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Does Information Break the Political Resource Curse? Experimental Evidence from Mozambique*

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Abstract

The political resource curse is the idea that natural resources can lead to the deterioration of public policies through corruption and rent-seeking by those closest to political power. One prominent consequence is the emergence of conflict. This paper takes this theory to the data for the case of Mozambique, where a substantial discovery of natural gas recently took place. Focusing on the anticipation of a resource boom and the behavior of local political structures and communities, a large-scale field experiment was designed and implemented to follow the dissemination of information about the newly-discovered resources. Two types of treatments provided variation in the degree of dissemination: one with information targeting only local political leaders, the other with information and deliberation activities targeting communities at large. A wide variety of theory-driven outcomes is measured through surveys, behavioral activities, lab-in-the-field experiments, and georeferenced administrative data about local conflict. Information given only to leaders increases elite capture and rent-seeking, while information and deliberation targeted at citizens increases mobilization and accountability-related outcomes, and decreases violence. While the political resource curse is likely to be in play, the dissemination of information to communities at large has a countervailing effect.

JEL codes: D72, O13, O55, P16.

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1 Introduction

Since Adam Smith's Wealth of Nations, which contains several unfavorable references to mining activities, economists have been wary of potential problems arising from the exploitation of natural resources. Gelb (1988) and Auty (1993) were the first to propose the term resource curse after observing a close relationship between mineral windfalls and the contraction of traded sectors, i.e., the Dutch Disease. In the 1990s, African countries such as Nigeria, Angola, and Sierra Leone, rich in oil and diamonds, became prominent cases for the development of new theories. These contributed to the argument that the resource curse was also related to political economy mechanisms involving widespread corruption (Treisman, 2000) and civil conflict (Collier and Hoeffler, 2004). While a significant body of research attends this phenomenon, little is known about how the presence of resources may directly impact the behavior of local political leaders and regular citizens.

The focus of this paper is on understanding the political roots of the resource curse. Theories based on political economy mechanisms start by associating the exploitation of natural resources with movements towards rent-seeking in the economy, at the expense of more productive activities (Tornell and Lane, 1999; Baland and Francois, 2000; Torvik, 2002). The curse become more explicitly political with Robinson et al. (2006), who posit that following news of a resource discovery, politicians become more interested in securing political power, pursuing corrupt behaviors and inefficient policies, and thus imposing negative consequences for the economy. A prominent symptom of these policies is the emergence of violence and civil conflict. Robinson et al. (2006) believe the curse is avoidable by promoting institutions that strengthen political accountability. However, causal evidence regarding the effects of the provision of information in the context of a future resource boom is scarce.

This paper tests for the presence of the political resource curse by analyzing reactions to news of a major resource discovery, i.e., the anticipation of a resource windfall. The focus is on first reactions at the local level, in particular those of citizens and local politicians. A large-scale randomized field experiment was conducted in 206 communities in Northern Mozambique in 2017, after a massive discovery of natural gas in the Rovuma basin, Cabo Delgado province. This provides a unique setting to study the political resource curse since the discovery, labeled the largest worldwide in many years, has the potential to generate a substantial impact on the Mozambican economy.[1] Facing limited media independence and penetration, as well as poor knowledge of the discovery in the province, a large coalition of governmental and non-governmental organizations, active in the international, national, and local arenas sponsored the efforts of disseminating information about

[1] See CNN (*Is Mozambique the next oil and gas hub?*, 03/05/2017) or The Financial Times (*Mozambique to become a gas supplier to world*, 27/06/2018) for two recent articles about natural gas in Mozambique.

the discovery and management of natural resources at the community level.

In cooperation with these partners, two interventions were designed and implemented. In the first, only local political leaders received the information module; in the second, it was delivered to both local leaders and citizens, targeting communities at large. In one version of the latter intervention, the information module was further accompanied by the organization of citizen deliberation meetings to discuss public policy priorities in relation to the future natural gas windfall. This design provided the opportunity to test for changes in behavior in a low-accountability context when only the local political elite is informed, and when the community at large is informed, with potentially higher levels of accountability. Most importantly for policy, this setting allows testing the role of information dissemination and of citizen deliberation on avoiding the curse.

The design of the experiment and of the measurements were included in a pre-analysis plan registered on the American Economic Association RCT registry (Armand et al., 2017), and followed closely in the analysis. The experimental design incorporates a wide range of measurements, including baseline and endline surveys, structured community activities (SCAs), lab-in-the-field experiments, and georeferenced data about violent events. Measurements were compiled specifically to depict behavioral changes among both local leaders and citizens, consistent with previous theoretical work on the political resource curse. Some behavioral measurements were originally developed for this project–namely SCAs measuring favoritism and rent-seeking, as well as a rent-seeking game; other behavioral measurements follow previous contributions, as in Casey et al. (2012), Batista and Vicente (2011), and Collier and Vicente (2014).

Outcome measures are grouped in five sets. The first is related to *awareness and knowledge* regarding natural resources, based on survey questions, measured both at baseline and endline, and administered to both local leaders and citizens. The second set is related to *elite capture* by local leaders, centered on behavioral measurements, including SCAs on resources intended for community use (e.g., zinc sheets for roof construction, funds for meetings) and on the appointment of a community taskforce, as well as leader behavior in a trust game. The third set is connected to *rent-seeking* by leaders and citizens, relying primarily on an auction eliciting willingness to engage in rent-seeking, and a novel rent-seeking lab-in-the-field game. The fourth set links to *mobilization, trust, and the demand for political accountability* by citizens. The outcomes on mobilization are grounded in survey-based measures of social capital, an SCA involving a matching grant activity that includes behavior associated with community meetings, and a public goods game. The outcomes on trust and accountability are based on survey questions, an SCA involving a postcard activity measuring demand for accountability, and citizen behavior in a standard trust game. Finally, the fifth set relates to *violence*, particularly important given the sudden rise in violent events attributed to extremist groups recruiting support in the province, which characterized the period at

end of the project and starting in October 2017.[2] Local conflict is measured through self-reported violence from surveys and through the incidence of conflict as measured by international event-based datasets (ACLED and GDELT). Given the large set of outcomes studied, multiple inference is addressed considering the joint-dependence of outcomes and following step-down multiple hypothesis testing (Romano and Wolf, 2005).

Clear positive effects of community-level information dissemination are observed on awareness and knowledge about the natural gas discovery among citizens and leaders. In particular, citizens become more optimistic regarding the future benefits of the discovery for their communities and households. On the contrary, when only leaders receive information, no change occurs in awareness and knowledge among citizens, while leaders become more acknowledged. In this case, impacts on increased elite capture are identified in terms of leaders' attitudes in favor of corruption, misuse of funds for public purposes, and less meritocratic appointments of community members for public service. Targeting information only at leaders increases by 27 percentage-points the probability of leakage for leaders entrusted with funds for a community activity. In addition, when only leaders receive information, increases in rent-seeking activities by both leaders and citizens occur. For citizens, this effect emerges for reported contacts with influential people, but also in bidding for meetings with district administrators, consistent with the effects on elite capture.

When the information campaign targets entire communities, no significant evidence of these adverse mechanisms is observed. Positive effects, such as increased citizen mobilization, trust, voice, and accountability, occur along with a decrease in violence as measured from different sources. For these effects, no clear differences occur as a result of adding citizen deliberation meetings to the information campaign.

Overall, the pattern of results is consistent with a mechanism of the resource curse centered on politicians' misbehavior, even if just in anticipation of a resource windfall. The simple act of being informed about resources exclusively seems to have emboldened local leaders. This suggests that such movements may be operating at the local level when only leaders have access to information. Crucially, the political resource curse can be avoided when communities are sufficiently informed and possibly more able to hold their leaders accountable.

This paper contributes to the vast literature on the natural resource curse, providing newly-available evidence on the role of information and on the political roots of the curse. In literature, the natural resource curse is defined by Caselli and Cunningham (2009) as a decrease in income following a resource boom. Empirically, this is observed in the cross-country negative relationship between

[2] Civilians were the main target. Appendix D.8 provides further details. For examples of coverage in international news see The Economist (*A bubbling Islamist insurgency in Mozambique could grow deadlier*, 09/08/2018), The Independent (*Mozambique's own version of Boko Haram is tightening its deadly grip*, 20/06/2018), The Financial Times (*Shadowy insurgents threaten Mozambique gas bonanza*, 21/06/2018).

GDP growth and exports of natural resources (Sachs and Warner, 1999).[3] Several theoretical contributions have attempted to explain this relationship, one of the first being the theory of the Dutch Disease. It proposed that resource booms shift inputs away from manufacturing and towards non-tradeables, leading to negative knowledge externalities in manufacturing. These ideas date back at least to Corden and Neary (1982). Other theoretical contributions link the resource curse instead with an increased propensity for rent-seeking. Tornell and Lane (1999) suggest that windfalls can increase interest group capture of fiscal redistribution, inducing a move towards the inefficient informal sector. Baland and Francois (2000) propose a multiple equilibrium framework, in which a resource boom could lead to increased rent-seeking rather than entrepreneurship. Similarly, Torvik (2002), using a simple model with rent-seeking and entrepreneurship as alternatives, shows that a resource boom leads to lower welfare in presence of a demand externality.

More recently, Mehlum et al. (2006) showed that the negative relationship encountered by Sachs and Warner (1999) holds only for countries with low-quality institutions. Building on this finding, Robinson et al. (2006) proposed a new theory of the resource curse based on a political mechanism, i.e., the political resource curse. In face of a resource discovery, and when institutional quality is poor, politicians are likely to enact inefficient policies that increase their likelihood of remaining in power and benefiting from resource rents. Vicente (2010) tests this assertion by analyzing patterns of change in perceived corruption after an oil discovery in the island-country of São Tomé and Príncipe, finding that vote-buying increased significantly after the discovery.[4] Another possible movement towards bad policies may involve lower taxation, as politicians try to decrease the level of political accountability. This is in line with the idea that political accountability is intimately associated with taxation, and that the presence of resource rents allows less interaction between government and citizens (Karl, 1997; Ross, 2001). McGuirk (2013) provides evidence consistent with this claim using Afrobarometer data.

Empirical evidence presented for Mozambique complements recent empirical work on the political resource curse devoted to the understanding of specific settings of natural-resource exploitation. The case of oil in Brazil has inspired a number of contributions. Caselli and Michaels (2013) analyze impacts of oil on the structure of municipality-level income. They find no evidence of the resource curse, but they show evidence consistent with political pressures for the resource curse: revenues of local governments increase significantly, but the quality of public good provision remains constant. Brollo et al. (2013) show that these additional revenues increase observed corruption and result in less educated mayoral candidates. In the context of Indonesia, in a field experiment where subjects were primed in different ways, Paler (2013) tests the hypothesis that

[3] In within-country studies evidence is mixed. In the context of Peru, Aragón and Rud (2013) find evidence of a positive effect of the demand for local inputs of a large gold mine on real income.

[4] At cross-country level, Arezki et al. (2017) find clear short-run effects for news about resource discoveries.

resource windfalls undermine political accountability, while taxes strengthen it. While the demand for political accountability is greater when taxation is primed, the role of information about government spending is as important when priming windfalls.[5]

The design and results of this study are closely related to four other contributions. First, the inspiration for the information and deliberation campaign is Humphreys et al. (2006), who first implemented a large-scale deliberative exercise related to the management of natural resources in the country of São Tomé and Príncipe in 2004. Second, knowledge about the impact on political participation of large-scale civic-education campaigns in Mozambique is available from the work of Aker et al. (2017). Third, work by Toews et al. (2016) shows positive impacts on job creation of resource-induced FDI in Mozambique. Finally, in the context of Tanzania, the recent paper by Cappelen et al. (2018) shows how videos conveying information about a natural resource discovery increase citizens' expectations of corruption.

The paper is organized as follows. Section 2 provides information about the context of the experiment. Sections 3 to 5 describe the treatments, sampling and randomization, as well as measurements, while Section 6 states the main hypotheses tested. Section 7 explains the estimation strategy and Section 8 shows the main results and presents the effects of deliberation. The paper concludes with a brief discussion.

2 Context

After substantial discoveries that started in 2010 in the Rovuma Basin (Cabo Delgado Province of Northern Mozambique), known gas reserves have risen to an estimated 130 trillion cubic feet. This led the US Energy Information Administration to name Mozambique as "one of the most promising countries in Africa in terms of natural gas".[6] High expectations surround the natural gas exploration in Cabo Delgado, headed by major multinationals such as Anadarko and ENI. Major investment plans were approved by the Government in 2017 and 2018, and new projects are currently under approval.[7] The epicenter of action is the town of Palma in the very north of the province, where a refinery and a port are expected to be built. If liquefied natural gas (LNG) investment plans materialize, Mozambique will become a global player in LNG exports (The World Bank, 2014) and can emerge as the third-largest exporter in the world (Frühauf, 2014).

The potential of these discoveries is considerable. Mozambique is a low-income country, ranking in 2017 seventh from the bottom worldwide in terms of GDP per capita (US$1,247, PPP current

[5] In a recent paper following a similar design in Ghana and Uganda, De la Cuesta et al. (2017) find no difference in the demand for accountability between priming on taxation or oil revenues.

[6] Source: Arabian Gazette (*East Africa: The New Global Energy Hot Spot*, 06/11/2014).

[7] Source: The Financial Times (*Mozambique to become a gas supplier to world*, 27/06/2018).

international $, The World Bank, 2017). Cabo Delgado province is primarily rural, with a total of 1.8 million habitants, and ranks lowest in human development among all the provinces of Mozambique (INE, 2015; Global Data Lab, 2016). Nevertheless, Mozambique faces a considerable risk of future resource and revenue mismanagement. Media independence and penetration are limited and political accountability also faces significant challenges. Mozambique is considered a "partly free" country (Freedom House, 2017), on a clearly decreasing trend in terms of voice and accountability (The World Bank, 2016).[8] In addition, it scores weakly in terms of management of natural resources, ranking 41st out of 89 countries in the 2017 Resource Governance Index (NRGI, 2017).

3 The treatments

The intervention consisted of a large information and deliberation campaign about the management of natural resources in the province of Cabo Delgado, focusing specifically on the recent natural gas discoveries. A large coalition of international, national, and local institutions, both governmental and non-governmental, sponsored the campaign.[9] In collaboration with these partners, the information and deliberation campaign was conducted at the community level between March and April in 2017. Figure 1 presents a timeline of the intervention.

The information module started by defining natural resources and the related legal rights of the population, including the presentation of various laws related to land, mines, forests, and fishing. This was a pre-condition for understanding, because at the outset, many communities were not fully clear about the concept of natural resources. The campaign provided details about the discovery of natural gas in Cabo Delgado, including plans for exploration, and the implications for local communities. Importantly, the module underlined the expected size of the natural gas windfall, with the positive implications for provincial government revenues and job creation. All sponsoring organizations involved in the project discussed and approved the final content of the information package, in order to guarantee widespread support and maintain neutrality.[10]

The campaign included two major randomized variations. Communities in treatment 1 (*Information to Leaders*) had the information module delivered to the corresponding local leaders only. In Mozambique, these individuals are the highest-ranked representatives of the Government within

[8] Melina and Xiong (2013) estimate that the improvement of institutions and governance practices in the country together with more efficient public spending can have an additional effect on non-LNG GDP growth rate of more than 0.5pp over more than 15 years.

[9] This group included the provincial government of Cabo Delgado, the Aga Khan Foundation, an international NGO with a strong presence in Cabo Delgado province, the Mozambican chapter of the Extractive Industry Transparency Initiative (EITI), two prominent national NGOs (the Christian Council and the Islamic Council of Mozambique), one university (Catholic University of Mozambique), one newspaper (@Verdade), and two local NGOs (UPC, the provincial farmers' union, and ASPACADE, the provincial association of paralegals).

[10] The full information manual is available upon request from the authors.

each community and are well-defined figures. In rural areas, these are known as village chiefs (*chefes de aldeia*), and in urban settlements as neighborhood chiefs (*secretários de bairro*). Their communities select both types of leaders, whom the State then acknowledges. They receive from the Government a wage, a uniform and the national flag (Nuvunga, 2013). The leaders' competencies are mainly related to land allocation, enforcement of justice, rural development, and formal ceremonies. In addition, they must be consulted when natural resources are procured in the community, and aid or public programs are to be implemented (Buur and Kyed, 2005).

Communities in treatment 2 (*Information to Leaders and Citizens*) had the information module provided to both leaders and citizens. In these communities, the information dissemination was targeted not only to local political leaders, but also to communities at large. Community meetings and door-to-door contact were implemented for this purpose in each community. In addition, communities in the *Control group* received no information nor deliberation campaigning.

Due to the low level of literacy among study participants, information was mainly delivered verbally. First, trained facilitators provided an explanation of the information content in local languages. Information delivery occurred either individually to local leaders in treatments 1 and 2, or in community meetings for treatment 2. Appendix A shows the structure of these presentations. Secondly, treatment 2 included a live community-theater presentation played by a team of three actors. The play represents a traditional family discussing the management of natural resources after hearing the news about the discovery of natural gas on the radio. A local theater company wrote the script in collaboration with the research team to communicate the contents of the information package in an informal manner. Finally, verbal communication was supplemented with the distribution of a tri-fold pamphlet designed in collaboration with a local artist. Figure 2 depicts the pamphlet: it is mostly pictorial and shows the main takeaways of the information package. It was hand-delivered to leaders in treatments 1 and 2, and to community members in treatment 2.

Within treatment 2, in addition to the information module, half of these communities were randomly selected and offered a deliberation module. This component started with the formation of small citizen committees of around 10 people. Each group was invited to meet and deliberate on the priorities for local spending of natural resource revenues. District administrators, the main political representative above the community but below the province level, received the results of the deliberation meetings from the research team.

4 Sampling and randomization

The study selected a sample of 206 communities in the province of Cabo Delgado, randomly drawn from the list of all 421 polling locations in the sampling frame and stratified on urban,

semi-urban, and rural areas. Appendix B provides additional details.

To randomly allocate polling stations to treatment groups and ensure balance on covariates, blocks of four communities were built using Mahalanobis-distance relative proximity, exploiting the richness of baseline information. Within each block, communities were randomly allocated with equal probability to either treatment 1, treatment 2 without the deliberation module (2A), treatment 2 with the deliberation module (2B), or a control group. This procedure resulted in 50, 51, 50, and 55 communities in each group, respectively.[11] Figure 3 presents their geographical distribution.

Sampling of citizens was the product of physical random walks during the baseline survey. In each house, heads of households were sampled for survey interviews and behavioral activities. A total of 2,065 heads of household were interviewed at baseline, approximately 10 per community. Post-treatment attrition was handled through substitutions in the same household, when possible. Attrition is not significantly different across all treatment groups (see Appendix B.1).

Table B2 in Appendix B.2 provides a characterization of the demographic traits of the sample. Twenty-seven percent of baseline household representatives are female, average age is 45 years old, average years of schooling is 4 years, and 56% are Muslim. Local leaders are almost all men (only 4% are female), average age is 54 years old, and average years of schooling is 6 years. They have been in power for 8.8 years on average (see Appendix D.6). Nine percent of the sample is located in urban areas, and 11% in semi-urban areas.

5 Measurement

The structure of measurements in this project included: (i) baseline and endline surveys at the household, local leader, and community levels; (ii) the holding of SCAs aimed at gathering behavioral data (implemented post-treatment); (iii) the implementation of lab-in-the-field experiments (implemented post-treatment); and (iv) georeferenced data on violent events from international datasets. Baseline data were collected from August to September 2016. Some SCAs were initiated immediately after the treatment activities in March 2017. The endline survey, the completion of SCAs, and the lab-in-the-field experiments were implemented in the period of August to November, 2017. Figure 1 depicts the timeline of the measurements.

[11] Disparities between groups are due to the efforts to reduce contamination across treatments. To avoid the potential for information spillovers, rural communities located within 3km of one another received the same treatment. Further details are available in the Appendix B. Results are robust to the exclusion of these substitute locations.

5.1 Surveys

The household questionnaire was answered by the household head and included questions on the demographic traits of the respondent and his/her household, knowledge relating to natural resources, expectations, trust, social capital and networks, political views, and violence. The leader questionnaire had a similar structure. The community questionnaire included questions on the existence of different types of local infrastructures and natural resources, distance to markets, local associations, community meetings, and local political structures; small groups of (self-selected) community representatives answered that questionnaire. Most questions in all three questionnaires were present in both baseline and endline surveys.

5.2 Structured community activities

SCAs follow the nomenclature of Casey et al. (2012), who consider these activities to be "concrete, real-world scenarios that allow unobtrusive measurement of leader and community decision-making, more objectively than lab experiments, hypothetical vignettes, or surveys." SCAs are differentiated as those submitted to local leaders and those submitted to citizens.

5.2.1 Leader: zinc roof tiles

This activity endeavors to measure elite capture of resources. The leader received eight zinc roof sheets and instructions that that they were "to be used in a way that benefits the community." Each zinc sheet was worth approximately 300 Meticais, equal to a total value of 2,400 (US$35). As the person representing the community, the leader was given the zinc sheets in private, and the activity was not announced publicly to the rest of the community. Leaders were told they had until the end of August 2017 to use the zinc sheets; otherwise, they would be redistributed to other needier communities. Casey et al. (2012) and Jablonski and Seim (2017) implemented versions of this activity. At the time of the endline visit to each community, leaders were asked whether the community (or the elite) had decided on the use of the zinc sheets, and to show each one of them. Their use was then recorded. The outcomes of interest for this activity are whether the elite or the community decided on the use of the zinc sheets and whether the zinc sheets were being used for private or public benefit, interpreting private purposes as elite capture.

5.2.2 Leader: funds for meetings

This SCA examined another form of elite capture, i.e., whether leaders appropriated funds that had been set aside to cover food items for the community members during their meetings. Leaders

were given 400 Meticais (US$6) and were requested to use the funds to purchase the food items. Quantities and types of food items purchased were observed and recorded by enumerators during the meetings, and the cost of each item was inquired at the nearest store. The main outcomes of interest are whether leaders appropriated any amount, and the share difference between the 400 Meticais and the amount spent on food items, i.e., the share appropriated by the leader.

5.2.3 Leader: appointing a taskforce

This activity was intended to measure propensity for favoritism by leaders choosing individuals for specific tasks. In this case, the leader was asked to select five individuals to take a Raven's test (Raven, 1936), a nonverbal test used in measuring abstract reasoning and regarded as a means of estimating intelligence, particularly in settings of low literacy. The test was composed of 10 questions, each of which asked respondents to complete a logical sequence of images. Leaders were told that if all five individuals got at least 5 out of 10 questions correct, they could earn a monetary prize of 1,000 Meticais (US$14) for their community. Leaders were also told that selected individual would receive a show-up bonus of 100 Meticais. Measurement thus centered on the test performance of the selected individuals. Moreover, all surveyed household representatives also took the Raven's test at endline, producing an estimate of the average score in the community. This allows observing a continuous measure of the appropriateness of the leader's choices, in absolute terms and relative to the corresponding community, as well as basic demographic characteristics, such as gender, of those individuals selected by the leader.

5.2.4 Leader and community: auctions

This SCA was meant to measure the propensity of both leaders and citizens to engage in potential rent-seeking activities. An auction for one or two activities was implemented. The first activity was a meeting with the district administrator (i.e., the main politician at the district level), including lunch and costs of transportation. This activity was thought to provide an environment conducive to possible rent-seeking activities, and was available to both local leaders and community members. The second activity was related to entrepreneurship and provided a productive alternative to the rent-seeking activity. It consisted of a training session, including lunch and transportation, on poultry farming focusing on the creation and management of a business in this sector. Only community members participated in this auction. The meetings with district administrators and the training were implemented in November and December 2017.

Each player in these auctions received 100 Meticais and was asked to bid for each activity. To ensure incentive compatibility of the auctions, the Becker-DeGroot-Marschak (BDM) mechanism

(Becker et al., 1964) was used. A set of prices was placed in a box, and after the individual had stated willingness-to-pay (WTP), the actual price was drawn at random. If the WTP was greater than the price, the bidder was forced to purchase the activity at the drawn price; otherwise, nothing was paid or purchased. This was repeated for the two auctions in the case of community members, with one being chosen by the toss of a coin afterwards. Thus, citizen bidders had an incentive to bid independently for each one of the two activities. All bidders in all auctions were allowed to bid more than 100 Meticais using their own funds and were truthfully told that there could be prices over 100 in the box. The primary outcomes of interest for this activity are the (log) amounts bid in the auction to meet the district administrator, and in the case of community members, the share amount bid for the meeting with the district administrator while considering the amount bid for the entrepreneurial activity.

5.2.5 Community: matching grants and meetings

The motivation for this SCA is the measurement of social cohesion and contribution to local public good provision. Communities got the opportunity to raise funds towards a community objective, similarly to an SCA implemented in Casey et al. (2012). Funds were matched at a rate of 50% until a maximum of 2,500 Meticais (US$35) if the community raised 5,000 Meticais or more. Specifically, communities were asked to form a committee that would raise and keep individual contributions until August 2017, and offered a book to record contributions. At the endline visit to the communities, the amounts they raised were verified and the corresponding matching grant given. This allows observing both survey data on awareness and reported contributions, and data on registered contributions from the book records.[12]

Before this matching activity, each community had an official public meeting to discuss whether to participate in the matching activity, and, if so, to select the objective for the funds raised under the activity. Thus, further behavioral outcomes related to the functioning of the meeting for the matching activity were collected. Each meeting was observed by enumerators, who recorded attendance, characteristics of participants, decisions made, and method of decision-making. The main outcomes of interest are participation and whether the meeting was conducted democratically–i.e., whether decisions were made by voting.

5.2.6 Community: postcards

The final SCA is an individual measure of demand for political accountability. At endline survey, each respondent received a pre-stamped postcard on which to write a message to the district admin-

[12] Both sources of data could be imperfect. The first because of social desirability bias, the second because fraudulent book entries for the purpose of inflating the matching grant cannot be rule out completely.

istrator about how to use revenues from natural gas. Figure 4 shows the postcard. All respondents could choose to ignore the postcard or to return the postcard with a message. The postcard had to be delivered to the leader, who was provided with a sealed box in which respondents could deposit their postcards. The assumption is that respondents were more likely to incur the cost of filling out and returning the postcard, the more they wanted to make politicians accountable for specific policies in the face of the natural gas windfall. Batista and Vicente (2011) used a similar instrument to measure demand for political accountability in Cape Verde, as did Collier and Vicente (2014) for empowerment against electoral violence in Nigeria.

Approximately one month after the endline survey, members of the research team collected the sealed boxes containing the returned postcards. While postcard messages were anonymous, numbering the postcards allowed recording individual behavior. The content was then recorded, and the messages were delivered to the respective district administrators. The main outcomes of interest are whether subjects sent the postcard, and the analysis of the message content.

5.3 Lab-in-the-field experiments

Three types of lab-in-the-field experiments were conducted to further measure behavioral preferences in controlled settings: (i) a trust game, (ii) a rent-seeking game, and (iii) a public goods game. The rent-seeking game is novel, while the trust and the public goods games are fairly standard in the experimental literature. All games involved the participation of all 10 community members surveyed. The trust and rent-seeking games also included the leader as a player. The sequence of play was randomized in each community.

5.3.1 Trust Game

The trust game measures elite capture, trust in local leaders from citizens and citizens' demand for leader accountability. The game involved the 10 sampled household heads and the leader. The version implemented was standard. Each citizen received an endowment of 100 Meticais in the form of 10 tokens worth 10 Meticais each. They had to decide to keep this income for themselves or send a portion to the leader. The funds sent to the leader were tripled. The leader then had to decide how much of this tripled amount to give back to the citizen. For the leader's decision, the strategy method was used; that is, the leader was asked for every possible positive amount sent from 1 to 10 tokens (which became 1 to 30), how much the leader would like to send back to the citizen. The game also included a punishment option at the end, before any decisions or outcomes were revealed. This option was phrased as: "Do you want to punish the leader if he/she sends back less than 50 Meticais, after having received 150 Meticais? Punishment costs 10

Meticais, and reduces the payoff of the leader by 30 Meticais." All citizens were paid according to the leader's full set of decisions, while the leader's payoff was determined by being randomly matched with one individual from the community.[13] The dominant strategy is not sending any tokens to one's counterpart in this game, as well as not punishing the leader.

5.3.2 Rent-seeking game

The rent-seeking game is a novel lab game specifically designed for this field experiment. It is intended to measure the willingness to engage in rent-seeking behavior at the expense of a more productive activity. The participants are the 10 citizens and the leader. Each citizen received an endowment of 10 tokens worth 10 Meticais each, for a total of 100 Meticais. Next, each citizen had to choose how many of the 10 tokens to send as a "gift" to the leader (understood as rent-seeking), with the remaining units being "put aside" (understood as a productive activity). The leader had to choose one citizen after observing the behavior of them all. The leader never observed the identity of the individuals, but only the amounts sent. In the case of a citizen not chosen by the leader, the units he/she sent as a gift accrued to the leader, while the units put aside stayed with the citizen. In the case of a citizen chosen by the leader, the leader received the units put aside in addition to the gift sent, while the citizen received a bonus of 300 Meticais for being chosen.

The leader receives all units sent as gifts and the units put aside by the person he/she chose. Therefore, the dominant strategy is to choose the person who set aside the most funds. An individual's best response is to put aside all of the endowment and do no rent-seeking at all. The main outcomes are whether citizens sent gifts, how much value they chose for the gifts they sent, and the extent to which leaders selected winners on the basis of the gifts they sent.

5.3.3 Public goods game

The public goods game measures social cohesion and contribution to a common goal. The version implemented was standard and involved the 10 citizens from the community, always excluding the leader. Each individual received an endowment of 100 Meticais in 10 tokens of 10 Meticais each and had to decide whether to keep it or contribute to a public account. All contributions in the public account were doubled, and divided equally to participants, independent of their contribution. The marginal per-capita return (MPCR) on contributing is 0.2, on the lower side of public goods experiments. The dominant strategy is not to contribute any token in the public account. The main outcome of interest is the extent to which participants invested in the public account.

[13] Community members were aware of this matching procedure. Punishment regarded leaders' decisions when faced with the scenario of receiving 150 Meticais (considered by the randomly selected citizen).

5.4 Conflict datasets

Survey measures are supplemented with administrative data about violence at the highest disaggregated level. As standard practice in the conflict literature, this study employed the Armed Conflict Location & Event Data Project - ACLED (Raleigh et al., 2010). ACLED provides information about geolocated violent events scrutinized by a team of dedicated researchers. For each event, it provides the exact day of the occurrence and the corresponding geolocation. Focus is on "*Violence against civilians*", described as "attacks by violent groups on civilians, with no fatalities being necessary for inclusion."

ACLED was supplemented with the Global Database on Events, Location and Tone - GDELT (Leetaru and Schrodt, 2013). GDELT provides information about geolocated events using automated textual analysis from news sources in print, broadcast, and web formats. The initial focus is on events classified as "*unconventional violence*", characterized by the "use of unconventional forms of violence that do not require high levels of organization or conventional weaponry" and by "repression, violence against civilians, or their rights or properties." Second, events classified as "*conventional military force*" were considered. These are defined as "all uses of conventional force and acts of war typically by organized armed groups not otherwise specified." Since information in GDELT is at the news level and not verified, it generates a much larger number of observations compared to ACLED, with a large percentage found to be wrongly assigned to the study area. For this purpose, each event reported by GDELT in the study area was hand-verified, and only verified events were included. Appendix D.7 presents a detailed explanation of the selection of events and the verification process. The direction of results is not affected by this correction.

In both datasets, post-treatment data starting in April 2017 and ending May 2018 was employed. The period between April 2015 and May 2016 was taken for baseline data. Appendix D.8 provides additional information about the nature and timing of events in these periods. Variables were built for whether any event was recorded in proximity to a community. Since median distance between two villages of different treatments is roughly 10 kilometers, a buffer zone of 5 kilometers around each community was defined, and an event was assigned to the community if the event was happening within the buffer zone.[14]

6 Hypotheses

Following Robinson et al. (2006), elites will distort allocations to increase the probability of staying in power when faced with a permanent resource boom, especially under lower levels of ac-

[14]Community location is computed as the median latitude and longitude using all observations collected in the community during the surveys, including households' and leaders' geolocations.

countability. Capture and rent-seeking are likely to increase in this context. Whether elites increase capture and rent-seeking when faced with private information about the future windfall correspond to the first test of this paper.[15] However, the role of institutional quality is key. In face of higher levels of political accountability, elites will be more constrained to do what is best for the common good. Hence, the second part of the analysis is devoted to testing the role of enhancing political accountability by targeting communities with information and deliberation possibilities. The specific hypotheses of this study follow.

Hypothesis 0 – Faced with information on future resource windfalls, both local leaders and citizens become more informed about natural resources and their management.

The base hypothesis is that the information campaign effectively gave new information to both local leaders and citizens. Undertaking the test of the theory requires showing that the campaign was powerful enough to act as an information shock at the level of the province.

Hypothesis 1 – Faced with private information on a future resource windfall, elites increase capture and rent-seeking.

Where treatment 1 is implemented–i.e., where information about a future windfall reached leaders only–elite capture and rent-seeking by leaders are expected to increase, as a way to cement local power. It could also be that elite capture increases simply due to the fact that local leaders feel more empowered because they were singled out to receive information. Rent-seeking activities by citizens could also increase as a consequence of treatment 1, in a case in which it triggers a reaction from citizens in a low-accountability setting. Treatment 2 is not expected to result in a rise in elite capture or rent-seeking by leaders, given the higher levels of local accountability.

Hypothesis 2 – Faced with public information (and deliberation) on a future resource windfall, citizen mobilization, trust, and demand for political accountability increase, while violence decreases.

Where treatment 2 is implemented–i.e., where information and possibly deliberation activities on the management of natural resources happen–higher levels of citizen mobilization, of trust in institutions at various levels, and of the demand for political accountability should be expected. It is possible that violence decreases when citizens feel included in the process of managing the resources and their opportunity costs of conflict increase. The deliberation module could have an

[15] As Caselli and Cunningham (2009) summarize, other theories of the resource curse emphasize its decentralized nature, anticipating generalized movements towards rent-seeking with negative consequences for the productive sector–e.g., Torvik (2002). While measurements used in this paper are able to distinguish decentralized from centralized theories, no generalized opportunities for rent-seeking in the economy are yet available as most structural changes to the economy are still to happen. Movements towards rent-seeking are then more likely closer to the political agents, making centralized theories most meaningful in this analysis.

added effect on these variables. Treatment 1 is not expected to have clear effects on any of the variables mentioned here, since leaders would have to channel these effects by themselves. This is unlikely in a low-accountability context like the one studied.

7 Empirical strategy

Standard specifications for the analysis of field experiments are adopted, depending on the existence of baseline data. For individual i, being either a local leader or a citizen and living in location j, the outcome variables are defined as Y_{ij}. Outcomes defined at the community level are treated in the same way as the ones defined at the level of the local leader. When baseline data are not available, the specification is:

$$Y_{ij} = \alpha + \beta_1 T1_j + \beta_2 T2_j + \gamma Z_j + \delta X_{ij} + \epsilon_{ij} \quad (1)$$

where $T1_j$ and $T2_j$ are indicator variables for living in a community in treatment 1 or 2, Z_j is a set of location control variables including strata dummies and community characteristics, and X_j is a set of individual characteristics, either for leaders or citizens depending on the outcome at stake.[16] ϵ_{ij} is an individual-specific error term, clustered at the community level to account for correlated errors within the community.[17] When baseline data are instead available, the specification is:

$$Y_{ijt} = \alpha + \beta_1 T1_{jt} + \beta_2 T2_{jt} + \gamma Z_{jt-1} + \delta X_{ijt-1} + \phi Y_{ijt-1} + \epsilon_{ijt} \quad (2)$$

where Y_{ijt-1} is the baseline value of the dependent variable. If autocorrelations of outcome variables are low, which is the case for most (subjective) survey outcomes, this specification maximizes statistical power in field experiments (McKenzie, 2012).[18] In the estimation of equations (1) and (2), OLS is employed in all regressions, even those with binary outcomes.

The objective is testing whether treatment 1 had an impact ($H_0 : \beta_1 = 0$), treatment 2 had an

[16] *Community characteristics* include district and stratum indicator variables, an infrastructure index measuring the presence of public infrastructures, presence of natural resources, number of voters, and distance to the city of Palma. The infrastructure index is built by averaging 14 indicator variables for the presence of a kindergarten, a primary school, a lower secondary school, an high school, an health center, a facilitator, a water pump, a market, a police station, a religious building, an amusement area, a community room, and for the access to electricity and to the sewage system. The presence of natural resources is built by averaging 10 indicator variables for the presence of limestone, marble, sands and rocks, forest resources, ebony and exotic woods, gold, charcoal, graphite, precious and semi-precious stones, mercury, fishing resource, salt and natural gas. When analyzing leader-level outcomes, district indicators are removed to avoid collinearity with stratum indicators. *Citizens' characteristics* include gender and age of the household head, household size, education, religion, and ethnic group indicators, and an indicator for whether the respondent was born in the community. *Leaders' characteristics* include the same variables measured at the leader level.

[17] Appendix D.10 shows robustness of estimates to selection of control variables or p-hacking (Simmons et al., 2011) using the Post-Double Selection LASSO procedure (Belloni et al., 2014a,b; Tibshirani, 1996).

[18] Difference-in-differences regressions are also estimated, with similar results available upon request.

impact ($H_0 : \beta_2 = 0$), and the impact is different across the two treatments ($H_0 : \beta_1 - \beta_2 = 0$). Given the large set of outcomes studied, these hypotheses are tested not only at the level of individual outcomes, but also for groups of outcomes. Concerns about multiple inference are addressed by presenting statistical significance for both individual-coefficient t-tests and for multiple hypothesis testing. For the latter, the Studentized k-StepM method for the two-sided setup is adopted, and p-values adjusted for step-down multiple testing are presented in the main tables (Romano and Wolf, 2005, 2016). This procedure improves on the ability to detect false hypothesis of program impact by capturing the joint-dependence structure of individual test statistics on treatment impacts. In each table, the test is repeated separately for two sets of hypotheses. The first test considers each treatment effect and each difference across treatment effects separately. The test is whether each one of those parameters is significantly different from zero across all outcomes considered in the table. This set is indicated as the *row-level* set since hypotheses group coefficients in tables' rows. For instance, to test that treatment 1 had an impact for a given set of outcomes Y^k with $k = 1, .., K$, a joint test that $H_0 : \beta_1^1 = 0, \beta_1^1 = 0, .., \beta_1^K = 0$ is performed. Secondly, following a more conservative strategy, a test for significance of both treatment effects and their difference across all outcomes presented in the table is implemented. This set is indicated as the *table-level* set.[19]

An alternative way to address multiple inference, which also helps summarizing the findings, is to aggregate outcomes. Following Kling et al. (2007), indices of outcomes Ω_{ij}^m are built for each category of outcomes m. These categories correspond to the main sets of outcomes of the paper (see Section 8.2 for the definition of each index). Outcomes are first normalized in standardized units (z-scores) to study mean effect sizes of the indices relative to the standard deviation of the control group. They are then grouped in m categories, with all outcomes in the same category interpretable in the same direction. Outcomes are then averaged within each category. Summary effects are presented using these aggregations.

To measure the impact of holding community-level deliberation meetings in addition to the information campaign, the sample is restricted to communities in treatment 2. The impact of holding deliberation meetings is then estimated with the following specification:

$$\Omega_{ij}^m = \alpha + \psi\, T2B_j + \gamma\, Z_j + \delta\, X_{ij} + \epsilon_{ij} \tag{3}$$

where $T2B_j$ is an indicator variable for living in a community where both the information dissemination and the deliberation activities are implemented.

[19] Further details of the procedure are presented in Appendix C. The procedure makes use of 2,000 bootstrap iterations using clustering at the community level. Iterations where at least one estimation cannot be performed due to lack of variation in the dependent variable are excluded.

8 Results

Randomization was effective at identifying comparable groups in the experiment. Table B2 in Appendix B.2 shows mean differences between the control group and all treatments bundled together, and between the control group and each treatment group separately. These differences concern a number of characteristics related to households, leaders, and communities, collected in baseline surveys. Of the 63 individual significance tests relating to each treatment intervention, only one comes out significant at standard levels: less years of schooling for leaders in treatment 2 with deliberation. No joint-significance tests yield a rejection of the null at standard levels.

Section 8.1 presents a detailed account of the findings, as well as more in-depth discussion about their implications. A summary of results by aggregation of outcomes follows in Section 8.2, while Section 8.3 discusses the effect of holding deliberation meetings.

8.1 Results by set of outcomes

Tables 1–7 report the main results by set of outcomes. When baseline values of the outcome variables are available, regressions controlling for those values (specification 2) are displayed side by side with the ones employing standard control variables (specification 1). Below the typical standard errors, displayed in parentheses, two sets of p-values adjusting for multiple hypothesis testing are presented in squared brackets. The first corresponds to jointly testing all coefficients at the row-level of the table. The second p-value is for a more demanding test that jointly considers all treatment coefficients at the table level, including the difference between treatments (see Section 7 for details). A test is considered as "passed" if the p-value is smaller or equal than 0.1.

8.1.1 Awareness and Knowledge

Consideration of treatment effects begins by focusing on the effect of the interventions on the awareness and knowledge of the natural gas discovery among local leaders and citizens. This is hypothesis 0 in Section 6.

The focus is on the same set of outcomes for leaders and citizens, presented in Tables 1 and 2 respectively. In both tables, columns (1) and (2) focus on awareness of the natural gas discovery. Awareness is measured using an indicator variable equal to 1 if the respondent has ever heard about the natural gas discovery, and 0 otherwise. Columns (3) and (4) focus on the level of knowledge about the natural gas discovery. An index averages 15 indicator variables related to knowledge about the location of the discovery, whether exploration has started, whether the government is receiving revenues, when extraction is expected to start, and which firms are involved (see Appendix

D.1 for the details about the index, as well as detailed results per component). Each indicator variable is equal to 1 if the respondent gives a correct answer, and 0 otherwise. The index is therefore equal to 1 if the respondent has full knowledge of these elements, and 0 if the respondent reports all answers wrongly or has never heard about the discovery. Columns (5) and (6) measure the effect on salience, as measured by asking the respondent about the three most important events in his/her district in the last 5 years, leaving the answer open. Then, performing content analysis led to building an indicator variable equal to 1 if the respondent used the word "gas," and 0 otherwise. Columns (7) and (8) restrict attention to respondents reporting that they are aware of the natural gas discovery. These columns display the analysis of perceived benefits from the natural gas discovery for the community and the household of the respondent. These are indicator variables equal to 1 if the respondent agrees or fully agrees that the discovery of natural gas will bring benefits for his community or his family, and 0 otherwise.

Beginning with local leaders (Table 1), awareness is increased by roughly 4-5 percentage points across both treatment groups. This suggests that the information campaign was indeed effective, especially given the already high level of awareness among the local elite. No differential effect is observed when information dissemination also targets citizens. Knowledge about the discovery also increased significantly across both treatment groups (3-6 percentage points), suggesting that the information campaign had impact not only in terms of awareness, but also in terms of knowledge. Relatively small effects on knowledge translated into large effects in terms of salience, but only in communities where the information was also distributed to citizens. This suggests these changes might be associated with the level of information among citizens. In treatment 2, 34% more leaders used the word "gas". No significant effect is observed on perceived benefits. All significant coefficients for treatment 2, as well as the tests of differences between coefficients for salience, pass multiple hypothesis testing.

Table 2 focuses on citizens' outcomes. When information was distributed to citizens, the intervention created a large increase in awareness of 25 percentage points. No effect is observed when the information is distributed only to the leader instead, suggesting that leaders did not introduce any clear within-community effort to disseminate information to citizens. This is particularly true given that citizens report increased interaction with leaders in treatment 1 (see Section 8.1.2). Treatment 2 not only increased awareness, but also made citizens more knowledgeable: the knowledge index increased by 17 percentage points. Similar to awareness, no effect of distributing the information to the leader is observed. This pattern is robust to restricting the sample to citizens who are aware of the discovery. In terms of salience, a significant increase in both treatment groups is observed, with a significantly larger effect for treatment 2. In this treatment, 24% more citizens used the word "gas." This pattern suggests that information targeted at leaders is mainly increasing salience among citizens who were already aware of the discovery at baseline, perhaps

in closer connection to the leader's network.[20]

Differently from leaders, citizens also become optimistic regarding the future benefits to their community and their household, but only when the information is targeted at the whole community. All significant coefficients or tests of differences between coefficients are strong enough to pass multiple hypothesis testing. The exceptions are the coefficients on treatment 1 for salience and on treatment 2 for the perceived benefit to the community (only for the test at the table level).

While the design of the experiment imposed a minimal distance between communities in different comparison groups in order to avoid information spillovers, information diffusion between communities beyond that minimal distance cannot be excluded. In this case, estimates would be capturing not only the effect of the intervention, but also the diffusion of information through local networks. Appendix D.2 shows whether being close to a community in treatment 1 or 2 significantly affects knowledge and salience about the natural resources. No evidence is found of information spillover effects for either leaders' or citizens' outcomes. However, there is a clear increase in citizen awareness, knowledge, and salience of the natural resource discovery from baseline to endline in the control group. This suggests effects may incorporate direct effects of the information campaign, but also effects of other sources of news.[21]

8.1.2 Elite capture and rent-seeking

Table 3 presents estimates of the effect of interventions on measures of elite capture by local leaders. Columns (1) and (2) focus on attitudes towards corruption from the leader surveys. The measure for these attitudes averages two indicator variables: the first indicator is coded as 1 when the leader agrees with the statement "the best way to overcome problems in public services is to pay bribes"; the second indicator is coded as 1 when the leader prefers demanding the governor of the province a job for himself, rather than a benefit for the community.[22] The index of attitudes towards corruption is the only outcome variable in this table that has baseline values for the outcome. Leader attitudes in favor of corruption increase significantly with treatment 1. When information is targeted only at leaders, the corresponding index increases by 10 percentage points, significant at the 5% level. The coefficient is also positive for treatment 2 with a magnitude of 7 percentage points. However, the latter effects never pass multiple hypothesis testing.[23] Differences across treatments are found not to be significant.

[20] Pre-program knowledge is mainly determined by individual characteristics, such as gender, household size and education. See Appendix D.1.

[21] Both treatments induced increases in (self-reported) hearing news from the radio. Results available upon request.

[22] The question reads as follows: "Imagine that you had the opportunity to have a meeting with the Governor of Cabo Delgado and that you could make a request. Please tell me what you would request."

[23] Similar results are found for leader's attitudes against corruption relative to average attitudes in the community.

Columns (3) and (4) are devoted to the zinc roofs SCA (see Section 5.2.1). Column (3) considers an indicator variable on how the zinc allocation decision was made, taking value 1 in the event that the local elite (including the local leader) decided the use of the zinc, and value 0 when the community made the decision. The leader provided this information. Column (4) considers as outcome variable the average across all zinc sheets received by a leader, with the value for each one defined as 1 if the zinc is used privately, 0 if the zinc is not used, and -1 if the zinc is used for community purposes. This is based on direct observation at the endline. At endline, despite the risk of losing the zinc if unused, only 22% had been used, with 80% of those used allocated privately. Though strong results in this SCA were not expected, treatment 2 led to a much lower probability that the elite decided on the allocation, a 19-percentage-point effect significant at the 1% level and significantly different from the effect of treatment 1. In terms of observed use, no significant effects or differences were found, despite negative point estimates for both coefficients of interest. The effect of treatment 2 on the probability of the elite deciding on the zinc allocation is the only difference that passes the procedure for multiple hypothesis testing at the row level.

Columns (5) and (6) are dedicated to the funds-for-meetings SCA (see Section 5.2.2). Column (5) shows an outcome indicator variable defined as 1 if the leader appropriated any fund. To conservatively allow for measurement error, any amount spent equal to or above 350 Meticais is considered equivalent to the full funds. Column (6) displays a variable defined as the share of the full funds not spent in the meetings (i.e., the share appropriated). In the control group, 47% appropriated funds, with the average share appropriated of 23%. Some leaders used their own money and spent more than 400 Meticais. Positive effects appear for the treatment involving information to leaders, considering both dependent variables. The effects are statistically different between treatments. Point estimates are large in absolute values for treatment 1, at 27 percentage points for the extensive margin and 14 percentage points for the intensive margin. Both are statistically significant at the 1% level. Multiple hypothesis testing yields a significant effect of treatment 1 for the extensive margin, and a significant difference between the treatments for the intensive margin. The effect of treatment 1 for the intensive margin only passes multiple hypothesis testing at the row level.

Columns (7) to (9) show several outcome variables related to the SCA where a taskforce was appointed by the leader (see Section 5.2.3). Column (7) employs the average score in the Raven's test for the taskforce selected by the leader. Column (8) uses an indicator variable constructed for the mid quintiles (2^{nd} to 4^{th}) in the distribution of the difference between the average score in the taskforce and the average score among representative citizens surveyed in the community. Column (9) refers to the percentage of men (vs. women) selected in the taskforce appointed by the leader. On average, individuals in the household survey got 5 out of 10 correct answers, while those chosen by the leader performed worse on average, scoring 3.7. The left panel of Figure 5 presents the distribution of Raven's test scores for both citizens and the taskforce selected by the

leader. No effects are found for the average scores of the taskforce selected by the leader. However, treatment 1 increases the probability of selecting mid performers. These effects are clear in the distributions of the right panel of Figure 5. Also, treatment 1 led to an increase in the percentage of men selected for the taskforce by 7 percentage points. This effect is statistically different from the one of treatment 2, which is not distinguishable from zero. However, these effects do not pass multiple hypothesis testing.[24]

Column (10) regards leader behavior in the Trust Game (see Section 5.3.1). The focus is on the amount (rescaled between 0 and 1) that the leader kept after receiving the transfer from a citizen in the trust game. The average amount sent by citizens was 4 out of 10 tokens, indicating some degree of trusting behavior. On average, leaders returned slightly more than citizens sent, taking home just under two-thirds of the surplus. Aggregate leader behavior was consistent for different amounts sent by citizens. No significant differences appear between comparison groups for the amounts kept by leaders; however, positive point estimates for both treatments are found, with greater magnitude for treatment 1.

Thus, some effects of treatment 1 increase elite capture, in terms of more favorable attitudes towards corruption, use of funds for other than specific public purposes, and appointments of community members for public service (i.e., more geared towards mid-ability individuals and involving a lower number of women). This is consistent with hypothesis 1, even though not all effects encountered pass multiple hypothesis testing.

In Table 4, the analysis of treatment effects on rent-seeking by both local leaders and citizens begins with survey outcomes concerning interaction with political leaders in the community. This information was built by asking leaders and citizens to list community leaders, members of the district or provincial government, religious leaders, and other influential people that they could personally contact if they wished, and their interaction with them in the six months previous to the interview. Using names and roles in the community, unique individuals within and across communities are identified, building a network between citizens and local leaders.[25] The focus is on "*chiefs*" (i.e., formal community leader and closest collaborators) and on "*other political leaders*" (i.e., chiefs in other communities, political representatives at the municipal, district, and provincial levels, and local party representatives). Indicator variables are analyzed in columns (1)–(2) and (5)–(8), assigning value 1 in case leaders/citizens reported having talked with or called chiefs (in the case of citizens in columns 5 and 6) and other political leaders (in the case of leaders in columns 1 and 2, and in the case of citizens in columns 7 and 8). With respect to interaction of local leaders with other political leaders, both treatments show clear effects. Magnitudes are 16

[24] No statistically significant effects is observed for selecting friends or family members in the taskforce.

[25] At baseline, this generated 3533 individuals composing the network of the 2065 citizens interviewed, and 1021 individuals composing the network of the 206 local leaders. See Appendix D.3 for further details.

percentage points for treatment 1 and between 11 and 12 percentage points for treatment 2, statistically significant at the 1% and 5% levels respectively, and passing multiple hypothesis testing at all levels in the case of treatment 1. For citizens, a strong effect of treatment 1 occurs on the probability of interaction with the chiefs in their own communities. The effect is 9 percentage points, statistically significant at the 1% level, passing multiple hypothesis testing. This effect is statistically different from that of treatment 2, even though this difference does not always pass multiple hypothesis testing. No significant effects were found on interaction of citizens with other political leaders.

Columns (3) and (9) of Table 4 show the auctions for meeting the district administrator, in the case of both leaders and citizens, and for business training, in case of citizens (see Section 5.2.4). The dependent variable in column (3) is built as the (log) amount bid for meeting the administrator. The variable in column (9) is the share of total bids allocated to meeting the administrator. Although no significant effects for leaders are found, there is an effect for citizens when faced with treatment 1. This is a 3-percentage-point effect, statistically significant at the 5% level, and statistically different from that of treatment 2.[26] None of these effects pass multiple hypothesis testing.

Columns (4) and (10)–(11) of Table 4 show the actions of leaders and citizens in the Rent-seeking Game (see Section 5.3.2). For leaders, the outcome variable is coded as the size of the gift chosen by the leader, which could range from 0 (lowest rent-seeking) to 1 (highest rent-seeking). The variable takes value 0 if the leader behaves rationally when at least one citizen put aside the whole amount for productive activities. The outcome variables devoted to citizen behavior in the game are defined as an indicator variable, with value 1 when the citizen sent a gift to the leader, in column (10), and the size of the gift sent to the leader, in column (11).

On average, citizens in the control group sent 4 tokens as gifts, with the remaining 6 being set aside for productive activities. Only 11% of citizens in the control group choose the rational action of sending a gift of 0. Statistically significant effects (at the 5% or 10% levels) occur with the intervention of information to leaders, for both citizen outcomes. These are positive effects of 6 and 4 percentage points for the extensive and intensive margins respectively. A positive and marginally significant effect for treatment 2 occurs on the extensive margin. The two treatments' effects on any of these regressions are indistinguishable. None of the referred significant effects pass multiple hypothesis testing. Despite positive coefficients and a higher magnitude for treatment 1, no statistical significance was found for leader rent-seeking in this game.

Positive movements occur in rent-seeking by leaders for both treatments, as well as in rent-seeking by citizens when faced with information targeting only the local leaders. The latter emerges mainly for interaction with local leaders, but also appears in the bidding for meetings with the district

[26] The same conclusion is reached when looking at the difference between the two bid amounts.

administrator, and in the rent-seeking game. Only the effects of treatment 1 on interaction with leaders pass multiple hypothesis testing. The effects of treatment 1 on rent-seeking among citizens are more evident in communities that had low mobilization capacity at baseline.[27]

8.1.3 Citizen mobilization, trust, and demand for political accountability

Table 5 presents estimates of treatment effects on measures of citizen mobilization, including contributions to public goods, while Table 6 focuses on trust and demand for political accountability.

In Table 5, columns (1) and (2) concern a standard survey question on participation in community meetings–an indicator variable equal to 1 if the citizen participated in at least one community meeting in the last 12 months. Baseline values for this outcome variables are used as controls in column (2). Among control respondents, 90% participated in at least one meeting in the last year. Treatment 2 induces a significant increase in participation in meetings:, a 4-percentage-point effect, statistically significant at the 5% level. However, it only passes multiple hypothesis testing at the row level. The null that both effects are equal in column 2 is rejected, even though this difference does not pass multiple hypothesis testing.

In columns (3) to (7), the outcomes of the matching grants SCA and related meetings (see Section 5.2.5) are explored. The first dependent variable is an indicator for awareness (column 3), taking value 1 if the individual knew about the matching activity. Column 4 considers an indicator variable taking value 1 if the individual reported contributing a positive amount of money in the matching activity. The corresponding intensive margin variable is found in column (5) by employing logarithms. Both variables relating to contributions are checked with the information in the community logbooks for the matching grants activity. Positive effects of information to leader and citizens are found on awareness, participation (extensive margin) and (log) contribution (intensive margin) in the matching grants SCA. The magnitudes are 11 percentage points for awareness, 15 percentage points for participation, and 48% for the (log) contribution. All are statistically significant at the 1% level, and different from the effects of information to leaders only. The effects in columns (3) and (4) pass multiple hypothesis testing; the one in column (5) passes multiple hypothesis testing at the row level. In the case of awareness, results enable rejection of the effect of 2 being equal to the effect of 1 when considering multiple hypothesis testing. Seventy percent of individuals in the control group report being aware of the contribution activity, while 22% report contributing positive amounts. Average contributions by survey respondents are 30 Meticais, although the median contribution is 0. A number of individuals report large contributions, with a

[27]This is based on analysis of heterogeneous effects by mobilization level of the community (see Appendix D.4). Heterogeneous effects are also explored in other dimensions identified in the pre-analysis plan, such as age, distance to Palma, where most of the gas extraction-related activities are taking place in Cabo Delgado, and knowledge of local leaders. Interestingly, citizens closest to Palma are also more responsive to treatment 1 in terms of rent-seeking.

maximum of 2,600, making logarithms particularly useful.

The dependent variables in columns (6) and (7) are measured at the community level. The first is attendance at the community meeting that decided participation in the matching grants initiative, depicted as the share of adults in the community who participated.[28] The second is an indicator taking value 1 if the community made decisions in the meeting through voting. Both are directly observed by the enumeration team. No significant coefficient or differences between coefficients are found; however, on the voting variable, the difference between coefficients approaches individual significance with the effect of treatment 2 being higher.

The regression in column (8) examines behavior in the Public Goods Game (see Section 5.3.3). The outcome variable is defined as the contribution to the public account in the public goods game (rescaled between 0 and 1). Average contributions in the public goods game were 4.5 out of 10 tokens, with only 6% contributing zero. No significant effects of the treatments are found, despite a larger point estimate for treatment 2.

Overall, information to leader and citizens (treatment 2) increased citizen mobilization as measured by participation in community meetings, awareness and contributions to the matching grants, for both the extensive and intensive margins. Significant differences from treatment 1 occur in several outcomes, consistently with hypothesis 2, including attendance at community meetings and all outcomes relating to the matching grants SCA. Most of these tests survive multiple hypothesis at least at the row level.

Table 6 analyzes survey outcomes on trust and voice/accountability (columns 1 to 7), as well as trust for the local leader and demand for accountability, as measured in the trust game and the postcard SCA (columns 8 to 10). Beginning with the survey outcomes on trust, columns (1) and (2) concern the average of all self-reported measures of trust, i.e., generalized trust, and trust concerning specific groups of people separately (i.e., family, neighbors, local leaders, local people, the district government, the provincial government, Mozambicans, and national leaders). Columns (3) and (4) relate to trust for leaders (e.g. community and religious leaders, high officials and influential people) personally known to the respondent. This measure is the average trust of leaders listed in the network section of the questionnaire; each trust measure is therefore relative to a specific individual (see Section 8.1.2). In all trust measures, the scale employed goes from 0 (do not trust at all) to 3 (trust a lot). Baseline values of the dependent variable are used in columns (2) and (4). Effects on average trust are observed, namely, negative effects of treatment 1, with magnitude of 2% of the subjective scale. They are statistically different from those of treatment 2, which have positive but insignificant magnitudes. These differences pass multiple hypothesis

[28]The average meeting size was 43 individuals, ranging from less than 1% to 45% of adults in the community. The number of adults per community is estimated using the number of voters.

testing. Positive and significant effects of treatment 2 on trusting known leaders are found, at a magnitude of 2% of the subjective scale. These effects pass multiple hypothesis testing. Again, they are statistically different from those of treatment 1. The levels of trust in the control group are already quite high: 2.2 out of 3 for average trust and 2.9 for trust in leaders personally known.

Columns (5) and (6) explore the average reported levels of voice that citizens have with provincial and national leaders. The scale ranges from 1 (no voice at all) to 4 (full voice). Column (7) employs an index of reported political accountability relating to leaders. This is an average of three indicator variables corresponding to different survey questions. Each variable is coded as 1 if the respondent agrees with a statement. The statements are: "Communities should demand more from their leaders"; "When communities ask accountability from their leaders things change"; and "If someone asks accountability from the leader, other community members will support the process." Baseline values of the dependent variable are employed as controls in column (6). These are not available for the outcome variable in column (7). Larger effects are identified for treatment 2 for voice with provincial and national leaders. The effect of treatment 2 is positive and significant, with magnitude of 4% of the subjective scale, significant at the 5% level. Only when including the lagged dependent variable as control does the coefficient of treatment 2 passes multiple hypothesis testing at the row level. A similar pattern emerges for the index of political accountability, even though the significant effect is negative on information to leaders only (treatment 1). The size of the effect is 14 percentage points, statistically significant at the 5% level, but not passing multiple hypothesis testing. The difference between treatment 1 and treatment 2 is significant and passes multiple hypothesis testing at the row level.

Columns (8) and (9) are related to behavior by citizens in the Trust Game (see Section 5.3.1). The outcome variable in column (8) is the amount sent by the citizens in the trust game (rescaled between 0 and 1), and the one in column (9) is an indicator variable taking value 1 if the citizen expressed the desire to punish the leader in the trust game. Forty percent of citizens in the control group chose to punish the leader; no statistically significant effects are found on average amounts sent or on the desire to punish.

Column (10) is devoted to the postcard SCA, which measures the demand for political accountability in an incentive-compatible manner (see Section 5.2.6). The dependent variable is an indicator taking value 1 if the respondent sends the postcard. An extensive analysis of the contents of the postcard was performed as well (see Appendix D.5). Eighty-eight percent of the respondents sent the postcard, which demonstrates a high level of interest in this activity. Even though no significant effects on the sending are observed, both treatments yield positive magnitudes. The content analysis shows a few interesting effects. Even though it is not possible to reject that treatment effects are different from each other on any of the outcome variables considered, treatment 2 yields

positive and significant effects on protests and requests at the provincial level. Treatment 1 also yields a positive and significant effect on requests at the provincial level. Higher demand for political accountability could translate into higher turnover of community leaders. However, since there are no formal elections or set mandate for these leaders in Mozambique, leader turnover is low; the average number of years in power in the sample is 8.8 years. No effects on turnover of leaders between baseline and follow-up are found (see Appendix D.6).

In summary, effects are found of treatment 2 on increasing trust in leaders personally known and voice. Negative effects are found of treatment 1 on average trust and survey measures of political accountability. Differences between the two treatments are often significant, even when accounting for multiple hypothesis testing. Also found are some effects on the demand for political accountability as given by the postcard SCA as treatment 2 increases the likelihood of sending protests. This is additional evidence in favor of hypothesis 2.

8.1.4 Violence

Starting in October 2017, Cabo Delgado experienced a rise in violence attributed to extremist groups recruiting support in the province, which targeted mainly civilians (see Appendix D.8 for further details). Table 7 presents effects of interventions with respect to violence outcomes, divided between survey and administrative measures in columns (1)–(4), and (5)–(8), respectively. Columns (1) and (2) focus on an indicator equal to 1 if the citizen believes violence is justified to defend a cause. In columns (3) and (4), the outcome variable is binary and defined as 1 if the respondent reports witnessing and being involved in the three months previous to the endline survey in any type of violence, including physical, against women, verbal, theft, and property destruction. The regressions of columns (2) and (4) control for baseline values of the dependent variable. The averages in the control group were 29% for respondents justifying violence, and 18% for respondents involved in violence. A negative and significant coefficient of treatment 2 occurs when considering involvement in violence, statistically different from that of treatment 1. The magnitude of the effect is between 4 and 5 percentage points, statistically significant at the 5% level. No significant effects are found on sympathy towards violence. The effect of treatment 2 on involvement in violence passes multiple hypothesis testing at the row level.

Columns (5)–(8) show results of employing georeferenced violent events from international datasets. Column (5) regards ACLED alone; column (6) concerns GDELT alone; and columns (7)–(8) considers both ACLED and GDELT events. Each dependent variable is an indicator variable, taking value 1 if a violent event was recorded in the corresponding location, i.e, within a 5-kilometer buffer. Regressions in columns (5), (6), and (8) include the lagged dependent variable as control. The probability that a location in the control group witnessed at least one violent event ranges

from 6% for ACLED to 9% for GDELT (13% for ACLED plus GDELT). Significant effects for treatment 2 are observed when considering all three definitions of dependent variables. These effects are lost for 10-kilometer buffers, mainly due to overlapping of buffer zones. The magnitudes range from 5 to 9 percentage points, statistically significant at the 1% or 5% levels. The effect for ACLED plus GDELT passes multiple hypothesis testing at all levels. The differences between treatment effects are not statistically significant, even though one of the p-values is below 0.15. These results are not driven by displacement of violence to the control group. The timing of events is very much specific to the post-intervention period (see Appendix D.8).

Treatment 2 had an impact on decreasing violence. For the variables based on surveys, a difference can be identified in the effects of the two treatments, even though it does not pass multiple hypothesis testing. This is generally in line with hypothesis 2. Positive perceptions of citizens about the benefits of the natural gas resulting from treatment 2 are consistent with this mechanism (see Section 8.1.1).

8.2 Outcome aggregation

To address hypothesis testing, in addition to publishing a pre-analysis plan and presenting p-values corrected for multiple hypothesis testing, a third approach that aggregates the outcome variables of interest under indices of z-scores (Kling et al., 2007) is explored.

The outcome variables in Tables 1–7 are aggregated to form indices of z-scores, dividing them into community-level and citizen-level index outcomes. The community-level index outcomes are: *Leader's knowledge*, formed from outcomes in columns (1)–(6) of Table 1; *Leader's perceived benefits*, formed from outcomes in columns (7)–(8) of Table 1; *Elite capture*, formed from the outcomes in Table 3; *Rent-seeking among leaders*, formed from the leader outcomes in Table 4; and *Violence*, formed from the administrative outcomes in Table 7. The citizen-level index outcomes are: *Citizen's knowledge*, formed from outcomes in columns (1)–(6) of Table 2; *Citizen's perceived benefits*, formed from outcomes in columns (7)–(8) of Table 2; *Rent-seeking among citizens*, formed from the citizen outcomes in Table 4; *Citizen's mobilization*, formed from the outcomes in Table 5; *Trust and accountability*, formed from the outcomes in Table 6; and *Self-reported violence*, formed from the survey outcomes in Table 7. Regressions are estimated following the specification with controls (see equation 1).

The results are summarized in Figure 6. Aggregation supports, and indeed strengthens, many of the patterns identified in the analysis per outcome. Knowledge is significantly increased by treatment 2 for both leaders and citizens. Treatment 1 also has an effect on leaders. However, expected benefits only improve after treatment 2 for citizens. Elite capture and rent-seeking by citizens are clearly increased by treatment 1. Treatment 2 has a clear positive impact on citizen

mobilization, less so for citizen trust and demand for political accountability. It has a significant effect on decreasing violence for both self-reports and administrative data.

8.3 The effect of holding deliberation meetings

Next follows analysis of the impact of the deliberation module by focusing attention on the sample composed of the communities in treatment 2. Using the indices presented in Section 8.2 as dependent variables, treatment effects are estimated using specification 3.

Table 8 presents the results. There are no significant effects of deliberation overall. The exceptions are citizens' mobilization, where deliberation had a positive impact, and trust and accountability where deliberation had a negative effect. The magnitudes are 13% and 6% of a standard deviation, respectively. These effects are statistically significant at the 10% level. It is intuitive that the deliberation meetings may have led to additional mobilization of citizens at the local level. However, the negative effect on trust and accountability is more difficult to explain, but may be related to the low levels of political accountability in Mozambique, particularly in rural areas. Citizens could have perceived deliberation as captured by a few, with negative implications for trust.

An alternative way to explore the effects of deliberation is to estimate the effects of attending the deliberation meetings, as well as estimating the effects of attending the information campaign meeting, and contrasting to the first (see Appendix D.9). Since attending meetings is endogenous to individual characteristics, instrumental variable estimation is employed, using the treatment indicators as excluded variables. For citizen-level outcomes, attending deliberation meetings has no significant effects, except for a positive effect on citizens' mobilization and a negative effect on trust and accountability. On the contrary, information campaign meetings have effects on most outcome variables. Both results are in line with the effects encountered for the reduced form.

9 Concluding remarks

The political resource curse has captured the attention of academics and policymakers alike and remains highly relevant for many low- and middle-income countries with significant resource endowments. A significant body of theory attends this phenomenon, along with observational empirical studies. Given the existing evidence, finding specific policy implications can be difficult. This paper studies a community-targeted information campaign about the recent discovery of natural gas in Northern Mozambique, a low-income country with relatively weak institutions.

The campaign was effective in raising awareness and knowledge of the topic by citizens; some effects were found for leaders as well. When information is given to local leaders only, an increase

in elite capture as well as in rent-seeking by leaders and citizens results. Most of these effects do not seem to emerge when information is given to citizens. Moreover, increases occur in citizen mobilization, trust, voice, the demand for political accountability, and a decrease in violence, when information is targeted at the general population. This pattern of results is consistent with a known mechanism of the resource curse that is centered on mis-governance by politicians. It is also consistent with the positive role of information in countering the curse.

This study is relevant for policymakers for two main reasons. First, a large-scale information campaign can be effective at raising levels of awareness in the population about a resource discovery and its related management debates. Second, clear effects occur on trust in government at different levels, as well as on decreasing violence. These findings are of crucial importance in face of the known association of the resource curse with localized conflict in resource-producing areas. The appropriate management of expectations of the local population and the implementation of inclusive management processes as resource exploration unfolds may be key to escaping the emergence of localized conflict. Information campaigns can be seen as a central piece of those efforts.

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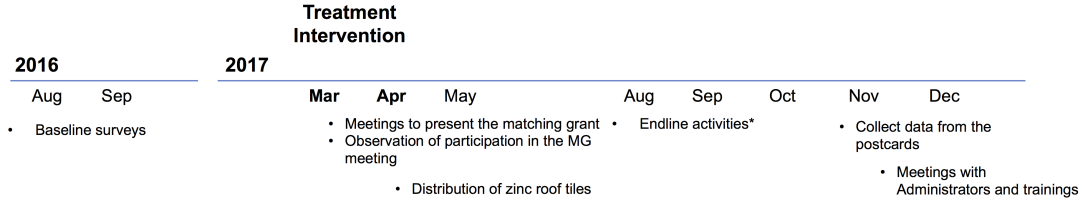
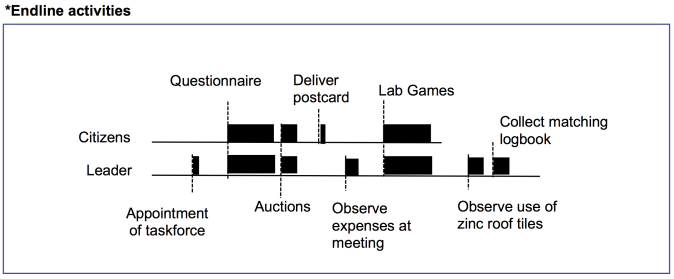
Figure 1: Timeline



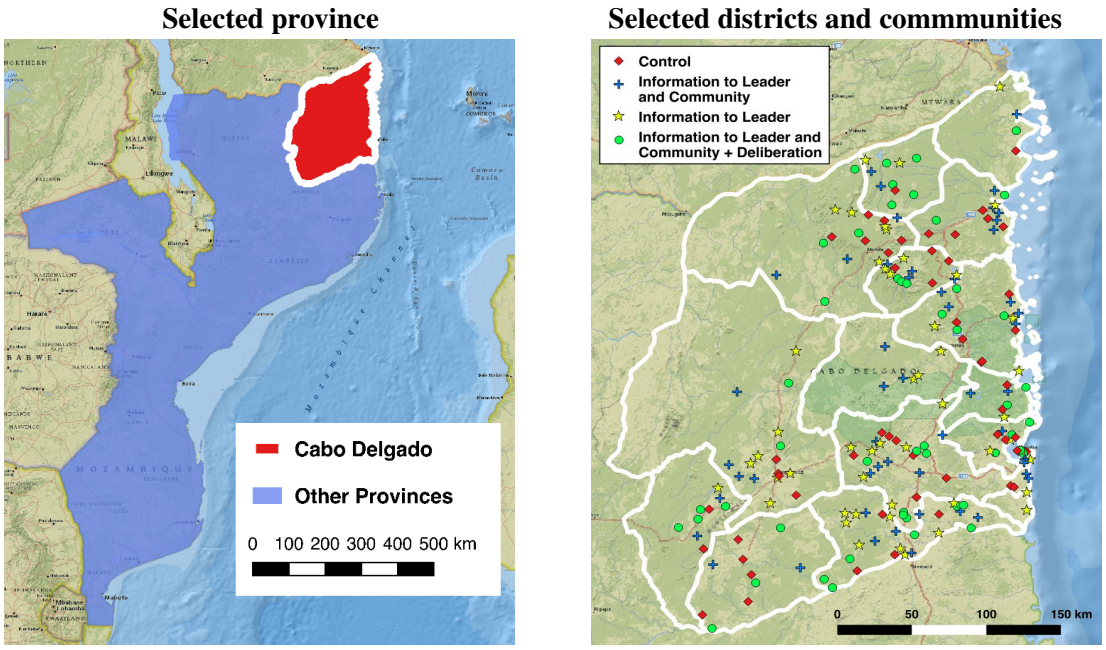


Note. The timeline presents the activities of the project from the implementation of the baseline survey in August 2016 to the completion of all SCAs in December 2017. The lower part of the figure presents the detailed timeline of the endline activities.

Figure 2: Information Leaflet

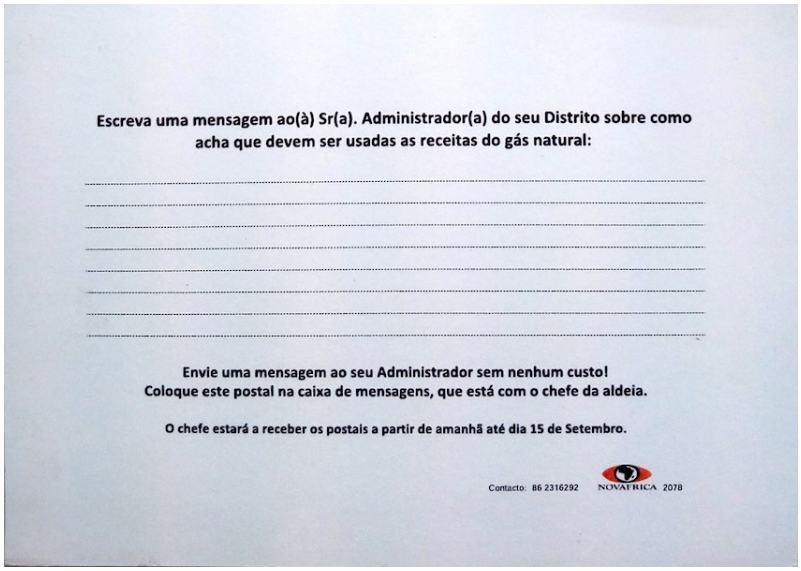
Note. The information leaflet was designed by the research team in collaboration with a large number of governmental and non-governmental organizations.

Figure 3: Selected communities and allocation to treatment groups



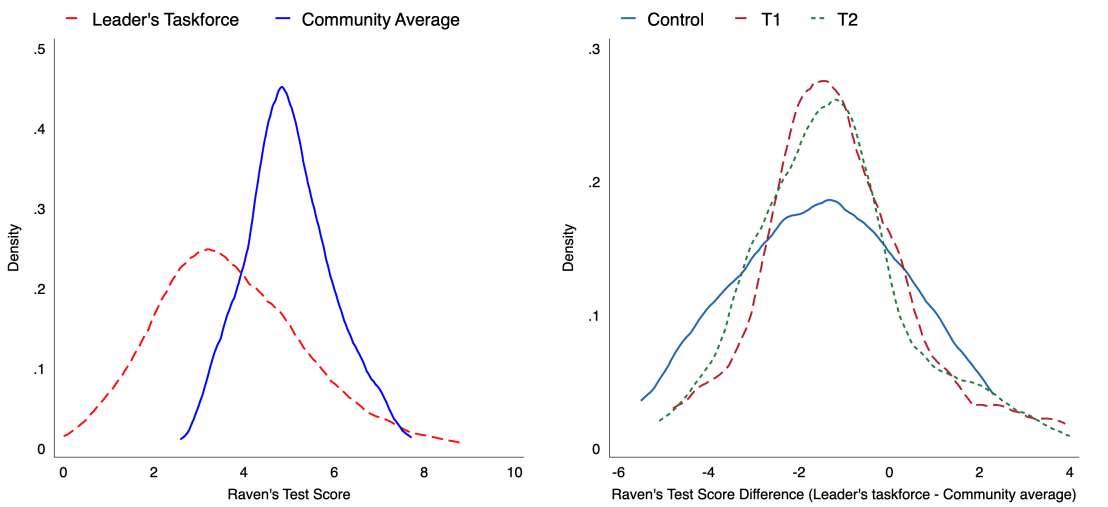
Note. Cabo Delgado province is highlighted in red. Georeferenced coordinates were obtained from tablets' GPS sensors used for interviews. The georeferenced coordinate of each location is determined using the average of all available data points within each location (household interviews, leader interviews, and community interviews).

Figure 4: Postcard



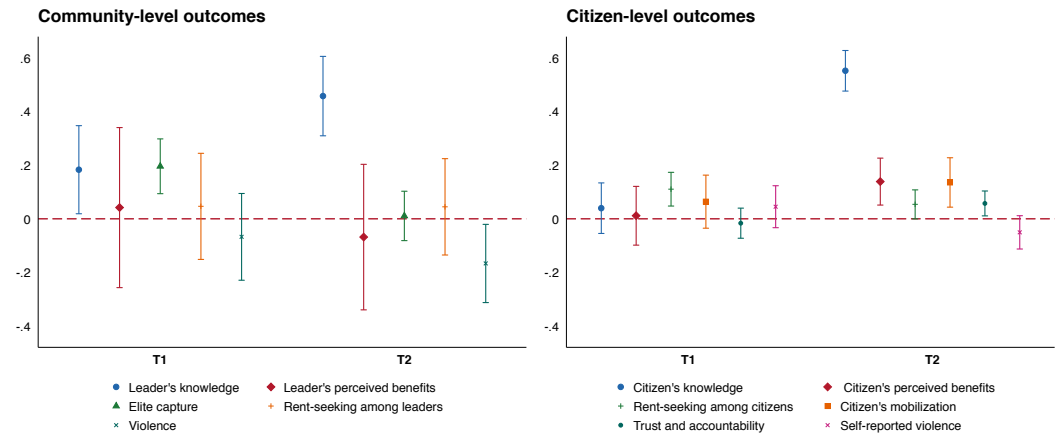
Note. The figure shows the front page of the postcard. The text translates as follows: "*Please write a message to the District Administrator about how you think the revenues from natural gas should be used*" (upper message); "*Sending the message to the Administrator is costless. Leave this postcard in the message box kept by the community leader. The leader will be ready to receive the postcard starting tomorrow September 15th*" (lower part).

Figure 5: Raven's test distributions



Note. The left panel shows a comparison in the distribution of Raven's test scores among community members and the average Raven's Test Score among the individuals selected for the taskforce activity. The right panel shows the distributions of the difference between the leader's taskforce and the community average in the control group and the two treatment groups.

Figure 6: Aggregation: results



Note. Estimates based on OLS regressions (see equation 1). Confidence intervals are built using statistical significance at the 10% level, and standard errors clustered at the community level when employing citizen-level outcomes. The specifications include community and household-level controls (for citizen-level outcomes) or community-level controls (for community-level outcomes). The full list of controls is presented in Section 7. Outcomes are grouped in indices that are built using the Kling et al. (2007) procedure. Outcomes are first normalized in standardized units to study mean effect sizes of the indices relative to the standard deviation of the control group and then averaged within each category.

Table 1: Leaders' knowledge and perceptions about the natural gas discovery

Dep.Var.:	**Awareness**		**Knowledge**		**Salience**		**Perceived benefit to...**	
							community	**household**
Sample:	All	All	All	All	All	All	Respondents aware of the discovery	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(T1) Information to Leader	0.043**	0.043**	0.034*	0.038**	0.035	0.045	0.016	0.014
	(0.020)	(0.019)	(0.018)	(0.018)	(0.086)	(0.087)	(0.065)	(0.079)
	[0.11-0.18]	[0.10-0.16]	[0.17-0.31]	[0.11-0.18]	[0.95-0.99]	[0.91-0.99]	[0.95-0.99]	[0.95-0.99]
(T2) Information to Leader and Citizens	0.049***	0.052***	0.054***	0.056***	0.334***	0.340***	-0.008	-0.042
	(0.018)	(0.018)	(0.017)	(0.016)	(0.078)	(0.079)	(0.059)	(0.072)
	[0.03-0.05]	[0.02-0.03]	[0.01-0.01]	[0.01-0.01]	[0.00-0.00]	[0.00-0.00]	[0.89-0.99]	[0.72-0.97]
Observations	206	203	206	203	206	203	204	204
R^2	0.109	0.146	0.200	0.273	0.339	0.333	0.154	0.125
Mean (control group)	0.964	0.964	0.627	0.627	0.291	0.291	0.868	0.830
T1 = T2 (p-value)	0.738	0.648	0.245	0.255	0.000	0.000	0.671	0.430
T1 = T2 (adj. p-value, row-level)	0.780	0.780	0.503	0.503	0.001	0.001	0.780	0.660
T1 = T2 (adj. p-value, table-level)	0.989	0.986	0.754	0.758	0.003	0.005	0.988	0.910
Lagged dependent variable	No	Yes	No	Yes	No	Yes	No	No

Note. Estimates based on OLS regressions (see equations 1 and 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis. P-values adjusted for multiple hypothesis testing are presented in brackets (see Section 7 for details). The first p-value corresponds to jointly testing coefficients grouped by rows (row-level), the second p-value corresponds to jointly testing that T1, T2 and T1-T2 are different from zero (table-level). Columns (1), (3), (5) and (7)–(8) present estimates using equation (1). Columns (2), (4), (6) present estimates using equation (2), including the lagged value of the dependent variable. Depending on the column, the dependent variables are defined by the following: (1)–(2) Awareness: indicator variable equal to 1 if the respondent reports having heard about the natural gas discovery; (3)–(4) Knowledge: index built averaging 15 indicator variables related to knowledge about the location of the discovery, whether exploration has started, whether the government is receiving revenues, when extraction is expected to start, and which firms are involved; (5)–(6) Salience: indicator variable equal to 1 whether the respondent use the word "gas" when asked about the three major events in the district in the last 5 years; (7) Perceived benefit to community: indicator variable equal to 1 if the respondent agrees or fully agrees that the community will benefit from natural gas; (8) Perceived benefit to household: indicator variable equal to 1 if the respondent agrees or fully agrees that his household will benefit from natural gas. In columns (7) and (8), the sample is restricted to respondents aware of the natural gas discovery. All specifications include community and leader-level controls. The full list of controls is presented in Section 7.

Table 2: Citizens' knowledge, and perceptions about the natural gas discovery

Dep.Var.:	**Awareness**		**Knowledge**		**Salience**		**Perceived benefit to...**	
							community	**household**
Sample:	All	All	All	All	All	All	Respondents aware of the discovery	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(T1) Information to Leader	-0.004	-0.003	-0.002	-0.001	0.053*	0.066**	-0.009	0.015
	(0.032)	(0.033)	(0.020)	(0.020)	(0.029)	(0.032)	(0.031)	(0.031)
	[0.99-0.99]	[1.00-1.00]	[1.00-1.00]	[1.00-1.00]	[0.25-0.27]	[0.18-0.25]	[0.99-0.99]	[0.97-0.97]
(T2) Information to Leader and Citizens	0.254***	0.251***	0.173***	0.169***	0.233***	0.238***	0.044*	0.071***
	(0.023)	(0.023)	(0.016)	(0.015)	(0.027)	(0.029)	(0.023)	(0.026)
	[0.00-0.00]	[0.00-0.00]	[0.00-0.00]	[0.00-0.00]	[0.00-0.00]	[0.00-0.00]	[0.06-0.27]	[0.02-0.07]
Observations	2072	1886	2072	1886	2077	1890	1592	1573
R^2	0.251	0.272	0.368	0.396	0.157	0.154	0.135	0.114
Mean (control group)	0.681	0.671	0.457	0.449	0.189	0.182	0.779	0.692
T1 = T2 (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.046	0.050
T1 = T2 (adj. p-value, row-level)	0.001	0.001	0.001	0.001	0.001	0.001	0.088	0.088
T1 = T2 (adj. p-value, table-level)	0.001	0.001	0.001	0.001	0.001	0.001	0.264	0.267
Lagged dependent variable	No	Yes	No	Yes	No	Yes	No	No

Note. Estimates based on OLS regressions (see equations 1 and 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level. P-values adjusted for multiple hypothesis testing are presented in brackets (see Section 7 for details). The first p-value corresponds to jointly testing coefficients grouped by rows (row-level), the second p-value corresponds to jointly testing that T1, T2 and T1-T2 are different from zero (table-level). Columns (1), (3), (5) and (7)–(8) present estimates using equation (1). Columns (2), (4), (6) present estimates using equation (2), including the lagged value of the dependent variable. Depending on the column, the dependent variables are defined by the following: (1)–(2) Awareness: indicator variable equal to 1 if the respondent reports having heard about the natural gas discovery; (3)–(4) Knowledge: index built averaging 15 indicator variables related to knowledge about the location of the discovery, whether exploration has started, whether the government is receiving revenues, when extraction is expected to start, and which firms are involved; (5)–(6) Salience: indicator variable equal to 1 whether the respondent use the word "gas" when asked about the three major events in the district in the last 5 years; (7) Perceived benefit to community: indicator variable equal to 1 if the respondent agrees or fully agrees that the community will benefit from natural gas; (8) Perceived benefit to household: indicator variable equal to 1 if the respondent agrees or fully agrees that his/her household will benefit from natural gas. In columns (7) and (8), the sample is restricted to respondents aware of the natural gas discovery. All specifications include community and household-level controls. The full list of controls is presented in Section 7.

Table 3: Elite capture

Dep.Var.	Attitudes towards corruption		Zinc roof tiles		Funds for meetings		Taskforce activity			Trust game
			Elite decided	Private usage	Appropriated funds	Share appropriated	Avg Raven's scores	Mid performers selected	Men selected	Leader kept
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(T1) Information to Leader	0.099**	0.099**	-0.067	-0.101	0.271***	0.144***	0.281	0.193**	0.073*	0.032
	(0.040)	(0.040)	(0.079)	(0.075)	(0.095)	(0.053)	(0.314)	(0.097)	(0.041)	(0.038)
	[0.09-0.23]	[0.09-0.23]	[0.71-0.99]	[0.51-0.89]	[0.04-0.10]	[0.06-0.15]	[0.71-0.99]	[0.25-0.54]	[0.30-0.67]	[0.71-0.99]
(T2) Information to Leader and Citizens	0.065*	0.069*	-0.187***	-0.084	0.120	0.005	0.204	0.122	-0.004	0.026
	(0.036)	(0.037)	(0.071)	(0.068)	(0.086)	(0.048)	(0.283)	(0.087)	(0.037)	(0.034)
	[0.41-0.67]	[0.36-0.61]	[0.07-0.17]	[0.67-0.92]	[0.67-0.88]	[0.99-1.00]	[0.89-0.99]	[0.67-0.88]	[0.99-1.00]	[0.89-0.99]
Observations	206	203	206	206	205	205	206	206	206	206
R^2	0.171	0.171	0.295	0.209	0.169	0.235	0.169	0.145	0.243	0.119
Mean (control group)	0.073	0.073	0.855	0.255	0.473	0.227	3.516	0.491	0.782	0.605
T1 = T2 (p-value)	0.343	0.413	0.095	0.806	0.079	0.004	0.784	0.422	0.038	0.861
T1 = T2 (adj. p-value, row-level)	0.870	0.917	0.406	0.985	0.392	0.038	0.985	0.917	0.220	0.985
T1 = T2 (adj. p-value, table-level)	0.984	0.992	0.720	0.999	0.674	0.097	0.999	0.992	0.472	0.999
Lagged dependent variable	No	Yes	No	No	No	No	No	No	No	No

Note. Estimates based on OLS regressions (see equations 1 and 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis. P-values adjusted for multiple hypothesis testing are presented in brackets (see Section 7 for details). The first p-value corresponds to jointly testing coefficients grouped by rows (row-level), the second p-value corresponds to jointly testing that T1, T2 and T1-T2 are different from zero (table-level). Columns (1), (3)–(10) present estimates using equation (1). Column (2) presents estimates using equation (2), including the lagged value of the dependent variable. Depending on the column, the dependent variables are defined by the following: (1)–(2) Attitudes towards corruption: average between an indicator variable equal to 1 if the leader agrees with the statement "the best way to overcome problems is to pay bribes" and an indicator variable equal to 1 if the leader would demand a job for him/herself when asked "Imagine that you had the opportunity to have a meeting with the Governor of Cabo Delgado and that you could make a request. Please tell me what you would request." For Zinc roof tiles [see 5.2.1], (3) Elite decided: dummy that takes value 1 if the elite decided the use of the zinc sheets, and 0 if the decision was made by the community (self-reported by the leader); (4) Private usage: observed use of zincs, takes value 1 if used for individual purposes, 0 if used for the community or not used yet. For Funds for Meetings [see 5.2.2], (5) Appropriated funds: indicator for whether the leader used less than 350 Meticais out of 400 for meeting; (6) Share appropriated: share difference between available funds and expenses during the meeting. For the Taskforce activity [see 5.2.3], (7) Average score on Raven's test of individuals chosen by leader; (8) Mid performers selected: indicator variable for 2^{nd}-4^{th} quintile in the sample distribution of difference between average test score of individuals chosen by leader and average test score of representative individuals selected for the survey at the level of the community; (9) Men selected: percentage of women chosen by leader for the Raven's test. For the Trust Game [see 5.3.1], (10) Leader kept: amount leader kept in Trust game (rescaled between 0 and 1). All specifications include community and leader-level controls. The full list of controls is presented in Section 7.

Table 4: Rent-seeking

	Rent-seeking among local leaders				Rent-seeking among citizens						
Dep.Var.	**Interaction with other political leaders**		**Auction Bid for meeting**	**Rent-seeking Degree of RS**	**Interaction with... chiefs**		**other political leaders**		**Auction Share bid to meeting**	**Rent-seeking game Any gift sent**	**Gifts sent**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(T1) Information to Leader	0.161***	0.162***	0.058	0.044	0.100***	0.092***	-0.007	0.001	0.025**	0.059**	0.040*
	(0.053)	(0.053)	(0.120)	(0.052)	(0.034)	(0.035)	(0.038)	(0.034)	(0.012)	(0.026)	(0.023)
	[0.01-0.03]	[0.01-0.03]	[0.62-0.93]	[0.62-0.88]	[0.03-0.06]	[0.06-0.13]	[0.93-0.99]	[0.97-0.99]	[0.14-0.36]	[0.10-0.27]	[0.20-0.56]
(T2) Information to Leader and Citizens	0.116**	0.114**	0.067	0.002	0.027	0.022	0.010	0.009	0.005	0.043*	0.031
	(0.048)	(0.048)	(0.108)	(0.047)	(0.028)	(0.029)	(0.032)	(0.030)	(0.010)	(0.025)	(0.021)
	[0.06-0.12]	[0.06-0.12]	[0.75-0.89]	[0.97-1.00]	[0.76-0.94]	[0.85-0.97]	[0.90-0.99]	[0.90-0.99]	[0.90-0.99]	[0.37-0.55]	[0.52-0.71]
Observations	206	203	206	204	2077	1890	2077	1890	2077	2027	2027
R^2	0.188	0.212	0.198	0.131	0.101	0.101	0.118	0.133	0.021	0.026	0.078
Mean (control group)	0.818	0.818	4.217	0.243	0.531	0.531	0.474	0.451	0.499	0.880	0.408
T1 = T2 (p-value)	0.351	0.311	0.939	0.372	0.011	0.022	0.608	0.789	0.025	0.361	0.615
T1 = T2 (adj. p-value, row-level)	0.681	0.642	0.931	0.681	0.061	0.106	0.863	0.863	0.106	0.743	0.863
T1 = T2 (adj. p-value, table-level)	0.871	0.839	0.997	0.871	0.153	0.268	0.986	0.986	0.275	0.948	0.986
Lagged Dependent Variable	No	Yes	No	No	No	Yes	No	Yes	No	No	No

Note. Estimates based on OLS regressions. *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis. P-values adjusted for multiple hypothesis testing are presented in brackets (see Section 7 for details). The first p-value corresponds to jointly testing coefficients grouped by rows (row-level), the second p-value corresponds to jointly testing that T1, T2 and T1-T2 are different from zero (table-level). Testing is performed separately for columns (1)–(4) and columns (5)–(11). Columns (1)–(9) present estimates using equation (1). Columns (1)–(3) refer to outcomes related to rent-seeking among local leaders, while columns (4)–(9) refer to rent-seeking among citizens. For local leaders, depending on the column, the dependent variables are defined by the following: (1)–(2) Interaction with other political leaders: indicator variable equal to 1 if the leader reported having talked or called another political leader in the 6 months previous to the interview; for the Auction activity [see 5.2.4], (3) Bid for meeting: log amount bid for the meeting with administrator. For the Rent-seeking game [see 5.3.2], (4) Degree of rent-seeking: size of gift chosen by leader in rent-seeking game, which could range from 0 (lowest rent-seeking) to 1 (full rent-seeking). For Citizens, depending on the column, the dependent variables are defined by the following: (5)–(6) Interaction with chiefs: indicator variable equal to 1 if the person reported having talked or having called the local leaders in the 6 months previous to the interview; (7)–(8) Interaction with other political leaders: indicator variable equal to 1 if the person reported having talked or having called to another political leader in the 6 months previous to the interview. For the Meeting − Training Auction activity [see 5.2.4], (9) Share bid to meeting: share of total bids allocated to meeting the administrator. For the Rent-seeking Game [see 5.3.2], (10) Any gift sent: indicator variable for whether the participant sent any tokens as gift to leader, (11) Gifts sent: number of gift tokens (rescaled between 0 and 1) sent to leader. Specifications in columns (1)–(3) include community and leader-level controls. Specifications in columns (4)–(9) include community and household-level controls. The full list of controls is presented in Section 7. Lagged Dependent variable is not included.

Table 5: Citizens' mobilization

Dep.Var.	Community meetings		Matching grants			Community meetings (MG)		Public goods game
	Attendance (self-reported)		Awareness	Contributed	Amount contributed	Attendance	Voting	Contribution
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(T1) Information to Leader	0.008	0.004	0.024	0.058	0.152	0.017	-0.030	-0.003
	(0.021)	(0.022)	(0.036)	(0.048)	(0.191)	(0.011)	(0.033)	(0.020)
	[0.94-1.00]	[0.98-1.00]	[0.91-0.99]	[0.72-0.93]	[0.91-0.98]	[0.59-0.80]	[0.87-0.97]	[0.98-1.00]
(T2) Information to Leader and Citizens	0.038**	0.039**	0.108***	0.152***	0.478***	0.005	0.015	0.001
	(0.015)	(0.016)	(0.029)	(0.046)	(0.180)	(0.010)	(0.030)	(0.020)
	[0.08-0.23]	[0.08-0.24]	[0.01-0.02]	[0.01-0.04]	[0.06-0.17]	[0.95-1.00]	[0.95-1.00]	[0.96-1.00]
Observations	2019	1803	2072	1510	1510	184	196	2027
R^2	0.070	0.086	0.100	0.075	0.065	0.266	0.093	0.057
Mean (control group)	0.899	0.892	0.704	0.223	0.892	0.025	0.019	0.448
T1 = T2 (p-value)	0.101	0.076	0.004	0.032	0.070	0.237	0.123	0.770
T1 = T2 (adj. p-value, row-level)	0.397	0.366	0.050	0.206	0.366	0.507	0.397	0.765
T1 = T2 (adj. p-value, table-level)	0.734	0.640	0.095	0.399	0.628	0.934	0.783	0.995
Lagged Dependent Variable	No	Yes	No	No	No	No	No	No

Note. Estimates based on OLS regressions. *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level, except in columns (6) and (7). P-values adjusted for multiple hypothesis testing are presented in brackets (see Section 7 for details). The first p-value corresponds to jointly testing coefficients grouped by rows (row-level), the second p-value corresponds to jointly testing that T1, T2 and T1-T2 are different from zero (table-level). Columns (1), (3)–(8) present estimates using equation (1). Column (2) presents estimates using equation (2), including the lagged value of the dependent variable. Depending on the column, the dependent variables are defined by the following: (1)–(2) Community meetings attendance (self-reported): indicator variable equal to 1 if the citizen attended at least one community meeting in the last 12 months. For matching grants activity [see 5.2.5]: (3) Awareness: indicator variable equal to 1 if the citizen heard about the activity; (4) Contributed: indicator variable equal to 1 if the citizen reported contributing a positive amount; (5) Amount contributed: log of self-reported contribution in matching activity; (6) Attendance: (observed) share of adults in the community who attended the community meeting where the participation in the matching grants (MG) activity was discussed; (7) Voting: indicator variable equal to 1 if the decision in the community meeting was determined by voting (observed). For public goods game [see 5.3.3]: (8) Contribution: contribution (rescaled between 0 and 1) in public goods game. Specifications in columns (1)–(5) and (8) include community and household-level controls. Specifications in columns (6) and (7) include community and leader-level controls. The full list of controls is presented in Section 7.

Table 6: Trust and demand for political accountability

Dep.Var.	Trust (self-reported)				Survey-based accountability			Trust game		Postcard
	Average trust		On leaders personally known		Voice outside the community		Political accountability	Amount sent	Desire to punish	sent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(T1) Information to Leader	-0.052*	-0.054*	-0.033	-0.033	-0.007	0.025	-0.136**	0.029	0.025	0.034
	(0.027)	(0.028)	(0.021)	(0.023)	(0.048)	(0.053)	(0.066)	(0.018)	(0.037)	(0.032)
	[0.35-0.57]	[0.35-0.57]	[0.52-0.80]	[0.52-0.85]	[0.88-1.00]	[0.80-0.99]	[0.30-0.49]	[0.52-0.81]	[0.80-0.98]	[0.69-0.96]
(T2) Information to Leader and Citizens	0.022	0.025	0.051***	0.050***	0.087**	0.123***	0.022	0.014	0.017	0.030
	(0.023)	(0.023)	(0.015)	(0.017)	(0.039)	(0.044)	(0.059)	(0.018)	(0.032)	(0.021)
	[0.83-0.98]	[0.78-0.96]	[0.01-0.03]	[0.03-0.09]	[0.16-0.39]	[0.04-0.15]	[0.86-1.00]	[0.84-0.98]	[0.86-0.99]	[0.59-0.85]
Observations	2035	1754	1958	1614	1983	1718	1997	2027	2007	1891
R^2	0.088	0.124	0.132	0.153	0.060	0.068	0.080	0.114	0.037	0.087
Mean (control group)	2.218	2.214	2.851	2.848	2.494	2.463	3.834	0.405	0.398	0.881
T1 = T2 (p-value)	0.003	0.002	0.000	0.000	0.022	0.035	0.009	0.378	0.805	0.864
T1 = T2 (adj. p-value, row-level)	0.040	0.025	0.001	0.002	0.140	0.183	0.083	0.785	0.963	0.963
T1 = T2 (adj. p-value, table-level)	0.090	0.055	0.001	0.007	0.365	0.472	0.193	0.976	0.995	0.995
Lagged dependent variable	No	Yes	No	Yes	No	Yes	No	No	No	No

Note. Estimates based on OLS regressions (see equations 1 and 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level. P-values adjusted for multiple hypothesis testing are presented in brackets (see Section 7 for details). The first p-value corresponds to jointly testing coefficients grouped by rows (row-level), the second p-value corresponds to jointly testing that T1, T2 and T1-T2 are different from zero (table-level). Depending on the column, the dependent variables are defined by the following: for Trust outcomes, (1)–(2) Average trust: average of all self-reported measures of trust (generalized trust, and trust on specific groups of people: family, neighbors, local leaders, local people, district government, province government, Mozambicans, and national leaders) (0 = not at all / 3 = trust a lot); (3)–(4) Trust on leaders personally known: self-reported trust for leaders (community and religious leaders, high officials and influential people) that are personally known by the respondent (0 = not at all / 3 = trust a lot). For Survey-based Voice/Accountability: (5)–(6) Voice outside the community: average level of citizen voice with provincial administrators and with national administrators (1 = not at all / 4 = totally); (7) Political accountability: average of 3 variables capturing whether the respondent agrees with the statements "Communities should demand more from their leaders," "When communities ask accountability from their leaders things change," and "If someone asks accountability from the leader, other members will support the process." (1 = fully disagree / 5 = fully agree). For the Trust Game [see 5.3.1], (8) Amount sent: amount sent (rescaled between 0 and 1) by the participant in the trust game; (9) Desire to punish: indicator variable equal to 1 if the respondent expressed the desire to punish the leader in the trust game. For (10) Postcard sent: indicator variable equal to 1 if the citizen sent the postcard. Specifications in columns include community and household-level controls. The full list of controls is presented in Section 7.

Table 7: Violence

Dep.Var.:	Self-reported violence				Violence in administrative data			
	Sympathy for violence		Involved in violence		ACLED	GDELT	ACLED + GDELT	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(T1) Information to Leader	0.013	-0.002	0.004	-0.012	-0.025	-0.017	-0.035	-0.047
	(0.031)	(0.035)	(0.023)	(0.026)	(0.031)	(0.028)	(0.035)	(0.035)
	[0.94-0.97]	[0.99-1.00]	[0.99-0.99]	[0.94-0.97]	[0.61-0.66]	[0.61-0.66]	[0.54-0.62]	[0.33-0.42]
(T2) Information to Leader and Citizens	-0.007	-0.038	-0.040**	-0.052**	-0.057**	-0.054**	-0.063**	-0.085***
	(0.028)	(0.031)	(0.019)	(0.021)	(0.028)	(0.026)	(0.032)	(0.032)
	[0.79-0.99]	[0.28-0.66]	[0.07-0.20]	[0.04-0.11]	[0.10-0.17]	[0.10-0.17]	[0.10-0.18]	[0.04-0.06]
Observations	1886	1522	2042	1827	206	206	206	206
R^2	0.035	0.043	0.058	0.060	0.275	0.733	0.634	0.656
Mean (control group)	0.298	0.323	0.176	0.187	0.055	0.091	0.127	0.127
T1 = T2 (p-value)	0.394	0.174	0.039	0.087	0.245	0.145	0.374	0.223
T1 = T2 (adj. p-value, row-level)	0.393	0.234	0.120	0.224	0.248	0.201	0.294	0.242
T1 = T2 (adj. p-value, table-level)	0.852	0.589	0.221	0.405	0.530	0.402	0.656	0.499
Lagged Dependent Variable	No	Yes	No	Yes	Yes	Yes	No	Yes

Note. Estimates based on OLS regressions (see equations 1 and 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level in columns (1) to (4). P-values adjusted for multiple hypothesis testing are presented in brackets (see Section 7 for details). The first p-value corresponds to jointly testing coefficients grouped by rows (row-level), the second p-value corresponds to jointly testing that T1, T2 and T1-T2 are different from zero (table-level). Testing is performed separately for columns (1)–(4) and columns (5)–(9). Columns (1), (3) and (7) present estimates using equation (1). Columns (2), (4), (5), (6) and (8) present estimates using equation (2), including the lagged value of the dependent variable. Depending on the column, the dependent variables are defined by the following: for self-reported violence, (1)–(2) Sympathy for violence: indicator variable equal to 1 if the citizen believes violence is justified to defend a cause; (3)–(4) Involved in violence: indicator variable equal to 1 if the respondent reports witnessing and being involved on any type of violence (physical, against women, verbal, theft, and property destruction) in the last 3 months. For violence in administrative data, (5) ACLED: indicator variable equal to 1 if an event was recorded in ACLED dataset (attacks against civilians) and occurred in proximity with the community; (6) GDELT: indicator variable equal to 1 if an event was recorded in GDELT dataset (conventional and non-conventional violence) and occurred in proximity with the community; (7)–(8) ACLED+GDELT: indicator variable equal to 1 if an event was recorded in ACLED (attacks against civilians) or GDELT (conventional and non-conventional violence) datasets and occurred in proximity with the community. Specifications in columns (1)–(4) include community and household-level controls. Specifications in columns (5)–(8) include community and leader-level controls. The full list of controls is presented in Section 7.

Table 8: Deliberation

	Information only	**Information plus deliberation**		
Outcome variable	Mean	Coeff.	S.E.	N
	(1)	(2)	(3)	(4)
Community-level outcomes				
Leader's knowledge	0.439	-0.006	0.089	101
Leader's perceived benefits	0.070	-0.163	0.209	101
Elite capture	-0.020	0.049	0.072	100
Rent-seeking among leaders	0.029	0.093	0.153	100
Violence	-0.150	-0.059	0.098	101
Citizen-level outcomes				
Citizen's knowledge	0.482	0.006	0.036	1014
Citizen's perceived benefits	0.163	-0.013	0.057	893
Rent-seeking among citizens	0.028	-0.008	0.031	989
Citizen's mobilization	0.032	0.131*	0.067	830
Trust and accountability	0.083	-0.061*	0.032	777
Self-reported violence	-0.068	0.010	0.040	910

Note. Estimates based on OLS regressions (see equation 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in column (3) and clustered at community level when employing citizen-level outcomes. The specifications include community and household-level controls (for citizen-level outcomes) or community-level controls (for community-level outcomes). The full list of controls is presented in Section 7. Outcomes are grouped in indices that are built using the Kling et al. (2007) procedure. Outcomes are first normalized in standardized units to study mean effect sizes of the indices relative to the standard deviation of the control group and then averaged within each category.

ONLINE APPENDIX FOR
"DOES INFORMATION BREAK THE POLITICAL RESOURCE CURSE?"

A Information module

The information module is based on a detailed information manual. Presentations to the communities, based on the manual, are composed of the following parts:

1. **Presentation**. This is an introductory space for those holding the meetings in the communities to present themselves and the implementing partners, and to introduce the subject of the meeting. This is also a moment for the community leader or any other influential person to explain to the community the contents and objectives of the meeting.

2. **Introduction**. Presenters explain that Mozambique is endowed with many different types of natural resources in large quantities, with the extractive industries of natural gas, coal, iron, precious stones and heavy minerals are in rapid expansion. The extractive industries offer potential for investment and creation of wealth. The first mention of the importance of the natural gas reserves discovered in the Rovuma Basin happens at this point. Specifically, it is explained that, according to the IMF, during the 2020s, the natural gas industry will account for half of the country's wealth.[2] This discovery has the potential to place Mozambique in the top producers of natural gas worldwide and the future of its economy may be heavily influenced by the management of the revenues generated by the extraction.

3. **Natural resources**. Presenters discuss the formal definition of a natural resource, and the difference between renewable and non-renewable resources. This distinction is important for the communities to understand that many of their resources are non-renewable, and therefore sustainability is an issue. Resources should generate benefits for present and future generations in an equitable way. Hence, environmental considerations should be taken into account. Then presenters cover the types of natural resources relevant for Cabo Delgado, i.e., minerals, forest resources, fishing, and natural gas.

4. **Natural gas**. Presenters provides detailed information about the natural gas discovery, including where in Cabo Delgado it was discovered, and the plans over the next few years for the exploration and transformation of natural gas. A brief mention of the uses of natural gas follows. At the end, presenters mention that Inhambane, another province in Mozambique, discovered natural gas in the past and what lessons were learned from that experience.

[2] International Monetary Fund (IMF), Country Report No. 16/10 (January, 2016).

5. **The importance for citizens**. This part shed light on what the local population can expect from the exploration of natural resources. Presenters explain that natural resources can be a source of income for the families, either through governmental transfers or through the creation of jobs, and that extractive companies operating locally should be aware of their social responsibility towards the citizens.

6. **Examples**. At this point, presenters discuss three examples of countries that discovered natural resources, including how they impacted their populations. Two examples are positive (Norway and Botswana), and one is negative (Nigeria). These cases exemplify both desirable and undesirable consequences from the discovery of natural resources.

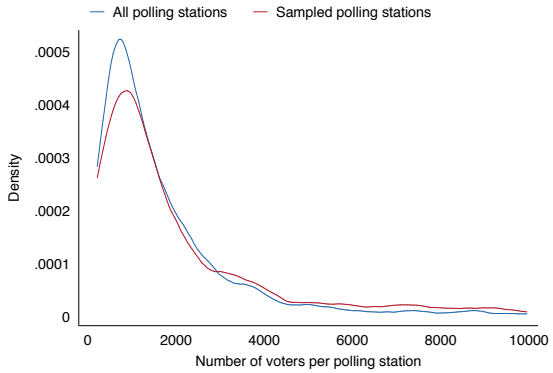
7. **Conclusion**. The meeting is concluded with a brief review of the topics covered, emphasizing the main lessons. Although citizens are allowed to raise questions during the meeting, this is typically the moment when most participants express their opinion.

B Sampling and randomization: further details

The 206 communities in the final sample were randomly drawn from the sampling frame of 421 polling stations. To obtain the sampling frame, 54 polling stations that were not operating in both the 2009 and 2014 general elections were excluded. Additionally, the smallest 5^{th} percentile by voter size (corresponding to a cutoff of 207 voters) was also excluded. The polling locations were located within the following 16 districts in Cabo Delgado: Ancuabe, Balama, Chiure, Macomia, Mecufi, Meluco, Metuge, Mocimboa da Praia, Montepuez, Mueda, Muidumbe, Namuno, Nangade, Palma, Pemba, and Quissanga. The Ibo district was excluded since it is an island, together with two other polling stations in another island. Eleven polling stations in Palma's "*posto administrativo*" were also excluded to avoid areas that experienced recent violent events.

Sampled communities were stratified by the two urban areas (Pemba and Montepuez), semi-urban communities (i.e., the main "*posto administrativo*" in each district) and rural communities. In urban strata, 8 polling locations were selected in Pemba and 4 in Montepuez; in semi-urban strata, 2 polling stations were selected per town (1 if only 1 was available); the remaining 165 stations were sampled from all other polling stations. To secure representation of the few urban settlements in the province, sampling embeds an oversampling of urban and semi-urban locations. Figure B1 presents a comparison of the distribution of registered voters in the sampling frame and the sampled locations. Figure B2 presents the distribution among different districts of the number of polling locations and the number of sampled polling locations. The stratified random sampling tends to replicate the distribution of polling stations in the sampling frame.

Figure B1: Distribution of voters in sampled polling locations versus all locations



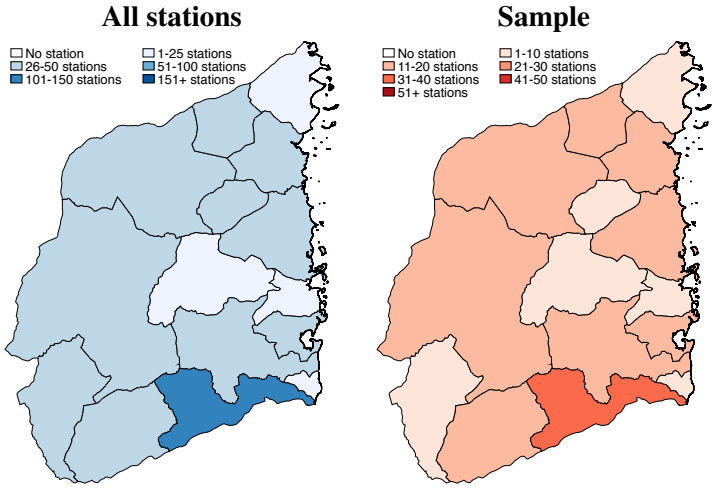
Note. The blue line presents the distribution of the number of registered voters per polling location in the sampling frame, while the red line presents the same distribution in the sampled polling locations.

Before implementing the randomization procedure, blocks of four communities were built implementing a code using Mahalanobis-distance and making use of the richness of baseline information. The following variables were used to compute the metric:

- *Household characteristics*. For each community, the mean household was constructed averaging the gender, age, education and income of the respondents, their household size, the share of Muslim households, the share of households from different ethnic groups (Macua, Maconde, Mwani), an asset index averaging ownership of all different assets and a self-reported violence index (built using information on whether the respondent observed or has been affected by violent events). Additional controls include average trust in the community, share of respondents who know an influential person, a religious leader or a community leader, share of respondents participating in organizations, the average attitudes towards bribes and towards the allocation of public funds, the share of respondents born in the village, the share of respondents earning money, and the share looking for a job.
- *Leader and Community characteristics*. Variables included are gender, age, education of the community leader, his/her trust, his/her knowledge of influential people, his/her attitudes towards bribes and towards the allocation of public funds, whether he/she is Muslim, and whether he/she is active as member of an organization. Community characteristics are measured by two indices averaging binary variables, one on the quality of infrastructures and one on the presence of natural resources.

Sampling of citizens within communities was the product of physical random walks during the baseline survey. Enumerators were told to select houses by departing in different directions from the center of the community as defined by the polling location. They were given a sampling interval for each community, which was a function of the number of registered voters in that

Figure B2: Geographic distribution of polling locations and sampled polling locations



Note. The left panel presents the geographic distribution of the number of polling locations. The right panel shows the same information, but restricted to sampled polling locations. In maps, Metuge is included in Pemba district and Ibo is included in Quissanga district.

community. The sampling interval defined the number of houses in between sampled houses.

B.1 Attrition and sample selection

This section analyzes attrition at the follow-up household survey. Columns (1)–(2) in Table B1 present probit regressions of household-level attrition under different specifications. The dependent variable is equal to 1 if the household was interviewed at baseline and not re-interviewed at follow-up, and zero if the household was interviewed in both rounds. Columns (3)–(4) check whether the refresher sample at follow-up was added differentially in different treatment arms. The dependent variable is a dummy variable equal to 1 if, at follow-up, the observation is from the refresher sample and zero if it is from the baseline.

Table B1: Attrition and sample selection at follow-up

Dep.var.:	**Attrition from baseline to follow-up**		**Refresher sample at follow-up**	
	(1)	(2)	(3)	(4)
(T1) Information to Leader (d)	0.014	0.018	-0.015	-0.010
	(0.018)	(0.019)	(0.017)	(0.017)
(T2) Information to Leader and Citizens (d)	-0.010	-0.010	-0.022	-0.022
	(0.015)	(0.014)	(0.014)	(0.014)
Observations	2065	2065	2103	2103
Mean (control group)	0.083	0.083	0.114	0.114
Randomization Strata	No	Yes	No	Yes

Note. Estimates based on probit regressions (marginal effects). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level. Depending on the column, the dependent variables are defined by the following: (1)–(2) Attrition from baseline to follow-up: dummy variable equal to 1 if the household was interviewed at baseline and not re-interviewed at follow-up, and zero if the household was interviewed in both rounds; (3)–(4) Refresher sample at follow-up: dummy variable equal to 1 if, at follow-up, the observation is from the refresher sample and zero if it is from the baseline.

B.2 Balance checks

Table B2 presents randomization checks for respondent, leader, and community characteristics. For each outcome of household/leader i living in community j, Y_{ij}, balance is first tested using the following least squares regression:

$$Y_{ij} = \alpha + \beta\, T_j + \epsilon_{ij} \tag{4}$$

where T_j is an indicator variable for living in a community in either treatment 1 or treatment 2. ϵ_{ij} is an individual-specific error term clustered at the community level for household-level outcomes. A second specification is also estimated:

$$Y_{ij} = \alpha + \beta_1\, T1_j + \beta_{2A}\, T2A_j + \beta_{2B}\, T2B_j + \epsilon_{ij} \tag{5}$$

where $T1_j$, $T2A_j$ and $T2B_j$ are indicator variables for living in a community in treatment groups 1, 2A (information to leader and citizens without deliberation), and 2B (information to leader and citizens plus deliberation). ϵ_{ij} is an individual-specific error term clustered at the community level. A test for joint-significance of β_1, β_{2A} and β_{2B} using an F-test is also provided.

Table B2: Descriptive Statistics

		Treatment Group:				
	Control	Any	T1	T2A	T2B	Joint test
	(1)	(2)	(3)	(4)	(5)	(6)
	mean	diff.	diff.	diff.	diff.	p-value
	[std.dev.]	(std.err.)	(std.err.)	(std.err.)	(std.err.)	[N]
Citizen-level						
Female	0.274	-0.033	-0.036	-0.037	-0.026	0.668
	[0.446]	(0.027)	(0.034)	(0.036)	(0.034)	[2065]
Age in years	44.880	0.220	0.280	0.655	-0.285	0.884
	[16.860]	(1.010)	(1.296)	(1.255)	(1.178)	[2058]
Household size	5.588	0.102	-0.098	0.208	0.193	0.329
	[2.861]	(0.168)	(0.198)	(0.214)	(0.198)	[2063]
No formal education	0.310	-0.020	-0.022	-0.017	-0.022	0.889
	[0.463]	(0.027)	(0.032)	(0.033)	(0.034)	[2065]
Primary education	0.575	0.002	0.025	0.010	-0.029	0.516
	[0.495]	(0.030)	(0.036)	(0.037)	(0.037)	[2065]
Secondary or higher education	0.114	0.018	-0.002	0.006	0.052	0.423
	[0.319]	(0.024)	(0.027)	(0.027)	(0.035)	[2065]
Years of schooling	3.690	0.077	0.004	-0.102	0.334	0.564
	[3.405]	(0.237)	(0.274)	(0.270)	(0.325)	[2065]
Muslim	0.555	0.017	0.015	0.044	-0.007	0.897
	[0.497]	(0.060)	(0.075)	(0.073)	(0.072)	[2065]
Macua ethnic group	0.599	0.049	0.083	0.031	0.033	0.784
	[0.491]	(0.065)	(0.081)	(0.081)	(0.083)	[2065]
Maconde ethnic group	0.294	-0.045	-0.054	-0.061	-0.020	0.839
	[0.456]	(0.063)	(0.078)	(0.075)	(0.078)	[2065]
Mwani and other ethnic groups	0.107	-0.004	-0.029	0.029	-0.013	0.556
	[0.309]	(0.032)	(0.035)	(0.044)	(0.038)	[2065]
Semi-urban	0.109	-0.005	-0.009	-0.001	-0.003	0.999
	[0.313]	(0.049)	(0.060)	(0.062)	(0.061)	[1950]
Urban	0.091	-0.035	-0.031	-0.037	-0.037	0.878
	[0.288]	(0.043)	(0.052)	(0.050)	(0.051)	[1950]
Average Trust	2.177	-0.016	-0.034	-0.045	0.032	0.297
	[0.546]	(0.037)	(0.044)	(0.046)	(0.045)	[1949]
Awareness of natural gas discovery	0.487	0.002	-0.053	0.026	0.033	0.381
	[0.500]	(0.047)	(0.056)	(0.055)	(0.058)	[2064]
Listens to radio frequently	0.394	0.017	-0.017	0.039	0.028	0.362
	[0.489]	(0.028)	(0.034)	(0.035)	(0.036)	[2063]
Community-level						
Female Leader	0.036	-0.016	-0.036	0.003	-0.016	0.556
	[0.189]	(0.024)	(0.030)	(0.030)	(0.030)	[206]
Leader's age	54.091	0.505	0.549	0.517	0.449	0.991
	[10.624]	(1.556)	(1.940)	(1.930)	(1.940)	[206]
Years of schooling	6.200	-0.783*	-0.500	-0.631	-1.220**	0.182
	[2.946]	(0.446)	(0.554)	(0.551)	(0.554)	[206]
Natural resources index	0.044	-0.001	-0.014	0.013	-0.004	0.180
	[0.060]	(0.010)	(0.012)	(0.012)	(0.012)	[206]
Infrastructure index	0.483	0.014	-0.000	0.032	0.011	0.702
	[0.150]	(0.025)	(0.031)	(0.031)	(0.031)	[206]

Note. *** p<0.01, ** p<0.05, * p<0.1. Column (1) reports sample mean and standard deviation in brackets for the control group. Column (2) reports the difference between all treatment groups pooled together and the control group using an OLS regression of the corresponding characteristic on the treatment indicator. Columns (3)–(5) report the difference between each treatment group and the control group. Standard errors clustered at community level are reported in parentheses. Column (5) presents a joint test of significance of the coefficients for each treatment dummy (columns 3 to 5). *Average Trust* is the average of all self-reported measures of trust and ranges from 0 = not at all to 3 = trust a lot. *Natural Resources index* is built averaging 10 dummy variables indicating the presence in the community of different natural resources (limestone, marble, sands, forest, ebony, exwood, gold, charcoal, graphite, semi-precious and precious stones, mercury, fishing resources, salt and natural gas). *Infrastructure index* is built averaging 14 dummy variables indicating the presence in the community of a kindergarten, a primary school, a lower secondary school, an high school, an health center, a facilitator, a water pump, a market, a police station, a religious building, an amusement area, a room for community activities, access to electricity and connection to sewage.

C Multiple hypothesis testing procedure

For multiple hypothesis testing, the Studentized k-StepM method for the two-sided setup (Romano and Wolf, 2005) is followed. Data is represented by a data matrix X_N, where N is the number of observations generated from some underlying unknown probability mechanism P. Interest focuses on the parameter vector $\theta = (\theta_{T1} \ \ \theta_{T2})'$, where each $\theta_t = (\beta_{t,1}, ..., \beta_{t,K})$, and $\beta_{t,k}$ is the parameter on the treatment vector $t = (T1 \ \ T2)'$ corresponding to equations (1) and (2) estimated with outcome variable k. Individual hypotheses concern all elements of θ, and are two-sided: $H_{t,k} : \beta_{t,k} = 0$ vs $H'_{t,k} : \beta_{t,k} \neq 0$. For each element of θ, the test of the difference between treatment effects is analogously considered. For a given set of hypotheses, the following procedure is implemented:

1. Let $\hat{\theta}_N$ denote an estimator of θ (with std. errors $\hat{\sigma}_{N,t,k}$) computed from the original data matrix X_N using specifications presented in Section 7. For each hypothesis $H_{t,k}$, the absolute studentized test statistics $|z_{N,t,k}| = \left|\hat{\beta}_{N,t,k}/\hat{\sigma}_{N,t,k}\right|$ is computed from the data matrix X_N and relabeled in descending order from r_1 to r_S, such that $z_{N,r_1} \geq z_{N,r_2} \geq ... \geq z_{N,r_S}$.

2. Generate M bootstrap data matrices $X_N^{*,m}$ with $1 \leq m \leq M$ (M is set at 2000). Due to the design of the experiment, bootstrap data matrices are clustered at the community level. From each bootstrap data matrix, estimates $\hat{\beta}^{*,m}_{N,t,1}, ..., \hat{\beta}^{*,m}_{N,t,K}$ and standard errors $\hat{\sigma}^{*,m}_{N,t,1}, ..., \hat{\sigma}^{*,m}_{N,t,K}$ are computed using the same specifications as in Step 1. Then set $j = 1$ and $R_0 = 0$.

3. For $1 \leq m \leq M$, compute $max^{*,m}_{N,j} = max_{R_{j-1}+1 \leq s \leq S}\left(\left|\hat{\beta}^{*,m}_{N,r_s} - \hat{\beta}_{N,r_s}\right| / \hat{\sigma}^{*,m}_{N,r_s}\right)$. Using the M $max^{*,m}_{N,j}$, compute $\hat{d}_j$ as the $1-\alpha$ empirical quantile of the M values $max^{*,m}_{N,j}$. For $R_{j-1}+1 \leq s \leq S$, if $|z_{N,r_s}| > \hat{d}_j$, reject the null hypothesis H_{r_s}. α is set at 10%.

4. If no further hypotheses are rejected, the procedure stops. Otherwise, denote by R_j the number of hypotheses rejected so far, let $j = j + 1$ and return to Step 3.

To compute p-values, we follow the procedure for the computation of p-values adjusted for step-down multiple testing (see Algorithm 4.1 in Romano and Wolf, 2016).

D Additional Analysis

D.1 Knowledge of the natural gas discovery

An index is built from the following 5 questions: "*Where was natural gas discovered?*", "*Do you think that the exploration of natural gas has begun?*", "*Do you think that the government has already started receiving revenues from natural gas?*", "*What year do you think the extraction of*

natural gas will begin?", and "*What are the names of the companies involved in the exploration of natural gas?*". Table D3 reports estimates of treatment effects on whether the respondent knows the correct answer for each of these questions. Each indicator variable is equal to 1 if the respondent provides a correct answer, and 0 otherwise. Answers to each individual questions are averaged into an index, equal to 1 if the respondent has full knowledge of the discovery and zero if the respondent reports all answers wrongly or has never heard about the discovery. The open-ended nature of these questions is exploited, allowing the construction of 15 indicator variables capturing whether the respondent provides an answer and whether it is correct. The value 1 is assigned if the respondent reports correct information and does not report wrong information, and 0 if the respondent reports wrong information or does not know the answer. The 15 indicators are then averaged into a single index.

Table D3: Knowledge of the natural gas discovery

	(T1) Information to Leader		**(T2) Information to Leader and Citizens**		F-test equality	
Outcome variable	Coeff. (1)	S.E. (2)	Coeff. (3)	S.E. (4)	(p-value) (5)	N (6)
Leaders' knowledge						
Knows the location of discovery	0.019	0.047	0.093**	0.042	0.058	206
Knows whether exploration started	0.158**	0.069	0.160**	0.062	0.023	206
Knows whether government receives revenues	0.027	0.082	-0.017	0.074	0.836	206
Knows expected start of extraction	0.074	0.084	0.162**	0.075	0.095	206
Knows companies involved	0.022	0.014	0.024*	0.013	0.150	206
Citizens' knowledge						
Knows the location of discovery	0.025	0.026	0.237***	0.022	0.000	2072
Knows whether exploration started	-0.017	0.034	0.242***	0.028	0.000	2072
Knows whether government receives revenues	-0.044*	0.026	0.086***	0.024	0.000	2072
Knows expected start of extraction	0.024	0.020	0.175***	0.021	0.000	2072
Knows companies involved	-0.008	0.021	0.154***	0.016	0.000	2072

Note. Estimates based on OLS regressions (see equation 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in columns (2) and (4) and clustered at the community level. Each variable ranges from 0 to 1, where 0 indicates zero knowledge, and 1 indicates full knowledge. The specification includes community and leader-level controls (leaders), or community and household-level controls (citizens). The full list of controls is presented in Section 7.

Table D4 presents the main correlates of awareness and knowledge by citizens about the natural gas discovery at baseline. Columns 1 and 3 include only household-level controls, while columns 2 and 4 include community and leader-level controls in addition to the household-level controls. Individual characteristics are the main determinants of citizen awareness and knowledge at the baseline.

Table D4: Correlates of awareness and knowledge at baseline

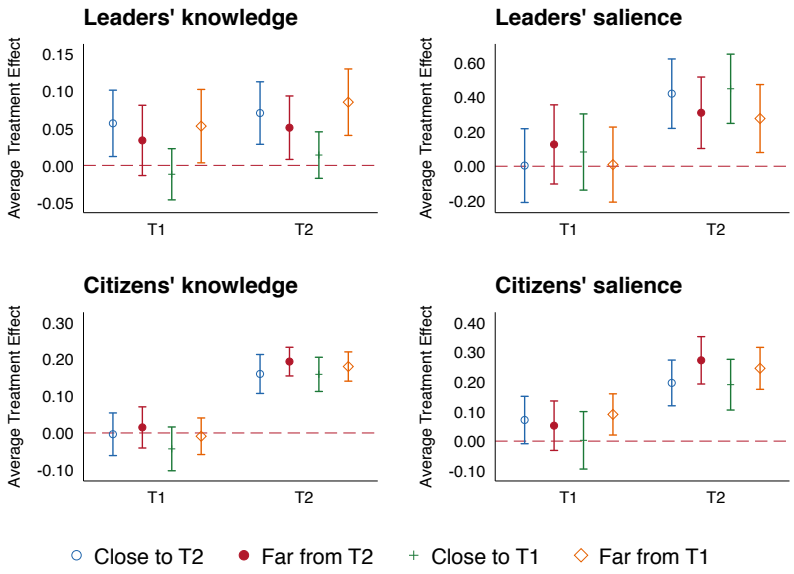
Dep.Var.	Awareness		Knowledge	
	(1)	(2)	(3)	(4)
Female respondent	-0.195***	-0.213***	-0.134***	-0.152***
	(0.026)	(0.025)	(0.017)	(0.016)
Age in years	0.014***	0.014***	0.011***	0.010***
	(0.004)	(0.003)	(0.002)	(0.002)
Age (squared)	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Primary education	0.099***	0.111***	0.072***	0.078***
	(0.022)	(0.021)	(0.015)	(0.014)
Secondary or higher education	0.408***	0.362***	0.301***	0.254***
	(0.037)	(0.038)	(0.026)	(0.025)
Muslim	0.140***	0.065***	0.096***	0.031*
	(0.025)	(0.024)	(0.017)	(0.016)
Macua ethnic group	-0.289***	-0.074*	-0.229***	-0.058**
	(0.038)	(0.038)	(0.031)	(0.027)
Maconde ethnic group	0.149***	-0.117**	0.055	-0.084**
	(0.047)	(0.049)	(0.035)	(0.034)
Household size	0.015***	0.012***	0.010***	0.008***
	(0.003)	(0.003)	(0.002)	(0.002)
Born in the village	0.022	0.025	0.018	0.023*
	(0.021)	(0.020)	(0.015)	(0.014)
In monogamous marriage	-0.035	-0.020	-0.036**	-0.022
	(0.022)	(0.021)	(0.015)	(0.014)
Subsistence farmer	-0.065***	-0.055**	-0.043***	-0.032**
	(0.022)	(0.022)	(0.016)	(0.015)
Infrastructure index		-0.008		-0.033
		(0.097)		(0.073)
Natural resources index		-0.258		-0.206
		(0.191)		(0.133)
Number of voters		0.001		0.003
		(0.008)		(0.006)
Below median distance from Palma		0.225***		0.177***
		(0.044)		(0.031)
Share of community of Macua ethnic group		-0.116		-0.120**
		(0.071)		(0.059)
Share of community of Maconde ethnic group		0.240***		0.068
		(0.076)		(0.061)
Share of community with secondary or higher education		0.106		0.087
		(0.080)		(0.055)
Observations	2055	2055	2055	2055
R^2	0.229	0.301	0.248	0.341
District indicator variables	No	Yes	No	Yes
Stratum indicator variables	No	Yes	No	Yes

Note. Estimates based on OLS regressions (see equations 1 and 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level. Depending on the column, the dependent variables are defined by the following: (1)–(2) Awareness: indicator variable equal to 1 if the respondent reports having heard about the natural gas discovery; (3)–(4) Knowledge: index averaging 15 indicator variables related to knowledge about the location of the discovery, whether exploration has started, whether the government is receiving revenues, when extraction is expected to start, and which firms are involved. Stratum indicator variables include dummy variables for semi-urban and urban strata (excluded category is rural stratum). Number of voters is measured as the number of tables at the polling station. The full list of controls is presented in Section 7.

D.2 Information spillovers and the evolution of the control group

The sample is split in communities close to (or far from) another community in T1 and in communities close to (or far from) another community in T2. Being close to or far from are defined using the sample median of the minimum distance to another community of these types. These median minimum distances are 12.01 km to T1 and 9.65 km to T2. The effect of each treatment is then estimated for each sub-group. Figure D3 presents the results relating to the effect of the interventions on leader's knowledge and salience of the natural gas discovery (upper panels), and on citizen's knowledge and salience of the natural gas discovery (lower panels). No evidence is found of spillover effects since estimates are not statistically different across sub-groups.[3]

Figure D3: Spillover effects on knowledge and salience about the natural gas discovery



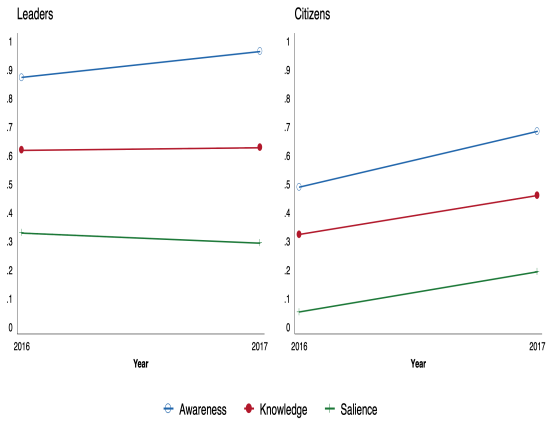
Note. *Close to* and *Far from* are based on the sample median of the minimum distance of a community to another community in T1 and in T2. The sample is split in communities closer than the median minimum distance (*close to*) and further away (*far from*). Minimum median distances are 12.01 km to T1 and 9.65 km to T2. Estimates based on OLS regression (see equations 1). Confidence intervals are built using statistical significance at the 10% level. Standard errors are clustered at the community level. For leader's knowledge and salience, the specifications include community and leader-level controls. For citizen's knowledge and salience, the specifications include community and household-level controls. The full list of controls is presented in Section 7.

Figure D4 shows the evolution between baseline and endline surveys of average awareness, knowledge, and salience of the natural gas discovery in the control group. The left panel focuses on leaders, while the right panel focuses on citizens. While leaders are much more aware of the discovery when compared to citizens, awareness increases over time for both. This is particularly the case among citizens. For citizens, a similar trend is observed for knowledge and salience.

[3] A similar conclusion is achieved when looking at awareness of the natural gas discovery. Estimates are omitted since in communities close to T2 all leaders are aware of the discovery. Therefore the treatment effect cannot be estimated for that group.

For leaders, knowledge tends to remain constant, while salience is slightly reduced. Since no contamination across communities is observed, this pattern suggests that, in the absence of any information campaign, news about the discovery reach citizens through alternative sources.

Figure D4: Evolution of awareness, knowledge, and salience in the control group



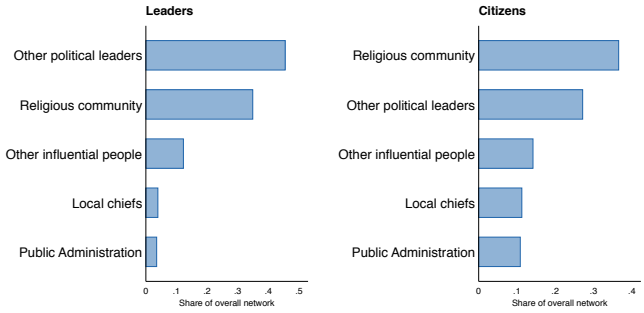
Note. The figure shows average awareness, knowledge, and salience of the natural gas discovery at baseline and follow-up restricted to the control group. The left panel focuses on leaders, while the right panel focuses on citizens.

D.3 Interaction with local leaders

Figure D5 shows the relative importance of different categories in the networks of leaders and citizens. Individuals in these networks are grouped into four major categories: local chiefs, other political leaders, public administration, religious community and other influential people. *Local chiefs* includes the village chief, his deputy and the chiefs for sub-units of the community. *Other political leaders* includes all higher level politicians (such as district and province-level governments), members of the party, the members of the community council, and all traditional leaders. *Public administration* includes all individuals working in the public administration. *Religious community* includes all religious leaders (imams and priests) and religious teachers. *Other influential people* is a residual category.

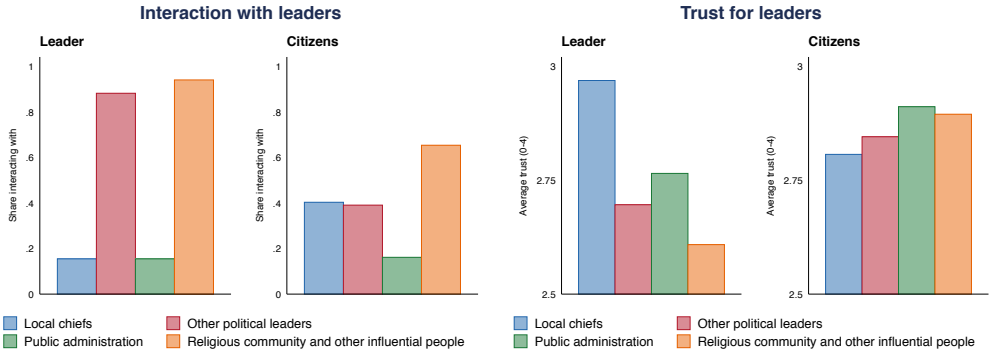
To understand interactions within the network, the left panel in Figure D6 shows whether citizens talked or called any of these individuals in the 6 months previous to the interview. The right panel in figure D6 analyzes instead the average trust towards these individuals. Figure D7 presents estimates of the effect of the interventions on the interaction of the leader and the citizens with people in their corresponding networks, both employing extensive (left panels) and intensive (right panels) margins. Results are similar across the two margins, and are suggestive that, consistently with figure D6, the interventions lead to different patterns of interaction with local leaders when comparing leaders to citizens.

Figure D5: Interaction with leaders



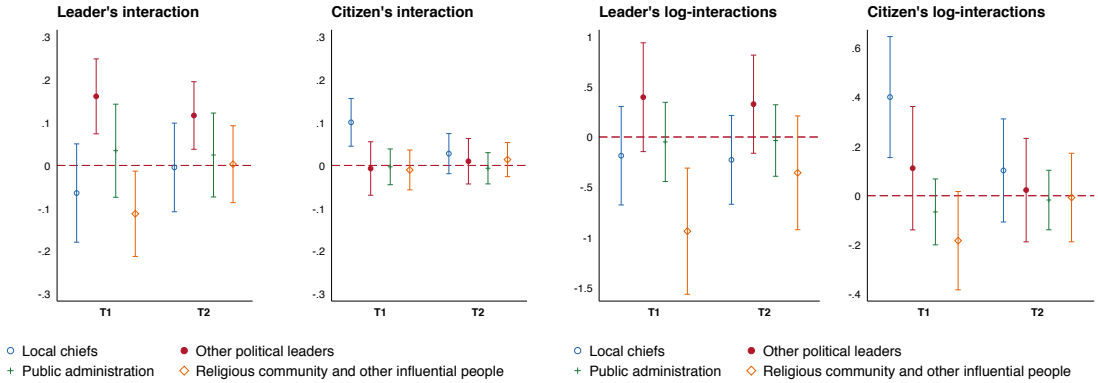
Note. The figure presents the composition at baseline of the network of all respondents (leaders in the left panel and citizens in the right panel). Categories are ordered from top to bottom in terms of relative importance within the network.

Figure D6: Network and interaction with local leaders



Note. The left figure shows the share of respondents that interacted with leaders in the corresponding category (for leaders and citizens). Interaction is defined as whether the respondent reports having called or talked with a leader in the 6 months previous to the interview. The right figure presents average trust for known leaders reported by both leaders and citizens. Trust is self-reported (0 = not at all to 3 = trust a lot). The sample is restricted to the baseline survey.

Figure D7: Interaction with leaders and the effect of the interventions



Note. Estimates based on OLS regressions (see equation 1). Confidence intervals are built using statistical significance at the 10% level, and standard errors clustered at the community level when employing citizen-level outcomes. In the left panels, the dependent variable is an indicator variable equal to 1 if the respondent reports having talked or called a leader in the corresponding category in the 6 months previous to the interview. In the right panels, the dependent variable is the log total number of times the respondent interacted with leaders in the corresponding category. The specifications include community and leader-level controls (for leader-level outcomes) or community-level and household-level controls (for citizen-level outcomes). The full list of controls is presented in Section 7.

D.4 Heterogeneous effects

This section presents an analysis of heterogeneous effects by basic demographics of the citizens (table D5), by baseline social capital (table D6), and by baseline wealth, awareness, aspirations, and risk/patience attitudes (table D7). Categories are identified in the pre-analysis plan (Armand et al., 2017). Outcomes are grouped in indices that are built using the procedure followed by Kling et al. (2007).

Table D5: Heterogeneous effects: basic demographics of citizens

	T1		T2			T1		T2		
Outcome variable	Coeff.	S.E.	Coeff.	S.E.	N	Coeff.	S.E.	Coeff.	S.E.	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Below median distance from Palma					**Above median distance from Palma**				
Citizen-level outcomes										
Citizen's knowledge	0.01	0.06	0.29***	0.06	1001	0.06	0.08	0.78***	0.06	1071
Rent-seeking among citizens	0.17***	0.05	0.13***	0.04	975	0.03	0.05	-0.03	0.04	1052
Citizen's mobilization	0.05	0.08	0.09	0.07	866	0.10	0.08	0.19**	0.09	835
Trust and accountability	0.04	0.04	0.07*	0.04	686	-0.03	0.05	0.07	0.04	883
Self-reported violence	0.03	0.07	-0.00	0.05	931	0.04	0.07	-0.11*	0.06	924
Community-level outcomes										
Leader's knowledge	-0.01	0.10	0.03	0.10	100	0.47***	0.17	0.97***	0.15	106
Leader's perceived benefits	0.07	0.23	0.04	0.22	100	0.09	0.30	-0.19	0.28	104
Elite capture	0.13*	0.08	0.04	0.07	99	0.19*	0.10	-0.09	0.09	106
Rent-seeking among leaders	0.11	0.16	0.24	0.15	99	-0.12	0.19	-0.16	0.17	105
Violence	-0.25	0.17	-0.40**	0.16	100	-0.04	0.07	-0.04	0.07	106
	Younger citizens ($<$ 35 y.o.)					**Older citizens ($\geq$ 35 y.o.)**				
Citizen-level outcomes										
Citizen's knowledge	-0.10	0.09	0.52***	0.07	555	0.08	0.06	0.55***	0.05	1517
Rent-seeking among citizens	0.13**	0.06	0.03	0.04	541	0.11**	0.04	0.06*	0.04	1486
Citizen's mobilization	0.08	0.07	0.12*	0.06	462	0.05	0.06	0.13**	0.06	1239
Trust and accountability	-0.05	0.06	0.05	0.05	431	-0.01	0.04	0.05	0.03	1138
Self-reported violence	-0.12	0.10	-0.16**	0.07	502	0.11**	0.05	0.01	0.05	1353
	Less educated ($\leq$ 4 years of schooling)					**More educated ($>$ 4 years of schooling)**				
Citizen-level outcomes										
Citizen's knowledge	0.06	0.07	0.60***	0.05	1269	-0.03	0.09	0.44***	0.07	803
Rent-seeking among citizens	0.11**	0.05	0.08**	0.04	1242	0.10**	0.05	0.01	0.04	785
Citizen's mobilization	0.07	0.06	0.14**	0.06	1069	0.04	0.07	0.13**	0.06	632
Trust and accountability	-0.03	0.04	0.03	0.03	919	-0.00	0.05	0.07*	0.04	650
Self-reported violence	0.04	0.05	-0.03	0.05	1123	0.05	0.09	-0.07	0.06	732
	Female citizen					**Male citizen**				
Citizen-level outcomes										
Citizen's knowledge	-0.03	0.09	0.50***	0.08	584	0.07	0.07	0.58***	0.05	1488
Rent-seeking among citizens	0.12*	0.06	0.11**	0.05	574	0.12***	0.04	0.03	0.04	1453
Citizen's mobilization	0.13	0.08	0.20***	0.07	471	0.05	0.06	0.12**	0.06	1230
Trust and accountability	-0.07	0.06	0.03	0.05	424	0.00	0.03	0.07**	0.03	1145
Self-reported violence	0.08	0.11	-0.01	0.07	511	0.05	0.06	-0.06	0.05	1344

Note. Estimates based on OLS regression (see equation 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in columns (2), (4), (7), and (9) and clustered at the community level for citizen-level outcome variables. The specifications include community and leader-level controls (for leader-level outcomes) or community-level and household-level controls (for citizen-level outcomes). The full list of controls is presented in Section 7. Outcomes are grouped in indices that are built using the procedure followed by Kling et al. (2007): outcomes are first normalized in standardized units to study mean effect sizes of the indices relative to the standard deviation of the control group and then averaged within each category.

Table D6: Heterogeneous effects: baseline social capital

Outcome variable	T1 Coeff. (1)	T1 S.E. (2)	T2 Coeff. (3)	T2 S.E. (4)	N (5)	T1 Coeff. (6)	T1 S.E. (7)	T2 Coeff. (8)	T2 S.E. (9)	N (10)
	Does not know chiefs					**Knows chiefs**				
Citizen-level outcomes										
Citizen's knowledge	-0.06	0.09	0.46***	0.07	737	0.09	0.07	0.61***	0.05	1335
Rent-seeking among citizens	0.10*	0.06	0.06	0.04	721	0.08*	0.04	0.07*	0.04	1306
Citizen's mobilization	0.11*	0.06	0.25***	0.06	597	0.05	0.07	0.10	0.07	1104
Trust and accountability	-0.03	0.07	-0.05	0.06	460	-0.01	0.04	0.10***	0.03	1109
Self-reported violence	0.02	0.08	-0.04	0.06	633	0.04	0.07	-0.05	0.05	1222
	Does not know other political leaders					**Knows other political leaders**				
Citizen-level outcomes										
Citizen's knowledge	0.03	0.08	0.52***	0.07	886	0.06	0.07	0.61***	0.05	1186
Rent-seeking among citizens	0.14***	0.04	0.06	0.04	874	0.10**	0.04	0.05	0.04	1153
Citizen's mobilization	0.08	0.06	0.20***	0.05	736	0.06	0.08	0.08	0.07	965
Trust and accountability	-0.02	0.05	0.09*	0.05	582	-0.01	0.05	0.04	0.04	987
Self-reported violence	0.06	0.07	-0.04	0.06	784	0.03	0.07	-0.05	0.06	1071
	Leader is less network-central					**Leader is more network-central**				
Citizen-level outcomes										
Citizen's knowledge	0.00	0.08	0.65***	0.06	1178	-0.04	0.08	0.28***	0.09	708
Rent-seeking among citizens	0.05	0.05	0.04	0.04	1156	0.15**	0.06	0.03	0.06	693
Citizen's mobilization	0.13	0.08	0.21***	0.08	987	-0.04	0.09	-0.00	0.08	567
Trust and accountability	-0.01	0.05	0.07*	0.04	890	-0.04	0.04	0.03	0.05	536
Self-reported violence	0.04	0.09	-0.10*	0.06	1032	-0.01	0.06	-0.03	0.06	659
	Community is less mobilized					**Community is more mobilized**				
Citizen-level outcomes										
Citizen's knowledge	0.04	0.07	0.53***	0.05	1341	-0.06	0.11	0.53***	0.08	731
Rent-seeking among citizens	0.13***	0.05	0.04	0.04	1309	0.04	0.06	0.06	0.04	718
Citizen's mobilization	0.14**	0.07	0.16**	0.07	1074	0.05	0.12	0.06	0.10	627
Trust and accountability	-0.03	0.04	0.06	0.04	1021	0.03	0.05	0.07*	0.04	548
Self-reported violence	0.10*	0.05	-0.02	0.04	1193	-0.12	0.09	-0.07	0.07	662
	Lower voice outside the community					**Higher voice outside the community**				
Citizen-level outcomes										
Citizen's knowledge	0.07	0.08	0.56***	0.07	1059	-0.01	0.07	0.55***	0.06	1013
Rent-seeking among citizens	0.02	0.05	-0.03	0.05	1032	0.19***	0.05	0.15***	0.04	995
Citizen's mobilization	-0.00	0.08	0.03	0.07	868	0.16**	0.08	0.23***	0.09	833
Trust and accountability	-0.01	0.04	0.06*	0.03	782	-0.03	0.05	0.07	0.05	787
Self-reported violence	0.08	0.06	0.05	0.05	980	0.03	0.07	-0.15**	0.06	875
	Lower trust					**Higher trust**				
Citizen-level outcomes										
Citizen's knowledge	0.02	0.07	0.46***	0.06	1012	0.09	0.09	0.68***	0.07	1060
Rent-seeking among citizens	0.11*	0.05	0.05	0.05	989	0.10*	0.06	0.03	0.04	1038
Citizen's mobilization	0.00	0.08	0.01	0.07	811	0.09	0.08	0.24***	0.08	890
Trust and accountability	0.03	0.05	0.07*	0.04	743	-0.03	0.05	0.04	0.04	826
Self-reported violence	0.07	0.07	-0.07	0.06	909	-0.03	0.07	-0.06	0.05	946

Note. Estimates based on OLS regression (see equation 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in columns (2), (4), (7), and (9) and clustered at the community level for citizen-level outcome variables. The specifications include community and leader-level controls (for leader-level outcomes) or community-level and household-level controls (for citizen-level outcomes). The full list of controls is presented in Section 7. Outcomes are grouped in indices that are built using the procedure followed by Kling et al. (2007): outcomes are first normalized in standardized units to study mean effect sizes of the indices relative to the standard deviation of the control group and then averaged within each category. See Section D.3 for the definition of chiefs and other political leaders. Leader's network centrality is defined as the percentage of citizens reporting to personally know the village leader at baseline ("less" corresponds to a percentage smaller than 50%). Community mobilization is defined as percentage of citizens reporting to have attended a community meeting at baseline ("less" corresponds to a percentage smaller than 90%, which is the median in the sample). Voice outside the community is defined as the community average at baseline of citizen voice with provincial administrators and with national administrators, with 1 = not at all and 4 = totally ("less" corresponds to an average smaller than 2.28, which is the median in the sample). Trust is the baseline community average of all self-reported measures of trust, with 0 = not at all and 3 = trust a lot ("less" corresponds to an average smaller than 2.19, which is the median in the sample).

Table D7: Heterogeneous effects: baseline wealth, awareness, aspirations, and risk/patience attitudes

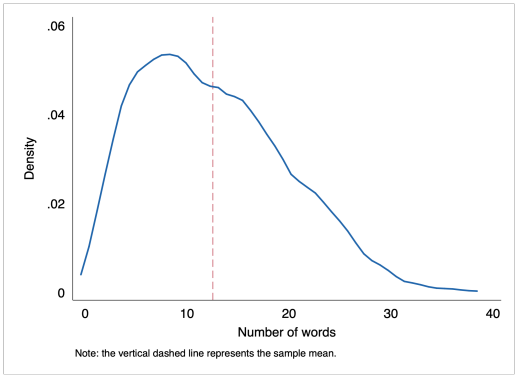
	T1		T2			T1		T2		
Outcome variable	Coeff.	S.E.	Coeff.	S.E.	N	Coeff.	S.E.	Coeff.	S.E.	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Assets are below median					**Assets are above median**				
Citizen-level outcomes										
Citizen's knowledge	0.04	0.07	0.66***	0.06	1189	0.04	0.07	0.40***	0.06	875
Rent-seeking among citizens	0.09**	0.04	0.05	0.04	1173	0.16***	0.05	0.07	0.05	846
Citizen's mobilization	0.08	0.07	0.21***	0.06	1009	0.05	0.06	0.03	0.06	686
Trust and accountability	-0.01	0.04	0.07**	0.03	884	-0.02	0.05	0.03	0.04	678
Self-reported violence	0.06	0.06	-0.00	0.06	1045	0.04	0.07	-0.10*	0.06	803
	Citizen was not aware of natural gas					**Citizen was aware of natural gas**				
Citizen-level outcomes										
Citizen's knowledge	0.05	0.08	0.80***	0.06	965	0.04	0.07	0.24***	0.06	921
Rent-seeking among citizens	0.01	0.05	-0.01	0.04	944	0.21***	0.05	0.11**	0.05	905
Citizen's mobilization	0.09	0.07	0.21***	0.07	797	0.04	0.08	0.10	0.06	757
Trust and accountability	-0.04	0.05	0.03	0.04	716	0.02	0.06	0.12***	0.04	710
Self-reported violence	0.05	0.07	-0.13**	0.06	842	-0.01	0.08	-0.04	0.06	849
	Citizen had negative/neutral aspirations					**Citizen had positive aspirations**				
Citizen-level outcomes										
Citizen's knowledge	-0.07	0.09	0.47***	0.07	699	0.14*	0.08	0.65***	0.06	894
Rent-seeking among citizens	0.16***	0.06	0.12**	0.05	683	0.08	0.05	0.02	0.05	877
Citizen's mobilization	0.01	0.07	0.13**	0.06	573	0.09	0.07	0.18***	0.06	727
Trust and accountability	-0.00	0.06	0.09*	0.05	512	0.00	0.04	0.07*	0.04	694
Self-reported violence	0.05	0.08	-0.10	0.06	622	-0.01	0.08	-0.12*	0.06	811
	Citizen is less risk-averse					**Citizen is more risk-averse**				
Citizen-level outcomes										
Citizen's knowledge	0.09	0.08	0.52***	0.07	764	0.02	0.08	0.58***	0.06	1106
Rent-seeking among citizens	0.15***	0.05	0.07	0.05	750	0.09**	0.05	0.03	0.04	1083
Citizen's mobilization	0.00	0.07	0.15**	0.07	644	0.10	0.07	0.16***	0.06	896
Trust and accountability	-0.01	0.05	0.11**	0.05	548	-0.02	0.04	0.03	0.04	868
Self-reported violence	0.05	0.09	-0.08	0.08	678	0.00	0.06	-0.08	0.05	998
	Citizen is more patient					**Citizen is less patient**				
Citizen-level outcomes										
Citizen's knowledge	0.12	0.08	0.58***	0.06	910	0.01	0.08	0.56***	0.06	959
Rent-seeking among citizens	0.08	0.05	0.06	0.05	891	0.13***	0.05	0.03	0.04	941
Citizen's mobilization	-0.03	0.06	0.15**	0.06	756	0.12*	0.07	0.15**	0.07	783
Trust and accountability	-0.04	0.05	0.09**	0.04	663	0.02	0.05	0.07	0.05	751
Self-reported violence	-0.03	0.08	-0.11**	0.06	820	0.09	0.06	-0.04	0.05	856

Note. Estimates based on OLS regression (see equation 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in columns (2), (4), (7), and (9) and clustered at the community level for citizen-level outcome variables. The specifications include community and leader-level controls (for leader-level outcomes) or community-level and household-level controls (for citizen-level outcomes). The full list of controls is presented in Section 7. Outcomes are grouped in indices that are built using the procedure followed by Kling et al. (2007): outcomes are first normalized in standardized units to study mean effect sizes of the indices relative to the standard deviation of the control group and then averaged within each category. Assets are computed as average of 15 indicator variables for whether the household owns a radio, a television, a bicycle, a motorbike, a car, a fishing boat, a fishing net, an electric or gas oven, an oven for bread, a typical coal oven, a fridge, a bed, a table, a cell phone, and a watch. The citizen has negative/neutral (positive) aspirations if the response to "How do you think your household's economic situation will be five years from now?" is much worse, slightly worse or similar to the current situation (slightly better, much better). Risk-aversion is defined using a non-incentivized version of a lottery game in which the respondent reports stated preferences between a fixed amount (1,000 Meticais) and a 50% chance lottery to win a larger amount ranging from 1,800 to 5,000 Meticais ("less" corresponds to an indifference between the fixed amount and amounts smaller than 5,000 Meticais for the lottery, which is the median in the sample). Patience is defined using a series of stated-preference questions in which the respondent choose between a fixed amount today (1,000 Meticais) and a larger amount in 1 month, ranging from 1,100 to 2,500 Meticais ("more" corresponds to an implicit discount rate smaller than 0.75, which is the median in the sample).

D.5 Content analysis of postcards

Figure D8 shows the distribution of number of words per postcard. Table D8 presents estimates of the treatment effects on different types of content. For each postcard, the number of words is computed after cleaning the string by removing prepositions and articles to highlight content.

Figure D8: Distribution of number of words in returned postcards



Note. The figure shows the distribution of the number of words in returned postcards estimated using kernel density. To highlight content, strings are cleaned by removing prepositions and articles.

Table D8: Postcard contents

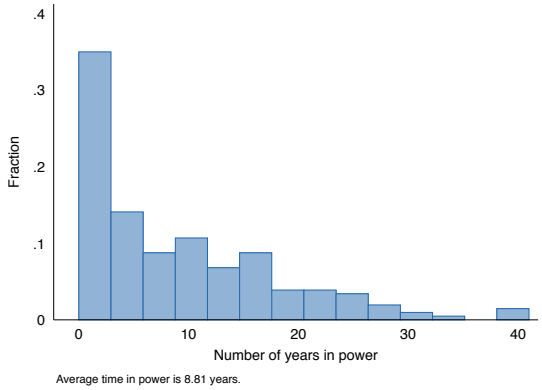
Dep.Var.:	**N. of words (log)**	**Gratitude**	**Complaint**	**Request for...**		
				Personal	**Community**	**Province**
	(1)	(2)	(3)	(4)	(5)	(6)
(T1) Information to Leader	-0.127*	-0.007	0.009	-0.029	-0.018	0.079***
	(0.074)	(0.016)	(0.009)	(0.029)	(0.020)	(0.026)
(T2) Information to Leader and Citizens	-0.142**	-0.007	0.018**	-0.019	0.002	0.040**
	(0.063)	(0.014)	(0.008)	(0.026)	(0.014)	(0.018)
Observations	1702	1700	1700	1700	1700	1700
R^2	0.083	0.047	0.024	0.034	0.089	0.136
Mean (control group)	2.443	0.044	0.011	0.103	0.963	0.076
T1 = T2 (p-value)	0.835	1.000	0.353	0.587	0.314	0.142
Lagged Dependent Variable	No	No	No	No	No	No

Note. Estimates based on OLS regressions (see equations 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level. Depending on the column, the dependent variables are defined by the following: (1) Number of words: number of words in returned postcards after the strings are cleaned by removing prepositions and articles, reported in logs; (2)–(6): indicator variables equal to 1 if the returned postcard contains greetings or gratitude, a complaint, a personal request, a request for the community or a request for the province. All specifications include community and household-level controls. The full list of controls is presented in Section 7.

D.6 Turnover of community leaders

Figure D9 presents the distribution of the number of years in which community leaders have been in power at the baseline. Leaders in the sample have been in power for an average time of 8.8 years. Table D9 presents estimates of treatment effects on the probability of a change in leader from baseline to follow-up. No significant effect of T1 and T2 is found. This result is robust to the removal of cases in which the change of leader is caused by the death of the previous leader.

Figure D9: Distribution of years in power among leaders



Note. The figure shows the distribution of leaders by the number of years they have been in power. Data is self-reported by the community leaders and collected at baseline.

Table D9: Probability that a leader changes from baseline to follow-up

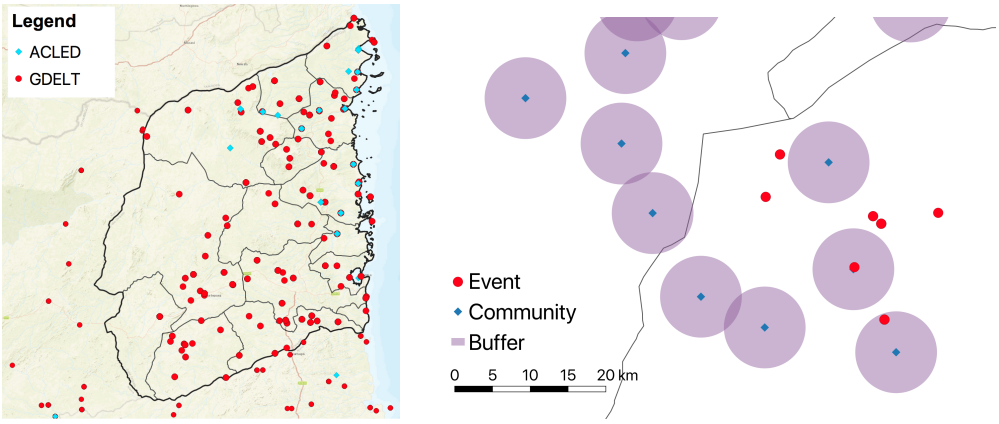
Dep.Var.:	**New leader**	**New leader (exclude death)**
	(1)	(2)
(T1) Information to Leader	0.014	0.015
	(0.041)	(0.034)
(T2) Information to Leader and Citizens	0.025	0.001
	(0.037)	(0.030)
Observations	206	206
R^2	0.113	0.120
Mean (control group)	0.018	0.018
T1 = T2 (p-value)	0.762	0.649

Note. Estimates based on OLS regressions (see equations 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level. The dependent variables are indicator variables equal to 1 if at follow-up the community leader has changed when compared to baseline. Column 1 considers all cases, while column 2 set the indicator variable to 0 if the replacement of a leader is due to his/her death. All specifications include community and leader-level controls. The full list of controls is presented in Section 7.

D.7 Verification process of GDELT violent events

Since GDELT events are generated through an automated process, it is possible that some events are mistakenly reported as events happening in the study area. For this reason, all observations characterized by unconventional and conventional violence and happening in Cabo Delgado province in the period of analysis are first selected. Unconventional violence events are coded in GDELT as *Assault* or *Coerce*, and conventional military force events are coded as *Fight*.[4] A total of 1317 observations in the period March 1, 2013, to June 17, 2018 is obtained. Each news item was then analyzed to check whether events are correctly specified as violent events happening in Cabo Delgado and whether each event is correctly georeferenced. Out of 1317 observations, only 325 verified events are obtained (25%), 877 (67%) are wrongly reported and 115 (9%) cannot be verified as the source is not accessible anymore (i.e., the link is broken). In the corresponding period, ACLED registers 51 events. To assign an event to a community, a buffer of 5 kilometers is used and an event is assigned to a community if it is located within the buffer. Figure D10 shows the geographic distribution of verified events for the period 2013-2018 and an example of this assignment rule.

Figure D10: Geographical distribution of violent events



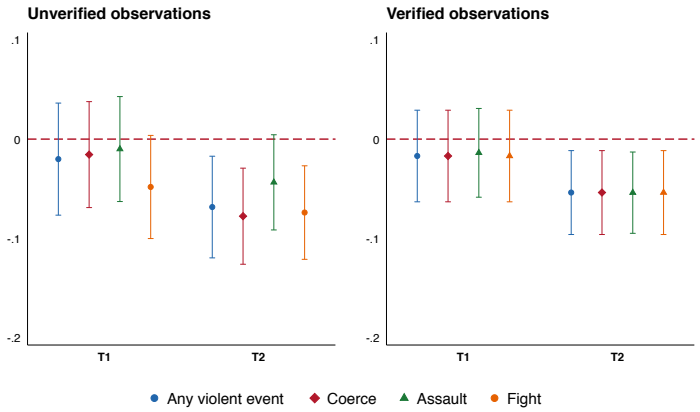
Note. The left panel shows the geographical distribution of violent events coded in the ACLED and GDELT datasets in the period February 2013 - June 2018. Borders highlight the province of Cabo Delgado and its districts. The right panel shows an example of the procedure to assign events to communities. Dots indicate the geographic location of events, rhombi indicate the geographic centroid of the community, and the shaded area highlights the buffer surrounding the community.

To check whether events wrongly-coded in GDELT present a non-random pattern, treatment ef-

[4] *Assault* includes the following actions: abduct, hijack, or take hostage; physically or sexually assault; torture; kill by physical assault; conduct suicide, car, or other non-military bombing; use as human shield; attempt to assassinate; assassinate; other unconventional violence. *Coerce* includes the following actions: seize or damage property; confiscate property; destroy property; impose administrative sanctions; impose restrictions on political freedoms; ban political parties or politicians; impose curfew; impose state of emergency or martial law; arrest, detain, or charge with legal action; expel or deport individuals; use tactics of violent repression; cybernetic attack. *Fight* includes the following actions: impose blockade; restrict movement; occupy territory; fight with small arms and light weapons; fight with artillery and tanks; employ aerial weapons; violate ceasefire; other conventional use of military force.

fects on violent events are estimated using verified and unverified GDELT events as dependent variables. Figure D11 presents estimates of equation (2) for each sub-category and for any events in the category using equation (2). Each dependent variable is an indicator variable equal to 1 if an event was recorded in GDELT dataset in the corresponding category and occurred in proximity with the community.

Figure D11: The effect of interventions on unverified versus verified GDELT events



Note. Estimates based on OLS regression (see equation 2). Confidence intervals are built using statistical significance at the 10% level, and standard errors clustered at the community level when employing citizen-level outcomes. In the left panel, the dependent variable is an indicator variable equal to 1 if an event was recorded in GDELT dataset in the corresponding category and occurred in proximity with the community. In the right panel, the dependent variable is an indicator variable equal to 1 if an event was recorded in GDELT dataset in the corresponding category, occurred in proximity with the community, and was verified. "Any violent event" includes events classified as coerce, assault or fight. The specifications include community and leader-level controls. The full list of controls is presented in Section 7.

D.8 Overview and displacement of violent events

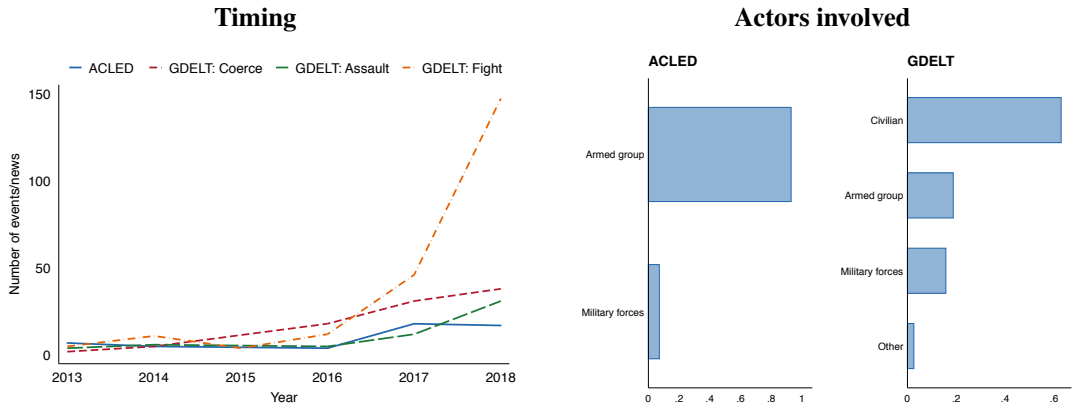
The left panel in figure D12 presents the time series of events in ACLED and in GDELT in the province of Cabo Delgado. A significant increase in violence occurs starting in October 2017.[5] The rise is attributed to extremist groups recruiting support within the Muslim community in the province. From the analysis of events, violence is targeted mainly against governmental institutions (such as the police and local government infrastructures), or against civilians. It developed first in semi-urban targets and then spread to rural locations in different districts. National and international news are linking this uprise in violence to poverty and discontent, in a province with large natural resources potential where Muslims account for half of the population.

The right panel in figure D12 presents the share of events in the endline period (April 2017 to June 2018) by actors involved. For ACLED, the figure shows the perpetrator of violence, while the victims are always civilians. For GDELT, all actors involved in GDELT events (typically two actors per event) are grouped– the share of actors that is represented in each category is graphed.

[5]For 2018, only the first six months of the year are available at the time of the analysis.

Civilians are the the main victims: most events targeting civilians resulted in deaths (including beheadings), burning of houses, and/or theft of supplies. A few confrontations between armed groups and military forces are also observed.

Figure D12: Timing and composition of violent events



Note. The left panel shows the evolution of violent events coded in the ACLED and GDELT datasets in the period February 2013 - June 2018 (all events are presented). For ACLED, violence against civilians is selected, while for GDELT, events coded as Coerce, Assault, and Fight are plotted separately. The right panel shows the share of events by actors involved as coded in ACLED and the share of observations by actor as coded in GDELT. "Military forces" includes the government and other authorities. "Other" includes civil society organizations. For actors, the sample is restricted to events happening in the follow-up period (April 2017-June 2018).

Table D10 shows whether the effect observed on conflict is driven by displacement of violence from communities in treatment 1 or 2 to communities in the control group. The sample is restricted to communities in the control group and OLS regressions are presented in which violent events are the dependent variables and distance from a T1 or T2 community is the explanatory variable of interest. An additional control is the distance to another community in the control group. Distances have no significant effect, providing evidence against the hypothesis of displacement.

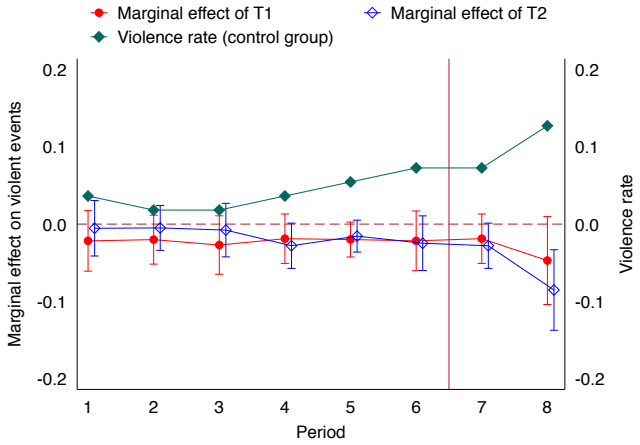
Table D10: Displacement of violent events

Dep.Var.:	**Violence in administrative data**					
	ACLED		**GDELT**		**GDELT + ACLED**	
	(1)	(2)	(3)	(4)	(5)	(6)
Min. distance from T1/T2 community	0.006	0.005	0.002	0.002	0.003	0.004
	(0.004)	(0.005)	(0.002)	(0.003)	(0.005)	(0.005)
Min. distance from another control		0.001		-0.000		-0.002
		(0.003)		(0.002)		(0.003)
Observations	55	55	55	55	55	55
R^2	0.618	0.620	0.919	0.919	0.781	0.784
Lagged Dependent Variable	Yes	Yes	Yes	Yes	Yes	Yes

Note. Estimates based on OLS regression (see equation 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis. Depending on the column, the dependent variables are defined by the following: (1)–(2) ACLED: indicator variable equal to 1 if an event was recorded in ACLED dataset (attacks against civilians) and occurred in proximity with the community; (3)–(4) GDELT: indicator variable equal to 1 if an event was recorded in GDELT dataset (conventional and non-conventional violence) and occurred in proximity with the community; (5)–(6) ACLED+GDELT: indicator variable equal to 1 if an event was recorded in ACLED (attacks against civilians) or GDELT (conventional and non-conventional violence) datasets and occurred in proximity with the community. Specifications include community and leader-level controls. The full list of controls is presented in Section 7. Distances are computed in kilometers from the geographical centroids of each community.

To understand the timing of treatment effects on violence, events are decomposed into pre-intervention and post-intervention periods and effects are estimated separately for each period. Figure D13 presents estimates of equation (2) in which, for each period, the dependent variables are indicator variables equal to 1 if an event was recorded in GDELT (conventional and non-conventional violence) or ACLED (attacks against civilians) datasets, occurred in proximity with a community and in the corresponding time period.

Figure D13: The effect of interventions by timing of violent events



Note. Estimates based on OLS regression (see equation 2). Estimates are computed separately for each period. Confidence intervals are built using statistical significance at the 10% level. The dependent variable is an indicator variable equal to 1 if an event was recorded in GDELT (conventional and non-conventional violence) or ACLED (attacks against civilians) datasets and occurred in proximity with the community. Due to the low number of events in the period before 2016, unequal time periods are considered. The vertical line separates pre-intervention to post-intervention periods. Pre-intervention periods: 1 = Jan 1997-Dec 2012 (only events coded in ACLED); 2 = Jan-Jun 2013; 3 = Jul-Dec 2013; 4 = Jan-Jun 2014; 5 = Jun 2014-Mar 2015; 6 = Jun 2016-Mar 2017. Post-intervention periods: 7 = Apr-Sep 2017; 8 = Oct 2017-May 2018. To make estimates comparable to the main text, the baseline period (April 2015-May 2016) is excluded since violent events in this period are used in all specifications as control variables. Specifications also include community and leader-level controls. The full list of controls is presented in Section 7.

D.9 Participation in the information and deliberation meetings: IV estimates

To measure the effect of participation in the information and the deliberation meetings, individual-level information on whether the person was present during the information campaign ($info_{ij}$) and during the deliberation meeting ($delib_{ij}$) are used. Attendance is indicated using two dummy variables equal to 1 if the citizen was present and 0 otherwise. The effect of participation is estimated using the following specification:

$$Y_{ij} = \alpha + \beta_1\, info_{ij} + \beta_2\, delib_{ij} + \gamma\, Z_j + \delta\, X_{ij} + \epsilon_{ij} \tag{6}$$

where Z_j is a set of location control variables including strata dummies and community characteristics, X_j is a set of individual characteristics, and ϵ_{ij} is an individual-specific error term clustered at the community level to account for correlated errors within the community. Since participation is endogenous, equation (6) is estimated using 2SLS and instrumenting $info$ and $delib$ using the treatment indicators. Instrumental variables are $T2$ for $info$ and $T2B$ for $delib$. T1 is also included as instrumental variable, but results are unaffected by its exclusion. Table D11 presents the results grouped by categories of outcomes.

Table D11: Participation in the information campaign and deliberation meetings

	Attended information campaign meeting		**Attended deliberation meeting**		F-test equality	N
Outcome variable	Coeff.	S.E.	Coeff.	S.E.	(p-value)	
	(1)	(2)	(3)	(4)	(5)	(6)
Citizen's knowledge	0.541***	0.046	0.008	0.070	0.000	2072
Rent-seeking among citizens	-0.003	0.027	0.006	0.040	0.988	2027
Citizen's mobilization	0.033	0.044	0.229**	0.095	0.013	1701
Trust and accountability	0.096***	0.021	-0.076*	0.044	0.000	1569
Self-reported violence	-0.083**	0.037	0.027	0.057	0.062	1855

Note. Estimates based on 2SLS regression where attendance to information campaign and to deliberation meetings are instrumented with the treatment indicators (see equation 6). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in columns (2) and (4) and clustered at the community level. The specification includes community and household-level controls. The full list of controls is presented in Section 7. Outcomes are grouped in indices that are built using the procedure followed by Kling et al. (2007): outcomes are first normalized in standardized units to study mean effect sizes of the indices relative to the standard deviation of the control group and then averaged within each category.

D.10 Robustness to selection of control variables

Robustness of estimates to control variable selection is tested using the Post-Double Selection (PDS) LASSO procedure (Belloni et al., 2014b,a; Tibshirani, 1996). The PDS LASSO provides a method for model selection in the presence of a large number of control variables by requiring that the effect of confounding factors can be controlled for up to a small approximation error by including a relatively small number of control variables.

Table D12 presents the variables selected for this procedure. PDS LASSO is performed for each outcome variable analyzed in the main text and estimate the corresponding treatment effects. The sampling strata are partialled out. Table D13 presents estimates of treatment effects on citizen-level outcomes using equation 1. For these outcomes, the procedure is cluster-robust. Table D14 presents estimates of treatment effects on community-level outcomes.

Table D12: Variables included in the Post-Double Selection LASSO procedure

Variable group	Description
Community characteristics	
Location, size and distances	District and stratum (rural, semi-urban, or urban) indicator variables, number of voters (measured by the number of tables at the polling station), distance (in kilometers) from the community to the main urban centers in the province (Pemba, Montepuez, Palma, Mocimboa da Praia) and average distance to all sampled communities.
Infrastructure	Indicator variables for the presence in the community of a kindergarten, a primary school, a lower secondary school, an high school, an health center, a facilitator, a water pump, a market, a police station, a church, mosque or temple, an amusement area, a room for community activities, and for access to electricity and to the sewage system. An index built by averaging the 14 indicator variables is also included.
Presence of natural resources	Average of 10 indicator variables for the presence in the community of limestone, marble, sands and rocks, forest resources, ebony and exotic woods, gold, charcoal, graphite, precious and semi-precious stones, mercury, fishing resource, salt and natural gas.
Average-citizen	Community-level average of variables included in citizens' characteristics.
Citizens' characteristics	
Demographics	Gender and age of the household head (reported in number of years), household size, education, religion, and ethnic group indicators, indicator for whether the respondent was born in the community.
Occupation	Indicator variables for whether the citizen is a subsistence farmer, a worker, a professional, or is employed in another activity, and an indicator variable for whether members of the family are employed in the extractive section.
Wealth	Indicator variables for whether the household owns a radio, a television, a bicycle, a motorbike, a car, a fishing boat, a fishing net, an electric or gas oven, an oven for bread, a typical coal oven, a fridge, a bed, a table, a cell phone, and a watch.
Leaders' characteristics	
Demographics	Same variables included in citizens' demographics, but measured at the level of the leader.
Occupation	Same variables included in citizens' occupation, but measured at the level of the leader.
Wealth	Same variables included in citizens' wealth, but measured at the level of the leader.

Note. Citizens' characteristics are included only in the PDS LASSO procedure for citizen-level outcomes. All continuous variables are also included in their squared term and are standardized. In order to have the same sample size between Post-Model Selection and PDS LASSO, missing values are replaced by the value 0 and an indicator variable equal to 1 if the observation had a missing value is introduced for all variables.

Table D13: Comparison with Post-Double Selection LASSO: citizen-level outcomes

	Post-Model Selection				Post-Double Selection LASSO				
	T1		T2		T1		T2		
Outcome variable	Coeff. (1)	S.E. (2)	Coeff. (3)	S.E. (4)	Coeff. (5)	S.E. (6)	Coeff. (7)	S.E. (8)	N (9)
Citizen's knowledge									
Awareness	-0.00	0.03	0.25***	0.02	-0.03	0.03	0.22***	0.02	2072
Knowledge	-0.00	0.02	0.17***	0.02	-0.02	0.02	0.15***	0.02	2072
Salience	0.05*	0.03	0.23***	0.03	0.04	0.03	0.21***	0.03	2077
Perceived benefit to community	-0.01	0.03	0.04*	0.02	0.00	0.03	0.04*	0.02	1592
Perceived benefit to household	0.02	0.03	0.07***	0.03	0.02	0.03	0.06**	0.02	1573
Rent-seeking among citizens									
Interaction with chiefs	0.10***	0.03	0.03	0.03	0.11***	0.03	0.04	0.03	2077
Interaction with other political leaders	-0.01	0.04	0.01	0.03	-0.01	0.04	0.00	0.03	2077
Auction: share bid to meeting	0.03**	0.01	0.00	0.01	0.02**	0.01	0.00	0.01	2077
Rent-seeking: gifts sent	0.04*	0.02	0.03	0.02	0.02	0.02	0.01	0.02	2027
Rent-seeking: any gift sent	0.06**	0.03	0.04*	0.02	0.05*	0.03	0.03	0.02	2027
Citizen's mobilization									
Community meetings participation	0.01	0.02	0.04**	0.02	0.00	0.02	0.03**	0.02	2019
MG: awareness	0.02	0.04	0.11***	0.03	0.01	0.03	0.11***	0.03	2072
MG: contributed	0.06	0.05	0.15***	0.05	0.04	0.05	0.15***	0.05	1510
MG: amount contributed	0.15	0.19	0.48***	0.18	0.13	0.19	0.49***	0.18	1510
Public goods game: contribution	-0.00	0.02	0.00	0.02	-0.01	0.02	-0.01	0.02	2027
Trust and accountability									
Average trust	-0.05*	0.03	0.02	0.02	-0.05*	0.03	0.01	0.02	2035
Trust in leaders known	-0.03	0.02	0.05***	0.01	-0.03	0.02	0.05***	0.01	1958
Voice outside the community	-0.01	0.05	0.09**	0.04	-0.03	0.05	0.05	0.04	1983
Political accountability	-0.14**	0.07	0.02	0.06	-0.12*	0.06	0.04	0.06	1997
Trust game: amount sent	0.03	0.02	0.01	0.02	0.02	0.02	0.00	0.02	2027
Trust game: desire to punish	0.03	0.04	0.02	0.03	0.02	0.04	-0.00	0.03	2007
Postcard returned	0.03	0.03	0.03	0.02	0.02	0.03	0.01	0.02	1891
Self-reported violence									
Sympathy for violence	0.01	0.03	-0.01	0.03	0.02	0.03	-0.00	0.03	1886
Involved in violence	0.00	0.02	-0.04**	0.02	0.00	0.02	-0.04**	0.02	2042

Note. Estimates based on OLS regression (see equation 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in columns (2), (4), (6) and (8) and clustered at the community level. In columns (1)–(4), the specifications are constant across outcome variables (see Section 7). In columns (5)–(8), the specifications are outcome-specific and include community-, leader-, and household-level controls which are selected using the Post-Double Selection LASSO procedure (Belloni et al., 2014a,b). The full list of variables included in the procedure is presented in table D12.

Table D14: Comparison with Post-Double Selection LASSO: community-level outcomes

	Post-Model Selection				Post-Double Selection LASSO				
	T1		T2		T1		T2		
Outcome variable	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Leader's knowledge									
Awareness	0.04**	0.02	0.05***	0.02	0.04**	0.02	0.04**	0.02	206
Knowledge	0.03*	0.02	0.05***	0.02	0.03*	0.02	0.05***	0.02	206
Salience	0.03	0.09	0.33***	0.08	0.03	0.08	0.31***	0.07	206
Perceived benefit to community	0.02	0.07	-0.01	0.06	-0.03	0.06	-0.01	0.05	204
Perceived benefit to household	0.01	0.08	-0.04	0.07	-0.03	0.07	-0.06	0.06	204
Elite capture									
Attitudes towards corruption	0.10**	0.04	0.06*	0.04	0.09**	0.04	0.03	0.03	206
Zinc roof tiles: elite decided	-0.07	0.08	-0.19***	0.07	-0.07	0.07	-0.18***	0.06	206
Zinc roof tiles: private usage	-0.10	0.07	-0.08	0.07	-0.05	0.06	-0.07	0.05	206
Funds: appropriated funds	0.27***	0.10	0.12	0.09	0.24***	0.09	0.12	0.08	205
Funds: share appropriated	0.14***	0.05	0.00	0.05	0.16***	0.05	0.01	0.04	205
Taskforce: avg Raven's scores	0.28	0.31	0.20	0.28	0.21	0.31	0.17	0.27	206
Taskforce: mid-low performers	0.19**	0.10	0.12	0.09	0.18*	0.09	0.12	0.08	206
Taskforce: men selected	0.07*	0.04	-0.00	0.04	0.06	0.04	0.00	0.03	206
Trust Game: leader kept	0.03	0.04	0.03	0.03	0.03	0.04	0.04	0.03	206
Rent-seeking among leaders									
Interaction with other polit	0.16***	0.05	0.12**	0.05	0.14***	0.05	0.09**	0.04	206
Bid for meeting with administrator	0.06	0.12	0.07	0.11	0.06	0.11	0.07	0.10	206
Degree of rent-seeking	0.02	0.06	0.01	0.06	0.01	0.06	-0.00	0.05	204
Violence									
ACLED	-0.03	0.03	-0.06**	0.03	-0.03	0.03	-0.05**	0.02	206
GDELT	-0.02	0.03	-0.05**	0.03	-0.03	0.02	-0.04**	0.02	206
ACLED+GDELT	-0.05	0.03	-0.09***	0.03	-0.04	0.03	-0.07***	0.03	206

Note. Estimates based on OLS regression (see equation 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in columns (2), (4), (6) and (8). In columns (1)–(4), the specifications are constant across outcome variables (see Section 7). In columns (5)–(8), the specifications are outcome-specific and include community- and leader-level controls which are selected using the Post-Double Selection LASSO procedure (Belloni et al., 2014a,b). The full list of variables included in the procedure is presented in table D12.