design

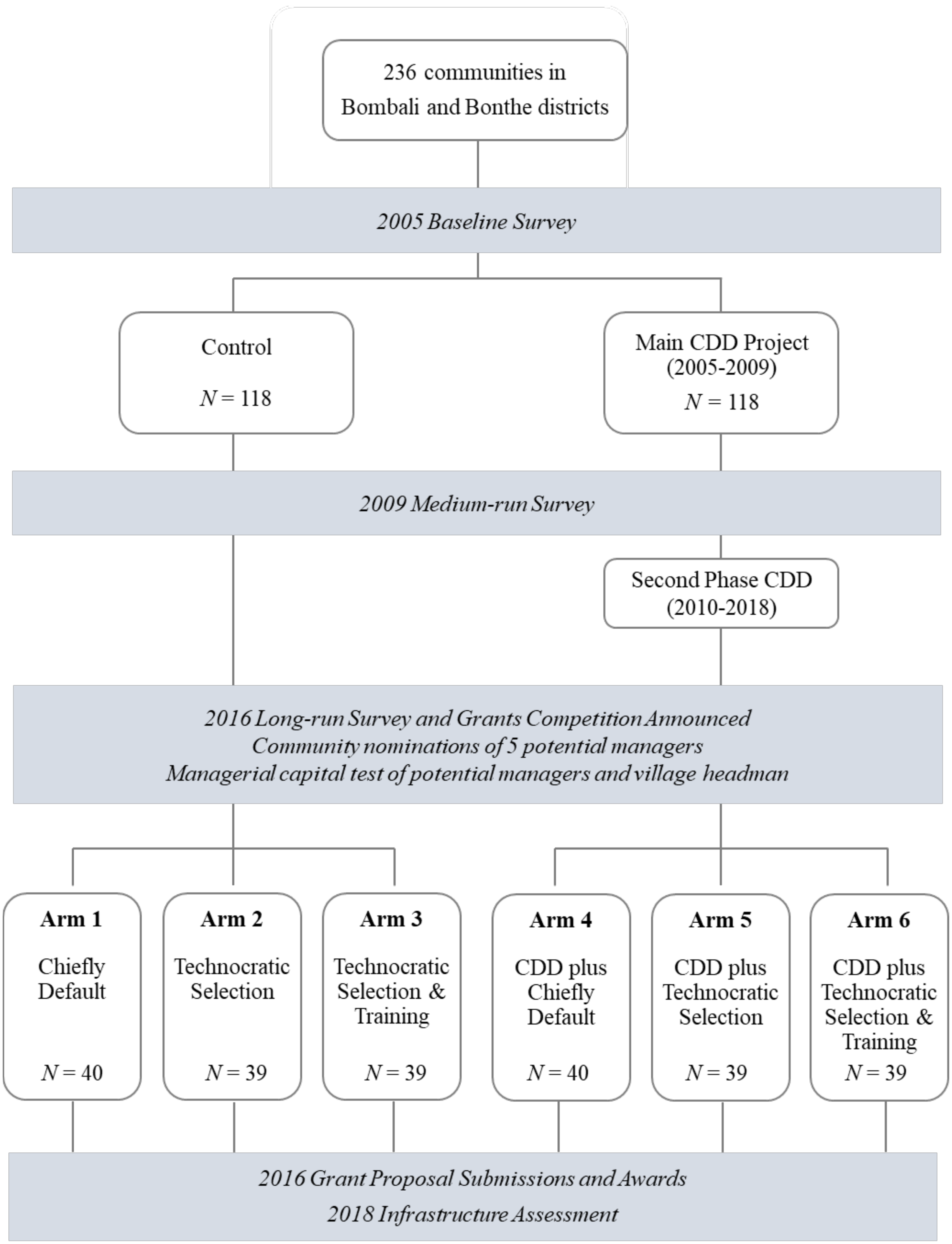
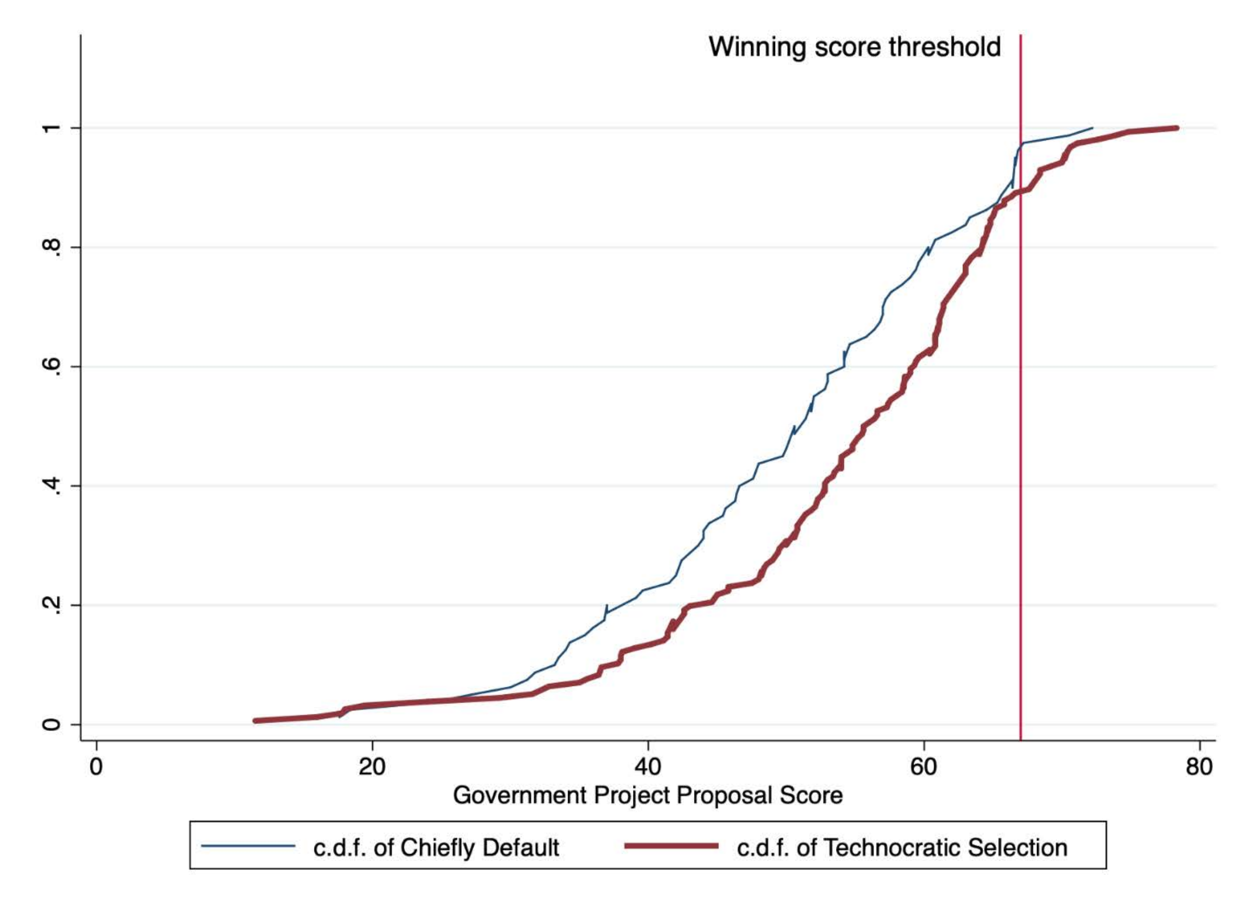
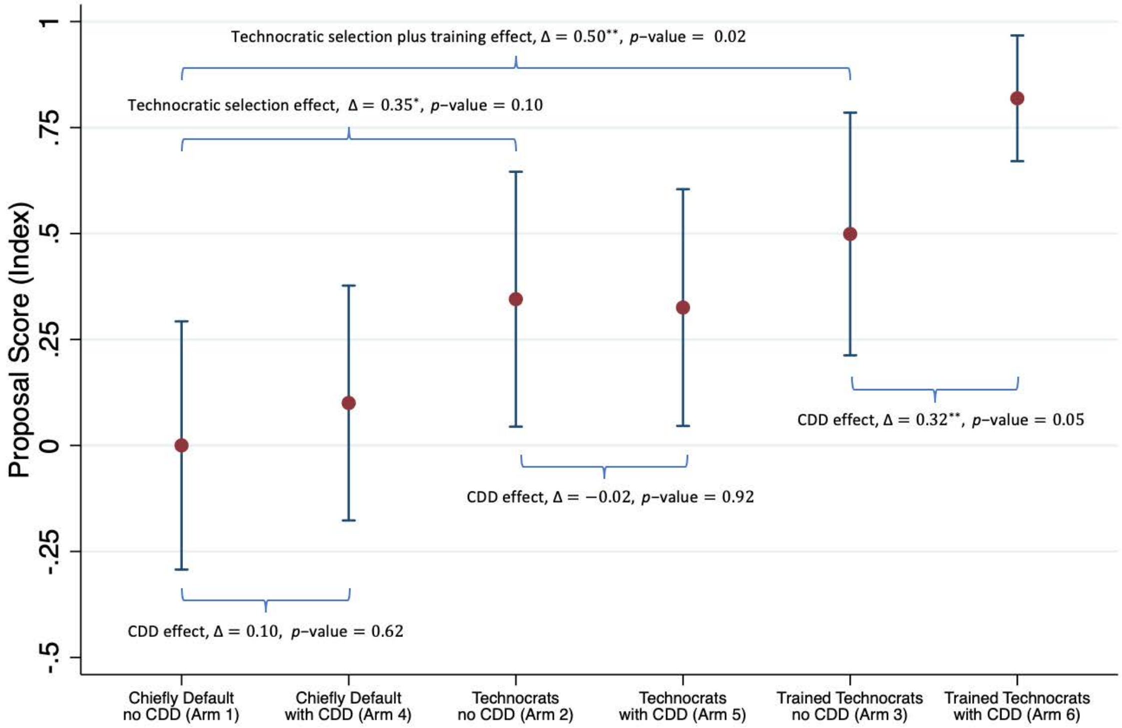


Figure 2: Distribution of Government Proposal Scores by Treatment Assignment



Notes: This figure presents the cumulative density of the scores the relevant district governments gave to proposals submitted by communities, separately for those assigned to the chiefly default condition (treatment arms 1 and 4 in Figure 1) and to the technocratic selection treatment (arms 2, 3, 5 and 6). The vertical line demarcates the minimum score threshold that determines which communities won an implementation grant (standardized by minus 1 point for Bombali District to place both districts on a uniform scale). Scores imputed at experimental arm mean for the four non-submitting communities (N = 236). A Kolmogorov-Smirnov test rejects equivalence of the two distributions at p-value = 0.03.

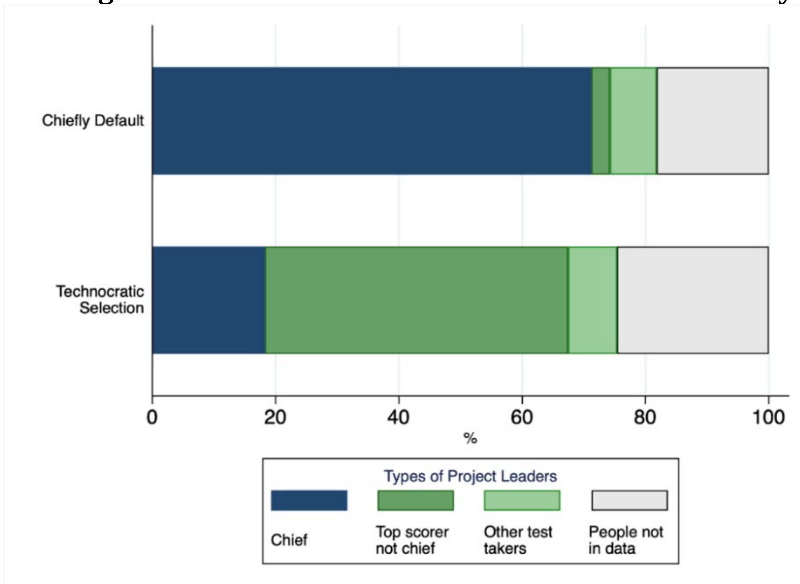
Figure 3: Proposal Performance across Manager Selection Treatment Arms



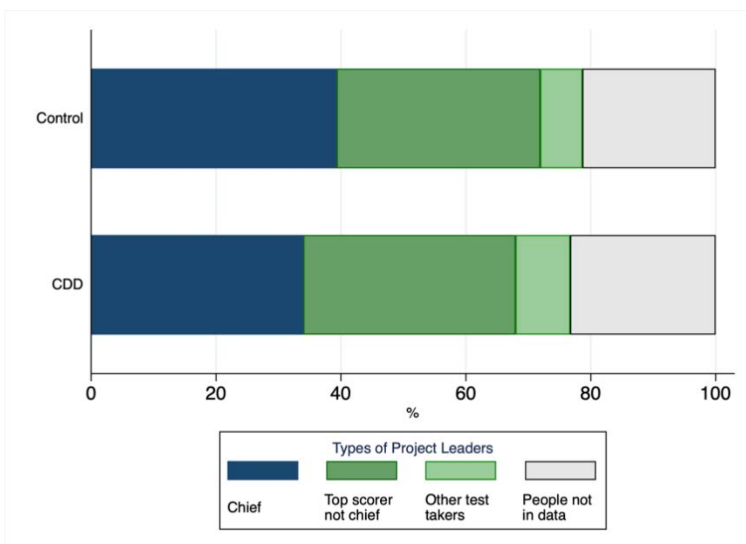
Notes: This figure presents the mean proposal score index and 95 percent confidence interval for the different types of managers in each of the six experimental arms indicated in Figure 1. Scores are standardized with respect to chiefs in the default condition without CDD exposure (Arm 1) and expressed in standard deviation units. The brackets compare two specific arms to each other and report the difference in mean scores and associated p-value from a t-test of equality of means across arms. The positive and marginally significant difference between Arm 2 and Arm 1 above captures the "pure" effect of technocratic selection in the absence of CDD. The positive and highly significant difference between Arm 3 and Arm 1 captures the combined effect of selecting and training technocrats in the absence of CDD. The three brackets below the point estimates capture the effect of CDD across comparable treatment arms in the technocratic selection experiment. The first two null results suggests that neither chiefs nor technocrats perform any better in CDD versus control communities. The rightmost bracket suggests that technocrats with CDD experience responded more strongly to the management training. Yet note that in the regression analogue (in Appendix Table A5), the F-test cannot reject that all three CDD estimates are jointly equal to zero, while the comparable F-test for the four technocratic selection and training arms rejects at above 99 percent confidence. Missing values for communities that did not submit a proposal are imputed at the relevant treatment arm mean.

Figure 4: Delegation Unpacked

Panel A: Delegation under Technocratic Selection versus Chiefly Default



Panel B: Delegation under CDD versus non-CDD Controls



Notes: This figure unpacks delegation by showing how the identity of who had the most say in choosing the project matches the community nominations and managerial capital testing data. Panel A shows that under technocratic selection (pooling communities across the CDD treatment arms), communities were much more likely to select the top scorer on the managerial capital test to choose the project; while under the chiefly default, communities were much more likely to rely on the village headman. Panel B shows that the CDD experience made communities somewhat more likely to select the top scorer (pooling communities across the technocratic selection treatment arms), but by much less than the public nudge to delegate.

Table 1: Treatment Effects on Performance in the Grants Competition

	Proposal Score (index)	Technical Score	Expert Score	Gov't Score	Won a Grant
	(1)	(2)	(3)	(4)	(5)
Panel A: Technocratic Selection versus CDD					
Technocratic Selection	0.397**	0.526***	0.377**	0.289	0.102**
	(0.164)	(0.193)	(0.169)	(0.177)	(0.049)
CDD	0.061	-0.015	0.063	0.136	0.049
	(0.181)	(0.206)	(0.192)	(0.190)	(0.047)
Technocratic Selection * CDD	0.094	0.017	0.218	0.047	-0.087
	(0.222)	(0.255)	(0.232)	(0.238)	(0.068)
F -statistic (on TS and TS*CDD)	8.00	8.65	9.01	3.44	2.17
p -value	<0.001	<0.001	<0.001	0.034	0.12
Omitted group mean	0.00	0.00	0.00	0.00	0.03
Observations	236	236	236	236	236
Panel B: Technocratic Selection and Managerial Training					
Technocratic Selection	0.315**	0.435***	0.298**	0.214	0.067
	(0.138)	(0.156)	(0.140)	(0.152)	(0.044)
Training	0.339**	0.280*	0.446***	0.292*	-0.013
	(0.133)	(0.157)	(0.130)	(0.155)	(0.049)
F -statistic (on TS and TR)	12.59	11.61	16.09	5.86	1.45
p -value	<0.001	<0.001	<0.001	0.003	0.238
Omitted group mean	0.00	0.00	0.00	0.00	0.05
Observations	236	236	236	236	236

*Notes: i) significance levels indicated by * p < 0.10, ** p <0.05, *** p < 0.01; ii) robust standard errors; iii) specifications in Panel A pool the technocratic selection and training arms together (see Appendix Table A5 for full interaction model) and include strata for geographic ward and two balancing variables (distance to road and community size) from the original randomization; iv) specifications in Panel B include the two balancing variables and strata for ward crossed with CDD assignment; v) outcomes in columns 2 to 4 are mean effects indices (see Kling, Liebman and Katz 2007), expressed in standard deviation units, standardized with respect to control arm 1 from Figure 1 in Panel A and arms 1 and 4 in Panel B; vi) missing scores for the 4 non-submitting communities are imputed at the respective treatment arm mean (see Appendix Tables A3 and A4 for imputation bounds); vii) outcome in column 1 is an equally weighted index of those in columns 2 to 4; viii) outcome in column 5 is a binary indicator; ix) Training term in Panel B captures the additional effect of training beyond that of technocratic selection; x) the F-statistic and associated p-value evaluate the hypothesis that the listed terms are jointly equal to zero; and xi) the sample for all specifications includes all communities in Figure 1.*

Table 2: Variation in Characteristics of Managers and Community Nominees

Panel A: Chiefs versus Top-scoring Technocrats (in all communities)

	Chiefs (1)	Technocrats (2)	*p*-value on difference (3)	*N* (4)
Average age	58.04	37.77	<0.01	455
Proportion male	0.98	0.95	0.09	466
Proportion with any formal education	0.35	0.98	<0.01	468
Proportion born in this community	0.95	0.76	<0.01	468
Proportions in occupation groups:				
farmer	0.88	0.32	<0.01	468
teacher	0.01	0.44	<0.01	468
business (e.g. petty trading)	0.04	0.05	0.66	468
Score on managerial capital test	31.47	74.77	<0.01	468

Panel B: Technocratic Nominees in CDD Treatment versus Control Communities

	CDD Controls (arms 1-3) (1)	CDD Treatment (arms 4-6) (2)	*p*-value on difference (3)	*N* (4)
Average age	38.23	40.32	0.02	1,148
Proportion male	0.76	0.76	0.77	1,162
Proportion with any formal education	0.68	0.70	0.50	1,168
Proportion born in this community	0.76	0.80	0.10	1,168
Proportions in occupation groups:				
farmer	0.62	0.56	0.08	1,168
teacher	0.15	0.17	0.56	1,168
business (e.g. petty trading)	0.06	0.07	0.64	1,168
Score on managerial capital test	43.96	45.38	0.49	1,155

Notes: i) Panel A compares characteristics of the chief to the single highest scoring technocratic nominee in each community; and ii) Panel B compares the average characteristics of all five technocratic nominees in CDD treatment versus control communities.

Table 3: Variation in Chief's Role in Project Management

Panel A: Technocratic Selection Effect	Chiefly Default (arms 1, 4)	Technocratic Selection (arms 2, 3, 5, 6)	*p*- value on difference	*N*
	(1)	(2)	(3)	(4)
Proportion where chiefly authorities chose the project	0.80	0.45	<0.01	192
Proportion where chiefly authorities wrote the description	0.40	0.26	0.03	221
Proportion where chiefly authorities did the budget	0.37	0.22	0.02	221
Proportion where chiefly authorities set the timeline	0.38	0.26	0.07	221
Panel B: CDD Effect in Full Sample	CDD Controls (arms 1-3)	CDD Treatment (arms 4-6)	*p* -value on difference	*N*
Proportion where chiefly authorities chose the project	0.64	0.51	0.08	192
Proportion where chiefly authorities wrote the description	0.32	0.28	0.49	221
Proportion where chiefly authorities did the budget	0.28	0.26	0.79	221
Proportion where chiefly authorities set the timeline	0.32	0.28	0.49	221
Panel C: CDD Effect in Technocratic Selection Arms	CDD Controls (arms 2, 3)	CDD Treatment (arms 5, 6)	*p* -value on difference	*N*
Proportion where chiefly authorities chose the project	0.55	0.37	0.04	126
Proportion where chiefly authorities wrote the description	0.27	0.25	0.78	148
Proportion where chiefly authorities did the budget	0.23	0.22	0.91	148
Proportion where chiefly authorities set the timeline	0.28	0.25	0.65	148

Notes: i) outcomes capture the propotion of management decisions that were made by the village headman or other chiefly authorities in the community; ii) Panel A compares communities assigned to technocratic selection (with or without training) to the default of chiefly control; iii) Panel B compares communities assigned to CDD treatment versus control; iv) Panel C compares CDD treated versus control communities in the technocratic selection (with or without training) arms, to look at compliance with the assignment to delegate to technocrats; and v) observations counts vary with missing values or "don't know" responses in the submission survey.

ONLINE APPENDIX: MATERIAL NOT INTENDED FOR PUBLICATION

Supplemental material for "Skill Versus Voice in Local Development"
by K. Casey, R. Glennerster, E. Miguel and M. Voors

Contents:

Appendix A: Technocratic Selection Implementation Script

Enumerator A SCRIPT: Project Challenge and Manager Selection

STEP 1: Explain project challenge

READ TO GROUP: The Local Councils in Bombali and Bonthe are running a new exciting project challenge competition in your area. They are asking communities to submit proposals for small scale infrastructure (like construction of a latrine or drying floor, or repairs to a local school building). The Councillors will evaluate the proposals and pick the 20 best proposals as the winners. These 20 winning communities will receive **14 Million Leones** to use for implementing their projects. This is a lot of money! Your community is eligible to participate and I would like to encourage you to apply.

[HOLD UP THE PROPOSAL FORM FOR ALL TO SEE] This is the proposal form you will need to fill out to enter the project competition. I want this community to do well in this competition so will explain the things you need to put into a proposal and ask you to think about people in this community who would be good at putting these things together.

First, a strong project proposal needs a clear **description of the project**. This section tells the Council what the project will be, why the project solves an important problem or addresses an urgent need, and who will benefit from the project. To develop this description, you need a project leader who is good at identifying problems, coming up with solutions, making a persuasive argument ("sabi tok"), and who can read and write well.

Second, a winning project proposal needs to have a clear and reasonable **budget**. The budget lists all the items you will need to construct the project, how much they will cost, and where you will get them. It needs to show that your project will deliver value for money. You need a project leader who is familiar with these kinds of construction projects, knows where to get things, and how to get them at a good price, and someone who is good with numbers.

Third, a strong project proposal sets out a clear plan of work and **timeline**. This part of the proposal tells the Council who will do what and when. It should show that you know how to get things done: you can mobilize the workers you need, or know how to find a good contractor to work for you. You need a project leader who can set deadlines for each part of the project and get things done on time.

Before we leave today we will give you this project application form that you can use to submit the proposal. We will also tell you the date before which you need to submit the proposals. The proposals should be submitted in person to the District Council office in Makeni/Mattru Jong.

The winners announcement will be done in January 2017. You will receive an invitation to participate in the awards ceremony. We hope you will apply!

STEP 2: Ask for nominations/volunteers

READ TO GROUP: Now I would like all of you to think about people in this village who are good at doing the things needed to develop a strong project proposal. I will step away from the group and let you think and talk about who would be good for this important job. We all know that the village headman has lots of experience running projects in this community. I would like you to also give me the names of 5 other people (in addition to the headman) that have these skills: they can **read and write**, they can come up with a **persuasive plan**, they know how to put a **budget** together, they are good at setting a **timeline**, **meeting deadlines** and **getting things done**. I will step away now so please call to me to come back when you have come up with the 5 people plus the headman.

STEP 3: Observe the proceedings

Step away outside the circle of the focus group and observe what happens.
Enumerator A: Fill out TALLY SHEET A below.
Enumerator B: Fill out TALLY SHEET B below.

STEP 4: Collect names of nominees / volunteers

Enumerator A: *When the community has finished its deliberation, rejoin the focus group and ask them to give you the names of the people they recommend.*

Name of Headman:____
Name of 1st nominee:____
Name of 2nd nominee:____
Name of 3rd nominee:____
Name of 4th nominee:____
Name of 5th nominee:____

NOTE: *if fewer than 5 nominees (in addition to the headman) were identified, only give the tests to the individual(s) selected by the focus group. If more than 5 nominees (in addition to the headman) were identified, ask the participants to rank the individuals and only work with the top 5 (plus the headman).*

READ TO GROUP: Thank you for these nominations. I would like to now ask each of these 5 nominated people to complete a short survey with me in private. The survey includes a test to measure the skills we talked about that are important for leading the project proposal: writing, making a project plan, doing a budget, working with numbers. The test will be done in private and the results will not be made public. Once all the tests are done, we will come back together as a group and I will unlock the project leader lottery. This lottery will randomly pick who will be the project proposal leader: it will tell us whether the leader for this project challenge competition will be A) the person with the highest score on the management test; or B) the village headman. I myself do not know which person the lottery will pick, and I cannot unlock the lottery until everyone completes the test. So let us please take a break and come back together at [TIME] to unlock the lottery and see who will lead the project challenge competition for this village!

STEP 5: COMPLETE THE MANAGEMENT TESTS

Complete the management tests with all 6 people above. Score the tests on site IN PRIVATE. When finished, see which person of the 5 NON-HEADMAN nominees had the highest score on the test. Make sure you know this person's name so you can announce it to the group if the lottery picks the HIGHEST SCORER to be the project leader. Do NOT share any information on how people scored on the management test.

STEP 6: RECONVENE THE FOCUS GROUP TO UNLOCK THE LOTTERY

READ TO GROUP: Thank you for coming back together. We can now unlock the project leader lottery! Remember, it will randomly pick whether A) the person with the highest score on the management test or B) the village headman will be the leader for the project challenge competition.

[UNLOCK THE LOTTERY: HOLD THE SCREEN UP SO THAT EVERYONE CAN SEE THE LOTTERY RUNNING. ANNOUNCE THE LOTTERY RESULT TO THE GROUP]

STEP 7: NEXT STEPS VARY BY LOTTERY RESULT

- ➔ **IF THE LOTTERY SAYS "HEADMAN LEADER":**

Explain that the lottery has randomly chosen the HEADMAN to be in charge of the project proposal for the challenge competition. Show the group the project application form and say that you are writing the HEADMAN down as the project proposal leader. Write his name on the application in front of the group. Walk over to the HEADMAN and give him the project application form. Explain that the proposal should be submitted in person by himself. Also give him the transportation voucher and explain that this can be redeemed when the proposal is submitted. Tell him that you hope he will put together a proposal for this village and that he will submit it to the Local Council.

Announce that the proposal needs to be submitted to [LOCAL COUNCIL ADDRESS] before the deadline [DATE]. Encourage them to apply.

Thank everyone for their time and wish them good luck with the project challenge competition!

END MEETING HERE AND GO TO VILLAGE INSPECTION SES SURVEY SECTION N

- ➔ **IF THE LOTTERY SAYS "HIGHEST SCORER":**

Explain that the lottery has randomly chosen the person with the highest management test score to be in charge of the project proposal for the challenge competition. Remind the group that you have used some tests to measure the skills needed for a strong proposal—reading and writing, budget and costing, previous project experience—and that the tests have identified [NAME OF HIGHEST SCORER] as the person with the strongest skills for this particular opportunity. Show the group the project application form and say that you are writing [NAME OF HIGHEST SCORER] down as the project proposal leader. Write his name on the application in front of the group. Walk over to [NAME OF HIGHEST SCORER] and give him/her the project application form. Explain that the proposal should be submitted in person by the [NAME OF HIGHEST SCORER]. Also give him/her the transportation voucher and explain that this can be redeemed when the proposal is submitted. Tell him/her that you hope he/she will put together a proposal for this village and submit it to the Local Council.

Announce that the proposal needs to be submitted to [LOCAL COUNCIL ADDRESS] before the deadline [DATE]. Encourage them to apply.

Thank everyone for their time and wish them good luck with the project challenge competition!

END MEETING HERE AND GO TO VILLAGE INSPECTION SES SURVEY SECTION N

➔ **IF THE LOTTERY SAYS "HIGHEST SCORER + TRAINING":**

Explain that the lottery has randomly chosen the person with the highest management test score to be in charge of the project proposal for the challenge competition. Remind the group that you have used some tests to measure the skills needed for a strong proposal—reading and writing, budget and costing, previous project experience—and that the tests have identified [NAME OF HIGHEST SCORER] as the person with the strongest skills for this particular opportunity. Show the group the project application form and say that you are writing [NAME OF HIGHEST SCORER] down as the project proposal leader. Write his name on the application in front of the group. Walk over to [NAME OF HIGHEST SCORER] and give him/her the project application form. Explain that the proposal should be submitted in person by the [NAME OF HIGHEST SCORER]. Also give him/her the transportation voucher and explain that this can be redeemed when the proposal is submitted. Tell him/her that you hope he/she will put together a proposal for this village and submit it to the Local Council.

Announce that the proposal needs to be submitted to [LOCAL COUNCIL ADDRESS] before the deadline [DATE].

READ TO GROUP: And, this village is very fortunate as you have qualified for a special one day training session that the Local Councils are offering in your area to teach you how to develop a successful project proposal. The session will cover the critical steps we discussed earlier: how to write a project description, how to draft a budget and how to set and meet deadlines, plus many other useful skills. I want to be sure that this village benefits from this training so will also cover the transport costs of [NAME OF HIGHEST SCORER] to participate in this important training.

Give [NAME OF HIGHEST SCORER] the TRAINING voucher that can be redeemed for full transport costs plus food and drinks at the training.

Announce that the training session will be held at [LOCATION] on this day [DATE] at this time [TIME]. Encourage them to [NAME OF HIGHEST SCORER] to attend the training!

Thank everyone for their time and wish them good luck with the project challenge competition!

END MEETING HERE AND GO TO VILLAGE INSPECTION SES SURVEY SECTION N

Appendix B: Additional Specifications

Table A1: Baseline (2005) Balance by Technocratic Selection and CDD

	Number of Households	Distance to Road	Infrastructure Score (index)	VDC	Assets	Any Petty Traders	Years of Education	Trust Chiefdom Officials	Trust Local Council Officials
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Technocratic Selection	5.186	-0.755	0.147	-0.126	-0.016	-0.065	0.127	-0.009	-0.002
	(5.227)	(0.597)	(0.09)	(0.088)	(0.124)	(0.095)	(0.193)	(0.03)	(0.029)
CDD	3.850	-0.879	0.064	0.046	0.091	-0.106	0.273	-0.017	0.013
	(5.983)	(0.756)	(0.092)	(0.105)	(0.160)	(0.101)	(0.246)	(0.032)	(0.035)
Technocratic Selection * CDD	-5.068	0.848	-0.050	0.035	0.053	0.171	-0.197	0.012	-0.015
	(7.561)	(0.851)	(0.127)	(0.129)	(0.189)	(0.134)	(0.298)	(0.04)	(0.043)
F -statistic	0.352	0.653	1.457	1.480	0.783	0.579	0.522	0.121	0.106
p -value	0.788	0.582	0.227	0.221	0.505	0.629	0.668	0.948	0.956
Omitted group mean	45.850	3.004	0.000	0.646	0.030	0.539	1.789	0.661	0.621
Observations	236	236	236	232	235	226	236	235	235

*Notes i) significance levels indicated by * p < 0.10, ** p <0.05, *** p < 0.01. ii) specifications include strata for geographic ward; iii) robust standard errors; iv) F-stat and associated p-value correspond to jointly testing that the three coefficients in each specification are equal to 0; v) all outcomes measured at baseline in 2005; and vi) the outcome in column 1 is the total number of households in the community, in column 2 it is the distance in miles to the nearest motorable road, in column 3 it is a community infrastructure index expressed in standard deivation units that measures whether the community had a functional primary school, health unit, water well, drying floor, grain store, community center, palava hut, court barrie, or market and whether it had submitted any infrastructure project proposal to an external funding agency, in column 4 it is an indicator of whether the community had a village development committee (VDC), in column 5 it is an average measure of household assets and amenities, in column 6 it is an indicator for the presence of any petty traders, in column 7 it is average years of education for household survey respondents, and in column 8 (9) it is an average measure of whether household survey respondents agree with the statement that chiefdom officials (local councillors) can be trusted.*

Table A2: Baseline (2005) Balance Using Fully Interacted Model

	Number of Households	Distance to Road	Infrastructure Score (index)	VDC	Assets	Any Petty Traders	Years of Education	Trust Chiefdom Officials	Trust Local Council Officials
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Technocratic Selection	6.712	-0.667	0.200*	-0.081	-0.067	-0.012	0.109	-0.021	0.000
	(6.64)	(0.68)	(0.11)	(0.10)	(0.14)	(0.11)	(0.23)	(0.035)	(0.034)
Technocratic Selection * Training	3.660	-0.842	0.094	-0.169*	0.034	-0.114	0.145	0.002	-0.005
	(5.89)	(0.63)	(0.11)	(0.10)	(0.14)	(0.11)	(0.22)	(0.034)	(0.035)
CDD	3.850	-0.879	0.064	0.046	0.091	-0.106	0.273	-0.017	0.013
	(6.01)	(0.76)	(0.09)	(0.11)	(0.16)	(0.11)	(0.25)	(0.032)	(0.035)
CDD * Technocratic Selection	2.532	-1.297**	0.148	-0.084	0.176	-0.071	0.389*	-0.039	-0.043
	(5.75)	(0.65)	(0.11)	(0.10)	(0.17)	(0.11)	(0.24)	(0.034)	(0.035)
CDD * Technocratic Selection * Training	5.404	-0.274	0.174*	-0.007	0.078	0.065	0.017	0.008	0.034
	(6.09)	(0.69)	(0.10)	(0.11)	(0.15)	(0.11)	(0.23)	(0.033)	(0.032)
F -statistic	0.273	1.105	1.028	1.207	0.63	0.868	0.774	0.546	1.068
p -value	0.928	0.359	0.402	0.307	0.677	0.503	0.570	0.741	0.379
Omitted group mean	45.850	3.004	0.000	0.646	0.030	0.539	1.789	0.661	0.621
Observations	236	236	236	232	235	226	236	235	235

*Notes i) significance levels indicated by * p < 0.10, ** p <0.05, *** p < 0.01. ii) specifications include strata for geographic ward; iii) robust standard errors; iv) F-stat and associated p-value correspond to jointly testing that the five coefficients in each specification are equal to 0; v) all outcomes measured at baseline in 2005; and vi) the outcome in column 1 is the total number of households in the community, in column 2 it is the distance in miles to the nearest motorable road, in column 3 it is a community infrastructure index expressed in standard deivation units that measures whether the community had a functional primary school, health unit, water well, drying floor, grain store, community center, palava hut, court barrie, or market and whether it had submitted any infrastructure project proposal to an external funding agency, in column 4 it is an indicator of whether the community had a village development committee (VDC), in column 5 it is an average measure of household assets and amenities, in column 6 it is an indicator for the presence of any petty traders, in column 7 it is average years of education for household survey respondents, and in column 8 (9) it is an average measure of whether household survey respondents agree with the statement that chiefdom officials (local councillors) can be trusted.*

Table A3: Lower Imputation Bound, Treatment Effects on Grants Competition Performance

	Proposal Score	Technical Score	Expert Score	Gov't Score
	(1)	(2)	(3)	(4)
Panel A: Technocratic Selection versus CDD				
Technocratic Selection	0.362**	0.465**	0.354**	0.267
	(0.168)	(0.191)	(0.172)	(0.179)
CDD	0.132	0.073	0.125	0.199
	(0.175)	(0.192)	(0.188)	(0.184)
Technocratic Selection * CDD	0.051	-0.025	0.173	0.006
	(0.221)	(0.247)	(0.232)	(0.236)
F-statistic (on TS and TS*CDD)	6.24	6.68	7.53	2.64
p-value	0.002	0.002	0.001	0.073
Omitted group mean	0.00	0.00	0.00	0.00
Observations	236	236	236	236
Panel B: Technocratic Selection and Managerial Training				
Technocratic Selection	0.252*	0.352**	0.245*	0.158
	(0.148)	(0.166)	(0.147)	(0.160)
Training	0.366**	0.311*	0.469***	0.319*
	(0.148)	(0.174)	(0.142)	(0.164)
F-statistic (on TS and TR)	10.39	9.23	13.99	5.17
p-value	<0.001	<0.001	<0.001	0.006
Omitted group mean	0.00	0.00	0.00	0.00
Observations	236	236	236	236

*Notes: i) significance levels indicated by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; ii) robust standard errors; iii) specifications in Panel A pool the technocratic selection and training arms together (see Appendix Table A5 for full interaction model) and include strata for geographic ward and two balancing variables (distance to road and community size) from the original randomization; iv) specifications in Panel B include the two balancing variables and strata for ward crossed with CDD assignment; v) outcomes in columns 2 to 4 are mean effects indices, expressed in standard deviation units, standardized with respect to the mean and standard deviation of control Arm 1 (Arms 1 and 4) in Figure 1 for Panel A (B) (see Kling, Liebman and Katz 2007); vi) missing scores for the 4 non-submitting communities are imputed at the lowest observed score in the data; vii) outcome in column 1 is an equally weighted index of those in columns 2 to 4; vii) Training term in Panel B captures the additional effect of training beyond that of technocratic selection; ix) the F-statistic and associated p-value evaluate the hypothesis that the listed terms are jointly equal to zero; x) the mean and standard deviation of each outcome for the excluded group in each specification; and xi) the sample for all specifications includes all communities in Figure 1.*

Table A4: Upper Imputation Bound, Treatment Effects on Grants Competition Performance

	Proposal Score (index)	Technical Score	Expert Score	Gov't Score
	(1)	(2)	(3)	(4)
Panel A: Technocratic Selection versus CDD				
Technocratic Selection	0.366**	0.486**	0.348**	0.265
	(0.169)	(0.196)	(0.172)	(0.181)
CDD	0.001	-0.072	0.003	0.071
	(0.183)	(0.207)	(0.192)	(0.191)
Technocratic Selection * CDD	0.123	0.053	0.240	0.077
	(0.223)	(0.254)	(0.232)	(0.239)
F-statistic (on TS and TS*CDD)	7.71	8.34	8.82	3.40
p-value	0.001	<0.001	<0.001	0.035
Omitted group mean	0.00	0.00	0.00	0.00
Observations	236	236	236	236
Panel B: Technocratic Selection and Managerial Training				
Technocratic Selection	0.324**	0.438***	0.306**	0.228
	(0.141)	(0.158)	(0.143)	(0.154)
Training	0.309**	0.252	0.415***	0.260*
	(0.134)	(0.155)	(0.132)	(0.156)
F-statistic (on TS and TR)	11.34	10.71	14.63	5.27
p-value	<0.001	<0.001	<0.001	0.006
Omitted group mean	0.00	0.00	0.00	0.00
Observations	236	236	236	236

*Notes: i) significance levels indicated by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; ii) robust standard errors; iii) specifications in Panel A pool the technocratic selection and training arms together (see Appendix Table A5 for full interaction model) and include strata for geographic ward and two balancing variables (distance to road and community size) from the original randomization; iv) specifications in Panel B include the two balancing variables and strata for ward crossed with CDD assignment; v) outcomes in columns 2 to 4 are mean effects indices, expressed in standard deviation units, standardized with respect to the mean and standard deviation of control Arm 1 (Arms 1 and 4) in Figure 1 for Panel A (B) (see Kling, Liebman and Katz 2007); vi) missing scores for the 4 non-submitting communities are imputed at the highest observed score in the data; vii) outcome in column 1 is an equally weighted index of those in columns 2 to 4; vii) Training term in Panel B captures the additional effect of training beyond that of technocratic selection; ix) the F-statistic and associated p-value evaluate the hypothesis that the listed terms are jointly equal to zero; x) the mean and standard deviation of each outcome for the excluded group in each specification; and xi) the sample for all specifications includes all communities in Figure 1.*

Table A5: Full Interaction Model

	Proposal Score (index)	Technical Score	Expert Score	Gov't Score	Won a Grant
	(1)	(2)	(3)	(4)	(5)
Technocratic Selection	0.312	0.430*	0.289	0.217	0.101
	(0.194)	(0.231)	(0.199)	(0.209)	(0.066)
Technocratic Selection * Training	0.162	0.185	0.165	0.138	0.003
	(0.197)	(0.234)	(0.194)	(0.218)	(0.078)
CCD	0.057	-0.018	0.056	0.132	0.049
	(0.182)	(0.207)	(0.193)	(0.191)	(0.047)
CCD * Technocratic Selection	-0.076	-0.076	-0.058	-0.094	-0.070
	(0.267)	(0.307)	(0.273)	(0.287)	(0.088)
CCD * Technocratic Selection * Training	0.349	0.192	0.564**	0.290	-0.033
	(0.255)	(0.308)	(0.253)	(0.292)	(0.099)
F -statistic (on TS, TR and interactions)	8.33	5.83	11.88	3.42	1.16
p -value	<0.001	<0.001	<0.001	0.010	0.331
F -statistic (on CDD and interactions)	1.44	0.14	4.07	1.11	0.63
p -value	0.233	0.939	0.008	0.345	0.597
F -statistic (on TS, TR, CDD and interactions	8.05	4.68	11.93	3.45	1.01
p -value	<0.001	<0.001	<0.001	0.005	0.414
Omitted group mean	0.00	0.00	0.00	0.00	0.03
Observations	236	236	236	236	236

*Notes: i) significance levels indicated by * p < 0.10, ** p <0.05, *** p < 0.01; ii) specifications include strata for geographic ward and two balancing variables (distance to road and community size) from the original randomization; iii) robust standard errors; iv) outcomes coded to treatment arm mean for communities that did not submit a proposal in columns 2 to 5; v) outcomes in columns 2 to 4 are mean effects indices, expressed in standard deviation units, standardized with respect to the mean and standard deviation of Arm 1 in Figure 1 (see Kling, Liebman and Katz 2007); vi) outcomes in column 1 are an equally weighted index of those in columns 2 to 4; vii) outcomes in column 5 are expressed in proportions; viii) the F-statistic and associated p-value evaluate the hypothesis that the listed terms are jointly equal to zero; ix) the mean and standard deviation of each outcome for the excluded group in each specification; and x) the sample for all specifications includes all communities in Figure 1 (Arms 1 to*

Table A6: Two-way Comparison of Technocratic Selection and CDD

	Proposal Score (index)	Technical Score	Expert Score	Gov't Score	Won a Grant
	(1)	(2)	(3)	(4)	(5)
Technocratic Selection	0.444***	0.534***	0.487***	0.312**	0.059
	(0.113)	(0.129)	(0.118)	(0.120)	(0.036)
CDD Treatment	0.123	-0.004	0.208*	0.167	-0.008
	(0.105)	(0.123)	(0.109)	(0.116)	(0.037)
F-statistic (on TS and CDD)	8.74	8.52	10.47	4.45	1.31
p-value	<0.001	0.003	<0.001	0.013	0.272
F-statistic (TS = CDD)	4.10	8.94	2.92	0.75	1.36
p-value	0.044	0.003	0.089	0.388	0.244
Omitted group mean	0.00	0.00	0.00	0.00	0.03
Observations	236	236	236	236	236

*Notes: i) significance levels indicated by * p < 0.10, ** p <0.05, *** p < 0.01; ii) specifications include strata for geographic ward and two balancing variables (distance to road and community size) from the original randomization; iii) robust standard errors; iv) outcomes coded to treatment arm mean for communities that did not submit a proposal in columns 2 to 5; v) outcomes in columns 2 to 4 are mean effects indices, expressed in standard deviation units, standardized with respect to the mean and standard deviation of Arm 1 in Figure 1 (see Kling, Liebman and Katz 2007); vi) outcomes in column 1 are an equally weighted index of those in columns 2 to 4; vii) the F-statistics and associated p-values evaluate the hypothesis that the listed terms are jointly equal to zero, or equal to eachother; viii) the mean and standard deviation of each outcome for the excluded group in each specification; and ix) outcomes in column 5 are expressed in proportions.*

Table A7: Technocratic Selection Effects for Simulated Winning Thresholds

	Winner, actual	Winner, 25th percentile	Winner, 50th percentile	Winner, 75th percentile
	(1)	(2)	(3)	(4)
Technocratic Selection	0.067	0.101	0.113	0.088
	(0.044)	(0.069)	(0.075)	(0.066)
Training	-0.013	0.090	0.167**	0.051
	(0.049)	(0.064)	(0.076)	(0.072)
F -statistic (on TS and TR)	1.45	3.96	6.82	2.25
p -value	0.238	0.021	0.001	0.108
Implied number of grants	21	178	120	61
Omitted group mean	0.050	0.662	0.388	0.188
Observations	236	236	236	236

*Notes: i) significance levels indicated by * p < 0.10, ** p <0.05, *** p < 0.01; ii) robust standard errors; iii) specifications include strata for geographic ward crossed with CDD assignment; iv) outcomes in column (2)-(4) are binary indicator for winning a grant at percentiles of the government proposal score distribution; v) the F-statistic and associated p-value evaluate the hypothesis that the listed terms are jointly equal to zero; and vi) the mean and standard deviation of each outcome for the excluded group in each specification.*

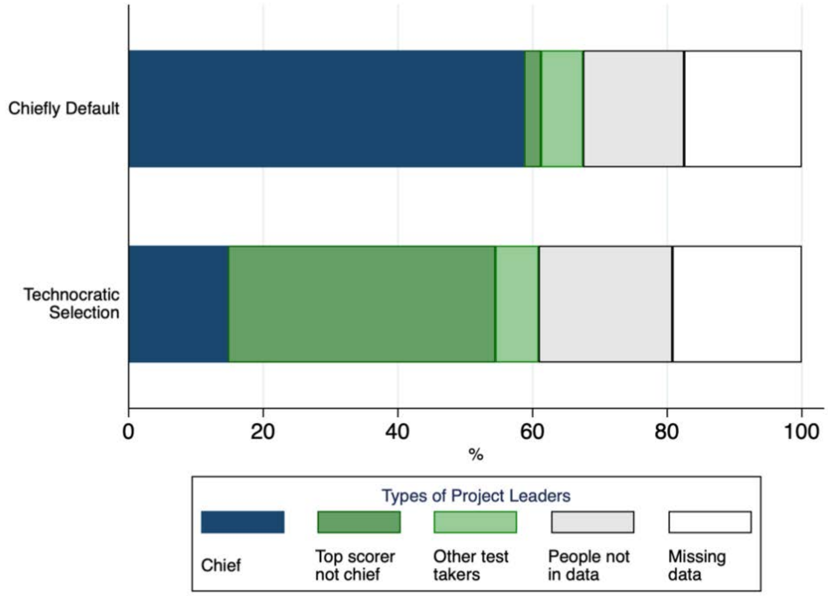
Table A8: Delegation to Trained versus Untrained Technocrats

Training Effect on Delegation	Technocratic Selection (arms 2, 5) (1)	Training (arms 3, 6) (2)	*p*- value on difference (3)
Proportion where chiefly authorities chose the project	0.43	0.48	0.59
Proportion where chiefly authorities wrote the description	0.20	0.31	0.13
Proportion where chiefly authorities did the budget	0.19	0.26	0.33
Proportion where chiefly authorities set the timeline	0.20	0.32	0.09
Observations	148		

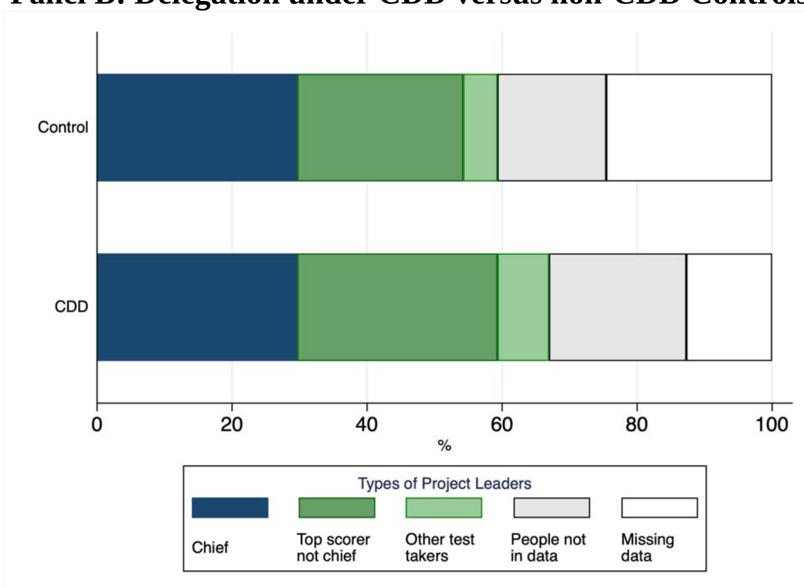
Notes: outcomes capture the propotion of management decisions that were made by the village headman or other chiefly authorities in the community and compares technocrates with and without training.

Figure A1: Delegation Unpacked Including Missing Values

Panel A: Delegation under Technocratic Selection versus Chiefly Default



Panel B: Delegation under CDD versus non-CDD Controls



Notes: This figure unpacks delegation by showing how the identity of who had the most say in choosing the project matches the community nominations and managerial capital testing data, and includes communities missing data (as a companion to main text Figure 4). Panel A shows that under technocratic selection (pooling communities across the CDD arms), communities were much more likely to select the top scorer on the managerial capital test to choose the project; while under the chiefly default, communities were much more likely to rely on the village headman. Panel B shows that the CDD experience made communities somewhat more likely to select the top scorer (pooling communities across the technocratic selection arms), but by much less than the public nudge to delegate.

Table A9: Delegation Unpacked

	Names Match	Project Leader is Chief	Project Leader is Top Scorer	Project Leader's MC Score	Project Leader's Education
	(1)	(2)	(3)	(4)	(5)
Technocratic Selection	0.013	- 0.584***	0.580***	21.351***	6.249***
	(0.087)	(0.092)	(0.085)	(5.885)	(1.033)
CDD	0.121	-0.022	0.005	-0.876	1.505
	(0.092)	(0.098)	(0.082)	(6.127)	(1.190)
Technocratic Selection * CDD	-0.142	-0.054	0.107	7.758	-0.833
	(0.117)	(0.133)	(0.121)	(8.216)	(1.645)
Omitted group mean	0.77	0.88	0.08	40.54	2.13
Observations	192	148	148	148	147

*Notes i) significance levels indicated by * p < 0.10, ** p <0.05, *** p < 0.01. ii) specifications include strata for geographic ward; iii) robust standard errors; iv) F-stat and associated p-value correspond to jointly testing that the three coefficients in each specification are equal to 0; v) Project leader is defined as the person who had the most say in choosing which project to propose; vii) the outcome in Column 1 is a dummy taking the value of 1 if the name of the project leader mentioned in the submission form is matched to those taking the managerial capital test, viii) estimates in Columns 2-5 are conditional on a match in Column 1 and report whether the project leader mentioned is the Chief (Column 2), whether they are the top scorer in the managerial capital test (Column 3), the managerial capital test score of the project leader (Column 4) and their years of education (Column 5); and ix) the bottom row includes the number of observations (communities), where out of 236 communities in the whole sample, 222 filled out the submission survey, and of these, 192 answered the question that allowed us to get a name for the project leader. For 149 communities, we can successfully match names to someone in the managerial capital test data (implying the leader was either the village headman or one of the 5 community nominees).*

Table A10: Management Training and "Teaching to the Test"

	Panel A: "Copycat" measures				Panel B: Performance spillover measures		
	References sustainability	References multiple bids	References skills needed	Index	Says who will benefit	Says where items bought	Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Technocratic Selection	-0.027	0.026	0.119*	0.147	0.073	0.064	0.158
	(0.039)	(0.026)	(0.068)	(0.108)	(0.062)	(0.076)	(0.112)
Training	0.092*	-0.026	0.052	0.093	0.047	-0.144**	-0.105
	(0.047)	(0.026)	(0.076)	(0.121)	(0.053)	(0.070)	(0.104)
Omitted group mean	0.06	0.01	0.17	0.00	0.77	0.28	0.00
Observations	232	232	232	232	232	232	232

*Notes i) significance levels indicated by * p < 0.10, ** p <0.05, *** p < 0.01; ii) specifications include fixed effects for geographic ward crossed with CDD assignment; iii) Panel A looks for evidence of "teaching to the test" by seeing whether trainees mechanically include reference in their proposals to topics covered by the training but not asked for on the application (e.g. the training emphasized the value of seeking multiple bids from contractors during project construction, a good practice for winners to use during implementation but not something that the application required, and column 2 shows that trainees were no more likely to include extraneous reference to it in their proposals); iv) Panel B takes the converse approach and evaluates whether the training had performance spillover effects on application questions that were not addressed in the training (e.g. the application asked for an explanation of who would benefit from the project, a topic not discussed during the training, and column 5 shows that trainees were no more conscientious in including explanation of who benefits in their proposal); and v) outcomes in columns 4 and 7 are summary indices for the multiple measures in each panel.*

Table A11: 2018 Infrastructure Assessment of Grant Competition Winners by Treatment Assignments

		Technocratic Selection Experiment				CDD Experiment			
	Mean, full sample	Mean, technocrats	Mean, Status Quo Chiefs	Difference	p-value	CDD treatment	CDD control	Difference	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Project present and functional	0.70	0.63	1.00	-0.38	0.16	0.89	0.55	0.34	0.11
Quality of construction	6.80	6.56	7.75	-1.19	0.26	7.00	6.64	0.36	0.67
Community contributions	218.3	173.8	396.5	-222.7	0.14	233.6	205.9	27.7	0.83
Located near chief	0.40	0.38	0.50	-0.12	0.67	0.33	0.45	-0.12	0.61
Observations	20	16	4			9	11		

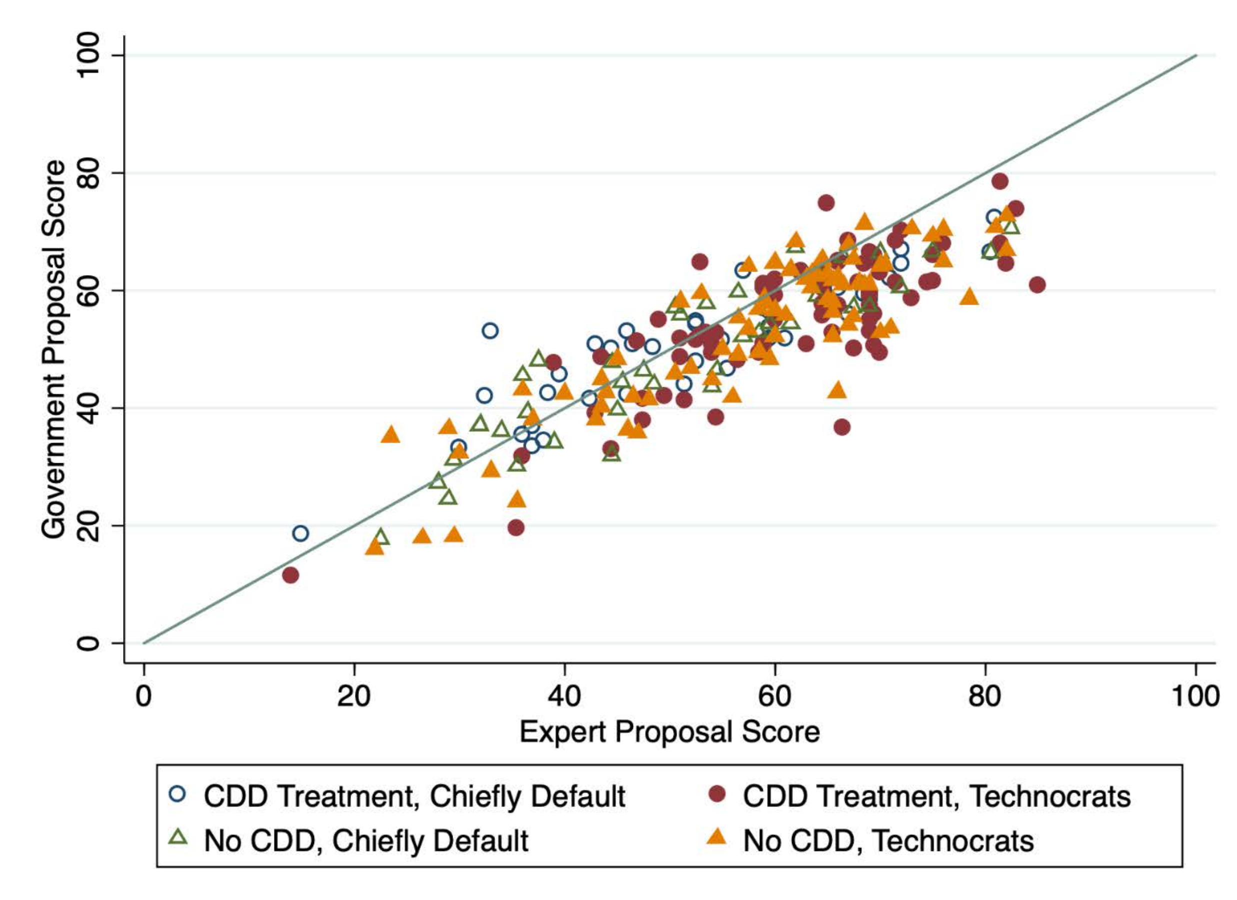
*Notes i) significance levels indicated by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; ii) data is from the July 2018 field inspection of infrastructure projects that won an implementation grant from the government competition; iii) estimates displayed are from two-sided t-tests for each of the two distinct experimental assignments; and iv) The first outcome is a binary variable of whether the infrastructure project is present and functional, the second one is a categorical variable measuring the quality of construction where 1 means "poor" and 10 means "excellent", the third one is the total community financial contributions in US$, and the forth one is a binary variable of whether the infrastructure is located near the chief's compound.*

Table A12: Text Analysis of Proposal Content Across Treatment Assignment

	Proposal mentions inclusiveness terms	Proposal mentions community institutions	Community Center project	Education project	Water project	Other project
	(1)	(2)	(3)	(4)	(5)	(6)
CDD	0.063	0.024	-0.116*	0.050	0.051*	0.014
	(0.101)	(0.062)	(0.060)	(0.037)	(0.030)	(0.064)
Technocratic Selection	-0.040	0.134**	-0.043	0.024	-0.038	0.058
	(0.109)	(0.068)	(0.064)	(0.038)	(0.035)	(0.069)
Omitted group mean	0.54	0.48	0.44	0.08	0.03	0.46
Observations	236	236	232	232	232	232

*Notes i) significance levels indicated by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. ii) specifications include strata for geographic ward and two balancing variables (distance to road and community size) from the randomization; and iii) robust standard errors.*

Figure A2: Distribution of Government and Practitioner Scores by Treatment Assignment



Notes: This figures plots the distribution of proposal scores given by the district government officials to allocate the infrastructure grants (Y-axis) against the scores given by unaffiliated development practitioners using the same scoring guidelines (X-axis). Higher scores indicate higher quality proposals. Both sets of raters were blinded to the name of the submitting communities. Each dot represents a proposal submitted by a particular community, where triangles indicate CDD treatment status, circles indicate CDD control status, shaded in shapes indicate assignment to technocratic selection and hollow shapes indicate assignment to the chiefly control default condition.

Table A13: Treatment Effects on Grants Competition Performance Controlling for Project Type

	Proposal Score (index)	Technical Score	Expert Score	Gov't Score	Won a Grant
	(1)	(2)	(3)	(4)	(5)
Technocratic Selection	0.378**	0.511***	0.355**	0.268	0.098*
	(0.166)	(0.196)	(0.170)	(0.181)	(0.051)
CDD	0.084	0.027	0.072	0.154	0.058
	(0.183)	(0.209)	(0.194)	(0.194)	(0.052)
Technocratic Selection * CDD	0.114	0.013	0.260	0.068	-0.090
	(0.225)	(0.260)	(0.235)	(0.244)	(0.072)
Community Center Project	-0.059	-0.128	0.020	-0.069	0.006
	(0.122)	(0.141)	(0.130)	(0.141)	(0.049)
School/Education Project	-0.475**	-0.499*	-0.498**	-0.429*	-0.054
	(0.224)	(0.260)	(0.218)	(0.239)	(0.054)
Water/Sanitation Project	-0.316	-0.546*	-0.114	-0.287	-0.122**
	(0.263)	(0.321)	(0.285)	(0.252)	(0.058)
Omitted group mean	0.00	0.00	0.00	0.00	0.03
Observations	232	232	232	232	232
F -stat (on TS and TS*CDD)	7.69	8.02	9.01	3.16	1.89
p- value	<0.001	<0.001	<0.001	0.044	0.154

*Notes: i) significance levels indicated by * p < 0.10, ** p <0.05, *** p < 0.01; ii) robust standard errors; iii) project type fixed effects denote the sectoral type of project proposed by the community in the grants competition application; iv) specifications pool the technocratic selection and training arms together and include strata for geographic ward and two balancing variables (distance to road and community size) from the original randomization; v) outcomes in columns 2 to 4 are mean effects indices, expressed in standard deviation units, standardized with respect to the mean and standard deviation of control arm 1 (arms 1 and 4) in Figure 1 for Panel A (B) (see Kling, Liebman and Katz 2007); vi) missing scores for the 4 non-submitting communities are imputed at the respective treatment arm mean; vii) outcome in column 1 is an equally weighted index of those in columns 2 to 4; viii) outcome in column 5 is a binary indicator; ix) the F-statistic and associated p-value evaluate the hypothesis that the listed terms are jointly equal to zero; x) the mean and standard deviation of each outcome for the excluded group in each specification ; and xi) sample includes all communities in Figure 1.*

Appendix C: Pre-analysis Plan

We wrote a pre-analysis plan that covers estimates in this paper as well as in the companion paper Casey et al (2021). We include below the excerpt from the plan that is specific to this paper. The plan in its entirety, with time stamps, can be found in the American Economic Association's registry for randomized control trials (https://www.socialscienceregistry.org/trials/1784).

Pre-analysis Plan: Two Approaches to Community Development

10 March 2017

PIs: K. Casey, R. Glennerster, E. Miguel and M. Voors

Part II: Managerial Capital

Component Overview: To evaluate a technocratic alternative to CDD's intensive social facilitation model, we overlaid a new randomized experiment across the GoBifo treatment arms. We will test whether i) a more technocratic approach to identifying project leaders with high managerial capital, and ii) the provision of training in project management fundamentals, improves community ability to active collectively and take advantage of a new development opportunity. Specifically, all communities had an opportunity to enter a project challenge competition run by the local District Councils that awarded US$2,000 implementation grants to the twenty best project proposals. We block randomized 80 communities to a management selection treatment arm (*MS*); 78 to a management selection plus training arm (*MST*); and 80 to a control or status quo (*SQ*) mechanism that favors the village headmen.

These three treatment arms were implemented by the research team enumerators on the data collection visits to communities at the end of the focus group discussion. In all three arms, enumerators explained the project challenge opportunity and the skills needed to develop a strong proposal. They asked the group to deliberate and nominate five individuals, in addition to the village headman, who had these skills. These 6 individuals were then asked to take a management test, in private, which was scored on site by enumerators. The focus group was then reconvened and a public lottery (implemented on a tablet device) determined treatment assignment for the village. In the *status quo (SQ) arm*, the village headman was designated as the project proposal leader. His name was written on the standardized project application form and he was given a transportation voucher to redeem if/when he submitted a proposal to the relevant Local Council. In the *manager selection (MS) arm*, the enumerators announced who was the highest test performer (of the 5 non-chief nominees), and designated that person on the submission form and provided the transport voucher. The *manager selection plus training (MSTR) arm* followed the same format as *MS* but also announced that the relevant ward development committee (most local tier of elected government) would hold a one day management training as part of the project challenge competition. Enumerators provided the date and location of the training, informed the group that the travel costs of the designated project leader will be reimbursed, and encouraged the designated project leader to attend the training.

The training sessions for *MSTR* covered: i) identification of local development needs and designing projects to address them; ii) costing local materials and developing itemized budgets; and iii) time management and planning to meet deadlines. Note that measures of proposal quality capture both items covered in the training and those that were not, to evaluate the extent to which any observed training effects reflect "teaching to the test."

Hypotheses: We plan to evaluate the following hypotheses:

- There is underutilized managerial capital in villages (H-II.1)

- Leveraging underutilized managerial capital leads to greater ability to act collectively and take advantage of local development opportunities (H-II.2)

- Lack of management skills constrains the ability to take advantage of local development opportunities (H-II.3).

Econometric Specifications: Our primary tests of interest estimate:

Table 1, Panel B

$$P_c = \delta_0 + \delta_1 MS_c + \delta_2 TR_c + W'_c \Psi + \zeta_c \quad (3)$$

where outcome *P* (i.e. proposal quality, test score of project leader) is measured for community *c*; *MS* is an indicator variable equal to one for assignment to the manager selection process (*MS* and *MSTR* arms) and zero otherwise; TR is an indicator for assignment to training (*MSTR* arm); W_c is a stratification fixed effect for geographic wards; and ζ_c the idiosyncratic error term. Hypotheses H-II.1 and H-II.2 test $\delta_1 = 0$. Hypothesis H-II.3 tests $\delta_2 = 0$.

Deviation: Wc is ward crossed with CDD assignment, see footnote 11

For Hypothesis H-II.1 we have only one outcome, the test score of the project proposal leader. For Hypotheses H-II.2 and H-II.3 we have four measures of proposal quality so our primary specification will be a mean effects index. We will also report estimates for the individual scores. As a robustness check, we will exclude quality assessments that involve any input from GoBifo staff (although note all proposals were blinded during the review).

Several additional analyses will aid in interpreting these results (see [PAP Sheet 2] for details). We will:

1. Explore the extent to which the training reflects "teaching to the test." Explore where the training appears most effective. — Table A10
2. Validate the management test by correlating test scores with proposal quality and explore relative predictive of power of subsection scores. — Section IV
3. Validate the extent to which the distinct manager selection treatment arms translated into differences in who actually managed the project proposal process. — Table 3
4. Compare the tests scores of the non-headman nominees to those of village headmen. — Table 2
5. Evaluate which characteristics correlate with managerial capital test scores (i.e. age, gender, education, management experience, leadership position, etc.). — Table 2
6. Test for heterogeneous response to training by management test score.
7. Test for interaction effects between participation in GoBifo and the *MS* and *TR* terms in Equation 3, noting that these tests are likely underpowered. — Table 1, Panel A; Table A5

Measurement and Survey Instruments: We used several instruments to implement and evaluate this new SCA, see ["Managerial capital test", "Manager selection tally sheet enumerator A and B", "Submission survey", "Submission form", "Technical scoring", "Policy Scoring", "Expert Scoring" and data from the transcripts of the training].

Outcomes: See ["PAP, Sheet 2"]