

Assessing the Longer Term Impact of Community-Driven Development Programs

Evidence from a Field Experiment
in the Democratic Republic of Congo

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Abstract

Community-driven development programs are a popular model for service delivery and socioeconomic development, especially in countries reeling from civil strife. Despite their popularity, the evidence on their impact is mixed at best. Most studies thus far are based on data collected during, or shortly after, program implementation. Community-driven development's theory of change, however, allows for a longer time frame for program exposure to produce impact. This study examines the longer term impact of a randomized community-driven development program implemented in 1,250 villages in Eastern Democratic Republic of Congo between 2007 and 2012. The study

team returned to these villages in 2015, eight years after the onset of the program. The study finds evidence of the physical endurance of infrastructure built by the program. However, it finds no evidence that the program had an impact on other dimensions of service provision, health, education, economic welfare, women's empowerment, governance, and social cohesion. These findings suggest that, although community-driven development programs may effectively deliver public infrastructure, longer term impacts on economic development and social transformation appear to be limited.

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**Assessing the Longer Term Impact of Community-Driven Development Programs:
Evidence from a Field Experiment in the Democratic Republic of Congo***

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1. Introduction

Community Driven Development (CDD) – a development approach that gives control of decisions and resources to community groups (Dongier et al, 2002) – has become a popular model for channeling foreign aid into local development (Mansuri et al. 2013). The typical CDD program consists of two components. First, communities obtain block grants for local infrastructure projects. Second, communities are responsible for project selection and implementation. This second component often comes with additional activities and requirements to promote democratic decision-making and inclusion of marginalized groups in project implementation and management. Proponents of the CDD approach suggest that the combination of both components not only leads to better targeted and more sustainable investments in infrastructure, but also has the potential to improve other outcomes such as economic welfare, women’s empowerment, social cohesion and good governance.

Over the past two decades, there has been a growing number of randomized evaluations of CDD programs in a variety of countries, most notably in Afghanistan (Beath et al. 2013, 2016), the Democratic Republic of Congo (Humphreys et al. 2019), Liberia (Fearon et al. 2015), Sierra Leone (Casey et al. 2013) and Sudan (Avdeenko et al. 2015). The accumulated evidence suggests that CDD programs can effectively deliver on local public infrastructure (Casey 2018). However, there is mixed evidence of their impact on economic welfare and little evidence on social outcomes like governance and social cohesion.² These studies have one thing in common: they measure impacts during or shortly after the CDD program. **Figure 1** presents the start and end dates of the above mentioned CDD programs, and their related study’s data collection period. It shows that data collection, on average, starts around 3.2 years after program onset, and 7 months before the end of the CDD program.³ To date, we thus know little about the longer term impact of CDD programs.

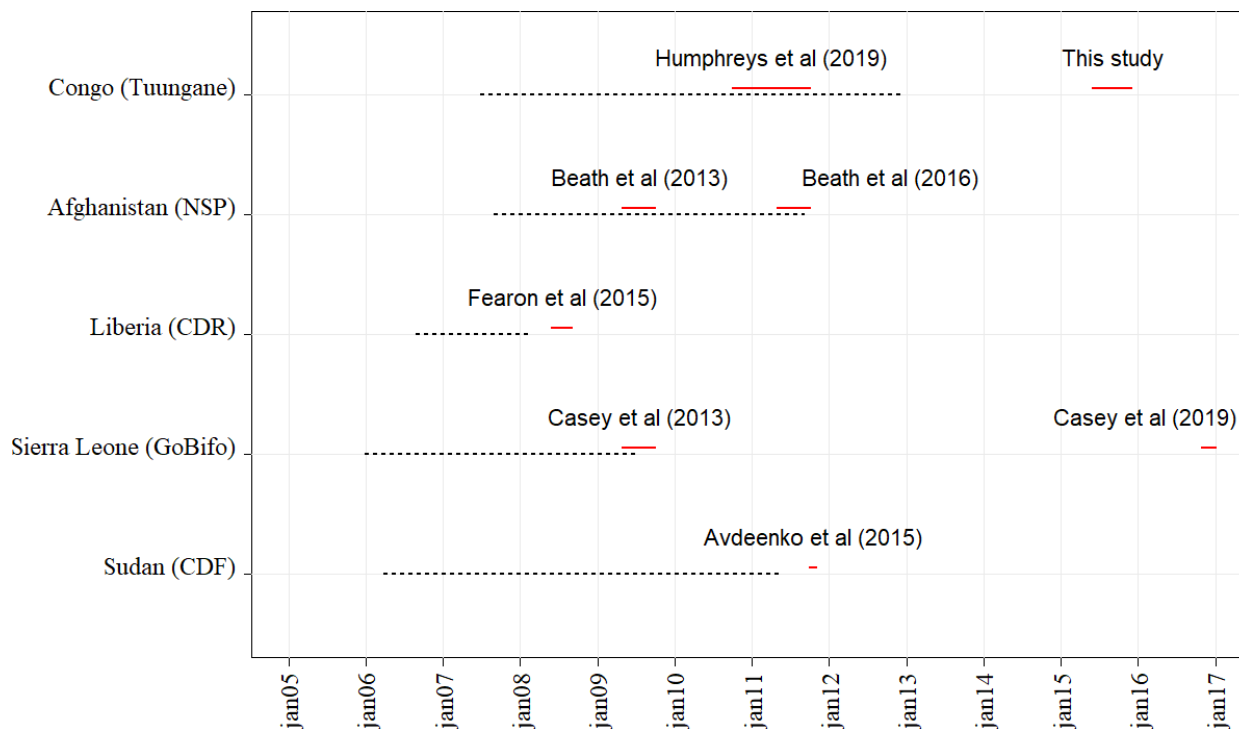
A better understanding of the longer term impact of CDD programs, however, is important for two reasons. First, there is an unsettled debate about whether the null effects of CDD programs thus far are because of theory or evaluation timing. That is, the average evaluation timeline in existing studies may be too short to pick up effects. Certain impacts by their nature may take longer

² See Wong (2012), King and Samii (2014) and Casey (2018) for a summary of accumulated evidence.

³ Program and data collection start and end dates are based on the published article, the donor report, or communication with the authors. For the calculations we exclude Casey et al. (2019) to which we return later.

to appear, such as governance spillover from program to village arenas or education learning outcomes (Wong 2012).

Figure 1. CDD Program Overview



Note: Overview of studies related to randomized CDD programs. Dotted (black) lines indicate CDD program. Solid (red) lines indicate data collection. CDD program name in parenthesis next to country name.

Second, a major purported benefit of the CDD approach is the longer term sustainability of infrastructure. Proponents claim that community control over planning decisions and investment resources results in better use and maintenance of the CDD-produced infrastructure (e.g. Dongier 2002). CDD programs are therefore claimed to be more sustainable compared to when investment decisions are made by actors outside the community. To date, however, there is little evidence to support (or reject) this claim.

In response, in 2015, we returned to the Democratic Republic of Congo and built on the randomization of a major CDD program, “Tuungane”. The program was implemented from 2007 onwards, and its short-term effects were studied by Humphreys et al. (2019) who collected data in 2010 and 2011. We focus on the Tuungane program for several reasons. First, the program was well implemented with high levels of exposure and compliance (see Humphreys et al. (2012) for details). Second, the program has many elements in common with other CDD programs. Third,

Tuungane was implemented with a variation in treatment, which allows us to explore, in addition to the program's overall effect, the impact of having women in leadership positions. Fourth, Congo provides a good setting because CDD programs often take place in the context of weak state capacity.

We collected outcome data in 735 of a targeted 781 villages, which makes this one of the largest CDD field experiments to date. As a comparison, Fearon et al. (2009) examine 83 villages, Casey et al. (2013, 2019) survey 236 villages, Beath et al. (2013, 2015) study 217 villages, while Avdeenko and Gilligan (2015) investigate 24 communities. This study builds on data from village chief and household surveys and a carefully-designed facility audit to explore the longer term impacts of the Tuungane program on eight outcome families that we pre-registered prior to data collection: service provision (in the health and education sector), health, education, economic welfare, women's empowerment, governance, intra-village and inter-village social cohesion.⁴

We find evidence for the physical endurance of infrastructure built by the program. Treatment villages are served by primary schools and hospitals that have higher quality infrastructure, and their hospitals are better stocked. However, we find no evidence that the program had an impact on other dimensions of service provision, health, education, economic welfare, women's empowerment, governance, and social cohesion. These findings are broadly consistent with findings from Casey et. al (2019); the only other study, we know of, that investigates the longer term impacts of CDD programs. Thus, while CDD programs appear to effectively deliver public infrastructure in the short and longer term, their impact on economic development and social transformation appears to be limited, even in the longer term.

The remainder of this paper proceeds as follows. Section 2 discusses the Tuungane program and the experimental design. Sections 3 and 4 discuss the data collection and present results, respectively. Section 5 concludes.

2. Field Experiment in Congo

The field experiment was designed around the Tuungane program, which was implemented between July 2007 and December 2012 in 1,250 villages throughout Eastern Congo (Appendix A). With, on average, 1,424 inhabitants per village, the program reached a beneficiary population of approximately 1.8 million people.

⁴For the conceptual frameworks of how CDD may affect each outcome, we refer the reader to the earlier

mentioned studies.

In 2006, prior to program rollout, villages were randomly assigned to the program. The process ran as follows. The implementing partner aggregated all villages into 560 village clusters. Clusters were, in turn, aggregated into 83 lottery bin areas, which largely corresponded to Chiefdoms. Next, half of the clusters in each lottery bin were selected for treatment using public lotteries. This approach improves balance between treatment and control by geographic features, including remoteness, poverty, institutions, and social composition. In total, 280 village clusters and 1,250 constituent villages were selected for treatment. The remaining villages were assigned to the control status.

The program was implemented in two phases: a village-level phase and a subsequent village cluster level phase. At the village level, local election teams were established and trained to mobilize and guide village populations. The idea was to ensure a good understanding of the program as well as the subsequent election for newly created village-level management committees. These ten-member strong committees were required to contain five men and five women. Next, these committees, in consultation with the population, decided how to allocate an envelope of \$3,000 for a maximum of two projects. The proposed project(s) was then voted on by the whole village. In the two years following project selection, the committees were responsible for project implementation, and were held accountable by village populations via regularly scheduled town hall meetings.

Subsequently, program activities took place at the village cluster level. A new village cluster-level committee was formed by selecting members from the constitutive village-level committees, again ensuring that half of the members were women. Each village cluster received a block grant of \$50,000 to \$70,000 (depending on population size) to implement infrastructure projects that were chosen by the inhabitants of the constituent villages via an election. Next, the cluster committees were responsible for project implementation and were held accountable by cluster populations.

In total, 2,335 village-level and 315 village cluster-level projects were undertaken. Appendix B gives an overview of implemented projects. The majority of these projects took place in the education and health sectors.

The program was implemented with a variation in treatment related to the gender composition of the management committees. Specifically, in 43 (not randomly selected) lottery

bins, half of the village clusters were randomly selected to enter a “gender parity lottery”.⁵ Among these, half of the village clusters (74 clusters and all 325 villages in those clusters) were selected to be free to choose the gender composition of their management committees. In the other clusters (75 village clusters, 337 villages), the program was implemented as normal; i.e. with an obligatory equal number of men and women in the committee. This design feature allows us to learn about the impact of having women in leadership positions.

The short-term impact of the program was assessed by Humphreys et al. (2019), who collected data between October 2010 and October 2011; after the onset of village-level projects, but well before the end of the village cluster-level projects. Appendix C illustrates the timing of the village and village cluster phases of the program, and the short-run data collection. This study leverages the same design as Humphreys et al. (2019) but returns to the villages in 2015, eight years after program onset and three years after all program activities have concluded.

3. Outcomes, Data and Empirical Strategy

This study focusses on eight outcome families: service provision, health, education, economic welfare, women’s empowerment, governance, intra-village cohesion, and inter-village cohesion.⁶

We collected data between June and December 2015, targeting 781 villages in the provinces of Haut Katanga, South Kivu and Tanganyika.⁷ Data were collected from four sources. In each village, surveys were conducted with the village chief and a randomly selected adult from five randomly selected households per village. In addition, as part of the household survey, in each household with children of school-going age (between 6 and 11 years old), one child was randomly selected for a brief exam. Finally, enumerators visited the village’s primary school and health facility.⁸ At each facility, enumerators undertook three activities. They conducted a carefully designed audit to assess the quality of the infrastructure and the presence of materials and

⁵ In total, 149 village clusters (661 villages) entered the lottery.

⁶ Note that the initial goal of the Tuungane program was improvements in governance, social cohesion and economic welfare (Humphreys et al., 2012).

⁷ Humphreys et al. (2019) targeted two randomly selected villages in each of the 560 clusters (280 treatment, 280 control). In total, 816 villages out of the targeted 1,120 villages were visited. There are no differences in attrition by treatment condition (Humphreys et al. 2012). In 2015, we targeted the same villages as visited for Humphreys et al. (2012), excluding the Maniema province for logistical reasons. These villages sum to 781.

⁸ We are interested in service provision as experienced by villagers. We therefore visited the main primary school and health facility for each village, thus not necessarily the Tuungane-built facilities in treatment areas.

equipment. They undertook interviews with users of the facility, visiting a randomly selected ongoing class in each school for close observation and interviewing a randomly selected patient in each health facility. Finally, they interviewed the director responsible for each facility.

In total, data were collected from 3,379 households in 735 villages, 610 primary schools, 504 health facilities, and 1,496 children's exams were conducted.⁹ These data provide us with 171 outcome variables (definition and summary information can be found in Appendix E). To avoid over-rejection of the null hypothesis due to multiple inference (Anderson 2008), we committed, in advance, to a mean effects approach. That is, we reduced the effective number of tests we conduct by combining the individual measures into eight family outcomes (Kling et al. 2007), of which the individual components were pre-registered.

In Appendix F, we show that the randomization procedure was successful in ensuring substantive balance across treatment arms. This study's empirical strategy is therefore straightforward. We compare mean outcomes between treatment and control areas, and – for those areas that participated in the parity lottery – between gender parity and non-parity areas. These analyses provide unbiased estimates of the average treatment effect (Rubin 1974). Specifically, we estimate (for individual-level outcomes) an equation of the following form:

$$y_{ijk} = \beta_0 + \beta_i T_j + v_k + \varepsilon_i \quad (1)$$

Where i indicates the individual, j indicates the village, and k the lottery block, and T is the treatment status (i.e., assignment to the Tuungane program). We use lottery bin fixed effects to control for average differences in observable or unobservable predictors across lottery bins, and we cluster our standard errors at the village cluster level.

4. Results

Panel (a) of **Figure 2** presents results for the eight outcome families. Appendix G provides results for the outcome measures individually.¹⁰ Each circle is a point estimate and bars (ticks) present 95% (90%) confidence intervals. The dependent variables are standardized. We report sample

⁹ Further details related to the data sources and attrition can be found in Appendix D. Attrition took place for a number of reasons, including inaccessibility of some regions for security reasons, as well as the loss, damage, and theft of tablets. Rates of attrition of these sources are balanced across treatment groups.

¹⁰ To create the family indices we took the following decisions (similar to Humphreys et al., 2012). We do not impute data for missing observations. When a unit has individual outcomes missing, the family index is constructed based on the remaining non-missing observations. Finally, when a family index is based on individual outcomes from different levels, we conduct the analysis at the village level. Results related to the outcome families mirror those from the individual outcomes.

average treatment effects, ignoring minor differences in sampling individuals in differently sized households and differently sized villages within clusters.

Service Provision

Did the CDD program deliver and maintain local public goods, and improve the local population's access to, and the quality of, services provided? We find no evidence that Tuungane had a positive impact on average levels of service provision in the health and education sector. The magnitude of 0.05 standard deviation (SD) is small and not significant.

In panel (b) of **Figure 2**, we break up the results by sector and the seven dimensions that make up service provision: infrastructure quality, capacity, availability of material and equipment, staff quality, administration quality, facility-community interactions and the costs and use of health facilities. We find that eight years after program onset, the infrastructure quality of hospitals and school buildings is significantly higher in treatment areas. The quality of hospital buildings is 0.16SD higher in Tuungane areas, which is largely driven by higher quality floors, higher quality walls, and a better rating of facility quality by villagers in the hospital's catchment area (see Appendix G). We find similar results in the education sector. School buildings in treatment villages score 0.19SD higher than those in control villages, largely driven by higher quality floors and roofs, the presence of windows and the villagers' rating. We also find that health facilities in Tuungane areas are significantly better stocked (0.22SD).¹¹ We do not find evidence that schools in Tuungane areas are better stocked. We also find no evidence that the Tuungane program improved the capacity, staff quality, administration quality, facility-community interactions and the costs and use of health facilities.

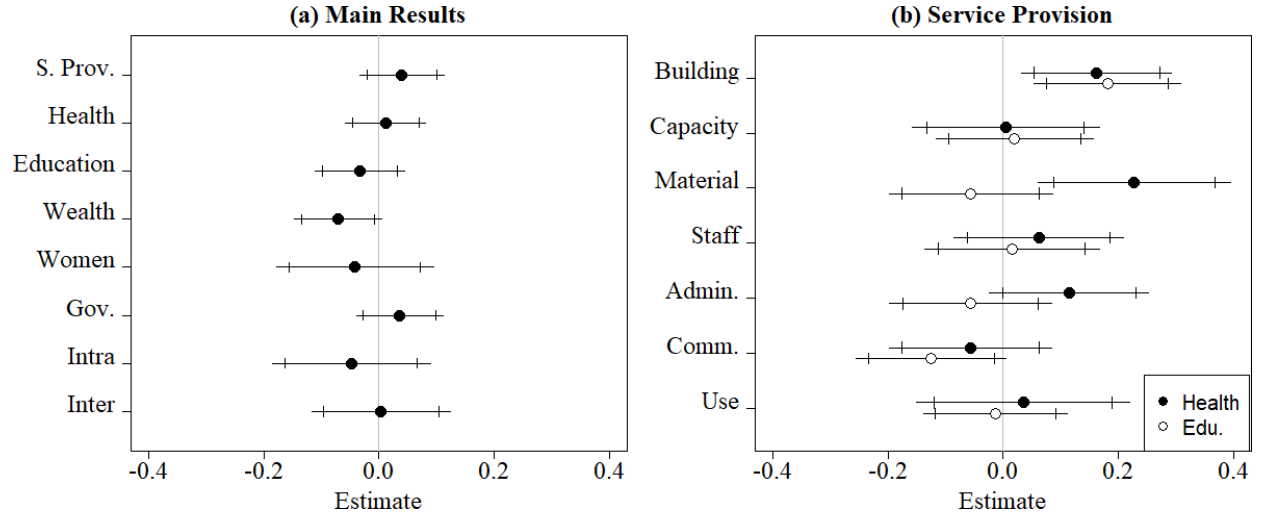
Health

The health situation in Congo is dire. For example, in control communities, 15% of respondents mention that, within the household, a child younger than five years old passed away during the previous year (a number similarly found in the DHS 2013). Panel (a) of **Figure 2** shows that there is no evidence that Tuungane improved health outcomes. The program had no impact on under-

¹¹ That is, enumerators calculated the number of antibiotics, anti-malaria and anti-inflammatory tablets present in the hospital's stockroom.

five mortality, nor did it decrease the incidence of household members falling severely ill or passing away, as reported by respondents.

Figure 2. Main Results and Service Provision



Note: Bars (ticks) indicate 95% (90%) confidence intervals. Fixed effects at lottery bin level. Errors clustered at the randomization unit level.

Education

The program also had no longer term impact on education outcomes. Households in program villages do not score better on measures related to school attendance. In addition, we find no differences in children's exam scores. Specifically, in households with children of school-going age, we randomly select one child and ask two questions about mathematics, French and science. The six questions used were informed by the national curricula for primary schools, and dependent on the child's age.¹² Enumerators first asked the question in French (the official language of education) and repeated the question in the local language if the child had difficulties understanding the question. On average, children answered 1.94 (2.58) out of the six French-instructed (local language-instructed) questions correctly. These numbers, however, are similar in treatment and control villages.

¹² Because many children do not attend school, the six questions differed by the child's age, not their current grade.

Economic Welfare

We explore the impact of Tuungane on economic welfare across a wide set of indicators. Enumerators recorded the material from which the roof and wall of the respondent's house was constructed. In addition, they asked the respondent about the household's asset ownership across 23 items. We also collected detailed information on household spending across ten categories in the month preceding the survey, and household income the preceding week. **Figure 2's** panel (a) shows that households in Tuungane areas are, in fact, 0.08SD worse off than in control areas; a result that is statistically significant ($p < 0.05$) but mainly driven by one indicator: lower quality roofs in treatment areas.

Women's Empowerment

Many elements of the Tuungane program emphasized women's empowerment. The village and village cluster management committees were, by default, gender balanced. Committee member trainings were conducted by the implementing partner and, among others, focused on the needs for women's participation. Furthermore, efforts were undertaken to sensitize village populations to the need of women's inclusion in committee elections and project choice. We collected a wide set of indicators to measure women's empowerment, including the respondent's opinion about a statement related to women's rights, a combined measure of the respondent's opinion about eight statements related to domestic violence towards women, the presence of women's association in the community, the proportion of girls to boys who are currently going to school, who have never been to school, and the share of members of the local development committee that are women. We find no evidence that Tuungane improved the role of women in society.¹³ Across the six outcome measures, only two tend positively (opinion about domestic violence and committee membership), but are not statistically significant.

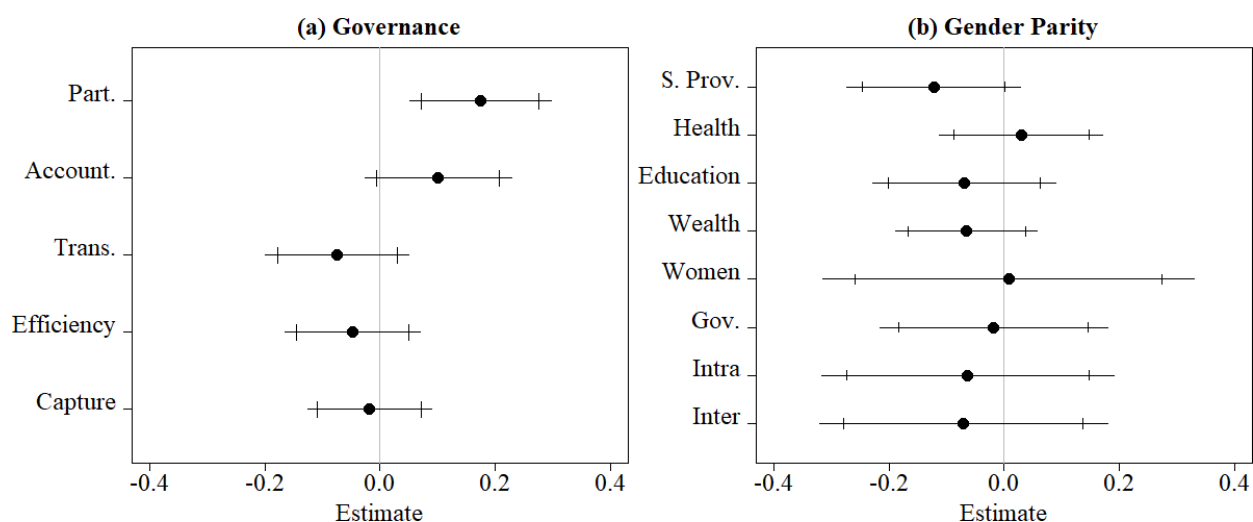
Governance

We followed Humphreys et al. (2012) and separate out governance across five dimensions: participation (the extent to which villagers are willing and able to be part of public decision making), accountability (the willingness and ability of community members to sanction leaders

¹³ These results reflect the short run findings in Van der Windt (2018). We obtain similar results when we restrict the analyses to the villages with gender parity.

for poor performance, and the willingness of leaders to respond to citizen requests), transparency (accessibility of information related to public decision making), efficiency (the ability to organize in order to achieve ends), and capture (the extent to which benefits of public projects are broadly distributed). Panel (a) of **Figure 2** shows no evidence that the program had an impact on overall levels of good governance. The magnitude of 0.04SD is small and not significant. In panel (a) of **Figure 3** we show the result for each governance dimension. We find that Tuungane had a positive impact on villagers' participation in decision making (0.18SD, $p < 0.01$), a result largely driven by villagers' participation in village meetings that took place during the six months preceding the survey and in the 2011 elections. Estimated effects for the other four participation measures are not statistically significant. We also find no evidence that Tuungane improved levels of accountability, transparency, efficiency and capture.

Figure 3. Governance and Gender Parity Results



Note: Bars (ticks) indicate 95% (90%) confidence intervals. Fixed effects at lottery bin level. Errors clustered at the randomization unit level. Panel (b) limits to only the 190 villages that participated in the gender parity lottery.

Intra-village Cohesion

We also examine Tuungane's impact on social cohesion within the village. We make use of a large set of measures to measure intra-village cohesion: individuals' opinion about divisions in the community and about whether voluntary projects have taken place in the village, and the village

chief's opinion about the use of community resources, the presence of a village development committee, and the existence of associations in the village. In addition, we conducted behavioral games to gauge respondents' trust towards a random fellow villager and the village chief. Across all nine individual measures, no effect is positive and significant.

Inter-village Cohesion

The village cluster component of the Tuungane program accounted for a considerably larger part of program expenditures than the village component (village-level projects received \$3,000 in funding, while cluster-level projects received \$50,000 to \$70,000). As part of this program phase, multiple villages had to work together. We thus also explore cohesion across villages. We find no evidence that there are fewer cleavages across villages or more cooperation with other villagers, either by community organizations or the village chief, in program areas. Respondents also played a trust game towards a random villager from a neighboring village. Contributions are similar across treatment conditions. Panel (a) of **Figure 2** shows that the magnitude on the family measure is almost zero.

Impact of Gender Parity

The Tuungane program, by default, created management committees that consisted of the same number of men and women. In a random subset of villages, this parity requirement was dropped. This design feature allows us to learn about the causal impact of having women in leadership positions. Program documents corroborate that there are significantly fewer women on village committees in Tuungane areas where gender parity was not mandated (3.1 women) compared to committees where it was (4.7 women).¹⁴ Panel (b) in **Figure 3** shows the impact of having more women on the committee, focusing solely on those villages that were part of the parity lottery. We find that across the eight family outcomes, there is no evidence of positive impact. This result is not driven by low statistical power; although the confidence intervals are larger (because only a subset of villages entered the gender parity lottery), the magnitudes are small and only two of the eight estimates are positive.

¹⁴ See Van der Windt et al. (2018) for details, and short term results that are similar as those reported here. There are no program data about the composition of the village cluster committees.

Robustness

The null results may reflect a weak treatment effect, or weaknesses in the research design. Humphreys et al. (2019), however, show that in the short run there is no evidence for spillovers, differential social desirability biases, or low statistical power. One may also be worried that the outcome measures are insufficiently refined to detect subtle differences between treatment and control communities. Some measures are certainly better than others. However, one of this study's strengths is the diversity of individual measures for each outcome family, often employing multiple data collection approaches – for example, employing direct observations by our enumerators, survey self-reports, and behavioral measures – and the fact that they produce very similar results.

5. Discussion and Conclusion

What is the longer term impact of CDD programs? To answer this question, we collect data in 735 villages in Eastern Congo eight years after the onset of a large, randomized CDD program. The data suggest that treatment villages are served by primary schools and hospitals that have higher quality infrastructure, and that their hospitals are better stocked. In contrast, we find no evidence that the CDD program had an impact on other dimensions of service provision, health, education, economic welfare, women's empowerment, governance, or intra and inter-village social cohesion. We know of only one other study that explores the longer term impact of a randomized

CDD program. Casey et al. (2019) collect data in Sierra Leone about 12 years after the inception of the GoBifo CDD program (**Figure 1**). They find positive effects on project implementation, the quality of local public services infrastructure, and economic welfare, outcomes they collectively term “hardware” effects. In contrast, they find no sustained impact on measures related to institutional or social change, what they term “software” effects.¹⁵ The authors conclude that their data provide evidence for the durability of CDD's material benefits, including the physical endurance of infrastructure built.

We complement Casey et al. (2019) and add to our understanding of the longer term impact of CDD programs in three ways. The first contribution relates to measurement and scope. Due to

¹⁵ Note that when the nine individual dimensions (collective action, inclusion, local authority, trust, groups and networks, access to information, participation in governance, crime and conflict and political and social attitudes) that constitute the software family are combined, the data suggest an impact (0.07SD, $p < 0.01$).

research budget restrictions, Casey et al. (2019) only make use of surveys conducted with community leaders and a limited number of measures based on direct observation of public infrastructure. In this study, we do the same but also collect data from randomly selected households, including children's test scores, and from the users and directors of the public infrastructure. One benefit of these additional data sources is that it provides a richer set of measures per outcome family. Another benefit is that these data allow us to explore a larger set of outcome families, such as additional dimensions of service provision, education, health, and women's empowerment; outcomes that are central to many CDD interventions.

Second, the size of the experiment we study here is much larger. Casey et al. (2019) employ data from 236 villages (113 treatment, 113 control). In contrast, our measurement strategy builds on data from 735 villages (367 treatment, 368 control), significantly increasing statistical precision and decreasing the possibility for Type-II errors.

Finally, we contribute through replication. Similar to Sierra Leone, the Democratic Republic of Congo scores badly when it comes to development outcomes. However, Congo is different in important ways, including the proliferation of armed groups and continuing conflict and violence, which may affect the effectiveness of a CDD program. As such, this study contributes to generalizable knowledge by understanding the impact of a similar program in a different context, specifically a fragile and conflict setting.

In sum, we find very similar results as those reported in Casey et al. (2019). We find no evidence for software results, despite the change in context, the additional precision, and the wider set of software-related outcomes. In addition, we find positive effects on some hardware-related outcomes. Specifically, the positive effect on the stock and quality of local public infrastructure (0.23SD, $p < 0.01$) as reported in Casey et al. (2019), is very similar to the positive effect on the infrastructure quality of health facilities (0.16SD, $p < 0.01$) and primary schools (0.19SD, $p < 0.01$) that we report in this study.¹⁶

The similarity in findings related to the durability of material benefits of CDD programs is encouraging. Furthermore, the longer term positive effects on hardware but not on software-related outcomes largely mirror the results found in short-run studies (Casey, 2018). Improving local infrastructure in some of the most challenging environments, and at times in the context of

¹⁶ Note that results differ when it comes to economic welfare. Casey et al (2019) find a positive effect (0.24SD, $p < 0.01$), while we find a negative effect (-0.08SD, $p < 0.05$).

crippling state incapacity is a worthy achievement of CDD programs in and of itself. Despite this, we remain hesitant to claim that CDD is an effective strategy to obtain these results. Over its four year period, the Tuungane program spent \$46 million. A large share of this funding was used for facilitation and indirect costs, with only around \$16 million, 35% of total program costs, going directly towards infrastructure. On the one hand, CDD's software-related activities may be essential to safeguard the initial financial investment over time. On the other hand, these same results may have obtained without these additional activities. The (short and longer term) studies that exist to date, however, only compare CDD programs to a control condition, and thus cannot directly test these claims. Future research could focus on disentangling the relative contribution of hardware-related activities from the contribution of software-related activities. Future studies could also attempt to directly compare CDD to other alternatives, such as more traditional, centrally-led programs or unconditional cash transfer programs. Finally, as is evident from the scarcity of longer term studies of CDD programs, external validity is limited, suggesting the need to accumulate more evidence from different contexts.

References

- Anderson, M. L. (2008). Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects. Journal of the American Statistical Association, 103(484), 1481–1495.
- Avdeenko, A. & Gilligan, M. J. 2015. International Interventions to Build Social Capital: Evidence from a Field Experiment in Sudan. American Political Science Review, 109(3): 427-449.
- Beath, A., Christia, F., & Enikolopov, R. (2013). Empowering Women through Development Aid: Evidence from a Field Experiment in Afghanistan. American Political Science Review, 107(3), 540–557.
- Beath, A., Christia, F., & Enikolopov, R. (2015). The National Solidarity Programme: Assessing the Effects of Community-Driven Development in Afghanistan. International Peacekeeping, 22(4), 302–320.
- Bouguen, A., Huang, Y., Kremer, M., & Miguel, E. (2018). Using RCTs to Estimate Long-Run Impacts in Development Economics. NBER Working Paper, 25356, 1–65.
- Casey, K., Glennerster, R. & Miguel, E. 2012. Reshaping Institutions: Evidence on Aid Impacts using a Preanalysis Plan. Quarterly Journal of Economics, 127(4), 1755-1812.
- Casey, K. 2018. Radical Decentralization: Does Community-Driven Development Work? Annual Review of Economics, 10, 139-163.
- Casey, K., Glennerster, R., Miguel, E. & Voors, M. 2019. Skill versus Voice in Local Development. Working paper, Stanford GSB.
- Fearon, J. D., Humphreys, M. & Weinstein, J. M. 2009. Can Development Aid Contribute to Social Cohesion after Civil War? Evidence from a Field Experiment in Post-Conflict Liberia. American Economic Review, 99(2), 287-291.
- Fearon, J. D., Humphreys, M., & Weinstein, J. M. 2015. How Does Development Assistance Affect Collective Action Capacity? Results from a Field Experiment in Post-Conflict Liberia. American Political Science Review, 109(3), 450–469.
- Humphreys, M., Sanchez de la Sierra, R., & Van der Windt, P. (2012). Social and Economic Impacts of Tuungane: Final Report on the Effects of a Community Driven Reconstruction Program in Eastern Democratic Republic of Congo.

- Humphreys, M., Sanchez de la Sierra, R. & Van der Windt, P. 2019. Exporting Democratic Practices: Evidence from a Village Governance Intervention in Eastern Congo". Journal of Development Economics, 140, 279–301.
- Kling, J. R., Liebman, J. B. & Katz, L. F. 2007. Experimental Analysis of Neighborhood Effects. Econometrica, 75(1), 83–119.
- Mansuri, G. & Rao, V. 2013. Localizing Development: Does Participation Work? World Bank Policy Report. Washington DC.
- Rubin, D. B. (1974). Estimating Causal Effects of Treatments in Randomized and Nonrandomized Studies. Journal of Educational Psychology, 66(5), 688–701.
- Van der Windt, P., Humphreys, M. & Sanchez de la Sierra, R. 2018. Gender Quotas in Development Programming: Null Results from a Field Experiment in Congo". Journal of Development Economics, 133, 326-345.
- Van der Windt, P. 2018. Can Development Aid Empower Women? Evidence from a Field Experiment in the Congo". Journal of Politics, 80(3), 1039-1044.

Appendix

Assessing the Long-run Impact of CDD Programs: Evidence from a Field Experiment in the Congo

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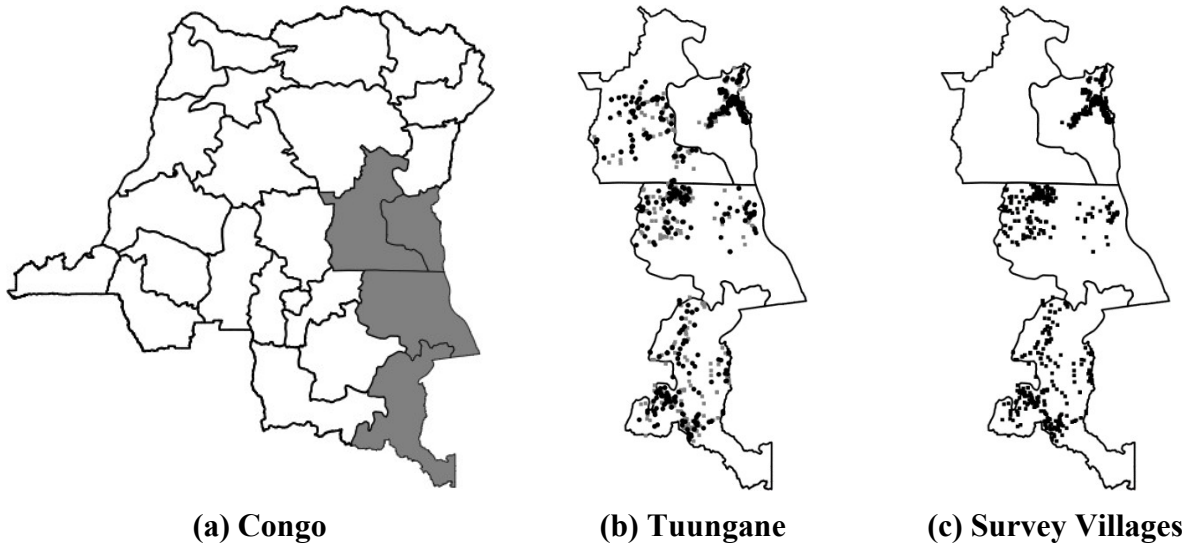
January 28, 2019

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Appendix A: Map Research Area

Figure A1. Map Research Area



Note: The maps display the location of the study. Panel (a) highlights the provinces (from north to south) of Maniema, South Kivu, Tanganyika, and Haut Katanga. Panel (b) shows Tuungane treatment (black circles) and control (gray squares) villages. Panel (c) plots the survey villages. Data were collected in South Kivu, Tanganyika, and Haut Katanga.

Appendix B: Summary of Village and Village Cluster Projects

Table A1 and **Table A2** give an overview of all the village and village cluster level projects implemented as part of the Tuungane program, respectively. Information is based on 2012 tracking data from the implementing partner.

Table A1. Village Level Projects

| Project type | # | % |
|---------------------------------------|----------|----------|
| Bridge | 86 | 4% |
| Classroom | 872 | 37% |
| Common room | 67 | 3% |
| Health facility | 176 | 8% |
| Health facility equipment | 81 | 3% |
| Latrines | 13 | 1% |
| Market | 41 | 2% |
| Mill | 139 | 6% |
| Mosquito nets | 20 | 1% |
| Other construction | 8 | 0% |
| Other purchase | 30 | 1% |
| Purchase agricultural tools | 54 | 2% |
| Purchase animals | 33 | 1% |
| Purchase doors, windows, benches, etc | 76 | 3% |
| Purchase seeds | 13 | 1% |
| Route | 77 | 3% |
| School material | 215 | 9% |
| Water source | 334 | 14% |
| Total | 2,335 | 100% |

Note: “Other construction” includes a bus stop, electricity and a morgue. “Other purchases” include projects like an oil press, community radio, satellite dish, field for pygmies, sewing machine and brick press.

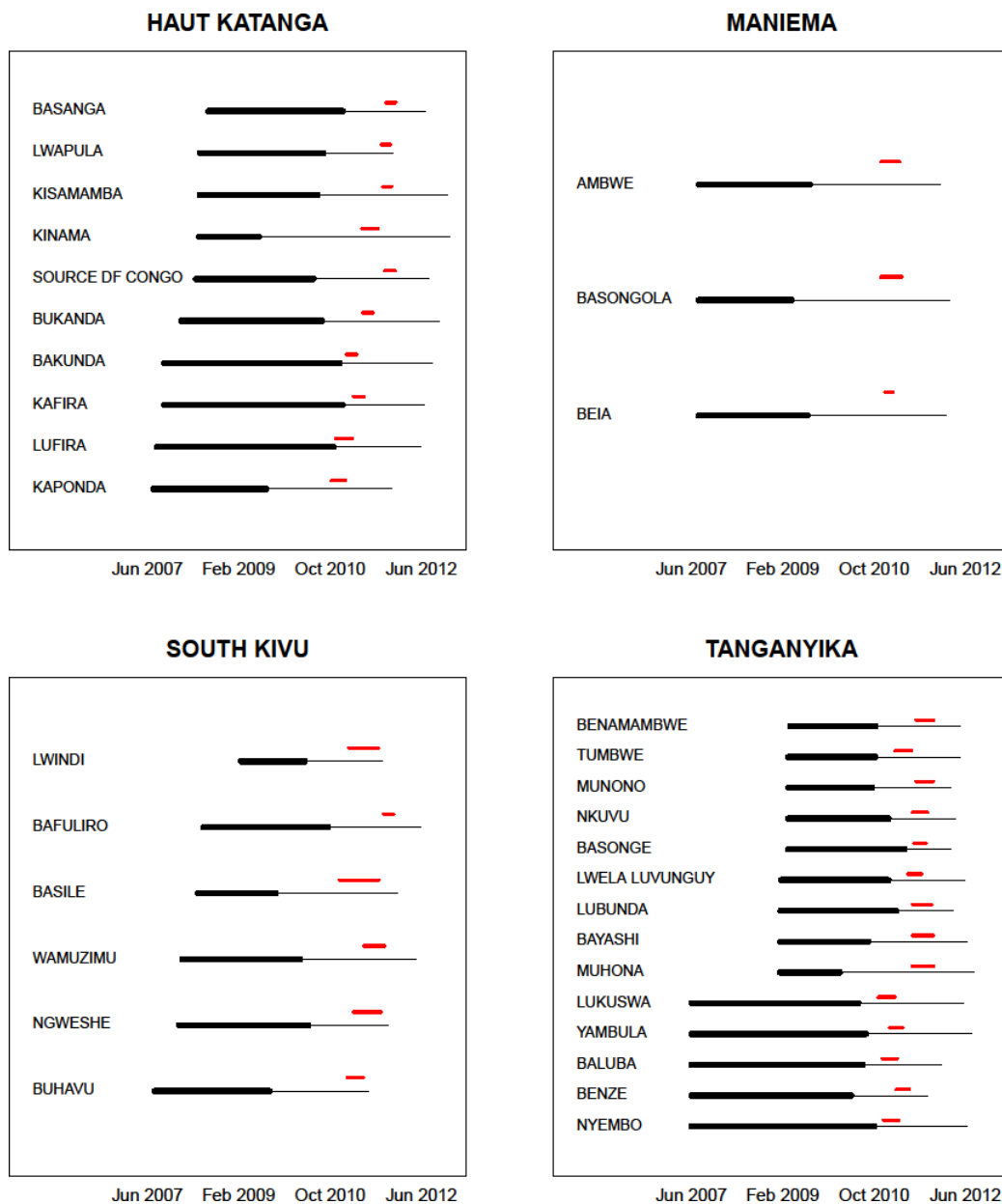
Table A2. Village Cluster Level Projects

| Project type | # | % |
|--------------------------------|----------|----------|
| Bridge | 6 | 2% |
| Electricity | 2 | 1% |
| Health facility | 51 | 16% |
| Health facility equipment | 20 | 6% |
| Market | 7 | 2% |
| Route | 9 | 3% |
| School | 131 | 42% |
| School equipment | 67 | 21% |
| Watsan (latrines, wells, etc.) | 18 | 6% |
| Other | 4 | 1% |
| Total | 315 | 100% |

Note: “Other” includes soil study and topographic study.

Appendix C: Timing of Intervention and Short Run Data Collection

Figure A2. Timing of Intervention and Short Run Data Collection



Note: Thin black lines indicate length of the Tuungane CDD program per chiefdom. Thick line indicates the village level phase. Shorter, red lines indicate the period of data collection in that chiefdom. Source: Humphreys et al. (2019).

Appendix D: Data Sources and Attrition

In this section, we discuss attrition in more detail and show that it is unrelated to both the Tuungane and the gender parity treatment status. **Table A3** gives, for each data source, an overview of the number of targeted observations, the number of observations actually used for analysis, and possible imbalances between treatment conditions. We discuss each data source in turn.

Villages Visited

Tuungane was implemented between 2007 and 2012 in 280 clusters comprising 1,250 villages across four provinces of the Democratic Republic of Congo: South Kivu, Maniema, Tanganyika and Haut Katanga. In 2010 and 2011, Humphreys et al. (2019) targeted to collect data from two randomly selected villages in each of the 560 clusters (280 treatment, 280 control). In total, 816 villages out of the targeted 1,120 villages were visited. There are no differences in attrition by treatment condition (Humphreys et al. 2019). In 2015, we targeted the same villages as visited Humphreys et al. (2019), excluding the Maniema province for logistical reasons. Specifically, we targeted 781 villages (286 in Haut Katanga, 208 in Tanganyika, 287 in South Kivu). In total, 735 of the 781 villages (94%) were visited. Attrition took place because of inaccessibility of villages. **Table A3** shows that almost the same number of villages are missing in treatment and control communities. Related to the gender parity treatment, a total of 190 villages out of the 781 participated in the gender parity lottery. We again find no differences in attrition by treatment status.

Village Chief Survey

Among the 735 villages that we visited, we conducted a survey with the village chief in 714 villages (97%). Among the 180 villages that participated in the gender parity treatment and were visited, a total of 176 village chief surveys were conducted. We find no differences in attrition by treatment status.

Household Survey

Per village, we targeted five randomly selected households. Within households we randomly selected the (adult) respondent in such a way as to ensure that each gender was represented equally within the sample. Given that 735 villages were visited, the study should make use of 3,675

household surveys. In total, we collected data from 3,379 households (92%). These numbers are 814 out of 900 (90%) for those villages that participated in the gender parity lottery. Again **Table A3** suggests no differences by treatment status.

Table A3. Attrition by Treatment Status

| Data Source | Target | Collected | Missing control | Missing treatment | Beta | (se) |
|--------------------------------|--------|-----------|-----------------|-------------------|--------|---------|
| <i>Tuungane treatment</i> | | | | | | |
| Villages visited | 781 | 735 | 22 | 24 | -0.005 | (0.017) |
| Village chief survey | 735 | 714 | 11 | 10 | 0.003 | (0.012) |
| Household survey | 3,675 | 3,379 | 149 | 147 | 0.0004 | (0.009) |
| Children's exam | 3,379 | 1,496 | 966 | 917 | 0.024 | (0.017) |
| Primary school | 735 | 610 | 67 | 58 | 0.0231 | (0.027) |
| Health facility | 735 | 504 | 114 | 117 | -0.010 | (0.034) |
| <i>Gender parity treatment</i> | | | | | | |
| Villages visited | 190 | 180 | 6 | 4 | 0.0177 | (0.032) |
| Village chief survey | 180 | 176 | 2 | 2 | -0.001 | (0.022) |
| Household survey | 900 | 814 | 42 | 44 | -0.008 | (0.019) |
| Children's exam | 814 | 338 | 236 | 240 | -0.041 | (0.034) |
| Primary school | 180 | 147 | 16 | 17 | -0.019 | (0.058) |
| Health facility | 180 | 112 | 33 | 35 | -0.039 | (0.072) |

Note: Table presents number of targeted observations, number of observations used for analyses, and difference between both across treatment condition. Standard errors clustered at the village cluster level. * $p \leq 0.10$, ** $p \leq 0.05$, *** $p \leq 0.01$.

Children's Exam

In those households with children of school-going age (between 6 and 11 years old), we randomly selected one child for a brief exam. In 1,496 of the 3,379 household surveys was the respondent part of a household with a child of school going age, and was the respondent willing to give permission for the exam. This was 338 out of 814 for those household surveys in villages that were part of the gender parity lottery. Again, we find no differences in exams conducted across treatment conditions.

Primary School and Health Facility

The final data source is the infrastructure survey. We are interested in service provision as experienced by the inhabitants of villages. We thus visited the primary school and health facility within a five-kilometer radius for each village, thus not necessarily the Tuungane-built facilities in treatment areas. Specifically, upon arrival in the village, the survey teams were tasked to visit the village chief to explain the data collection exercise and obtain approval. During this meeting, surveyors also asked the village chiefs about the name and location of the primary school and the health infrastructure that are used by the community. After obtaining this information, both facilities were visited for the infrastructure surveys. We instructed our surveyors not to visit the school or health facility if the facility was located more than five kilometers (about one hour walking distance) away. We thus do not measure the difference in quality provided between a Tuungane facility and a control facility. We compare the quality of nearby service provision for villagers in Tuungane and control areas. In other words, we are thus not interested in whether a Tuungane facility is better than a not-Tuungane facility. This study is interested in whether service provision has improved for people that live in Tuungane areas, compared that those that do not.

In total, 610 primary schools and 504 health facilities were visited. Given that we visited 735 villages, this amounts to 83% and 68%, respectively. These numbers are 147 and 112 out of 180 for those villages that participated in the gender parity lottery. **Table A3** shows that there are no differences by Tuungane and gender parity treatment status. This is an important result in and of itself insofar that the nearby presence of hospitals and schools is an indicator for accessibility of service provision.

In sum, the data presented in this section suggest that the probability of attrition is similar across treatment conditions. Although unlikely, we acknowledge that those villages lost in treatment and control conditions may be different.

Appendix E: Variable Definitions and Summary Information

Table A4 gives summary information of all 171 individual outcome variables used in this study.

Table A4. Summary Information

| # | Family | Subfamily | Outcome | Description | Q | Mean | Sd. | Min. | Max. | Obs. |
|----|----------|-----------|-----------------------------|--|---------------|---------|---------|------|-------|------|
| 1 | Hospital | Building | Floor quality | Binary. From the following list: mud, straw, wood/ bamboo, metal plates, concrete/ cement, tiles, plastic, stone, backed bricks, cardboard, other. Floors made of mud, wood, plastic, and cardboard are low quality, the rest are high quality. | ES42 | 0.85 | 0.35 | 0 | 1 | 502 |
| 2 | Hospital | Building | Wall quality | Binary. From the following list: mud, straw, wood/ bamboo, metal plates, concrete/ cement, tiles, plastic, stone, backed bricks, cardboard, other. Walls made of cement and baked bricks are high quality, the rest are low quality. | ES41 | 0.87 | 0.33 | 0 | 1 | 462 |
| 3 | Hospital | Building | Infrastructure | Continuous 0-1. Simple average of the presence of: consultation room, treatment room, laboratory, observation room, pharmacy, maternity or delivery room, waiting room, nurse office, trash can in all rooms, incinerator, garbage hole, placenta hole, working latrines, showers. | ES19- ES32 | 0.67 | 0.23 | 0 | 1 | 502 |
| 4 | Hospital | Building | Clean floor | Binary. The floor is clean. | ES35 | 0.74 | 0.44 | 0 | 1 | 498 |
| 5 | Hospital | Building | Clean wall | Binary. The wall is clean. | ES36 | 0.65 | 0.48 | 0 | 1 | 499 |
| 6 | Hospital | Building | Rate building | Binary. Rate building quality. Options: 0) bad, 1) average, 2) good. Respondents that reply good equal one, zero otherwise. | Q101a | 0.54 | 0.5 | 0 | 1 | 3205 |
| 7 | Hospital | Building | Toilets | Binary. The building has toilets that work and are clean? | Q106 | 0.79 | 0.41 | 0 | 1 | 3166 |
| 8 | Hospital | Capacity | # Providers present | Continuous. Number of health care providers present. | ES37 | 3.07 | 2.9 | 0 | 26 | 501 |
| 9 | Hospital | Capacity | # Beds | Continuous. Number of beds present. | ES18 | 9.1 | 10.13 | 0 | 95 | 496 |
| 10 | Hospital | Capacity | Wait personnel | Continuous. Minutes wait before being seen by qualified person. | ES45 | 6 | 9.91 | 0 | 120 | 414 |
| 11 | Hospital | Capacity | Wait treatment | Continuous. Minutes wait before being treated. | ES47 | 5.95 | 9.37 | 0 | 120 | 410 |
| 12 | Hospital | Capacity | # Nurses | Number of nurses employed by the facility. | ES66 | 3.21 | 2.1 | 0 | 17 | 498 |
| 13 | Hospital | Capacity | # Doctors | Number of doctors employed by the facility. | ES67 | 0.31 | 0.81 | 0 | 8 | 471 |
| 14 | Hospital | Capacity | Treatments | Continuous (0-6). From the following list, how many can be treated at the facility: diarrhea, wound, infection of respiratory tract, delivery, dermatosis, and high blood pressure. | ES64 | 4.96 | 1.29 | 1 | 6 | 492 |
| 15 | Hospital | Capacity | Rate capacity | Binary. Rate building capacity. Options: 0) bad, 1) average, 2) good. Respondents that reply good equal one, zero otherwise. | Q101b | 0.46 | 0.5 | 0 | 1 | 3181 |
| 16 | Hospital | Capacity | Wait time | Continuous. The expected time (in minutes) before seeing the doctor or nurse? | Q114 | 9.9 | 23.37 | 0 | 720 | 2909 |
| 17 | Hospital | Material | # Antibiotics | Continuous. Number of antibiotic tablets present | ES38 | 1436.05 | 1957.18 | 0 | 10000 | 454 |
| 18 | Hospital | Material | # Malaria tablets | Continuous. Number of malaria tablets present | ES39 | 962.92 | 1449.74 | 0 | 10000 | 459 |
| 19 | Hospital | Material | # Anti-inflammatory tablets | Continuous. Number of anti-inflammatory tablets present | ES40 | 1013.29 | 1616.36 | 0 | 10000 | 449 |
| 20 | Hospital | Material | Rate material | Binary. Rate availability and quality of equipment. Options: 0) bad, 1) average, 2) good. Respondents that reply good equal one, zero otherwise. | Q101c | 0.42 | 0.49 | 0 | 1 | 3107 |
| 21 | Hospital | Staff | Doctor nurse ratio | Continuous. Number of doctors over number of nurses. | ES66, ES67 | 0.1 | 0.26 | 0 | 2.33 | 466 |
| 22 | Hospital | Staff | Director education | Continuous. Years of education by director. | ES56 | 13.4 | 2.89 | 0 | 19 | 510 |

| | | | | | | | | | | |
|----|----------|-----------|--------------------------|---|-----------|--------|--------|-------|--------|------|
| 23 | Hospital | Staff | Director medical studies | Binary. Director studied medicines. | ES57 | 0.9 | 0.29 | 0 | 1 | 502 |
| 24 | Hospital | Staff | Rate care | Binary. Rate quality of care. Options: 0) bad, 1) average, 2) good. Respondents that reply good equal one, zero otherwise. | Q101d | 0.58 | 0.49 | 0 | 1 | 3148 |
| 25 | Hospital | Staff | Rate health provider | Binary. Rate quality of health care providers. Options: 0) bad, 1) average, 2) good. Respondents that reply good equal one, zero otherwise. | Q101e | 0.63 | 0.48 | 0 | 1 | 3110 |
| 26 | Hospital | Staff | Presence health provider | Binary. The doctor or nurse is always present on time? | Q98 | 0.95 | 0.21 | 0 | 1 | 3157 |
| 27 | Hospital | Admin | Director present | Binary. The director is present. | ES50 | 0.79 | 0.41 | 0 | 1 | 505 |
| 28 | Hospital | Admin | Patient register | Binary. Presence (and verification) of patient register | ES81 | 0.94 | 0.23 | 0 | 1 | 496 |
| 29 | Hospital | Admin | Staff register | Binary. Presence (and verification) of staff register | ES82 | 0.8 | 0.4 | 0 | 1 | 493 |
| 30 | Hospital | Admin | Stock register | Binary. Presence (and verification) of stock register | ES83 | 0.79 | 0.41 | 0 | 1 | 477 |
| 31 | Hospital | Admin | Cash book | Binary. Presence (and verification) of cash book | ES84 | 0.74 | 0.44 | 0 | 1 | 481 |
| 32 | Hospital | Admin | Rate administration | Binary. Rate quality of administration. Options: 0) bad, 1) average, 2) good. Respondents that reply good equal one, zero otherwise. | Q101f | 0.59 | 0.49 | 0 | 1 | 2908 |
| 33 | Hospital | Community | # Comm. meetings | Continuous. How many meetings were held with the community during last school year? | ES91 | 4.2 | 5.25 | 0 | 48 | 415 |
| 34 | Hospital | Community | Contr. in kind | Binary. During last year, did [village name] contribute in kind? | ES70 | 0.11 | 0.32 | 0 | 1 | 453 |
| 35 | Hospital | Community | Contr. in \$ | Binary. During last year, did [village name] contribute in cash? | ES71 | 0.04 | 0.19 | 0 | 1 | 450 |
| 36 | Hospital | Community | Know CODESA | Continuous. How many members of CODESA do you know [list]? | ES86 | 9 | 6.64 | 0 | 30 | 462 |
| 37 | Hospital | Community | CODESA meetings | Continuous. How many meetings were held with CODESA during last school year? | ES87 | 10.55 | 7.59 | 0 | 48 | 459 |
| 38 | Hospital | Community | Director present | Continuous. How many of these meetings did you personally attend? | ES88 | 8.16 | 6.91 | 0 | 48 | 472 |
| 39 | Hospital | Community | Rate interaction | Binary. Rate interaction of facility with the community. Options: 0) bad, 1) average, 2) good. Respondents that reply good equal one, zero otherwise. | Q101g | 0.63 | 0.48 | 0 | 1 | 3092 |
| 40 | Hospital | Community | Contr. in kind | Binary. During last year, did you contribute in kind? | Q112 | 0.04 | 0.2 | 0 | 1 | 2950 |
| 41 | Hospital | Community | Contr. in \$ | Binary. During last year, did you contribute in cash? | Q113 | 0.03 | 0.16 | 0 | 1 | 2871 |
| 42 | Hospital | Costs | Open | Binary. Health center is open. | ES14 | 0.98 | 0.15 | 0 | 1 | 505 |
| 43 | Hospital | Costs | \$ Paid | Continuous. How much does your treatment cost? In US dollars. | ES49 | 11.39 | 31 | 0 | 277.78 | 376 |
| 44 | Hospital | Costs | # Patients now | Continuous. Number of patients at the moment. | ES69 | 4.4 | 7.69 | 0 | 73 | 480 |
| 45 | Hospital | Costs | # Patients last month | Continuous. Number of patients during last month. | ES68 | 175.17 | 183.13 | 0 | 943 | 472 |
| 46 | Hospital | Costs | Cost index | Continuous. The \$ price for a visit, the \$ price for a consultation, the \$ price for a health card, and the \$ price for an overnight stay. Each variable is standardized. We then average across the four. | ES58-ES61 | 0.05 | 0.64 | -0.81 | 3.63 | 486 |
| 47 | Hospital | Costs | Rate cost | Binary. Rate costs. Options: 0) bad, 1) average, 2) good. Respondents that reply good equal one, zero otherwise. | Q101h | 0.28 | 0.45 | 0 | 1 | 3114 |
| 48 | Hospital | Costs | Cost index | Continuous. The \$ price for a consultation, the \$ price for a health card, and the \$ price for an overnight stay. Each variable is standardized. We then average across the three. | Q108-Q111 | 0.02 | 0.9 | -0.61 | 26.79 | 2852 |
| 49 | Hospital | Costs | # Visits | Continuous. In the last year, how many times did somebody in your household visit the facility. | Q92 | 3.86 | 8.64 | 0 | 300 | 3184 |
| 50 | School | Building | Floor quality | Same as above | EE35 | 0.55 | 0.5 | 0 | 1 | 550 |
| 51 | School | Building | Wall quality | Same as above | EE37 | 0.78 | 0.42 | 0 | 1 | 481 |
| 52 | School | Building | Roof quality | Binary. From the following list: mud, straw, wood/ bamboo, metal plates, concrete/ cement, tiles, plastic, stone, backed bricks, cardboard, other. Roofs made of metal plates, concrete/cement, tiles and backed bricks are high quality. | EE34 | 0.82 | 0.38 | 0 | 1 | 551 |
| 53 | School | Building | Windows | Binary. Presence of windows with glass. | EE32 | 0.31 | 0.46 | 0 | 1 | 553 |
| 54 | School | Building | Toilets | Binary. Presence of functional toilet | EE36 | 0.68 | 0.47 | 0 | 1 | 554 |

| | | | | | | | | | | |
|----|--------|-----------|-----------------------|--|------------|--------|--------|------|-----|------|
| 55 | School | Building | Rate building | Same as above | Q130a | 0.41 | 0.49 | 0 | 1 | 3154 |
| 56 | School | Building | Toilets | Same as above | Q135 | 0.58 | 0.49 | 0 | 1 | 3182 |
| 57 | School | Capacity | # Classrooms | Continuous. Number of classrooms | EE31 | 6.92 | 3.35 | 0 | 26 | 554 |
| 58 | School | Capacity | Classroom size | Continuous. Classroom size in square meters | EE26 | 27.79 | 20.56 | 0 | 75 | 153 |
| 59 | School | Capacity | Highest class | Binary. Highest degree: elementary, middle, terminal. Response is terminal equal one, zero otherwise. | EE54 | 0.86 | 0.35 | 0 | 1 | 526 |
| 60 | School | Capacity | # Teachers | Continuous. Number of teacher employed | EE53 | 7.25 | 2.86 | 0 | 15 | 495 |
| 61 | School | Capacity | # Students reg. | Continuous. Number of students registered | EE55 | 246.85 | 161.55 | 0 | 930 | 522 |
| 62 | School | Capacity | Teacher student ratio | Continuous. Number of teachers employed divided by number of students registered | EE53, EE55 | 0.04 | 0.03 | 0.01 | 0.3 | 475 |
| 63 | School | Capacity | Rate capacity | Same as above | Q101b | 0.44 | 0.5 | 0 | 1 | 3103 |
| 64 | School | Capacity | Classrooms large | Binary. Do you consider the classrooms large enough? | Q133 | 0.74 | 0.44 | 0 | 1 | 2918 |
| 65 | School | Material | Blackboard | Binary. Blackboard present | EE24 | 0.96 | 0.19 | 0 | 1 | 154 |
| 66 | School | Material | # Benches | Continuous. Number of seats | EE25 | 9.84 | 9.38 | 0 | 45 | 157 |
| 67 | School | Material | Prop. books | Continuous (0-1). Proportion of students with study books. | EE20, EE22 | 0.19 | 0.36 | 0 | 1 | 148 |
| 68 | School | Material | Prop. notebooks | Continuous (0-1). Proportion of students with notebooks. | EE20, EE23 | 0.68 | 0.43 | 0 | 1 | 143 |
| 69 | School | Material | Teacher book | Binary. Teacher has study book. | EE27 | 0.73 | 0.45 | 0 | 1 | 143 |
| 70 | School | Material | Teacher prep. | Binary. Teacher has workbook. | EE28 | 0.84 | 0.37 | 0 | 1 | 145 |
| 71 | School | Material | Teacher list | Binary. Teacher has attendance list. | EE29 | 0.82 | 0.38 | 0 | 1 | 145 |
| 72 | School | Material | Rate material | Same as above | Q130c | 0.36 | 0.48 | 0 | 1 | 2765 |
| 73 | School | Staff | Teacher present | Binary. Teacher is present. | EE19 | 0.96 | 0.2 | 0 | 1 | 150 |
| 74 | School | Staff | Studied pedagogy | Binary. Teacher is studied pedagogy | EE30 | 0.99 | 0.12 | 0 | 1 | 147 |
| 75 | School | Staff | Director education | Continuous. Years of education by director. | EE45 | 10.84 | 3.56 | 0 | 17 | 555 |
| 76 | School | Staff | Director pedagogy | Binary. Director studied pedagogy | EE46 | 0.95 | 0.21 | 0 | 1 | 516 |
| 77 | School | Staff | Rate teachers | Binary. Rate quality of teachers. Options: 0) bad, 1) average, 2) good. Respondents that reply good equal one, zero otherwise. | Q130d | 0.59 | 0.49 | 0 | 1 | 2797 |
| 78 | School | Staff | Teacher absence | Binary. Are the teachers often absent? | Q128 | 0.26 | 0.44 | 0 | 1 | 2537 |
| 79 | School | Staff | Teacher punctual | Binary. Are the teachers punctual? | Q129 | 0.92 | 0.27 | 0 | 1 | 2551 |
| 80 | School | Staff | Teacher qualified | Binary. Are the teachers qualified? | Q131 | 0.91 | 0.29 | 0 | 1 | 2490 |
| 81 | School | Staff | Teacher rigorous | Binary. Are the teachers rigorous? | Q132 | 0.88 | 0.32 | 0 | 1 | 2402 |
| 82 | School | Admin | Director present | Same as above | EE39 | 0.66 | 0.47 | 0 | 1 | 546 |
| 83 | School | Admin | Staff register | Binary. Presence (and verification) of staff register | EE61 | 0.9 | 0.3 | 0 | 1 | 465 |
| 84 | School | Admin | National program | Binary. Presence (and verification) of national curriculum | EE60 | 0.66 | 0.48 | 0 | 1 | 384 |
| 85 | School | Admin | Rate director | Same as above | Q130e | 0.54 | 0.5 | 0 | 1 | 2671 |
| 86 | School | Community | # Comm. meetings | Same as above | EE72 | 2.91 | 2 | 0 | 12 | 502 |
| 87 | School | Community | Contr. in kind | Same as above | EE58 | 0.27 | 0.45 | 0 | 1 | 484 |
| 88 | School | Community | Contrib. in \$ | Same as above | EE59 | 0.19 | 0.39 | 0 | 1 | 473 |
| 89 | School | Community | Know COPA | Continuous. How many members of COPA do you know [list]? | EE67 | 5.59 | 2.36 | 0 | 18 | 521 |
| 90 | School | Community | COPA meetings | Continuous. How many meetings were held with COPA during last school year? | EE68 | 4.64 | 3.45 | 0 | 27 | 505 |
| 91 | School | Community | Director present | Same as above | EE69 | 4.1 | 3.52 | 0 | 28 | 515 |
| 92 | School | Community | Rate interaction | Same as above | Q130f | 0.6 | 0.49 | 0 | 1 | 2899 |
| 93 | School | Community | Contr. in kind | Same as above | Q140 | 0.08 | 0.28 | 0 | 1 | 2867 |
| 94 | School | Community | Contr. in \$ | Same as above | Q141 | 0.06 | 0.24 | 0 | 1 | 2818 |
| 95 | School | Costs | Open | Same as above | EE13 | 0.3 | 0.46 | 0 | 1 | 519 |
| 96 | School | Costs | Boys | Continuous. Number of boys present in class | EE20 | 18.78 | 10.01 | 0 | 49 | 147 |
| 97 | School | Costs | Girls | Continuous. Number of girls present in class | EE56 | 16.05 | 9.79 | 1 | 50 | 147 |

| | | | | | | | | | | |
|-----|-----------|-------|----------------------------|---|-------|--------|--------|------|---------|------|
| 98 | School | Costs | Students pres. | Continuous. On average, how many students are present per day. | EE47 | 218.22 | 153.12 | 0 | 910 | 520 |
| 99 | School | Costs | School fee (\$) | Continuous. Monthly school fee per child. In US dollars. | EE48 | 2.07 | 1.54 | 0 | 10.56 | 527 |
| 100 | School | Costs | Fee (\$) | Continuous. Operating fee per child per trimester. In US dollars. | EE48 | 0.87 | 1.42 | 0 | 11.11 | 418 |
| 101 | School | Costs | Rate costs | Same as above | Q130g | 0.33 | 0.47 | 0 | 1 | 2875 |
| 102 | School | Costs | Cost (\$) | Continuous. Since the start of this school year, how much has the household spent on the education of the children of this household (6-12 years). This includes tuition, manuals, uniforms, transportation and other fees. In US dollars. | Q121 | 81.87 | 108.39 | 0 | 1111.11 | 2247 |
| 103 | School | Costs | School fee (\$) | Continuous. Monthly school fee per child. In US dollars. | Q137 | 2.27 | 1.5 | 0 | 11.11 | 2616 |
| 104 | School | Costs | Fee (\$) | Continuous. Operating fee per child per trimester. In US dollars. | Q138 | 1.87 | 1.98 | 0 | 11.11 | 1677 |
| 105 | Health | | Medical care | Binary. In last 12 months, somebody in household fell ill enough to require medical care? | Q88 | 0.76 | 0.43 | 0 | 1 | 3372 |
| 106 | Health | | U5 mortality | Binary. In last 12 months, did a child younger than 5 years old in the household die due to illness? | Q89 | 0.12 | 0.33 | 0 | 1 | 3343 |
| 107 | Health | | Death head | Binary. In the last 12 months, did the head of the household pass away? | Q60a | 0.02 | 0.15 | 0 | 1 | 3377 |
| 108 | Health | | Death other | Binary. In the last 12 months, did somebody else in the household pass away? | Q60b | 0.16 | 0.37 | 0 | 1 | 3378 |
| 109 | Health | | Sick head | Binary. In the last 12 months, was the head of the household severely ill? | Q60c | 0.29 | 0.46 | 0 | 1 | 3374 |
| 110 | Health | | Sick other | Binary. In the last 12 months, was somebody else in the household severely ill? | Q60d | 0.59 | 0.49 | 0 | 1 | 3372 |
| 111 | Education | | Attendance daughters | Continuous. How many daughters have gone to school uninterrupted (since age 6) | Q115 | 1.04 | 1.19 | 0 | 8 | 2894 |
| 112 | Education | | Attendance sons | Continuous. How many sons have gone to school uninterrupted (since age 6) | Q115 | 1.34 | 1.39 | 0 | 9 | 2919 |
| 113 | Education | | Never attended (daughters) | Continuous. How many daughters have never attended school | Q118 | 0.39 | 0.85 | 0 | 9 | 2787 |
| 114 | Education | | Never attended (sons) | Continuous. How many sons have never attended school | Q118 | 0.36 | 0.91 | 0 | 20 | 2777 |
| 115 | Education | | Grade (French) | Continuous (0-6). Correct responses by child to six question related to mathematics, French and science (2 questions each). In French. | EX11 | 1.93 | 1.7 | 0 | 6 | 1259 |
| 116 | Education | | Grade (local) | Continuous (0-6). Correct responses by child to six question related to mathematics, French and science (2 questions each). Questions related to mathematics and science are repeated in the local language if incorrect in French. | EX11 | 0.87 | 1.24 | 0 | 5 | 406 |
| 117 | Welfare | | Roof quality | Same as above | Q39 | 0.37 | 0.48 | 0 | 1 | 3371 |
| 118 | Welfare | | Wall quality | Same as above | Q40 | 0.08 | 0.27 | 0 | 1 | 3336 |
| 119 | Welfare | | Assets | Continuous. Simple average of the number of items owned across the following assets: basin, beds, jerry cans, bikes, boats, boxes, buckets, cabinets, chairs, cows, goats, hoes, lamps, mattress, motor, pans, phone, photo camera, pigs, poultry, radio, rooms, straw mattress. | Q37 | 1.42 | 0.83 | 0.09 | 8.92 | 3379 |
| 120 | Welfare | | Consumption (\$) | Continuous. Aggregation of household spending during the preceding 30 days in the following areas: food, medicine, leisure, clothes, alcohol, cigarettes, seeds, household equipment, small works, large works. In US dollars. | Q54 | 81.29 | 113.39 | 0 | 1461.11 | 3377 |
| 121 | Welfare | | Earnings (\$) | Continuous. Total household income in the last seven days. In US dollars. | Q74 | 12.57 | 34.72 | 0 | 666.67 | 2919 |
| 122 | Women | | Women rights | Binary. Opinion about the following statement: "In this village, women should have the same rights and obligations as men." Options: disagree, no opinion, agree. Respondents that reply agree. | Q237 | 0.55 | 0.5 | 0 | 1 | 3359 |
| 123 | Women | | Hit women | Continuous (0-8). "Sometimes a husband is upset or angry because of certain things his wife does. In your opinion, is it justified for a husband to beat or beat his wife in the following situations: 1) if she goes out without telling him, 2) if she refuses to have sex with him, 3) if she neglects children, 4) if she burns the food, 5) if she quarrels with him, 6) if she is unfaithful, 7) if she demands the use of contraceptive methods, 8) if she drinks alcohol." Simple sum across the eight variables. | Q241 | 2.58 | 2.39 | 0 | 8 | 3364 |
| 124 | Women | | Women association | Binary. Is a women association active in the village? | Q183d | 0.21 | 0.41 | 0 | 1 | 3204 |

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|-----|------------|----------------|----------------------------|---|----------------|------|------|---|-----|------|
| 125 | Women | | Daughter school attendance | Continuous (0-1). Share of girls, among all household children, that go to school. | Q115 | 0.43 | 0.33 | 0 | 1 | 2162 |
| 126 | Women | | Daughter never to school | Continuous (0-1). Share of girls, among all household children, that have never been to school. | Q118 | 0.53 | 0.37 | 0 | 1 | 806 |
| 127 | Women | | Women committee members | Continuous (0-1). Proportion of members of the local development committee that are women. | EC105d, EC105e | 0.35 | 0.18 | 0 | 0.8 | 210 |
| 128 | Governance | Participation | Present meeting | Binary. In the last six months, did you participate in a village meeting? | Q199a | 0.45 | 0.5 | 0 | 1 | 3349 |
| 129 | Governance | Participation | Voluntary contribution | Continuous (0-6). In the last six months, did you contribute (time, money or labor) to: construction and maintenance of primary schools or health infrastructure, construction or maintenance of roads, construction or maintenance of wells, organization of security patrols, maintenance of a church or mosque, construction of a market. Simple summation. Conditional on one of those projects taking place. | Q194 | 1.33 | 0.96 | 0 | 6 | 1393 |
| 130 | Governance | Participation | Voted 2011 | Binary. Did you vote in the 2011 elections? | Q218 | 0.93 | 0.26 | 0 | 1 | 3368 |
| 131 | Governance | Participation | Election meeting | Binary. Did you participate in a rally/ election campaign during the last election? | Q219 | 0.36 | 0.48 | 0 | 1 | 3350 |
| 132 | Governance | Participation | Right to participate | Binary. Opinion about the following statement: "Everyone should have the right to participate in the political and economic decisions, even if they do not master all the aspects of the problem in question" Options: disagree, no opinion, agree. Respondents that reply agree. | Q232 | 0.64 | 0.48 | 0 | 1 | 3347 |
| 133 | Governance | Participation | Interaction | Continuous (0-11). In the last six months, which of 11 activities has the chief undertaken: 1) contact the police or judiciary for problems related to the village, 2) contact the military for problems related to the village, 3) contact provincial government for problems related to the village, 4) contact national government for problems related to the village, 5) contact local, decentralized government entities (ETDs) for problems related to the village, 6) contact the chief of the grouping or chieftdom for problems related to the village, 7) contact MONUSCO to ask to initiate a village project, 8) contact an international NGO to ask to initiate a village project, 9) contact the national assembly member that represents the village, 10) contact armed groups, 11) contact CODESA/ COPA to discuss a development project related to the village. Simple summation. | EC205 | 2.35 | 2.3 | 0 | 9 | 712 |
| 134 | Governance | Accountability | Interaction | Continuous (0-7). In the last six months, how many accountability-related activities have you undertaken from the following activities: 1) meet the village chief to raise an issue, 2) meet a member of a village management committee to raise an issue, 3) contact the police or the judiciary about some problems you had, 4) meet or contact other state officials about some problems you had, 5) meet representatives of MONUSCO or NGOs to raise an issue, 6) participate in a demonstration or a peaceful protest march, 7) meet with influential individuals, but without authority recognized by the state (e.g. armed groups). Simple summation. | Q199c-i | 0.76 | 1.19 | 0 | 7 | 3371 |
| 135 | Governance | Accountability | Local committee | Continuous (1-8). Does the local committees (COPA and CODESA) undertake the following activities: 1) inform the public about its actions, 2) inform the population of resource management, 3) inform the community about the performance of providers and the quality of services, 4) allow people like you to participate, 5) be consulted before making decisions, 6) ensure that local resources are used for public purposes and not for private interests, 7) conduct advocacy with the state authorities on community needs, 8) inform state authorities about the performance of providers and the quality of services. Simple summation. | Q200a-h | 3.86 | 3.23 | 0 | 8 | 2620 |
| 136 | Governance | Accountability | Chief informs | Binary. When it comes to making important decisions, the leader takes care to inform the population about why the decisions were made? | Q211 | 0.71 | 0.45 | 0 | 1 | 3253 |
| 137 | Governance | Accountability | Other bodies | Binary. If a village member is not satisfied with the leaders' decisions, are there any other bodies that can influence the decisions? | Q212 | 0.5 | 0.5 | 0 | 1 | 2898 |

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|-----|------------|----------------|---------------------|---|------------|------|------|---|----|------|
| 138 | Governance | Accountability | Influence leaders | Binary. Are you of the opinion that you can influence your leaders? | Q228 | 0.17 | 0.38 | 0 | 1 | 3018 |
| 139 | Governance | Accountability | Verify leaders | Binary. Opinion about the following statement: "As citizens we have the duty to check regularly and to question the actions of our provincial political leaders and nationals." Options: disagree, no opinion, agree. Respondents that reply agree equal one, zero otherwise. | Q233 | 0.26 | 0.44 | 0 | 1 | 3343 |
| 140 | Governance | Accountability | Local committee | Same as above | EC206a-d,g | 2.63 | 2.1 | 0 | 5 | 601 |
| 141 | Governance | Transparency | Accept school | Binary. Each fifth (randomly selected) respondent is asked whether they are willing to seek information about the revenues received in the last period for the school or the hospital (randomly selected). Respondents are offered \$1 as compensation for attempting to retrieve the information and an additional dollar upon success. Outcome equals one when the respondent is willing to collect information from the school. | Q269 | 0.83 | 0.38 | 0 | 1 | 299 |
| 142 | Governance | Transparency | Accept health | Binary. See above. Willingness to collect information from the hospital. | Q271 | 0.78 | 0.41 | 0 | 1 | 228 |
| 143 | Governance | Transparency | Knowledge | Continuous (0-6). Respondent knows the name of: 1) the Prime Minister of the Congo, 2) the member of the National Assembly who represents the community, 3) the largest party in the National Assembly, 4) the governor of the province, 5) the head of their territory, and 6) the leader of their grouping. Simple summation. | Q242 | 2.37 | 1.71 | 0 | 6 | 3184 |
| 144 | Governance | Transparency | Verify chief | Binary. Opinion about the following statement: "As inhabitants of the village, we have the duty to check regularly and question the actions of our village chief" Options: disagree, no opinion, agree. Respondents that reply agree equal one, zero otherwise. | Q235 | 0.74 | 0.44 | 0 | 1 | 3353 |
| 145 | Governance | Efficiency | Approached state | Binary. In the last six months, did members of this village approach the state to ask them to initiate projects for the village? | Q196 | 0.06 | 0.23 | 0 | 1 | 3024 |
| 146 | Governance | Efficiency | Successful state | Binary. In the last six months, did members of this village successfully approach the state to ask them to initiate projects for the village? | Q197 | 0.02 | 0.12 | 0 | 1 | 3024 |
| 147 | Governance | Efficiency | Approached NGO | Binary. In the last six months, did members of this village approach and NGO to ask them to initiate projects for the village? | Q176 | 0.04 | 0.19 | 0 | 1 | 3087 |
| 148 | Governance | Efficiency | Successful NGO | Binary. In the last six months, did members of this village successfully approach and NGO to ask them to initiate projects for the village? | Q180 | 0.02 | 0.12 | 0 | 1 | 3084 |
| 149 | Governance | Capture | Committee exist | Continuous (0-9). Presence of the following committees: 1) water/ sanitation, 2) roads and erosions, 3) health (CODESA), 4) education/ school (COPA), 5) farming or agriculture, 6) protection or security, 7) conflict resolution, 8) development general, and 9) other. Simple summation. | Q183A-I | 2.04 | 1.66 | 0 | 8 | 3343 |
| 150 | Governance | Capture | Committee elected | Continuous (0-1). Proportion of committees in the village that are democratically elected. | Q185 | 0.83 | 0.29 | 0 | 1 | 2504 |
| 151 | Governance | Capture | # Associations | Continuous (1-11). Presence of the following association: 1) an association affiliated to the church/ mosque, 2) a peasant association, 3) an association of the elderly, 4) an association of women, 5) a youth organization, 6) an association of former combatants / militia 7) an association for savings and credit, 8) an association to support a certain politician or political party, 9) a human rights association, 10) a cultural association / ethnic, and 11) other. Simple summation. | Q207 | 1.39 | 1.79 | 0 | 11 | 3332 |
| 152 | Governance | Capture | Association elected | Continuous (0-1). Proportion of associations in the village that are democratically elected. | Q198 | 0.76 | 0.34 | 0 | 1 | 1652 |
| 153 | Governance | Capture | Collected tax | Binary. In the last thirty days, did the village chief collect taxes from you? | Q207 | 0.05 | 0.22 | 0 | 1 | 3300 |
| 154 | Governance | Capture | Committee funds | Binary. If the village received \$1000 for its development, to whom should the responsibility to manage this amount to be sure the money is really used for the wellbeing of the village: village chief, development committee, NGO, national government in Kinshasa, provincial government, other. Response is development committee equal one, zero otherwise. | Q198 | 0.26 | 0.44 | 0 | 1 | 3201 |

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|-----|---------------|--|-------------------------|--|---------------|--------|--------|---|------|------|
| 155 | Intra-village | | Cleavages | Continuous (0-10). It is sometimes difficult for the inhabitants of a village to work together because of the differences that exist between them. What cleavages exist in this village? The cleavages were not prompted. We have a list from which they could check the following cleavages: 1) between the rich and poor, 2) between men and women, 3) between the young and the elderly, 4) between indigenous and newcomers, 5) between the different religions, 6) between the tribes or ethnic groups, 7) between civilians and ex-combatants/ militia, 8) between pastoralists and farmers, 9) between people of different political parties, and 10) between educated and uneducated. Simple summation. | Q186 | 1.06 | 1.3 | 0 | 8 | 3167 |
| 156 | Intra-village | | Trust village member | Continuous (0-1000). Contribution in trust game to another randomly selected villager. Specifically, each participant played a standard trust game four times. Each time, they received 1,000 Congolese Francs (around \$1, or a day's wage). The amount sent to the receiver would be tripled, and the receiver would subsequently decide how much to return. What was different each time was the receiver type. Participants played with four of the following eight possible receivers: a village member or the village chief (to measure intra-village cohesion), a village member of a neighboring village (to measure inter-village cohesion), and five other potential receivers (not further used in this study). The four receivers and their order was randomly assigned. One of the four games was randomly selected for payout. | Q277 | 384.06 | 247.39 | 0 | 1000 | 1344 |
| 157 | Intra-village | | Trust village chief | Continuous (0-1000). Contribution in trust game to the village chief. See above for game details. | Q277 | 420.72 | 263.99 | 0 | 1000 | 1304 |
| 158 | Intra-village | | Voluntary projects | Continuous (0-6). In the last six months, which of the following voluntary project take place in the village: 1) construction and maintenance of primary schools or health infrastructure, 2) construction or maintenance of roads, 3) construction or maintenance of wells, 4) organization of security patrols, 5) maintenance of a church or mosque, 6) construction of a market? Simple summation. | Q192 | 0.7 | 1.02 | 0 | 6 | 3352 |
| 159 | Intra-village | | Community ownership | Continuous (0-8). The community is capable of independently determining the rules of access and use for a number of community resources: 1) arable land, 2) community forest, 3) pasture, 4) water (lake, rivers), 5) mineral mine, 6) quarry for stone/ sand, 7) hunting reserve, and 8) other. Simple summation. | EC121b-EC128b | 1.29 | 1.36 | 0 | 7 | 465 |
| 160 | Intra-village | | Development committee | Binary. Development committee exist in the village? | EC105a | 0.39 | 0.49 | 0 | 1 | 704 |
| 161 | Intra-village | | Committee population | Binary. Development committee undertakes activities that benefits the whole community. Conditional on development committee existence. | EC105b | 0.92 | 0.27 | 0 | 1 | 272 |
| 162 | Intra-village | | Committee frequency | Binary. How often does the development committee meet per month? Conditional on development committee existence. | EC105c | 1.69 | 1.31 | 0 | 8 | 252 |
| 163 | Intra-village | | # Associations | Same as above | EC105a-EC120a | 3.07 | 2.2 | 0 | 13 | 712 |
| 164 | Inter-village | | Cleavages other village | Continuous (0-10). It is sometimes difficult for the inhabitants of a village to work together because of the differences that exist between them. What cleavages exist between members of this village and those in neighboring villages? The cleavages were prompted. We have a list from which they could check the following cleavages: 1) between the rich and poor, 2) between men and women, 3) between the young and the elderly, 4) between indigenous and newcomers, 5) between the different religions, 6) between the tribes or ethnic groups, 7) between civilians and ex-combatants/ militia, 8) between pastoralists and farmers, 9) between people of different political parties, and 10) between educated and uneducated. Simple summation. | Q187 | 0.96 | 1.26 | 0 | 8 | 3124 |
| 165 | Inter-village | | Trust other village | Continuous (0-1000). Contribution in trust game to a (randomly selected) villager of a neighboring village. See above for game details. | Q277 | 367.32 | 239.66 | 0 | 1000 | 1358 |

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|-----|---------------|--|--------------------|---|-------------------|------|------|---|---|------|
| 166 | Inter-village | | Committee other | Continuous (0-9). Existing committees that work together with other villages: 1) water/ sanitation, 2) roads and erosions, 3) health (CODESA), 4) education/ school (COPA), 5) farming or agriculture, 6) protection or security, 7) conflict resolution, 8) development general, and 9) other. Simple summation. | Q182 | 1.36 | 1.32 | 0 | 7 | 2405 |
| 167 | Inter-village | | Projects other | Continuous (0-6). Voluntary projects undertaken with other villagers: 1) construction and maintenance of primary schools or health infrastructure, 2) construction or maintenance of roads, 3) construction or maintenance of wells, 4) organization of security patrols, 5) maintenance of a church or mosque, 6) construction of a market. Simple average. | Q195 | 0.45 | 0.46 | 0 | 1 | 1385 |
| 168 | Inter-village | | Associations other | Continuous (0-11). Existing associations that undertake activities with other villages: 1) an association affiliated to the church/ mosque, 2) a peasant association, 3) an association of the elderly, 4) an association of women, 5) a youth organization, 6) an association of former combatants / militia 7) an association for savings and credit, 8) an association to support a certain politician or political party, 9) a human rights association, 10) a cultural association / ethnic, and 11) other. Simple average. | EC105g- EC120g | 0.66 | 0.37 | 0 | 1 | 628 |
| 169 | Inter-village | | Resources other | Continuous (0-8). Community resources held jointly with the other villages in this territory: 1) arable land, 2) community forest, 3) pasture, 4) water (lake, rivers), 5) mineral mine, 6) quarry for stone/ sand, 7) hunting reserve, and 8) other. Simple average. | EC121j- EC128j | 0.52 | 0.45 | 0 | 1 | 457 |
| 170 | Inter-village | | Managed conflict | Binary. In the last three months, chief has managed conflict between his/her village and a neighboring village. | EC179 | 0.24 | 0.43 | 0 | 1 | 655 |
| 171 | Inter-village | | Hosted other | Binary. In the last three months, chief has hosted the chief of a neighboring village. | EC179 | 0.16 | 0.36 | 0 | 1 | 655 |

Note: Variable definitions and summary information.

Appendix F: Balance across Treatment Conditions

The analyses in this paper rely on randomization, which guarantees that treatment and control areas are similar in expectation. In practice, however, it is possible for them to differ simply by virtue of unlucky draws. To test this, we compare Tuungane treatment and control areas, and – for those areas that partook in the parity lottery – gender parity and control areas. Because we do not have baseline data for the villages, we make use of the data collected in 2010 and 2011 by Humphreys et al. (2019) in 816 randomly selected villages. We limit ourselves to pre-treatment information and variables that do not change due to the treatment. We analyze the following variables. Distance from a set of (nearest) points of importance that are unlikely to change due to the program: mine, post office, and the kingdom headquarters. Distance data (measured in hours of walking) are based on individual responses, mean aggregated to the village level. Note that in a large number of villages, individuals do not know the distance to these locations, and thus we have fewer observations than the 816 visited villages. We also use data on ethnic and religious composition of the village, measured as the probability that two individuals, selected at random from the village, will be of different ethnicities or religious groups. These data come from a survey conducted with village chiefs. In total, 773 of the 816 village chiefs were interviewed. Data were also collected about the characteristics of the previous chief: his year of birth, and whether he was democratically elected. Note that many chiefs responded with “Don’t know”, resulting in considerably fewer than 773 observations for the balance test. We also collected data on the principal economic activities undertaken in the village (as a percentage of the village population). In addition, data were collected on the presence of infrastructure in the village in 2006: wells, schools, clinics, churches and meeting halls. We use data from the chief on the number of IDPs, returned-IDPs, refugees and repatriated refugees that entered the village in 2006. Again, many chiefs responded with “Don’t know”. Finally, at the individual level we analyze gender and age. The data were obtained from the respondent about all the other individuals (both adults and children) in the household.

Table A5 lists the mean and standard deviation for each variable for the Tuungane and control areas. We also test the difference between both, based on simple OLS regressions. **Table A6** presents the same information comparing villages with and without the gender parity requirement, restricted only to those villages that partook in the gender parity lottery.

The results suggest that there are no consistent differences across treatment groups, which is what is to be expected given the random assignment.

Table A5. Balance Tuungane and Control

| Variable | Q | Tuungane | Sd. | Control | Sd. | Diff. | (Se.) | N |
|------------------------------|-------|----------|-------|---------|-------|---------|--------|-------|
| Distance mine | QE13 | 20.98 | 42.46 | 25.03 | 59.73 | -4.05 | (3.86) | 723 |
| Distance police post | QE13 | 3.61 | 6.11 | 3.69 | 6.14 | -0.08 | (0.44) | 777 |
| Distance kingdom HQ | QE13 | 8.99 | 19.6 | 8.68 | 11.76 | 0.31 | (1.16) | 771 |
| Ethnic heterogeneity | CQ13 | 0.32 | 0.27 | 0.33 | 0.28 | -0.02 | (0.02) | 728 |
| Religious heterogeneity | CQ14 | 0.52 | 0.19 | 0.52 | 0.2 | 0 | (0.01) | 724 |
| Birth year former chief | CQ45 | 1936.43 | 19.62 | 1938.53 | 21.13 | -2.1 | (2.19) | 347 |
| Former chief democratic | CQ48 | 0.16 | 0.37 | 0.17 | 0.38 | -0.01 | (0.03) | 653 |
| Share in agriculture | CQ15 | 71.17 | 20.5 | 71.61 | 20.49 | -0.43 | (1.52) | 724 |
| Share in herding | CQ15 | 9.43 | 10.47 | 9.29 | 9.52 | 0.13 | (0.77) | 669 |
| Share in commerce | CQ15 | 3.8 | 8.67 | 3.98 | 7.4 | -0.19 | (0.62) | 669 |
| Share in fishing | CQ15 | 6.13 | 12.76 | 6.05 | 12.2 | 0.08 | (0.96) | 673 |
| Share in industrial | CQ15 | 0.13 | 0.97 | 0.17 | 1.42 | -0.04 | (0.09) | 665 |
| Share in mining | CQ15 | 3.29 | 8.71 | 3.5 | 8.32 | -0.2 | (0.66) | 667 |
| Share in other | CQ15 | 4.44 | 8.04 | 4.21 | 7.9 | 0.22 | (0.63) | 646 |
| Share in other services | CQ15 | 4.41 | 4.66 | 4.13 | 4.55 | 0.28 | (0.36) | 665 |
| Wells in 2006 | CQ23 | 0.91 | 1.83 | 1.4 | 3.29 | -0.49** | (0.2) | 705 |
| Schools in 2006 | CQ24 | 3.5 | 5.04 | 3.51 | 4.48 | -0.01 | (0.36) | 713 |
| Clinics in 2006 | CQ25 | 0.32 | 0.84 | 0.29 | 0.51 | 0.03 | (0.05) | 718 |
| Churches in 2006 | CQ26 | 2.18 | 2.5 | 2.55 | 2.67 | -0.37* | (0.19) | 716 |
| Halls in 2006 | CQ27 | 0.04 | 0.3 | 0.04 | 0.21 | 0.01 | (0.02) | 709 |
| IDPs in 2006 | CQ136 | 2.8 | 12.64 | 4.86 | 20.07 | -2.06 | (1.47) | 533 |
| IDPs returned in 2006 | CQ137 | 5.4 | 24.45 | 3.91 | 16.04 | 1.49 | (1.8) | 518 |
| Refugees in 2006 | CQ138 | 0.57 | 3.78 | 0.97 | 7.29 | -0.41 | (0.5) | 557 |
| Refugees repatriated in 2006 | CQ139 | 0.76 | 12.13 | 0.25 | 3.21 | 0.52 | (0.72) | 575 |
| Share of male respondents | QF7 | 0.5 | 0.5 | 0.5 | 0.5 | 0 | (0.01) | 23567 |
| Average age respondents | QF9 | 20.12 | 16.82 | 20.17 | 17.02 | -0.06 | (0.23) | 22536 |

Note: Question number responds to 2010-2011 survey (Humphreys et al. 2012). Tests of difference based on simple OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed).

Table A6. Balance Gender Parity and Control

| Variable | Q | Tuungane | Sd. | Control | Sd. | Diff. | (Se.) | N |
|------------------------------|-------|----------|-------|---------|-------|--------|--------|------|
| Distance mine | QE13 | 11.8 | 18.93 | 15.59 | 33.25 | -3.79 | (4.11) | 169 |
| Distance police post | QE13 | 2.91 | 4.34 | 3.36 | 4.74 | -0.45 | (0.67) | 184 |
| Distance kingdom HQ | QE13 | 7.63 | 10.32 | 9.93 | 10.31 | -2.3 | (1.53) | 183 |
| Ethnic heterogeneity | CQ13 | 0.33 | 0.27 | 0.33 | 0.27 | 0 | (0.04) | 171 |
| Religious heterogeneity | CQ14 | 0.53 | 0.18 | 0.54 | 0.15 | -0.02 | (0.03) | 171 |
| Birth year former chief | CQ45 | 1937.83 | 20.82 | 1935.52 | 20.84 | 2.31 | (5.14) | 66 |
| Former chief democratic | CQ48 | 0.16 | 0.37 | 0.16 | 0.37 | 0 | (0.06) | 150 |
| Share in agriculture | CQ15 | 75.79 | 17.34 | 71.61 | 19.79 | 4.18 | (2.85) | 170 |
| Share in herding | CQ15 | 8.48 | 8.34 | 9.74 | 13.34 | -1.26 | (1.8) | 153 |
| Share in commerce | CQ15 | 5.83 | 14.21 | 2.41 | 4.85 | 3.42** | (1.7) | 156 |
| Share in fishing | CQ15 | 2.96 | 8.13 | 5.64 | 13.2 | -2.68 | (1.75) | 155 |
| Share in industrial | CQ15 | 0.19 | 1.27 | 0 | 0 | 0.19 | (0.14) | 155 |
| Share in mining | CQ15 | 2.01 | 4.7 | 2.51 | 7.09 | -0.49 | (0.97) | 156 |
| Share in other | CQ15 | 3.7 | 4.41 | 6.02 | 10.17 | -2.31* | (1.26) | 157 |
| Share in other services | CQ15 | 5.47 | 5.11 | 5.06 | 4.49 | 0.41 | (0.77) | 157 |
| Wells in 2006 | CQ23 | 1.07 | 2.11 | 0.88 | 1.93 | 0.19 | (0.31) | 168 |
| Schools in 2006 | CQ24 | 2.37 | 4.02 | 2.96 | 4 | -0.6 | (0.62) | 169 |
| Clinics in 2006 | CQ25 | 0.49 | 1.37 | 0.28 | 0.48 | 0.21 | (0.16) | 170 |
| Churches in 2006 | CQ26 | 1.62 | 1.76 | 1.68 | 1.75 | -0.06 | (0.27) | 169 |
| Halls in 2006 | CQ27 | 0.02 | 0.15 | 0.07 | 0.46 | -0.05 | (0.05) | 169 |
| IDPs in 2006 | CQ136 | 3.3 | 9.51 | 2.93 | 12.53 | 0.37 | (2.11) | 114 |
| IDPs returned in 2006 | CQ137 | 2.36 | 12.52 | 7.79 | 28.52 | -5.43 | (4.26) | 110 |
| Refugees in 2006 | CQ138 | 0 | 0 | 1.1 | 5.24 | -1.1 | (0.7) | 119 |
| Refugees repatriated in 2006 | CQ139 | 0 | 0 | 0.05 | 0.38 | -0.05 | (0.05) | 122 |
| Share of male respondents | QF7 | 0.5 | 0.5 | 0.5 | 0.5 | -3.79 | (0.01) | 5457 |
| Average age respondents | QF9 | 20.49 | 17.21 | 19.81 | 16.84 | -0.45 | (0.47) | 5198 |

Note: Question number responds to 2010-2011 survey (Humphreys et al. 2012). Tests of difference based on simple OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed). Data only from the 190 villages that participated in the gender parity lottery.

Appendix G: Results by Individual Measures

Table A7 provides results for the 171 outcome measures individually to provide a sense of their magnitude and economic significance.

Table A7. Results by Individual Outcome

| # | Family | Subfamily | Outcome | Control | Tuungane | (Se.) | N |
|----|----------|-----------|-----------------------------|---------|----------|--------|------|
| 1 | Hospital | Building | Floor quality | 0.82 | 0.08** | 0.04 | 499 |
| 2 | Hospital | Building | Wall quality | 0.85 | 0.06* | 0.03 | 459 |
| 3 | Hospital | Building | Infrastructure | 0.67 | 0.01 | 0.02 | 500 |
| 4 | Hospital | Building | Clean floor | 0.75 | 0.01 | 0.04 | 496 |
| 5 | Hospital | Building | Clean wall | 0.64 | 0.04 | 0.05 | 497 |
| 6 | Hospital | Building | Rate building | 0.52 | 0.04* | 0.02 | 3205 |
| 7 | Hospital | Building | Toilets | 0.77 | 0.05** | 0.02 | 3166 |
| 8 | Hospital | Capacity | # Providers present | 3.01 | -0.01 | 0.28 | 499 |
| 9 | Hospital | Capacity | # Beds | 8.46 | 1.38 | 0.85 | 494 |
| 10 | Hospital | Capacity | Wait personnel | 5.2 | 1.88 | 1.21 | 413 |
| 11 | Hospital | Capacity | Wait treatment | 5.66 | 0.41 | 1.02 | 409 |
| 12 | Hospital | Capacity | # Nurses | 3.19 | -0.05 | 0.21 | 496 |
| 13 | Hospital | Capacity | # Doctors | 0.3 | 0.01 | 0.07 | 469 |
| 14 | Hospital | Capacity | Treatments | 4.95 | -0.04 | 0.12 | 490 |
| 15 | Hospital | Capacity | Rate capacity | 0.45 | 0.04* | 0.02 | 3181 |
| 16 | Hospital | Capacity | Wait time | 9.74 | 0.36 | 1.07 | 2909 |
| 17 | Hospital | Material | # Antibiotics | 1293.38 | 354.14* | 199.77 | 454 |
| 18 | Hospital | Material | # Malaria tablets | 781.8 | 325.52** | 151.58 | 458 |
| 19 | Hospital | Material | # Anti-inflammatory tablets | 868.85 | 237.61 | 171.9 | 448 |
| 20 | Hospital | Material | Rate material | 0.41 | 0.03 | 0.02 | 3107 |
| 21 | Hospital | Staff | Doctor nurse ratio | 0.11 | -0.03 | 0.02 | 464 |
| 22 | Hospital | Staff | Director education | 13.5 | -0.17 | 0.27 | 507 |
| 23 | Hospital | Staff | Director medical studies | 0.9 | -0.01 | 0.03 | 500 |
| 24 | Hospital | Staff | Rate care | 0.58 | 0.03 | 0.02 | 3148 |
| 25 | Hospital | Staff | Rate health provider | 0.62 | 0.02 | 0.02 | 3110 |
| 26 | Hospital | Staff | Presence health provider | 0.95 | 0 | 0.01 | 3157 |
| 27 | Hospital | Admin | Director present | 0.81 | -0.01 | 0.04 | 502 |
| 28 | Hospital | Admin | Patient register | 0.93 | 0.04* | 0.02 | 494 |
| 29 | Hospital | Admin | Staff register | 0.82 | -0.01 | 0.04 | 491 |
| 30 | Hospital | Admin | Stock register | 0.77 | 0.07* | 0.04 | 475 |
| 31 | Hospital | Admin | Cash book | 0.72 | 0.02 | 0.04 | 479 |
| 32 | Hospital | Admin | Rate administration | 0.57 | 0.05** | 0.02 | 2908 |
| 33 | Hospital | Community | # Comm. meetings | 4.46 | -0.11 | 0.49 | 414 |
| 34 | Hospital | Community | Contr. in kind | 0.1 | 0.03 | 0.03 | 451 |

| | | | | | | | |
|----|----------|-----------|-----------------------|--------|----------|-------|------|
| 35 | Hospital | Community | Contr. in \$ | 0.04 | 0 | 0.02 | 448 |
| 36 | Hospital | Community | Know CODESA | 9.45 | -1.07* | 0.63 | 460 |
| 37 | Hospital | Community | CODESA meetings | 10.96 | -0.95 | 0.78 | 458 |
| 38 | Hospital | Community | Director present | 8.82 | -1.17 | 0.72 | 471 |
| 39 | Hospital | Community | Rate interaction | 0.63 | 0.02 | 0.02 | 3092 |
| 40 | Hospital | Community | Contr. in kind | 0.05 | 0 | 0.01 | 2950 |
| 41 | Hospital | Community | Contr. in \$ | 0.03 | 0 | 0.01 | 2871 |
| 42 | Hospital | Costs | Open | 0.98 | 0 | 0.01 | 502 |
| 43 | Hospital | Costs | \$ Paid | 10.75 | 1.44 | 2.79 | 374 |
| 44 | Hospital | Costs | # Patients now | 4.04 | 0.58 | 0.69 | 478 |
| 45 | Hospital | Costs | # Patients last month | 191.33 | -33.07** | 16.4 | 470 |
| 46 | Hospital | Costs | Cost index | 0.01 | 0.08 | 0.05 | 484 |
| 47 | Hospital | Costs | Rate cost | 0.28 | 0.01 | 0.02 | 3114 |
| 48 | Hospital | Costs | Cost index | 0.01 | 0.04 | 0.04 | 2852 |
| 49 | Hospital | Costs | # Visits | 3.88 | -0.03 | 0.31 | 3184 |
| 50 | School | Building | Floor quality | 0.5 | 0.07* | 0.04 | 494 |
| 51 | School | Building | Wall quality | 0.74 | 0.04 | 0.04 | 435 |
| 52 | School | Building | Roof quality | 0.75 | 0.07** | 0.03 | 495 |
| 53 | School | Building | Windows | 0.26 | 0.1** | 0.04 | 497 |
| 54 | School | Building | Toilets | 0.64 | 0.05 | 0.04 | 498 |
| 55 | School | Building | Rate building | 0.38 | 0.06*** | 0.02 | 3154 |
| 56 | School | Building | Toilets | 0.57 | 0.03 | 0.02 | 3182 |
| 57 | School | Capacity | # Classrooms | 7.06 | -0.47* | 0.27 | 498 |
| 58 | School | Capacity | Classroom size | 29.03 | -2.46 | 2.71 | 149 |
| 59 | School | Capacity | Highest class | 0.86 | -0.02 | 0.03 | 477 |
| 60 | School | Capacity | # Teachers | 7.21 | -0.03 | 0.25 | 451 |
| 61 | School | Capacity | # Students reg. | 262.69 | -35.71** | 14.88 | 473 |
| 62 | School | Capacity | Teacher student ratio | 0.04 | 0 | 0 | 437 |
| 63 | School | Capacity | Rate capacity | 0.42 | 0.04* | 0.02 | 3103 |
| 64 | School | Capacity | Classrooms large | 0.7 | 0.07*** | 0.02 | 2918 |
| 65 | School | Material | Blackboard | 0.96 | -0.01 | 0.03 | 150 |
| 66 | School | Material | # Benches | 8.44 | 2.41** | 1.2 | 153 |
| 67 | School | Material | Prop. books | 0.22 | -0.07 | 0.06 | 144 |
| 68 | School | Material | Prop. notebooks | 0.68 | 0 | 0.07 | 139 |
| 69 | School | Material | Teacher book | 0.72 | -0.04 | 0.09 | 139 |
| 70 | School | Material | Teacher prep. | 0.79 | 0.02 | 0.07 | 141 |
| 71 | School | Material | Teacher list | 0.75 | 0.09 | 0.08 | 141 |
| 72 | School | Material | Rate material | 0.35 | 0.01 | 0.02 | 2765 |
| 73 | School | Staff | Teacher present | 0.94 | 0.03 | 0.02 | 146 |
| 74 | School | Staff | Studied pedagogy | 0.97 | 0.02 | 0.02 | 143 |
| 75 | School | Staff | Director education | 10.78 | 0 | 0.24 | 499 |
| 76 | School | Staff | Director pedagogy | 0.95 | 0.03 | 0.02 | 469 |
| 77 | School | Staff | Rate teachers | 0.59 | 0.02 | 0.02 | 2797 |
| 78 | School | Staff | Teacher absence | 0.25 | 0 | 0.02 | 2537 |

| | | | | | | | |
|-----|-----------|-----------|----------------------------|--------|----------|-------|------|
| 79 | School | Staff | Teacher punctual | 0.92 | 0 | 0.01 | 2551 |
| 80 | School | Staff | Teacher qualified | 0.91 | 0 | 0.01 | 2490 |
| 81 | School | Staff | Teacher rigorous | 0.88 | 0.01 | 0.02 | 2402 |
| 82 | School | Admin | Director present | 0.67 | 0 | 0.04 | 490 |
| 83 | School | Admin | Staff register | 0.88 | 0.03 | 0.03 | 426 |
| 84 | School | Admin | National program | 0.63 | 0.04 | 0.05 | 357 |
| 85 | School | Admin | Rate director | 0.54 | 0.02 | 0.02 | 2671 |
| 86 | School | Community | # Comm. meetings | 3.11 | -0.36** | 0.18 | 457 |
| 87 | School | Community | Contr. in kind | 0.28 | -0.02 | 0.04 | 440 |
| 88 | School | Community | Contrib. in \$ | 0.19 | -0.02 | 0.04 | 432 |
| 89 | School | Community | Know COPA | 5.69 | -0.18 | 0.21 | 470 |
| 90 | School | Community | COPA meetings | 5.02 | -0.78** | 0.33 | 456 |
| 91 | School | Community | Director present | 4.4 | -0.69** | 0.34 | 465 |
| 92 | School | Community | Rate interaction | 0.6 | 0.03 | 0.02 | 2899 |
| 93 | School | Community | Contr. in kind | 0.08 | 0.01 | 0.01 | 2867 |
| 94 | School | Community | Contr. in \$ | 0.06 | -0.01 | 0.01 | 2818 |
| 95 | School | Costs | Open | 0.32 | -0.01 | 0.04 | 465 |
| 96 | School | Costs | Boys | 17.65 | 3.73** | 1.82 | 143 |
| 97 | School | Costs | Girls | 15.47 | 1.58 | 1.54 | 143 |
| 98 | School | Costs | Students pres. | 232.16 | -32.98** | 13.34 | 473 |
| 99 | School | Costs | School fee (\$) | 2.11 | -0.26* | 0.13 | 477 |
| 100 | School | Costs | Fee (\$) | 0.84 | 0.01 | 0.15 | 381 |
| 101 | School | Costs | Rate costs | 0.33 | 0.01 | 0.02 | 2875 |
| 102 | School | Costs | Cost (\$) | 87.18 | -9.63* | 5.23 | 2247 |
| 103 | School | Costs | School fee (\$) | 2.38 | -0.21*** | 0.07 | 2616 |
| 104 | School | Costs | Fee (\$) | 1.77 | 0.2* | 0.11 | 1677 |
| 105 | Health | | Medical care | 0.79 | -0.03 | 0.04 | 434 |
| 106 | Health | | U5 mortality | 0.14 | -0.04 | 0.03 | 431 |
| 107 | Health | | Death head | 0.03 | 0 | 0.02 | 434 |
| 108 | Health | | Death other | 0.2 | 0.01 | 0.04 | 434 |
| 109 | Health | | Sick head | 0.34 | -0.04 | 0.04 | 434 |
| 110 | Health | | Sick other | 0.58 | 0.04 | 0.05 | 432 |
| 111 | Education | | Attendance daughters | 1.07 | -0.03 | 0.05 | 2894 |
| 112 | Education | | Attendance sons | 1.37 | -0.03 | 0.05 | 2919 |
| 113 | Education | | Never attended (daughters) | 0.39 | -0.01 | 0.03 | 2787 |
| 114 | Education | | Never attended (sons) | 0.35 | 0.01 | 0.04 | 2777 |
| 115 | Education | | Grade (French) | 1.98 | -0.12 | 0.1 | 1259 |
| 116 | Education | | Grade (local) | 0.92 | -0.07 | 0.11 | 406 |
| 117 | Welfare | | Roof quality | 0.38 | -0.04** | 0.02 | 3371 |
| 118 | Welfare | | Wall quality | 0.09 | -0.01 | 0.01 | 3336 |
| 119 | Welfare | | Assets | 1.45 | -0.04 | 0.03 | 3379 |
| 120 | Welfare | | Consumption (\$) | 84.93 | -5.69 | 4.24 | 3377 |
| 121 | Welfare | | Earnings (\$) | 12.27 | 0.62 | 1.29 | 2919 |
| 122 | Women | | Women rights | 0.57 | -0.02 | 0.02 | 3359 |

| | | | | | | | |
|-----|---------------|----------------|----------------------------|--------|---------|-------|------|
| 123 | Women | | Hit women | 2.65 | -0.13 | 0.08 | 3364 |
| 124 | Women | | Women association | 0.21 | 0 | 0.02 | 3204 |
| 125 | Women | | Daughter school attendance | 0.44 | -0.01 | 0.01 | 2162 |
| 126 | Women | | Daughter never to school | 0.53 | 0 | 0.03 | 806 |
| 127 | Women | | Women committee members | 0.33 | 0.03 | 0.03 | 210 |
| 128 | Governance | Participation | Present meeting | 0.42 | 0.05*** | 0.02 | 3349 |
| 129 | Governance | Participation | Voluntary contribution | 1.33 | 0.04 | 0.05 | 1393 |
| 130 | Governance | Participation | Voted 2011 | 0.92 | 0.03*** | 0.01 | 3368 |
| 131 | Governance | Participation | Election meeting | 0.35 | 0.02 | 0.02 | 3350 |
| 132 | Governance | Participation | Right to participate | 0.63 | 0 | 0.02 | 3347 |
| 133 | Governance | Participation | Interaction | 2.37 | -0.06 | 0.14 | 712 |
| 134 | Governance | Accountability | Interaction | 0.74 | 0.04 | 0.04 | 3371 |
| 135 | Governance | Accountability | Local committee | 3.86 | 0.21 | 0.13 | 2620 |
| 136 | Governance | Accountability | Chief informs | 0.71 | 0.02 | 0.02 | 3253 |
| 137 | Governance | Accountability | Other bodies | 0.49 | 0.02 | 0.02 | 2898 |
| 138 | Governance | Accountability | Influence leaders | 0.17 | 0.01 | 0.01 | 3018 |
| 139 | Governance | Accountability | Verify leaders | 0.27 | -0.01 | 0.01 | 3343 |
| 140 | Governance | Accountability | Local committee | 2.66 | -0.06 | 0.15 | 601 |
| 141 | Governance | Transparency | Accept school | 0.81 | 0 | 0.05 | 299 |
| 142 | Governance | Transparency | Accept health | 0.81 | -0.05 | 0.07 | 228 |
| 143 | Governance | Transparency | Knowledge | 2.39 | -0.02 | 0.06 | 3184 |
| 144 | Governance | Transparency | Verify chief | 0.74 | -0.01 | 0.01 | 3353 |
| 145 | Governance | Efficiency | Approached state | 0.06 | 0 | 0.01 | 3024 |
| 146 | Governance | Efficiency | Successful state | 0.02 | 0 | 0 | 3024 |
| 147 | Governance | Efficiency | Approached NGO | 0.04 | 0 | 0.01 | 3087 |
| 148 | Governance | Efficiency | Successful NGO | 0.01 | 0 | 0 | 3084 |
| 149 | Governance | Capture | Committee exist | 2.01 | 0.06 | 0.07 | 3343 |
| 150 | Governance | Capture | Committee elected | 0.82 | 0 | 0.01 | 2504 |
| 151 | Governance | Capture | # Associations | 1.4 | -0.04 | 0.07 | 3332 |
| 152 | Governance | Capture | Association elected | 0.76 | -0.01 | 0.02 | 1652 |
| 153 | Governance | Capture | Collected tax | 0.06 | 0 | 0.01 | 3300 |
| 154 | Governance | Capture | Committee funds | 0.26 | 0 | 0.02 | 3201 |
| 155 | Intra-village | | Cleavages | 1.09 | -0.07 | 0.05 | 3167 |
| 156 | Intra-village | | Trust village member | 389.67 | -2.03 | 13.74 | 1344 |
| 157 | Intra-village | | Trust village chief | 431.89 | -14.48 | 13.23 | 1304 |
| 158 | Intra-village | | Voluntary projects | 0.72 | -0.02 | 0.04 | 3352 |
| 159 | Intra-village | | Community ownership | 1.26 | 0.02 | 0.11 | 465 |
| 160 | Intra-village | | Development committee | 0.4 | -0.02 | 0.03 | 704 |
| 161 | Intra-village | | Committee population | 0.94 | -0.02 | 0.03 | 272 |
| 162 | Intra-village | | Committee frequency | 1.62 | 0.21 | 0.17 | 252 |
| 163 | Intra-village | | # Associations | 2.99 | 0.12 | 0.16 | 712 |
| 164 | Inter-village | | Cleavages other village | 0.97 | -0.02 | 0.05 | 3124 |
| 165 | Inter-village | | Trust other village | 378.66 | -16.13 | 12.85 | 1358 |
| 166 | Inter-village | | Committee other | 1.36 | 0.02 | 0.05 | 2405 |

| | | | | | | |
|-----|---------------|--------------------|------|-------|------|------|
| 167 | Inter-village | Projects other | 0.46 | 0 | 0.02 | 1385 |
| 168 | Inter-village | Associations other | 0.65 | 0.03 | 0.03 | 628 |
| 169 | Inter-village | Resources other | 0.49 | 0.05 | 0.03 | 457 |
| 170 | Inter-village | Managed conflict | 0.27 | -0.04 | 0.03 | 655 |
| 171 | Inter-village | Hosted other | 0.15 | 0.03 | 0.03 | 655 |

Note: We report sample average treatment effects. Regressions use randomization block fixed effects. Standard errors clustered at the cluster level. * $p \leq 0.10$, ** $p \leq 0.05$, *** $p \leq 0.01$.

Appendix H: Deviations from the Pre-Analysis Plan

This study was preregistered at the EGAP registry (ID: [Redacted]) on [Redacted]. The registration took place prior to researcher access to outcome data. In this section, we discuss deviations from the pre-analysis plan.

First, the family outcomes governance, women empowerment, intra-village cohesion and inter village cohesion were pre-registered as secondary outcomes. In this manuscript, however, we present them together with the original main outcomes.

Second, a number of individual outcomes were originally preregistered but were not included. For the building quality dimensions of service provision related to the primary school and the hospital, electricity (EE38, ES34) and running water (EE32, ES33) were not included because of a lack of variation (almost no facility has running water or electricity). Related to governance's participation dimension, we did not include the village chief's opinions about the decision making process in the village (EC194-196), as these are particularly prone to social desirability biases. Related to governance's transparency dimension, we excluded information related to bribes (Q107, Q123, Q136) because of a lack of variation (few people say they pay bribes). Finally, related to the women empowerment family, for sensitivity reasons, we excluded survey questions about respondents' opinions related to rape (Q301-305). Including these individual measures, however, does not change this study's findings.

Finally, we originally suggested to conduct subgroup analysis across a wide set of different characteristics: improvements in service provision, gender parity, type of community and type of project. We also suggested to explore unintended consequences of the program, specifically whether the program increased prices in treatment communities. We did not include these additional analyses to avoid making the manuscript unwieldy.