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 of those closest to political power. One prominent consequence is the emergence of conflict. In this paper, we take this theory to the data for the case of Mozambique, where a substantial discovery of natural gas recently took place. We focus on the anticipation of a resource boom and the behavior of local political structures and communities. For this purpose, we designed and implemented a large-scale field experiment to follow the dissemination of information about the newly-discovered resources. We designed two types of treatments, one with information for local leaders, the other with information and deliberation activities targeting communities at large. We measure a variety of theory-inspired outcomes through surveys, behavioral activities, and lab-in-the-field experiments. Our measures of actual conflict come from geo-referenced international datasets. We find that information given to leaders increases elite capture and rent-seeking, while information/deliberation given to citizens increases mobilization/accountability-related outcomes and decreases conflict. We conclude that while the political resource curse is likely to be in place, the dissemination of information to communities is a force in the opposite direction.

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1 Introduction

Since Adam Smith's Wealth of Nations, which contains a number of unfavorable references to mining activities, economists have been wary of potential problems arising from the exploration of natural resources. Gelb (1988) and Auty (1993) were the first to propose the term resource curse: both looked at mineral windfalls and presented a series of case studies from a macroeconomic perspective, with a strong emphasis on the contraction of traded sectors, i.e., the Dutch Disease. Then, African countries such as Nigeria, Angola, and Sierra Leone, rich in oil and diamonds, became prominent cases in the 1990s. These cases contributed to the argument in the cross-country empirical literature that the resource curse was also related to political economy mechanisms involving widespread corruption (Treisman, 2000) and civil conflict (Collier and Hoeffler, 2004).

In this paper we focus on the political resource curse. Political economy theories of the resource curse started by associating 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). At this point it was not clear whether politicians were to blame for the curse, even though many interpretations of these models are consistent with that conclusion. The curse became more explicitly political with Robinson et al. (2006). These authors posited that, after news about a resource discovery, politicians become more interested in securing political power, and consequently, further pursue corrupt behaviors and inefficient policies, with negative consequences for the economy. A prominent symptom of inefficient policies is the emergence of conflict. Still, Robinson et al. (2006) believe the curse is avoidable, namely through promoting institutions that strengthen political accountability.

In this paper we test 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. Our analysis focuses on first reactions at the local level: we are particularly interested in observing the behavior of local politicians. However, and most importantly for policy, this paper is also about testing the role of widespread information and citizen deliberation mechanisms on avoiding the curse.

We employ a large-scale randomized field experiment conducted in Northern Mozambique in 206 communities, after a massive discovery of natural gas in the region (in the Rovuma basin, Cabo Delgado province). This discovery was labeled as the largest worldwide in many years.[1] We follow the dissemination of information about the discovery and management of natural resources at the community level. These efforts were sponsored by a large coalition of governmental and non-governmental organizations, active in the international, national, and local arenas. We designed

[1] See http://www.cnn.com/2017/05/03/africa/mozambique-oil-and-gas-hub/index.html for a recent piece by CNN on gas in Mozambique.

two types of interventions at the community level in this context: in the first, the information module was only delivered to local leaders; in the second, it was delivered to both local leaders and citizens. In one version of the latter intervention, the information module was further accompanied by the organization of deliberation meetings by citizens where public policy priorities for the community were discussed (in relation to the future windfall from natural gas).

In our experiment, we designed a wide range of measurement instruments including surveys, behavioral activities or structured community activities (SCAs), and lab in the field experiments. We also make use of international datasets that geo-reference conflict episodes (GDELT and ACLED).

We group our outcome measures in five sets. The first set is related to information and awareness regarding natural resources. These are based on survey questions, administered to both local leaders and citizens, for which we typically have both baseline and endline information. The second set concerns outcomes related to elite capture by local leaders. These are centered on behavioral measurements, including SCAs on the use of resources intended for community use (zinc sheets for roof construction, funds for meetings), 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. This relies primarily on an auction activity eliciting willingness to engage in rent-seeking, relative to a benchmark related to entrepreneurship, and further involves 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, a matching grants SCA, behavior related to community meetings, and a public goods game. The outcomes on trust and accountability are based on survey questions, a postcard SCA measuring demand for accountability, and citizen behavior in a standard trust game. Finally, the fifth set focuses on conflict outcomes. These include self-reported violence from our surveys and the incidence of conflict as measured by international datasets. We note that some of our behavioral measurements follow previous contributions. This is the case of Casey et al. (2012) for the zinc, matching grants, and meetings SCAs;[2] and of Batista and Vicente (2011), Collier and Vicente (2014), for the postcard SCA. On the other hand, some of our measurements were originally developed for this project, namely the taskforce SCA, the rent-seeking vs. entrepreneurship auction, and the rent-seeking game.

To summarize our findings, we find clear positive effects of the community-level treatments on awareness and knowledge about the natural gas discovery. Citizens become more optimistic regarding the future benefits of the discovery for their communities and households. Consistent with the mechanisms underlying the political resource curse, we identify impacts on increasing elite capture, when information is given to local leaders only. This appears in terms of leaders' attitudes

[2] Jablonski and Seim (2017) is a recent contribution employing a zinc SCA in the context of a transparency intervention in Malawi.

in favor of corruption, misuse of funds for public purposes, and less meritocratic appointments of community members for public service. For instance, we find a 28 percentage-point higher probability of leakage for leaders entrusted with funds for a community activity. Local leaders seem to have been emboldened by the simple act of being informed about resources exclusively. We also observe increases in rent-seeking activities by leaders and citizens when information is given to leaders. For citizens, this effect emerges for reported contacts with influential people, but also in the bidding for meetings with district administrators. These may denote movements by those close to leaders, consistent with the effects on elite capture. We report that treatments targeting communities at large increased citizen mobilization, as well as trust, voice, and accountability at different levels. For these effects, we do not find clear differences between information and information plus deliberation. Finally, we observe that these treatments led to a decrease in violence as measured by GDELT, consistent with a decrease in the likelihood of experiencing violence as reported in the survey. We conclude that our patterns of effects are consistent with a curse mechanism centered on politician misbehavior. However, and perhaps most importantly, we also find that treatments empowering citizens have the potential to counter curse-like effects such as conflict.

Our paper relates to the vast literature on the natural resource curse, defined by Caselli and Cunningham (2009) as a decrease in income following a resource boom. The theory of the Dutch Disease was one of the first put forward to explain the resource curse. It proposed that resource booms shift inputs away from manufacturing (towards non-tradeables), subsequently leading to a curse through negative knowledge externalities in manufacturing. These ideas date back to at least Corden and Neary (1982). Our empirical knowledge of the resource curse is more recent, e.g. Sachs and Warner (1999) were the first to identify a negative relationship between GDP growth and exports of natural resources in cross-country data.

Several related models of the resource curse have been proposed which identify the resource curse with an increased propensity for rent-seeking. Tornell and Lane (1999) suggest that a windfall can increase interest group capture of fiscal redistribution; lower growth can follow through a move towards the (inefficient) informal sector. Baland and Francois (2000) propose a multiple equilibrium framework, in which a resource boom could lead to more rent-seeking (instead of entrepreneurship), depending on the initial equilibrium. Torvik (2002) introduces a simple model with rent-seeking and entrepreneurship and argues that, with a demand externality, a resource boom leads to lower welfare. This is generally the case for this family of models, and for models of Dutch Disease: the existence of an externality is a necessary condition for the emergence of a resource curse.

More recently, Mehlum et al. (2006) showed that the negative relationship encountered by Sachs and Warner only held for countries with low-quality institutions. Building on this finding, Robin-

son et al. (2006) proposed a new theory of the resource curse, based on a political mechanism: in face of a resource discovery, and when institutional quality is poor, namely in terms of political accountability, politicians are likely to enact inefficient policies that increase the likelihood that they remain in power (and benefit from resource rents). Vicente (2010) tests this assertion more specifically than Mehlum et al. (2006) by analyzing patterns of change in perceived corruption after an oil discovery in the island-country of São Tomé and Príncipe.[3] He finds that vote-buying increased significantly after that discovery by using Cape Verde as a control group. Another possible movement towards bad policies may involve lower taxation, as politicians try to decrease the level of political accountability. McGuirk (2013) shows evidence consistent with this claim using Afrobarometer data. This is in line with the idea that political accountability is intimately associated with taxation, and that the presence of resource rents allows lower interaction between government and citizens (see for instance the early contributions by Karl, 1997; Ross, 2001).

Recent empirical work has been devoted to the understanding of specific settings where natural resources are being explored. The case of oil in Brazil has inspired a number of contributions. Caselli and Michaels (2013) analyze impacts of oil on the structure of local income at the municipality level. They find no evidence of the resource curse. However, they find no significant changes in the quality of public good provision either, despite major increases in the revenues of local governments. Brollo et al. (2013) study the effect of these additional revenues on political corruption and on the quality of politicians. They show that larger transfers increase observed corruption and result in less educated mayoral candidates. In the context of Peru, Aragón and Rud (2013) examine the local impact of a large gold mine. They find evidence of a positive effect of the mining sector's demand for local inputs on real income. In Indonesia, Paler (2013) tests the hypothesis that resource windfalls undermine while taxes strengthen political accountability in the context of a field experiment where subjects were primed in different ways. This study finds that, 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.[4]

Closely related to our experiment in Mozambique are three other contributions. First, our information and deliberation campaign is inspired by the model of Humphreys et al. (2006), who were the first to implement a large scale deliberative exercise related to the management of natural resources, with the Earth Institute at Columbia University, in the country of São Tomé and Príncipe in 2004. Second, we are endowed with some knowledge about the impact of large scale civic education campaigns in Mozambique, through the work of Aker et al. (2017) on political participation. Finally, recent work by Toews et al. (2016) shows positive impacts, namely in terms of

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

[4] Note, however, that in a recent paper following a similar design in Kenya and Uganda, De la Cuesta et al., 2017 find no difference in the demand for accountability between priming on taxation or oil revenues.

job creation, of resource-induced FDI in Mozambique, while employing household and firm-level data.

The paper is organized as follows. We first provide the context of our experiment. Then we describe the treatments, sampling and randomization, as well as measurements. In the following section we state our main hypotheses. We then explain our estimation strategy. Subsequently, we show our results on: information; capture and rent-seeking; citizen mobilization, trust, and accountability; violence; and effects of deliberation. The paper concludes with a brief discussion.

2 Context

Mozambique recently discovered substantial natural resources, generating a significant amount of attention from international organizations and corporations. Mozambique has been named in 2014 'one of the most promising countries in Africa in terms of natural gas and coal resources' by the US Energy Information Administration.[5] Coal deposits are estimated at 20 billion tons and coal exports could be 100 million tons annually at peak, making Mozambique one of the top ten coal exporters in the world. After substantial discoveries starting in 2010, known gas reserves in the Rovuma Basin, Cabo Delgado Province in Northern Mozambique, are estimated at 130 trillion cubic feet. If current liquefied natural gas (LNG) investment plans materialize, Mozambique will become a global player in LNG exports (World Bank, 2014). High expectations have been built surrounding the natural gas exploration in Cabo Delgado, which is headed by major multinationals such as Anadarko and ENI. 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.[6].

Mozambique is a low income country with GDP per capita 1217 USD (International, PPP) in 2016, ranking seventh from the bottom of the World Development Indicators of the World Bank. Mozambique's population is mostly rural, i.e., 68 percent;[7] 81 percent report agriculture as the main occupation.[8] Cabo Delgado province is primarily rural. It has on average 22.15 inhabitants per km^2 and a total of 1.8 million habitants (National Statistics office INE, 2013). It experiences a poverty rate of 45 percent,[9] and a child mortality rate of 180 per 1000 births, higher than the national average.[10]

Being a recent democracy, and with relatively weak institutions, Mozambique faces a considerable

[5] See https://arabiangazette.com/east-africa-the-new-global-energy-hot-spot-20141106/.

[6] As cited in Frühauf (2014), the chairman of Anadarko said: 'We believe, as we go into the next decade, Mozambique will emerge as the third-largest exporter of LNG in the world.'

[7] World Development Indicators, World Bank, 2016.

[8] CIA World Factbook, 2017.

[9] Household Budget Survey 2014-2015, INE.

[10] INE, 2010.

risk of resource and revenue mismanagement in the future. The Natural Resource Governance Institute in 2017 rates Mozambique with a weak score of 50/100 (41st out of 89 countries), which draws particular attention to poor enabling environment namely in terms of accessing data. In this context, the role of the media and of civil society organizations is particularly important. Still, media independence in Mozambique is limited, with the main television, radio, and newspaper being state-owned. Media penetration is also low, with newspaper readership confined to elites in the main cities of the country. In view of these conditions and a number of episodes of state interference in press freedom during recent years, Freedom House considers Mozambique to be a 'Partly Free' country. Political accountability also faces significant challenges in Mozambique. In fact, the Governance Indicators of the World Bank identify Mozambique on a clear decreasing trend in terms of voice and accountability, with a percentile rank of 34 in 2016.[11]

3 The treatments

The intervention we are evaluating consists of a large information and deliberation campaign about the management of natural resources in the Province of Cabo Delgado, focusing on the recent natural gas discoveries. A large coalition of international, national, and local institutions, both governmental and non-governmental, sponsored the campaign. 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 (the Catholic University of Mozambique), one newspaper (@Verdade), and two local NGOs (UPC, the provincial farmers' union, and ASPACADE, the provincial association of paralegals). In collaboration with our partners, the information and deliberation campaign was submitted at the community level in March-April 2017. There were two types of campaigning.

The first group of communities (Treatment 1 - Information to Leaders) had the information module about natural resources and its management provided to the local leaders only. In Mozambique, these individuals are well-defined figures in each community. We targeted the highest-ranked representative of the Government within each community. In rural communities, these are known as village chiefs (*chefes de aldeia*), and in urban settlements as neighborhood chiefs (*secretários de bairro*). Both types of leaders are typically elected by the community, even though the ruling party can strongly influence such outcome. Their competences are mainly related to conflict resolution,

[11] 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.

land allocation, and formal ceremonies. They also influence the allocation of aid, employment and public programs, such as government funding towards small entrepreneurs ('7 milhões' rural development program).

The other group of communities (Treatment 2 - Information to Leaders and Citizens) was as follows. They had the information about natural resources and its management provided to both the leaders and the citizens. Community meetings and door-to-door contact were implemented for this purpose in each community.

The information being distributed started by defining natural resources and the legal rights of the population in face of its exploration (various laws related to land, mines, forests, and fishing). This was a pre-condition for understanding, as the concept of natural resources was absent in many communities. The campaign then gave details about the discovery of natural gas in Cabo Delgado, including plans for exploration, and the implications for local communities. The final content of the information package was discussed and approved by all sponsoring organizations involved in the project, in order to guarantee widespread support and maintain neutrality.[12] Importantly, the information provided underlined the expected size of the natural gas windfall, with significant positive implications for provincial government revenues and job creation.

Due to the low level of literacy in our context, treatments in this experiment focus on verbal communication methods to deliver information. They included: (i) Explanation in local language of the information content by trained facilitators.[13] This was done either individually targeting leaders, or in the context of community meetings (for treatment 2). (ii) Live presentation of a community theater, 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. The script was written by a local theater company in collaboration with the research team, and was meant to communicate the contents of the information package in an informal manner.[14] (iii) Distribution of a three-fold pamphlet designed in collaboration with a local artist. The pamphlet is mostly visual and has the main takeaways of the information package. This leaflet was hand-delivered in each treatment community to the leader (for groups 1 and 2) and to the community members (for group 2). It is depicted in Figure 1.

Within treatment 2, half of this group of communities had, in addition to the information, a deliberation module. This module started with the formation of small citizen committees of around 10 people. Each group was then invited to meet and to deliberate on priorities for the local spending of natural resource revenues. Local leaders were given the results of the deliberation meetings.

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

[13] In the Online Appendix to this paper, section A, we provide the structure of these presentations.

[14] The script of the theater is available upon request from the authors.

4 Sampling and randomization

We study a sample of 206 communities. These communities were randomly drawn from the list of polling locations in the province of Cabo Delgado that were present across both the 2009 and the 2014 general elections,[15] and that had more than the number of voters corresponding to the 5^{th} percentile of that distribution (corresponding to 207 voters per polling location).[16] In our final sampling frame, we had 421 polling locations, with 14 in urban areas and 39 in semi-urban areas. Our study thus covers nearly 50 percent of polling locations across the entire province of Cabo Delgado. We stratified the sampled communities by the two urban areas (Pemba and Montepuez), semi-urban communities (i.e., the main 'posto administrativo' in each district) and rural communities.[17] We then built blocks of four communities using m-distance (Mahalanobis) relative proximity. To construct m-distances, we made use of the richness of baseline information we have, including household, leader, and community characteristics.[18]

After forming blocks of similar communities, we randomly allocated each community in a block to either treatment 1 (information to leaders), treatment 2 (information to leaders and citizens) without the deliberation module, treatment 2 with the deliberation module, or a control group, which had no information or deliberation campaigning. Each one of the four possibilities had the same probability, and we made sure each block had the four possibilities.[19] We ended up with 50 communities for treatment 1, 51 communities for treatment 2 without deliberation, 50 communities for treatment 2 with deliberation, and 55 communities for the control group. Disparities between the groups are due to the fact that we included 9 substitute communities. Results are robust to the exclusion of these substitute locations. Figure 2 presents the geographical distribution of the sample, distinguishing between comparison groups.

Sampling of citizens within communities was the product of 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

[15] 54 polling locations across the two elections were dropped because they were not operating in both elections.

[16] The polling locations were located within the following 16 districts: Ancuabe, Balama, Chiure, Macomia, Mecufi, Meluco, Metuge, Mocimboa da Praia, Montepuez, Mueda, Muidumbe, Namuno, Nangade, Palma, Pemba, and Quissanga. These districts represent all the districts of Cabo Delgado, except one, Ibo, excluded since it is an island. We also excluded two polling stations in another island, and the 11 polling locations in Palma's 'posto administrativo'. The reason for the latter was to avoid areas that have been subject of recent violence related to the discovery of natural gas.

[17] Since we aimed for a sample of 200 communities: in urban strata, we selected 8 polling locations in Pemba and 4 polling locations in Montepuez; in semi-urban strata, we selected 2 polling stations per town (1 if only 1 was available); the remaining 165 stations were sampled from all other polling stations.

[18] In the Online Appendix to this paper, section B, we provide the specific characteristics used in the process of forming blocks for the randomization.

[19] To limit the risk of treatment contagion to other groups, at the end of this procedure, we computed the minimum distance from each community to a community in a different group. If two or more communities were closer than 3km, were control versus any treatment or treatment 1 versus treatment 2, and were rural, then we selected at random one of these equidistant communities and re-assigned the same group to the others.

each community, which was a function of the number of registered voters in that community. The sampling interval defined the number of houses in between sampled houses. In each house, heads of households were sampled for survey interviews and behavioral activities. We interviewed 2065 heads of household in the baseline survey, approximately 10 per community. Post-treatment attrition was handled through substitutions in the same household, when possible.

5 Measurement

The structure of the measurement in this project included (i) baseline and endline surveys at the household, local leader, and community levels, (ii) the holding of structured community activities (SCAs) aimed at gathering behavioral data (post-treatment), (iii) the implementation of lab in the field experiments (post-treatment), and (iv) geo-referenced conflict data from international datasets. The baseline data were collected in August-September, 2016. Some SCAs were initiated immediately after the treatment activities in March 2017. The endline survey, the completion of SCAs, and the lab experiments happened in the period August-November, 2017. We depict in Figure 3 the timeline of the project. We now turn to the details of the design of each type of measurement in this experiment. Note that the design of this experiment and corresponding measurements were included in a pre-analysis plan registered on the AEA RCT registry (AEARCTR-0002493).

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. This questionnaire was answered by small groups of (self-selected) community representatives. Most questions in all three questionnaires were present in both baseline and endline surveys.

5.2 Structured community activities

We now turn to Structured Community Activities (SCAs). These follow the nomenclature of Casey et al. (2012), who consider SCAs 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.' We divide SCAs between those submitted to local leaders and

those submitted to citizens. We implement versions of previous SCAs in the literature, following Casey et al. (2012), Batista and Vicente (2011), and Collier and Vicente (2014), as well as some new additions, as described below.

5.2.1 Leader: zinc roof tiles

In this activity we endeavor to measure elite capture of resources. The community leader was given eight zinc roof sheets and told that they were 'to be used in a way that benefits the community.' Each zinc sheet was worth approximately 300 Meticais, meaning a total value of 2400 (35USD). The leader was given the zinc sheets in private, as the person representing the community, 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 more needy communities. A version of this activity was implemented in Casey et al. (2012). At the time of the endline visit to each community, we asked leaders about whether the community (or the elite) had decided on the use of the zinc sheets, we asked to see each one of the zinc sheets, and we recorded how the zinc sheets were being used. The outcomes of interest of this activity are who decided on the use of the zinc sheets, i.e., the elite or the community, and how the zinc sheets were being used, i.e., for private or public benefit. We thus interpret the use of the zinc for private purposes as a measure of elite capture.

5.2.2 Leader: funds for meetings

In this SCA we examine 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. Community leaders were given 400 Meticais (6USD) and were requested to use the funds in order to purchase the food items. We observed how many food items were purchased, and inquired at the nearest store the cost of each item. Our main outcomes of interest are thus 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 in how leaders choose individuals for specific tasks. In this case, the leader was asked to select five individuals to be submitted to a Raven's test. The Raven's test is a nonverbal test used in measuring abstract reasoning and regarded as a means of estimating intelligence, particularly in settings of low literacy. Our version was composed of 10 questions, each of which asking respondents to complete a logical sequence

of images. Leaders were told that, conditional on the performance of the five selected individuals on the test, they could earn a monetary prize of 1000 Meticais (14USD) for their community. Specifically, if all of the five individuals get at least five of the 10 questions correct, the prize would be awarded. In addition, leaders were also told that, for participating in the activity, each selected individual was given a show-up bonus of 100 Meticais. Our measurement is thus the performance on the test of the five selected individuals. Additionally, since all surveyed household representatives also took the Raven's test at endline, we have an estimate of the average score of household heads in the community. We are thus able to observe a continuous measure of how appropriate the leader's choices are, in absolute terms and relative to the corresponding community. We also observe basic demographic characteristics of those individuals selected by the leader, like gender.

5.2.4 Leader and community: auctions

In this SCA we wanted to have a measure of the propensity of both leaders and citizens to engage in potential rent-seeking activities. To get at this question, we conducted an auction that could be for one or two activities. The first activity was a meeting with the district administrator (the main politician at the district level, the administrative level just below the province level), including lunch and costs of transportation. This activity was thought to provide an environment conducive to possible rent-seeking activities, though there may be other potential benefits. This was the activity available to both local leaders and community members. The second activity was related to entrepreneurship, and was intended to provide a productive alternative to the rent-seeking activity. It consisted of a training session on poultry farming (creation and management of a business in this area), including lunch and transportation. Only regular community members participated in this auction.[20]

Each player in these auctions was endowed with 100 Meticais. When asked to bid for both activities, only one of them would later be randomly selected for implementation. Thus citizen bidders had an incentive to bid independently for each one of the two activities. To ensure incentive compatibility of the auctions, i.e., so that individuals revealed their true willingness to pay (WTP) for each activity, the Becker DeGroot Marschak (BDM) mechanism was used. A set of prices was placed in a box, and after the individual had stated their WTP, the actual price was drawn at random. If the WTP was greater than the price, then they were forced to purchase the activity, at the drawn price. If not, they did not pay anything, and did not purchase the activity. This was repeated for the two auctions in the case of community members, with one being chosen by the toss of a coin afterwards. All bidders in all auctions were allowed to bid more than 100 Meticais, and were truthfully told that there could be prices over 100 in the box. The primary outcomes of interest for

[20]The meetings with administrators and the training happened in November-December, 2017.

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 administrator (while taking into account 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. We gave communities the opportunity to raise funds towards a community objective. Funds were matched at a rate of 50 percent until a maximum of 2500 Meticais (35USD), if the community raised 5000 Meticais or more. Specifically, we asked communities to form a committee that would raise and keep the individual contributions until August 2017. This committee was offered a book to keep the records of contributions. At the time of the endline visit to the communities, the amounts raised by the communities would be verified and the corresponding matching grant would be given. This activity was similar to an SCA implemented in Casey et al. (2012). We employ both survey data on awareness and reported contributions, and data on registered contributions from the book records.[21]

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

5.2.6 Community: postcards

Our final SCA is an incentive-compatible individual measure of demand for political accountability. During the endline survey, each respondent received a pre-stamped postcard with the possibility to write a message to the district administrator on how to use revenues from natural gas. Figure 4 shows the postcard that was provided to the citizens. All respondents could therefore choose to ignore the postcard or to return the postcard with a message for the administrator. The postcard had to be delivered to the village leader, who was provided with a sealed box in which respondents could introduce their postcard.

The actions of filling and returning the postcard imply clear costs. Our assumption is that respon-

[21] Note that both sources of data could be imperfect. The first because of social desirability bias, the second because we can rule out completely fraudulent book entries for the purpose of inflating the matching grant.

dents were more likely to incur these costs the more they wanted to make politicians accountable for specific policies in face of the natural gas windfall. A similar measurement is used by Batista and Vicente (2011) to measure demand for political accountability in Cape Verde, and by Collier and Vicente (2014) to measure behavioral 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 the postcard messages were anonymous, we were able to record individual behavior through numbering the postcards. The content of the postcards was then recorded and the messages were delivered to the respective district administrators. We explore below whether subjects sent the postcard. We also analyze the message contents of the postcards.

5.3 Lab in the field experiments

In addition to traditional survey measurements and the SCAs, we conducted a number of lab in the field experiments, to further measure behavioral preferences in controlled settings.

In particular we implemented three types of lab experiments in our intervention: (i) a trust game, (ii) a rent-seeking game, and (iii) a public goods game. The trust and the public goods game are fairly standard in the experimental and development literatures, while the rent-seeking game is novel. All games involved the participation of all 10 community members surveyed. The trust and rent-seeking games also included the community leader as a player. The sequence of play was randomized in each community.

5.3.1 Trust Game

The trust game involved 10 participants from the community (citizens) and the community leader. The version played was standard. Each citizen was given 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 proportion 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 leaders decision we used the strategy method, that is, we asked the leader for *every* possible amount sent from 1 to 10 tokens (which became 1 to 30)[22], 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. Specifically, this punishment option was phrased as: 'Imagine the leader sends back less than 50 Meticais, after having received 150 Meticais. Do you want to punish the leader? Punishment costs 10 Meticais, and reduces the payoff of the leader by 30 Meticais.' All citizens

[22]Note that it was possible to send 0.

were paid according to the leaders full set of decisions, while the leader's payoff was determined by being randomly matched with one individual from the community.[23] It is a dominant strategy not to send any tokens to one's counterpart in this game - as well as not punishing the leader. This trust game measures elite capture from leaders, as well as trust in local leaders from citizens. The option to punish is meant to measure citizens' demand for leader accountability.

5.3.2 Rent-seeking game

The rent-seeking game is a novel lab game purposely-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 was given 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 (which we understand as rent-seeking), with the remaining units being 'put aside' (which we understand as a productive activity). The leader had to choose one citizen after observing the behavior of all of them (note that the leader never observed the identity of the individuals, 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.

In summary, the leader receives all units sent as gifts. Additionally the leader receives the units put aside by the person he/she chose. Thus the leader has a dominant strategy which is to choose the person who set aside the most funds (the most ambitious entrepreneur). Knowing this, individuals' best response is to put aside all of their endowments and do no rent-seeking at all. We analyze below 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 we implemented was standard and involved 10 participants from the community, always excluding the leader. Each individual was given an endowment of 100 Meticais in 10 tokens of 10 Meticais. They had to decide whether to keep this income for themselves, or contribute towards a public account. All contributions in the public account were doubled, and divided back equally to all 10 individuals, independently of their contribution. Thus the marginal per-capita return (MPCR) to

[23] Community members were aware of this matching procedure. Punishment regarded leaders' decisions when faced with the scenario of receiving 150 Meticais.

contributing is 0.2, which is on the lower side of public goods experiments. The dominant strategy in this game is not to put any token in the public account. We analyze below the extent to which experimental subjects invested in the public account.

5.4 Conflict datasets

We supplement survey measures with administrative data about violence. We employ two open-source datasets: the Global Database on Events, Location and Tone - GDELT, described in Leetaru and Schrodt (2013), and the Armed Conflict Location & Event Data Project - ACLED, described in Raleigh et al. (2010).

GDELT provides information about geo-located events using automated textual analysis from news sources in print, broadcast, and web formats in over 100 languages. For each event the data report the exact day of the occurrence and corresponding location (latitude and longitude of the centroid) at the level of city or landmark. Since we analyze short-run effects of the intervention, we first focus on events characterized by *unconventional violence*. Events classified under this category are characterized by the "use of unconventional forms of violence which do not require high levels of organization or conventional weaponry". Second, we also analyze *conventional military force*, defined as "all uses of conventional force and acts of war typically by organized armed groups not otherwise specified".[24]

ACLED is similar to GDELT. However, ACLED events are scrutinized by a team of dedicated researchers before being published in the dataset. That process leads to a substantially lower number of events when compared to GDELT. To complement GDELT, we employ in our analysis below ACLED's category *Violence against civilians*, which is described as "attacks by violent groups on civilians, with no fatalities being necessary for inclusion".

In both datasets, we employ post-treatment data starting in May 2017 until April 2018. For baseline data, we take the period between May 2012 and April 2016. We build variables for whether any event was recorded in between 0 to 5 or 0 to 10 kilometers from our experimental locations. Community location is computed as the median geo-coordinate using all observations collected in the community during the surveys, including households' and leaders' geo-locations.

[24]Unconventional violence is coded in GDELT as "*Assault*" and includes events characterized by the following actions: abduct, hijack, or take hostage; physically assault; 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. Conventional military force is coded in GDELT as "*Fight*" and includes events characterized by 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.

6 Hypotheses

In this paper, we test the theory of the political resource curse at the local level in Mozambique. We undertake this challenge in the context of the first news on a substantial resource discovery. Following the literature, namely Robinson et al. (2006), we postulate that, when faced with a permanent resource boom, under low institutional quality, elites will distort allocations to increase the probability of staying in power. Capture and rent-seeking are likely to increase in this context. Those movements corresponds to our first test: whether elites respond by increasing capture and rent-seeking when faced with private information about the future windfall.[25] The role of institutional quality is, however, key in the theory we adopt: in face of higher levels of political accountability, elites will be more constrained to do what is best for common good. Hence, the second part of our analysis is devoted to testing the role of enhancing political accountability through information and deliberation possibilities targeting communities. Our main specific hypotheses are as follows.

Hypothesis 0: Faced with information on the future resource windfall in Cabo Delgado, both local leaders and citizens become more informed about natural resources and their management.

Our base hypothesis is that the information campaign we followed was effective at giving new information to both local leaders and citizens. This is the central variation we work with in this project. To be able to undertake the tests of the theory as mentioned we need to prove that the campaign was powerful enough to act as an information shock on natural resources at the level of Cabo Delgado 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, and eventually flows from these individuals, we expect elite capture and rent-seeking by leaders to increase, as a way to cement local power. It could also be that elite capture increases sinply for the fact that local leaders feel more entitled or empowered because they were singled out to receive information. Rent-seeking activities by citizens could also increase as a consequence of treatment 1, as leaders induce movements in individuals who are close to the local political elite.

[25] Like Caselli and Cunningham (2009) summarize, other theories of the resource curse emphasize its decentralized nature, as they anticipate generalized movements towards rent-seeking activities with negative consequences for entrepreneurship and the productive sector - e.g., Torvik (2002). Although our measurements are able to distinguish these decentralized theories from the centralized one we adopt, we contend that our setting is such that no generalized opportunities for rent-seeking in the economy are yet available. Indeed, we analyze the effects of news on an anticipated resource windfall: most structural changes to the economy are still to happen. Movements towards rent-seeking are then likely, but only close to the political agents, thus making centralized theories most meaningful in our analysis.

Treatment 2 is not expected to increase elite capture or rent-seeking by leaders, provided 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. Violence could decrease.

Where treatment 2 is implemented, i.e., where information and possibly deliberation activities on the management of natural resources happen, we expect higher levels of citizen mobilization, of trust in institutions at various levels, and of the demand for political accountability. It is possible that violence could decrease, as citizens feel included in the process of managing the resources. The deliberation module could have an 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 we study in Mozambique.

7 Empirical strategy

We adopt standard specifications for the analysis of experiments. Specifically, we employ two types of specifications, depending on the existence of baseline data. We consider outcome variables defined as Y_{ij}, i.e., for location j and individual i. Individual i can be a local leader or a citizen. Outcomes defined at the community level are treated in the same way as outcomes defined at the level of the local leader.

The first specification, when baseline data are not available, is:

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

where $T1_j$ and $T2_j$ are indicator variables for living in a community in treatment groups 1 or 2, Z_j is a set of location control variables including strata dummies and community characteristics,[26] X_j is a set of individual characteristics, either for leaders or citizens depending on the outcome

[26]Community characteristics include district and stratum (rural, semi-urban, or urban) indicator variables, an infrastructure index measuring the presence of public infrastructures in the village, presence of natural resources in the village, presence of a market in the village, number of voters (measured by the number of tables at the polling station), and distance to the city of Palma. The infrastructure index is built by averaging 14 indicator variables for the presence in the village 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 the access to electricity and to the sewage system. The presence of natural resources in the village is built by averaging 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. When analyzing leader-level outcomes, we remove district indicators to avoid collinearity with stratum indicators.

at stake,[27] and ϵ_{ij} is an individual-specific error term which we cluster at the community level to account for correlated errors within the community.

The second specification, when baseline data are available, 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. McKenzie (2012) supports that this specification maximizes statistical power in experiments, if autocorrelations of outcome variables are low. This is arguably the case for most survey outcomes, which are subjective.[28] In the estimation of equations (1) and (2), we employ OLS in all regressions, even those with binary outcomes (i.e., linear probability models) and test for the null that the coefficients of each pair of treatments are equal.

Given the large set of outcomes studied, we address concerns about multiple inference by presenting statistical significance for both individual-coefficient t-tests and multiple hypothesis testing. In order to test for significance of multiple outcomes, we follow the Studentized k-StepM Method for Two-Sided Setup (Romano and Wolf, 2005; Romano et al., 2008). This procedure improves on the ability to detect false hypothesis of program impact by capturing the joint dependence structure of the individual test statistics on the treatment impacts. We repeat the test separately for each table, and we highlight in bold coefficients or p-values (in the case of the test of the difference between coefficients) those for which we cannot reject at 10 percent of significance level the null hypothesis of no effect when adjusting the critical values for multiple hypothesis testing. The full procedure is detailed in the Online Appendix (section C).

An alternative way to address problems with multiple hypotheses testing, is to aggregate outcomes. This also helps summarizing our findings. We follow Kling et al. (2007) and build indices of outcomes Ω_{ij}^m for each category of outcomes m. These categories are the main ones relating to our hypotheses: information, elite capture, rent-seeking, citizen mobilization, citizen trust and demand for accountability, and violence. 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.

We show summary effects using these aggregations. We also measure the impact of holding de-

[27] Citizens characteristics include gender and age of the household head, household size, education, religion, and ethnic group indicators, indicator for whether the respondent is born in the village, and indicators for ownership of radio and television. Leaders characteristics include the same variables, but measured at the level of the community leader.

[28] We also ran difference-in-difference regressions when the baseline values of the outcomes are available and found similar results - these are available upon request.

liberation meetings in the communities in addition to the information campaign using aggregated outcomes. For that purpose, we select only locations where the community-wide information campaign is held, i.e., we restrict the sample to communities in treatment 2. We then estimate the impact of holding deliberation meetings 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 assigned to treatment 2, Z_j is a set of location control variables including strata dummies and community characteristics, X_j is a set of individual characteristics, either for leaders or citizens depending on the outcome at stake, and ϵ_{ij} is an individual-specific error term which we cluster at the community level to account for correlated errors within the community.

8 Results

We begin by referring to balance checks in our experiment. In the Online Appendix to this paper (Table D1), we show differences between the control group and all treatments bundled together under a dummy variable, and between the control group and each one of the treatment groups. These differences concern a number of household, leader, and community characteristics, as collected in our baseline surveys. We also depict joint F-tests of the null that the three treatments are jointly equal to zero. 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 significant tests yield a rejection of the null at standard levels. We can conclude that our randomization procedures were effective at identifying comparable groups in our experiment.

Table D1 also provides us with a simple characterization of the demographic traits of our sample (control group averages): 27 percent of our baseline household representatives are female, average age is 45 years old, 11 percent have secondary education or higher, 56 percent are Muslim; local leaders are almost all men (only 4 percent are female), average age is 54 years old, and average years of schooling is 6 years; 9 percent of our sample is located in urban areas, and 11 percent in semi-urban areas.

8.1 Information

In terms of treatment effects, we begin by focusing on the effect of the interventions on the awareness and knowledge of the natural gas discovery among local leaders and among citizens. This is

hypothesis 0 above. For both groups of experimental subjects, we focus on a similar set of outcomes, presented in Tables 1 and 2, respectively for leaders and citizens. Note that, when baseline values of the outcome variable are available, we display regressions controlling for those values (specification 2 above) side by side the ones just employing standard control variables (specification 1 above). We test for multiple hypothesis and display in bold those coefficients or p-values for which we cannot reject at 10 percent of significance level the null hypothesis of no effect when adjusting the critical values. In columns (1) and (2), we 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 zero otherwise. In column (3) and (4), we focus on the level of knowledge about the natural gas discovery. For both leaders and citizens, we build an 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 (see Online Appendix D.2 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 zero if the respondent reports all answers wrongly or whether he has never heard about the discovery. In column (5) and (6), we measure the effect on salience, as measured by asking the respondent about the three major events in his/her district in the last 5 years and leaving the answer open. We then perform content analysis and build an indicator variable equal to 1 if the respondent used the word 'gas' and zero otherwise. In columns (7) and (8), we restrict attention to respondents reporting that they are aware of the natural gas discovery. In these columns, we 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 zero otherwise.

We now turn to the analysis of results. We begin with the effect of the interventions on leaders' awareness and knowledge about the natural resource discovery (Table 1). First, awareness is increased by roughly 4-6 percentage points across both treatment groups. This suggests that the information campaign was indeed effective in raising awareness by distributing information to the community leader, specially given the already high level of awareness among the elite. We do not observe a differential effect when information is also targeting 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 about the details of the discovery. Relatively small effects in knowledge translated into large effects in terms of salience, but only in communities where the information was also distributed to citizens, suggesting changes in salience across leaders might be associated

with the level of information among citizens. In treatment 2, 33 percent more leaders used the word 'gas' to describe one of the major events in the district in the last 5 years. When turning our attention to the perceived benefits from the discovery for the community and the household of the leader, we do not observe any significant effect. Note that all significant coefficients, as well as tests of differences between coefficients, pass multiple hypothesis testing.

We now turn our focus to citizens' outcomes (Table 2). Only when the information was distributed to citizens, the intervention created a large increase in awareness of 25 percentage points. We do not observe an effect on citizen's awareness when the information is distributed to the leader only, suggesting that leaders did not introduce any clear within-community effort for passing the information to the citizens. Treatment 2 did not only increase awareness, but also made citizens more knowledgeable about the details of the discovery: the knowledge index increased by 17 percentage points. Similar to awareness, we do not observe any effect of distributing the information to the community leader on citizens' knowledge.[29] In terms of salience, we observe a significant increase in both treatment groups, with a significantly larger effect for treatment 2. In treatment 1, 6-8 percent more citizens used the word 'gas'. This pattern of effects suggests that information targeted at leaders is mainly increasing salience among citizens that were already aware of the discovery at baseline, perhaps in closer connection to the leader's network.[30] Differently from leaders, treatment 2 leads to a significant increase in the extent to which citizens believe the natural gas will bring benefits to their community and their household. This is not observed when information is targeted at leaders only. All significant coefficients are strong enough to pass multiple hypothesis testing. The same happens with tests of differences between coefficients.

In summary, we can see clear effects of the treatments on awareness and knowledge of the natural gas discovery. This is particularly the case for treatment 2, for both leaders and citizens. Treatment 1 also has effects on awareness and knowledge of leaders, and on salience for citizens. Citizens also become optimistic regarding the future benefits of the discovery for the community and their corresponding households, but only when the information is targeted at the whole community.[31]

While the design of the experiment allowed treatment units to be separated in distance to avoid information spillovers, we cannot exclude that information spread across communities beyond the distance imposed in the randomization design. In this case, our estimates would be capturing not

[29] The effect on knowledge is also significantly positive for treatment 2 when we restrict the sample to citizens that are aware of the discovery.

[30] In the Online Appendix, we focus on the correlates of awareness about the natural gas discovery at baseline (Table D3). We observe that pre-program knowledge is mainly determined by individual characteristics, such as gender, household size and education. Network is also important, with individuals being active members in a group, being more informed.

[31] Note that these effects may incorporate direct effects of the campaign we follow but also effects of other sources of news. Indeed, both treatments induced clear increases in hearing news from the radio, as reported in citizen surveys - results available upon request.

only the effect of the intervention, but also the diffusion of information through local knowledge networks. In appendix D.3, we look at whether being close to another treatment (1 or 2) community affects significantly the impact of treatments 1 and 2 on knowledge and salience about the natural resources. We do not find evidence of the presence of information spillover effects for both leaders and citizens' outcomes. We do, however, find a clear increase in citizen awareness, knowledge, and salience of the natural resource discovery from baseline to endline in the control group. This is suggestive that other sources of information were at play during the time of the experiment.

8.2 Elite capture and rent-seeking

Table 3 presents estimates of the effect of the treatment interventions on measures of elite capture, namely by local leaders. In columns (1) and (2), we focus our attention on attitudes towards corruption from the leader surveys. We build a measure for these attitudes by averaging two indicator variables from available questions measuring corruption. The first indicator is coded as 1 in case 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 in case the leader prefers demanding the governor of the province a job for himself, rather than a benefit for his/her community.[32] The index of attitudes towards corruption is the only outcome variable in this table for which we have baseline values of 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 to 11 percentage points, significant at the 1 or 5 percent levels. The coefficient is also positive for treatment 2, with a marginally significant effect (6 to 7 percentage-point effects), that only passes multiple hypothesis testing when employing the lagged dependent variable as control.[33] Differences across treatments are found not to be significant.

Columns (3) and (4) are devoted to the zinc roofs SCA (see 5.2.1). Specifically, in column (3) we consider an indicator variable on how the zinc allocation decision was made, taking value 1 in the event that the use of the zinc was decided by the local elite (including the local leader), and value 0 in case the decision was made by the community. This information was provided by the community leader. In column (4) the outcome variable averages 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 of each zinc sheet at the endline. We note that at the time of the follow-up visit, despite design

[32] The exact text of 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'.

[33] Similar results are found when taking leader attitudes relative to the average attitudes in the community. Specifically, using the difference between the leader attitudes against corruption and the average attitudes in the community as dependent variable leads to similar conclusions.

incentives to use the zinc (risk of losing the zinc sheets if unused), only 22 percent of the zinc roof tiles had been used, with 80 percent of the used ones allocated privately. We therefore do not expect strong results in this SCA. Still, we find that treatment 2 led to a much lower probability that the elite decided on the allocation: a 24 percentage-point effect significant at the 1 percent level, which passes multiple hypothesis testing, and is significantly different from the effect of treatment 1. However, in terms of observed use, we do not find any significant effects, despite consistently negative point estimates, largest in absolute value for treatment 2.

Columns (5) and (6) are dedicated to the funds for meetings SCA through which leaders received funds to organize meetings (see 5.2.2). (5) shows an outcome indicator variable defined as 1 if the leader spent less than all funds received for the meetings, i.e., appropriated funds. To allow for measurement error, conservatively, we consider any amount spent equal or above 350 Meticais to be 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. We note that 47 percent of the control group appropriated funds, with the average share appropriated being 23 percent. Some leaders used their own money and spent more than 400. We find significantly positive treatment effects for information to leader when considering both dependent variables. The effects are statistical different between treatments, marginally so for the outcome variable representing the extensive margin. Point estimates are large in absolute values for treatment 1: 28 percentage points for the extensive margin and 15 percentage points of the intensive margin. Both are statistically significant at the 1 percent level, and both pass multiple hypothesis testing.

Columns (7) to (9) show several outcome variables related to the SCA where a taskforce was appointed by the leader (see 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 middle quintiles (2nd to 4th) in the distribution of the difference between the average score in the taskforce and the average score among representative citizens surveyed in the community. The regression in column (9) refers to the percent of men 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 on average worse, 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. We do not find treatment effects for the average scores of the taskforce selected by the leader. However, we find that treatment 1 increases the probability of selecting mid performers, as defined by the middle quintiles of the distribution of the difference in Raven's scores between appointed individuals and the community. These effects are clear in the distributions of the right panel of Figure 5. We also observe that treatment 1 led to an increase in the percent of men selected for the taskforce by 8 percentage points. We also observe that it is statistically different from the one of treatment 2, which is not distinguishable from zero. All significant differences also pass

multiple hypothesis testing.[34]

Column (10) regards leader behavior in the Trust Game (TG - see 5.3.1), i.e., the amount (rescaled to 0-1) the leader kept after receiving the transfer from a citizen in the trust game. Note that the average amount sent by citizens was 4 out of 10 tokens, indicating some degree of trusting behavior. Leaders returned on average slightly more than citizens sent, taking home on average just under two-thirds of the surplus. Aggregate leader behavior was consistent for different amounts sent by citizens. We do not find any significant differences between comparison groups for the amounts sent back by leaders. However, we observe negative point estimate for both treatments, with larger magnitude for treatment 1.

We can conclude for some clear effects of treatment 1 on increasing elite capture, in terms of more benevolent 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 our hypothesis 1.

We now turn to the analysis of treatment effects on outcomes related to rent-seeking by both local leaders and citizens (respectively, in the left and right panels of Table 4). We begin with survey outcomes. We analyze in columns (1) and (4)-(5) indicator variables assigning value one in case leaders/citizens reported having talked or called influential political leaders in the last six months before the endline survey.[35] Column (4) concerns specifically the (formal) community leaders, village or neighborhood chiefs, on citizens' own communities. Columns (1) and (5) consider all other political leaders, including chiefs in other communities, political representatives at the municipal, district, and provincial levels, and local party representatives. When taking interaction of local leaders with other political leaders, we clear effects of both treatments. Magnitudes are 16 percentage points for treatment 1 and between 11 and 12 percentage points for treatment 2, statistically significant at the 1 and 5 percent levels (respectively), and passing multiple hypothesis testing. We also find a strong effect of treatment 1 when considering citizen behavior, namely on interaction with local leaders. The probability of interaction increases by 8-9 percentage points, statistically significant at the 1 or 5 percent levels, passing multiple hypothesis testing. This effect seems to be statistically different from that of treatment 2, even though this difference between coefficients does not pass multiple hypothesis testing. We do not find significant effects on interaction of citizens with other political leaders.

In columns (2) and (7) of Table 4 we look at the auctions for meeting the district administrator (in the case of both leaders and citizens) and for business training (in case of citizens) - see 5.2.4. The

[34] We do not find statistically significant effects for selecting friends or family to the taskforce.

[35] To build this information, we asked citizens and leaders to list community leaders, members of the district or provincial government, religious leaders, and other influential people that they could personally contact if they wanted to and their interaction with them in the 6 months previous to the interview. Detailed description of the data is presented in section D.4 of the Online Appendix.

dependent variable in column (2) is built as the the log amount bid for meeting the administrator. The variable in (7) is the share of total bids allocated to meeting the administrator, considering the bid for the training activity. Again, although we do not find significant effects for leaders, we do find an effect for citizens when faced with treatment 1. This is a 3 percentage-point positive effect, statistically significant at the 5 percent level. It passes multiple hypothesis testing. This effect is statistically different from that of treatment 2.[36] Note that the average in the control group is that citizens divide equally their bids between the meeting with the district administrator and the training session.

In columns (3) and (8)-(9) of 4 we consider the action of leaders and citizens in the Rent-seeking Game (RSG - see 5.3.2). Namely, for leaders, we code the outcome variable as the share of the gift chosen by the leader in the difference between the maximum and minimum gifts decided by the citizens in the game. This means the variable takes value 0 if the leader behaves rationally (i.e., selects the highest amount put aside by citizens for productive purposes, or the lowest gift) and 1 if the leader accepts the highest gift in the game. Only 30 percent of leaders choose the profit maximizing, highest amount set aside. The outcome variables devoted to citizen behavior in the rent-seeking game are defined as: the size of the gift sent to the leader, in column (8), and an indicator variable taking value one when the citizen sent a gift (i.e., valued more than zero), in column (9). On average, citizens in the control group send 4 tokens as gifts, with the remaining 6 being set aside for productive activities. Only 11 percent of citizens in the control group choose the rational action of sending a gift of zero. We find a statistically significant treatment effect (at the 5 percent level), when considering the intervention of information to leader, for the probability of sending a gift to the leader. This is a positive effect of 5 percentage points. However, it does not pass multiple hypothesis testing. We do not find any other statistically significant effect across leaders and citizens. We note positive point estimates for treatment 1 for both leaders and citizens. The significant effect for citizens in treatment 1 is not distinguishable from the effect of treatment 2.

We conclude for clear positive movements in rent-seeking by leaders for both treatments, as well as in rent-seeking by citizens when faced with information targeting the local leaders (treatment 1). The latter emerges mainly for interaction with local leaders. It also appears in the bidding for meetings with the district administrator, and in the rent seeking game. Note however that the latter does not pass multiple hypothesis testing. Effects of treatment 1 on rent-seeking may denote movements by those close to leaders, consistent with the effects found on elite capture and hypothesis 1. This interpretation is confirmed for some of the rent-seeking outcomes through analysis of heterogeneous treatment effects by knowledge of community leaders.[37]

[36] The same conclusion is obtained when looking at the difference between the two bid amounts, rather than the share of the total amount bid.

[37] In section D.5 of the Online Appendix we explore heterogeneous effects by age, by distance to Palma, where

8.3 Citizen mobilization, trust, and demand for political accountability

We now turn to our results relating to citizens' mobilization, trust, and demand for political accountability. Table 5 presents estimates of treatment effects on measures of citizen mobilization. These include contributions to public goods. Table 6 presents estimates of treatment effects on citizen's trust and demand for political accountability.

Beginning with Table 5, columns (1) and (2) concern a standard survey question on participation in community meetings. Specifically, we employ an indicator variable equal to 1 if the citizen participated in at least one community meeting in the last 12 months. We have baseline values for this outcome variables and so employ them as controls in column (2). Note that 89-90 percent of the control respondents participated in at least a meeting in the last year. We find that treatment 2 induces a significant increase in participation in meetings: this is a 4 percentage-point effect, statistically significant at the 5 percent level. However, it does not pass multiple hypothesis testing. We cannot reject the null that both treatment effects are equal, even though this test is not far from statistical significance.

In columns (3) to (7), we explore the outcomes of the matching grants SCA and related meetings SCA (see 5.2.5). The first dependent variable is an indicator for awareness (column 3), i.e., and indicator variable taking value 1 in case the individual knew about the matching activity. The next outcome (column 4) is an indicator variable taking value 1 in the event that the individual reported contributing a positive amount of money in the matching activity. The corresponding intensive form variable is found in column (5) employing logarithms. Note that both variables are checked with the information in the community logbooks for the matching grants activity. We find positive treatment effects of information to leader and citizens on awareness, participation (extensive form) and log contribution (intensive form) in the matching grants SCA. The magnitudes are 10 percentage points for awareness, 16 percentage points for participation, and 51 percent for log contribution. All are statistically significant at the 1 percent level, and pass multiple hypothesis testing. In the case of awareness, we are able to reject that the treatment effect of 2 is equal to the treatment effect of 1. 70 percent of individuals in the control group report being aware of the contribution activity, while 22 percent 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, the maximum is 2600, which make logarithms particularly useful.

The dependent variables in columns (6) and (7) are measured at the community level. The first variable is attendance of the community meeting that decided participation in the matching grants

most of the gas extraction-related activities are taking place in Cabo Delgado, and by knowledge of local leaders. Interestingly, we find that citizens closest to Palma are most responsive to treatment 1 in terms of rent-seeking outcomes.

initiative. This is taken as the share of adults who participated from the community.[38] The second variable is an indicator taking value 1 if community made decisions in meeting through voting. Both are directly observed by the enumeration team. We find a positive and significant effect of treatment 1 when considering the share of participants in the meetings. However, this treatment effect does not pass multiple hypothesis testing, and we are unable to distinguish this impact from the one of treatment 2. The average meeting size was 43 individuals, ranging from 9 to 600. Turning to the voting variable, we find no significant effects of the treatments. However, there is a statistically significant difference between them, with the treatment effect of information to leader and citizens being higher. This difference does not pass multiple hypothesis testing.

The regression in column (8) examines behavior in the Public Goods Game (PGG - see 5.3.3). The outcome variable is defined as the contribution to the public account in the public goods game (rescaled between 0-1). Average contributions in the public goods game were 4.5 out of 10 tokens, with only 6 percent contributing zero. We find no significant effects of the treatments, despite the fact that the point estimate is higher for treatment 2.

Overall, we find some evidence that 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 margina). We report significant differences to treatment 1 in several outcomes, consistently with hypothesis 2, including awareness about the matching grants, and observed voting in meetings. However only the first passes multiple hypothesis testing.

Turning to Table 6, we now analyze survey outcomes on trust and voice/accountability (columns 1 to 7), as well as trust and demand for accountability as measured in the trust game and the postcard SCA (columns 8 to 10). We begin 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: 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 (community and religious leaders, high officials and influential people) that are personally known by the respondent. In all trust measures, the scale employed goes from 0 (do not trust at all) to 3 (trust a lot). We use baseline values of the dependent variable in columns (2) and (4). We observe effects on average trust, namely negative effects of treatment 1, with magnitude of 2 percent of the subjective scale. They are statistically different from those of treatment 2, which have positive but insignificant magnitudes. These results pass multiple hypothesis testing. We find positive and significant effects of treatment 2 on trusting known leaders: the magnitude is 2 percent of the subjective scale. These effects pass multiple hypothesis testing.

[38]The number of adults per community is estimated from the number of houses in the community as reported in the community survey, together with the average number of adults per household from the household survey.

Again, they are statistically different from those of treatment 1. Note that the levels of trust in the control group are already quite high: 2.2 for average trust and 2.9 for trust in leaders personally known (out of a maximum of 3).

In columns (5) and (6), we explore the average reported levels of voice citizens have with provincial and national leaders. The scale ranges from 1 (no voice at all) to 4 (full voice). In column (7), we employ an index of reported political accountability from leaders. This is an average of three indicator variables corresponding to different survey questions. We code each variable 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.. Note that we employ baseline values of the dependent variable as controls in column (6). These are not available for the outcome variable in column (7). We identify larger treatment effects for treatment 2 than for treatment 1 when considering voice with provincial and national leaders. The effect of treatment 2 is positive and significant: its magnitude is 3-4 percent of the subjective scale, significant at the 5 percent level (only with lagged dependent variable as control the coefficient passes multiple hypothesis testing). A similar pattern emerges for the index of political accountability, even though the significant treatment effect is negative and on information to leader. The size of the effect is 16 percentage points, statistically significant at the 5 percent level (which passes multiple hypothesis testing). The difference between treatment 1 and treatment 2 is, again, significant, also taking into account multiple hypotheses.

The following two columns of Table 6, (8) and (9), are related to behavior by citizens in the Trust Game (TG - see 5.3.1). The outcome variable in column (8) is the amount sent by the citizens in the trust game (rescaled between 0-1), and the one in column (9) is an indicator variable taking value one if the citizen expressed the desire to punish the leader in the trust game. We can report that 40 percent of citizens in the control group chose to punish the leader. We find no statistically significant effects on average amounts sent or on the desire to punish.

The final column of Table 6 is devoted to the postcard SCA, which measures the demand for political accountability in an incentive-compatible manner. The dependent variable in column (10) is an indicator taking value 1 in case the respondent sends the postcard. However, we performed an extensive analysis of the contents of the postcard as well. This additional analysis is reported in the Online Appendix (section D.6). Importantly, 88 percent of the respondents sent the postcard, which demonstrates a high level of interest in this costly activity. Even though we do not report significant treatment effects on the sending of the postcards, we can observe that both treatments yield positive magnitudes. The content analysis that we performed shows a few interesting treatment effects. Even though we cannot reject that treatment effects are different from each other on

any of the outcome variables considered, we find that treatment 2 yields positive and significant effects on protests and requests at the province level. Treatment 1 also yields a positive and significant effect on requests at the province level. The number of words written on the postcards is significantly lower for treatment 2.

In summary, we observe effects of treatment 2 on increasing trust in leaders personally known and voice at the provincial/national levels, at the same time that we find negative effects of treatment 1 on average trust and survey measures of political accountability. Differences between the two treatments are often significant. We also find some effects on the demand for political accountability as given by the postcard SCA. Specifically, treatment 2 increases the likelihood of sending protests on the postcards. This is additional evidence in favor of hypothesis 2.

8.4 Violence

We now devote our attention to violence outcomes. Table 7 summarizes our results. We divide them between survey and administrative measures, in columns (1)-(4), and (5)-(8), respectively. We begin with the survey outcomes. In columns (1) and (2) we depict regressions employing as dependent variable 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 the respondent reports witnessing and being involved on any type of violence in the three months before the endline survey. Types of violence included are physical, against women, verbal, theft, and property destruction. We are able to control for baseline values of the dependent variable in the regressions of columns (2) and (4). The averages in the control group were 29 percent for respondents justifying violence, and 18 percent for respondents involved in violence. We find significantly lower point estimates for treatment 1 relative to treatment 2 on both outcome variables, even though these results do not pass multiple hypothesis testing. We do not find any significant treatment effect when employing the measure of sympathy towards violence. We report a negative and significant coefficient of treatment 2 when considering involvement in violence. The magnitude is between 4 and 5 percentage points, statistically significant at the 5 percent level - this is only passing multiple hypothesis testing when including the lagged dependent variable as a control.

In columns (5)-(8) of Table 7, we show our results using international datasets which record georeferenced violent events. (5)-(6) regard GDELT alone, and (7)-(8) add ACLED events. Each dependent variable is an indicator variable taking value 1 if a violent event was recorded in the corresponding location. For each variant, GDELT or GDELT plus ACLED, we show results matching events happening in 5 or 10-kilometer windows from our experimental locations. GDELT events include those classified as unconventional violence and protests, while ACLED events include those classified as attacks against civilians. All regressions include the lagged dependent variable

as control. Note that the probability that a location in the control group witnessed at least one violent event rages from 9 percent for GDELT/5kms to 12 percent for GDELT+ACLED/10kms. We observe significant effects for treatment 2 when considering both GDELT and GDELT+ACLED variables for 5-kilometer windows. The effects are lost for 10-kilometer windows. The magnitudes range from 5 to 6 percentage points, statistically significant at the 5 or 10 percent levels. These effects do not however pass multiple hypothesis testing.

We conclude that treatment 2 had clear impacts on decreasing violence, as measured in the household survey, and as measured through international datasets of violence events. Note however that the latter do not pass multiple hypothesis testing. For some of the variables analyzed, namely the ones based on surveys, we can identify a difference in the effects of the two treatments, even though it does not pass multiple hypothesis testing. This is generally in line with hypothesis 2, which suggested that treatment 2 could have an impact on violence through including the general population in the process of managing natural resources at the local level in Mozambique.

8.5 Hypothesis testing: aggregation

In this project, we pursued several approaches to guarantee robust hypothesis testing. First, we published a pre-analysis plan that we follow closely in the analysis of this paper. Second, we allow for multiple hypothesis testing by using the Studentized k-StepM Method for Two-Sided Setup (Romano and Wolf, 2005; Romano et al., 2008), as analyzed above. We now explore a third approach that aggregates our outcome variables of interest under indices of z-scores. This is following Kling et al. (2007).

We aggregate the outcome variables in Tables 1-7 to form indices of z-scores. We divide them in community and citizen-level index outcomes. The community-level index outcomes are: Leaders Knowledge formed from outcomes in Table 1, columns (1)-(6); Leader Expected Benefits formed from outcomes in Table 1, columns (7)-(8); 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: Citizens' Knowledge formed from outcomes in Table 2, columns (1)-(6); Citizens' Perceived Benefits formed from outcomes in Table 2, columns (7-(8); Rent-seeking among Citizens formed from the citizen outcomes in Table 4; Citizen Mobilization formed from the outcomes in Table 5; Citizen Trust and Accountability formed from the outcomes in Table 6; and Self-reported Violence formed from the survey outcomes in Table 7. We then run regressions following our simple specification with controls - see equation 1.

The results are summarized for convenience in Figure 6. Confidence intervals are built for statistical significance at the 5 percent level. We find that 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 borderline significant effect on decreasing violence for both self-reports and community-level outcomes. We conclude that aggregation provides support, and indeed strengthens, many of the patterns we identified in the analysis per outcome.

8.6 The effect of holding deliberation meetings

Our analysis of treatment 2 joined together two treatment groups: one that had the information campaign targeting communities at large, and one that had a deliberation module in addition to the information campaign. We now perform analysis of the impact of the deliberation module by focusing our attention on the sample composed by the communities in treatment 2. We take our indices of outcomes and run regressions on a binary variable taking value one if the community had the deliberation module. We follow a specification analogous to equation 1.

Table 8 presents the results. We report no significant effects of deliberation overall. The exception is citizens' mobilization where deliberation had a positive impact. The magnitude is 21 percent of a standard deviation. It is statistically significant at the 1 percent level. It is intuitive that the deliberation meetings may have led to additional mobilization of citizens at the local level. However this effect is the only one observed. It is surprising that deliberation did not carry more effects. This may be related to the low levels of political accountability in Mozambique, particularly in rural areas.

An alternative way to explore the effects of deliberation is to estimate the effects of attending the deliberation meetings. We can also estimate the effects of attending the information campaign meeting and contrast to the first. That is what we do in Section D.7 in the Online Appendix. Since attending meetings is endogenous to individual characteristics, we employ instrumental variable estimations using the treatments as excluded variables. We find that, for citizen-level outcomes, attending deliberation meetings has no clear significant effects, except for a positive effect on citizens' mobilization (in line with the effect encountered for the reduced form) and a negative effect on trust. On the contrary, information campaign meetings have effects on many other variables, first and foremost on improving knowledge outcomes, but also on increasing citizens' trust and accountability, as well as reducing violence.

9 Concluding remarks

In this paper we find evidence that a community-targeted information campaign in Northern Mozambique, relating to the recent discovery of natural gas in the region, 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, we observe an increase in elite capture as well as in rent-seeking by leaders and citizens. Most of these effects do not seem to emerge when information is given to citizens. Moreover, we document increases 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 misgovernance by politicians. It is also consistent with a positive role of information in countering the curse.

Our study is relevant for policy-makers for two main reasons. First, we show that 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, we report clear effects 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 escape the emergence of localized conflict. Information campaigns like the one we study in this paper can be seen as a central piece of those efforts.

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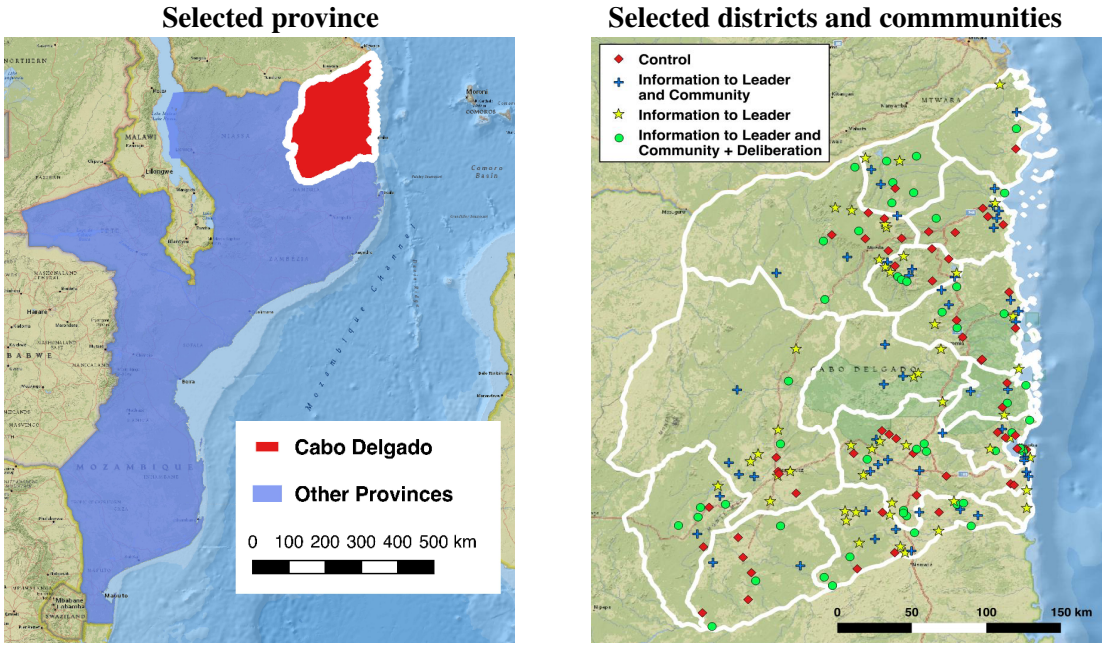
Figure 1: Information Leaflet

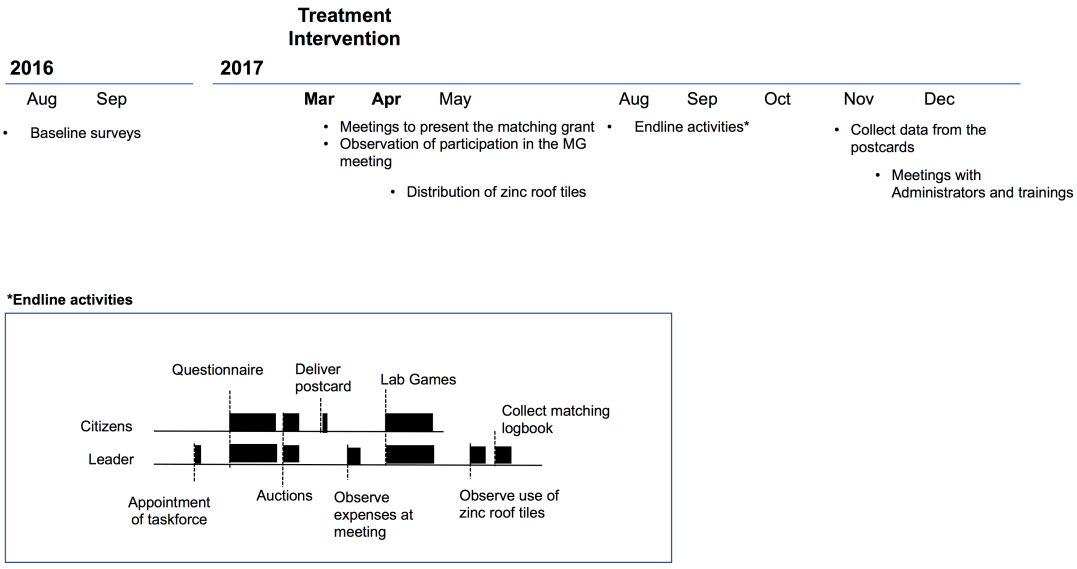
Note. The information leaflet was designed by the research team in collaboration with a large number of governmental and non-governmental organizations.

Figure 2: Selected communities and allocation to treatment groups



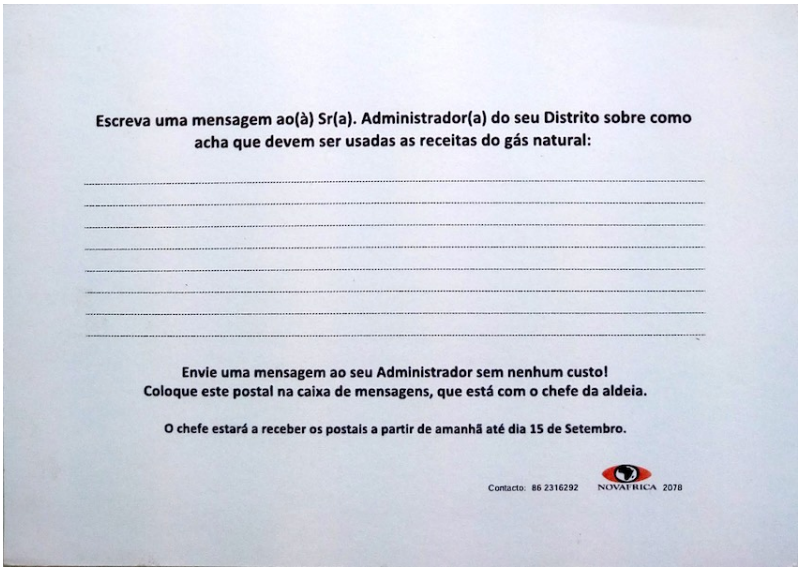
Note: We show in red the selected province for the project, Cabo Delgado. Geo-coded coordinates were obtained from tablets' GPS sensors used for interviews. The geo-coded coordinate of each location is determined using the average of all available data points within each location (household interviews, leader interviews, and community interviews). For the locations where geo-coding is missing (10 communities), we use the closest neighbor community and the reported distance to the missing community to formulate an approximation.

Figure 3: Timeline



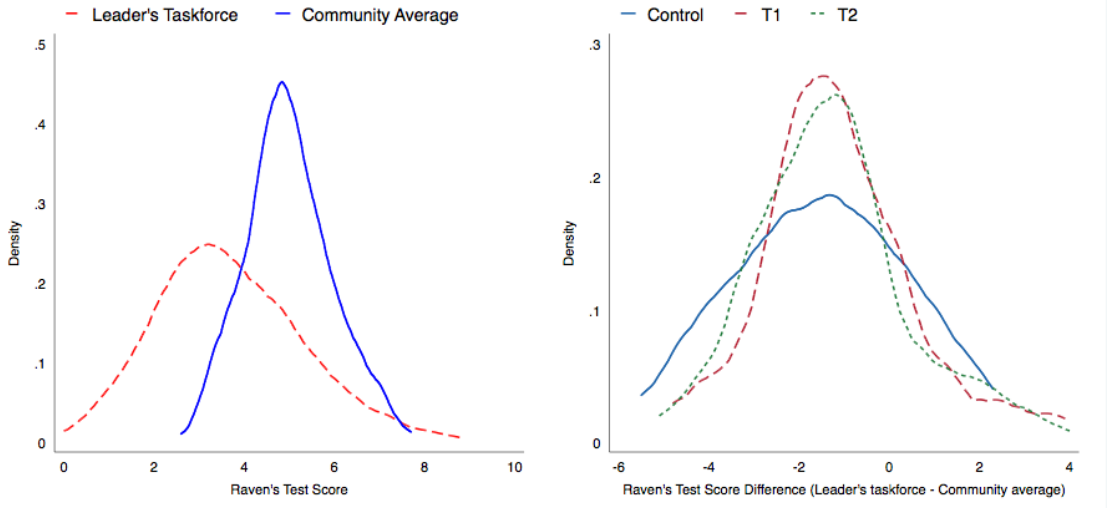
Note. The timeline presents the activities of the project from the implementation of the baseline survey in August 2016 to the completion of all SCAs in December 2017. The lower part of the figure presents the detailed timeline of the endline activities.

Figure 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 the community members in the sample and the average Raven's Test Score among the individuals selected by the leader 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.

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	**0.042****	**0.042****	**0.034***	**0.038****	0.072	0.085	0.036	0.030
	(0.020)	(0.020)	(0.018)	(0.018)	(0.088)	(0.088)	(0.065)	(0.081)
(T2) Information to Leader and Citizens	**0.053*****	**0.055*****	**0.054*****	**0.055*****	**0.326*****	**0.332*****	-0.012	-0.044
	(0.018)	(0.018)	(0.017)	(0.016)	(0.080)	(0.080)	(0.059)	(0.074)
Observations	206	203	206	203	206	203	204	204
R^2	0.142	0.174	0.235	0.288	0.336	0.340	0.196	0.129
Mean (control group)	0.964	0.964	0.627	0.627	0.291	0.291	0.868	0.830
T1 = T2 (p-value)	0.546	0.472	0.234	0.289	**0.002**	**0.003**	0.410	0.310
Lagged dependent variable	No	Yes	No	Yes	No	Yes	No	No

Note. Estimates based on OLS regression (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. 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. We highlight in bold coefficients for which we cannot reject at 10 percent of significance level the null hypothesis of no effect when adjusting the critical values for multiple hypothesis testing.

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	0.011	0.014	0.011	0.012	0.058**	**0.076****	-0.011	0.013
	(0.031)	(0.032)	(0.020)	(0.020)	(0.029)	(0.032)	(0.032)	(0.032)
(T2) Information to Leader and Citizens	**0.253*****	**0.250*****	**0.174*****	**0.169*****	**0.234*****	**0.239*****	**0.049****	**0.072*****
	(0.022)	(0.023)	(0.015)	(0.015)	(0.026)	(0.027)	(0.024)	(0.027)
Observations	2070	1878	2070	1878	2070	1877	1592	1573
R^2	0.256	0.273	0.380	0.405	0.156	0.154	0.113	0.093
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**	**0.025**	**0.037**
Lagged dependent variable	No	Yes	No	Yes	No	Yes	No	No

Note. Estimates based on OLS regression (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. 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. We highlight in bold coefficients for which we cannot reject at 10 percent of significance level the null hypothesis of no effect when adjusting the critical values for multiple hypothesis testing.

Table 3: Elite capture

Dep.Var.	Attitudes towards corruption		Zinc roof tiles		Funds for meetings		Taskforce activity			Trust game
			Elite decided	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	**0.106*****	**0.102****	-0.038	-0.121	**0.276*****	**0.147*****	0.321	**0.219****	**0.081****	0.032
	(0.040)	(0.041)	(0.077)	(0.084)	(0.096)	(0.053)	(0.318)	(0.096)	(0.041)	(0.037)
(T2) Information to Leader and Citizens	0.062*	**0.072***	**-0.237*****	-0.126	0.133	0.014	0.299	0.130	-0.009	0.044
	(0.036)	(0.038)	(0.069)	(0.076)	(0.087)	(0.048)	(0.287)	(0.087)	(0.037)	(0.034)
Observations	204	192	206	206	205	205	206	206	206	206
R^2	0.199	0.203	0.365	0.277	0.184	0.274	0.181	0.196	0.270	0.162
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)	0.229	0.441	**0.005**	0.951	0.105	**0.007**	0.940	0.305	**0.018**	0.727
Lagged dependent variable	No	Yes	No	No	No	No	No	No	No	No

Note. Estimates based on OLS regression (see equations 1 and 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis. 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) Usage: observed use of zincs, takes value 1 if used for individual purposes, 0 if not used yet, and -1 if used for the community. 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 2nd-4th 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: percent 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 0-1). All specifications include community and leader-level controls. The full list of controls is presented in section 7. We highlight in bold coefficients for which we cannot reject at 10 percent of significance level the null hypothesis of no effect when adjusting the critical values for multiple hypothesis testing.

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 Gifts sent**	**Any gift sent**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(T1) Information to Leader	**0.157*****	**0.158*****	0.102	0.028	**0.093*****	**0.083****	0.007	0.022	**0.030****	0.028	0.053**
	(0.055)	(0.055)	(0.119)	(0.062)	(0.034)	(0.034)	(0.038)	(0.034)	(0.012)	(0.024)	(0.025)
(T2) Information to Leader and Citizens	**0.118****	**0.114****	0.044	-0.000	0.029	0.024	0.007	0.010	0.006	0.020	0.039
	(0.050)	(0.050)	(0.108)	(0.057)	(0.029)	(0.030)	(0.030)	(0.029)	(0.011)	(0.021)	(0.024)
Observations	206	203	206	204	2075	1882	2075	1882	2075	2025	2025
R^2	0.145	0.181	0.235	0.110	0.104	0.104	0.117	0.130	0.022	0.072	0.022
Mean (control group)	0.818	0.818	4.217	0.179	0.529	0.533	0.471	0.446	0.499	0.408	0.880
T1 = T2 (p-value)	0.445	0.371	0.593	0.618	0.027	0.044	0.996	0.692	**0.007**	0.663	0.432
Lagged Dependent Variable	No	Yes	No	No	No	Yes	No	Yes	No	No	No

Note. Estimates based on OLS regression. *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis. 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) Interaction with other political leaders: indicator variable equal to 1 if the leader reported having talked or having called to another political leader in the 6 months previous to the interview; for the Auction activity [see 5.2.4], (2) Bid for meeting: log amount bid for the meeting with administrator. For the Rent-seeking game [see 5.3.2], (3) Degree of rent-seeking: amount of rent seeking as proportion of total possible, given gifts received: it varies continuously from 0 (lowest rent-seeking), to 1 (full rent-seeking). For Citizens, depending on the column, the dependent variables are defined by the following: (4) 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; (5) 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; (6) Interaction with traditional leaders: indicator variable equal to 1 if the person reported having talked or having called a traditional leader in the 6 months previous to the interview. For the Meeting − Training Auction activity [see 5.2.4], (7) Share bid to meeting: share of total bids allocated to meeting the administrator. For the Rent-seeking Game [see 5.3.2], (8) Gifts sent: number of gift tokens (rescaled between 0-1) sent to leader; (9) Any gift sent: indicator variable for whether the participant sent any tokens as gift 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. We highlight in bold coefficients for which we cannot reject at 10 percent of significance level the null hypothesis of no effect when adjusting the critical values for multiple hypothesis testing.

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	0.012	0.008	0.023	0.077	0.254	0.025*	-0.028	-0.009
	(0.019)	(0.020)	(0.036)	(0.050)	(0.198)	(0.015)	(0.032)	(0.020)
(T2) Information to Leader and Citizens	0.035**	0.036**	**0.105****	**0.162****	**0.507****	0.014	0.025	-0.005
	(0.016)	(0.016)	(0.030)	(0.046)	(0.176)	(0.014)	(0.030)	(0.020)
Observations	2017	1795	2070	1508	1508	203	196	2025
R^2	0.070	0.089	0.098	0.080	0.071	0.205	0.138	0.056
Mean (control group)	0.899	0.892	0.704	0.223	0.892	0.044	0.019	0.448
T1 = T2 (p-value)	0.171	0.121	**0.005**	0.063	0.166	0.431	0.081	0.808
Lagged Dependent Variable	No	Yes	No	No	No	No	No	No

Note. Estimates based on OLS regression. *** 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). 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 0-1) 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. We highlight in bold coefficients for which we cannot reject at 10 percent of significance level the null hypothesis of no effect when adjusting the critical values for multiple hypothesis testing.

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	-0.060**	**-0.068****	-0.038*	-0.040	-0.018	0.018	**-0.162****	0.020	0.032	0.028
	(0.027)	(0.028)	(0.023)	(0.025)	(0.047)	(0.053)	(0.068)	(0.019)	(0.038)	(0.032)
(T2) Information to Leader and Citizens	0.018	0.022	**0.048*****	**0.047*****	0.078**	**0.114****	0.029	0.007	0.020	0.029
	(0.022)	(0.022)	(0.015)	(0.017)	(0.038)	(0.044)	(0.059)	(0.017)	(0.032)	(0.022)
Observations	2033	1746	1957	1607	1981	1710	1995	2025	2005	1889
R^2	0.087	0.124	0.124	0.144	0.061	0.070	0.080	0.114	0.036	0.080
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)	**0.001**	**0.000**	**0.000**	**0.000**	**0.022**	0.047	**0.002**	0.460	0.727	0.987
Lagged dependent variable	No	Yes	No	Yes	No	Yes	No	No	No	No

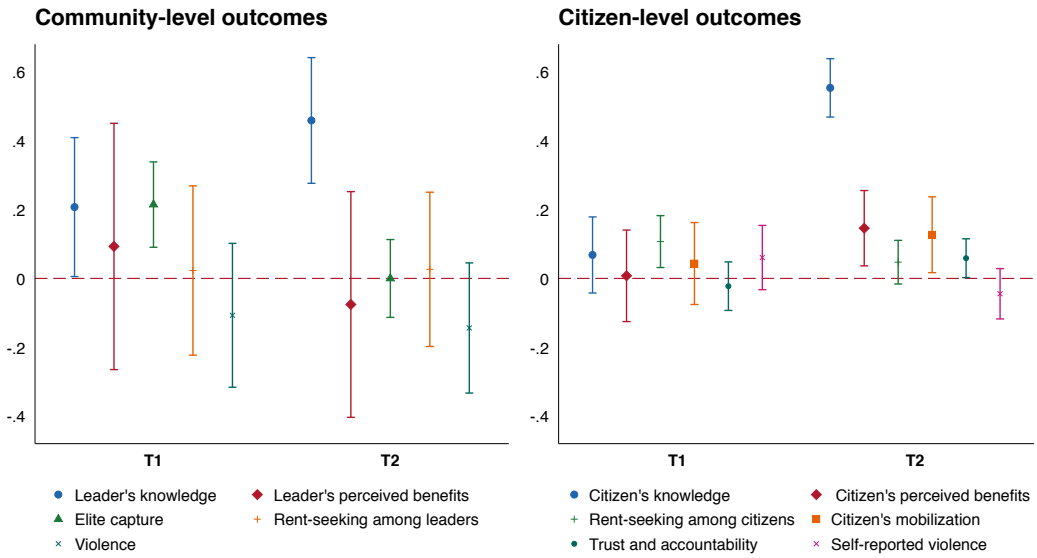
Note. Estimates based on OLS regression (see equations 1 and 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level. Depending on the column, the dependent variables are defined by the following: for Trust outcomes, (1)-(2) Average trust: 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 0-1) 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. We highlight in bold coefficients for which we cannot reject at 10 percent of significance level the null hypothesis of no effect when adjusting the critical values for multiple hypothesis testing.

Table 7: Violence

Dep.Var.:	**Self-reported violence**				**Violence in administrative data**			
	Sympathy for violence		**Involved in violence**		**GDELT**		**GDELT + ACLED**	
Proximity bound:	-	-	-	-	5km	10km	5km	10km
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(T1) Information to Leader	0.026	0.013	0.003	-0.016	-0.018	-0.013	-0.031	-0.024
	(0.030)	(0.035)	(0.024)	(0.027)	(0.028)	(0.040)	(0.033)	(0.048)
(T2) Information to Leader and Citizens	-0.002	-0.034	-0.041**	**-0.052****	-0.047*	-0.022	-0.062**	-0.006
	(0.028)	(0.031)	(0.019)	(0.021)	(0.025)	(0.037)	(0.030)	(0.044)
Observations	1884	1515	2040	1819	206	206	206	206
R^2	0.038	0.048	0.056	0.056	0.675	0.586	0.604	0.504
Mean (control group)	0.298	0.323	0.176	0.187	0.091	0.109	0.109	0.127
T1 = T2 (p-value)	0.233	0.076	0.041	0.119	0.254	0.822	0.318	0.678
Lagged dependent variable	No	Yes	No	Yes	Yes	Yes	Yes	Yes

Note. Estimates based on OLS regression (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). Columns (1) and (3) present estimates using equation (1). Columns (2), (4), and (5)-(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 being involved and having witnessed any type of violence (physical, against women, verbal, theft, and property destruction) in the last 3 months. For violence in administrative data, (5)-(6) GDELT: indicator variable equal to 1 if an event was recorded in GDELT dataset (non-conventional violence or protests) and occurred within 5 or 10 km from the community; (7)-(8) GDELT+ACLED: indicator variable equal to 1 if an event was recorded in GDELT (non-conventional violence or protests) or ACLED (attacks against civilians) datasets and occurred within 5 or 10 km from 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. We highlight in bold coefficients for which we cannot reject at 10 percent of significance level the null hypothesis of no effect when adjusting the critical values for multiple hypothesis testing.

Figure 6: Aggregation: results



Note. Estimates based on OLS regression (see equation 1). Confidence intervals are built using statistical significance at the 5 percent 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 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	-0.053	0.085	101
Leader's perceived benefits	0.070	-0.196	0.205	101
Elite capture	-0.025	0.064	0.070	98
Rent-seeking among leaders	0.059	-0.047	0.160	100
Violence	-0.148	0.114	0.114	101
Citizen-level outcomes				
Citizen's knowledge	0.483	0.011	0.037	1009
Citizen's perceived benefits	0.163	-0.040	0.060	893
Rent-seeking among citizens	0.032	0.002	0.033	989
Citizen's mobilization	0.052	0.209***	0.070	897
Trust and accountability	0.083	-0.052	0.033	777
Self-reported violence	-0.068	0.024	0.043	910

Note. Estimates based on OLS regression (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 structure

The information structure on natural resources employed in the community meetings, drawing from the structure of the information manual, was composed of the following parts.

1. **Presentation**. This was an introductory space for those who were holding the meetings in the communities to present themselves and the implementing partners and to introduce the subject of the meeting. It was 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 explained that Mozambique is a country endowed with many different types of natural resources in large quantities. The extractive industries of natural gas, coal, iron, precious stones and heavy minerals are in rapid expansion in Mozambique. 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, 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 world producers of natural gas. The future of the Mozambican economy may be heavily influenced by the management of the revenues generated by the extraction of natural gas.

3. **Natural resources**. Campaigners included information about the formal definition of a natural resource, and the difference between renewable and non-renewable resources. This distinction was important for the communities to understand that many of their resources, including natural gas, are non-renewables, and that, consequently, sustainability is an issue. It was noted in this context that resource management should benefit present generations in an equitable way, as well as future generations. Hence, environmental considerations should be taken into account.

4. **Types of natural resources**. The campaign presented at this point the types of natural resources that have relevance in the province of Cabo delgado: minerals, forest, fishing, and the natural gas.

[2] International Monetary Fund, Country Report No. 16/10 (January, 2016): http://www.imf.org/external/pubs/ft/scr/2016/cr1609.pdf

5. **Natural gas**. At this point, presenters described where in Cabo Delgado natural gas was discovered, and the plans for the exploration and transformation of natural gas in the Rovuma Basin over the next few years. A brief mention of the uses of natural gas followed. At the end, presenters mentioned that another province in Mozambique, i.e., Inhambane, discovered natural gas in the past and what lessons were learned from that experience.

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

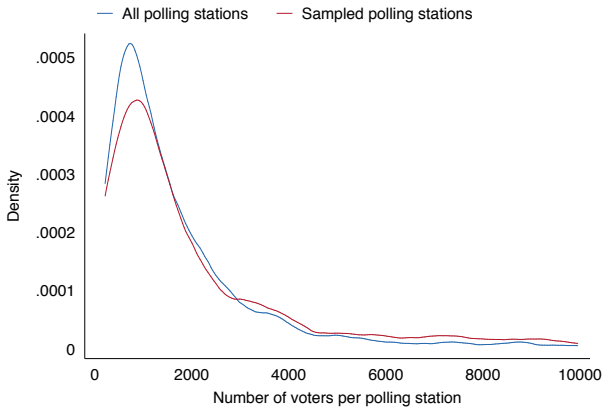
7. **Practical examples**. After explaining how communities can be involved in the management of natural resources, three examples of countries that discovered natural resources, including how they impacted their populations, were discussed. Two of the examples were positive (Norway and Botswana), while the other one was negative (Nigeria). These cases served the purpose of exemplifying both desirable and undesirable consequences that can arise from the discovery of natural resources.

8. **Conclusion**. In the end, campaigners emphasized the main lessons to take from the meeting, and it was concluded with a brief review of what had been explained before. Although citizens were allowed to raise questions during the meeting, this was typically the moment when most people expressed their opinion about the topic.

B Sampling and randomization: further details

Our sampling design embeds an oversampling of urban and semi-urban polling locations. This is for the purpose of securing clear representation of the few urban settlements in the province. Figure B1 presents a comparison of the distribution of registered voters in the sampling frame and the sampled polling locations. In order to obtain a geographical representation of sampled polling locations, we present the distribution among different districts of the number of polling locations and the number of sampled polling locations (Figure B2). We can observe that the stratified random sampling tends to replicate the distribution of polling stations in the sampling frame. While the number of polling stations is comparable across districts, we can observe that the number of stations is particularly high in Chiure district, in the southern part of Cabo Delgado.

Figure B1: Distribution of voters in sampled polling locations vs. 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 our randomization procedure, we built blocks of four communities by implementing a code using m-distance (Mahalanobis). To construct m-distances, we make use of the richness of baseline information. Specifically, we use the following variables to compute our metric:

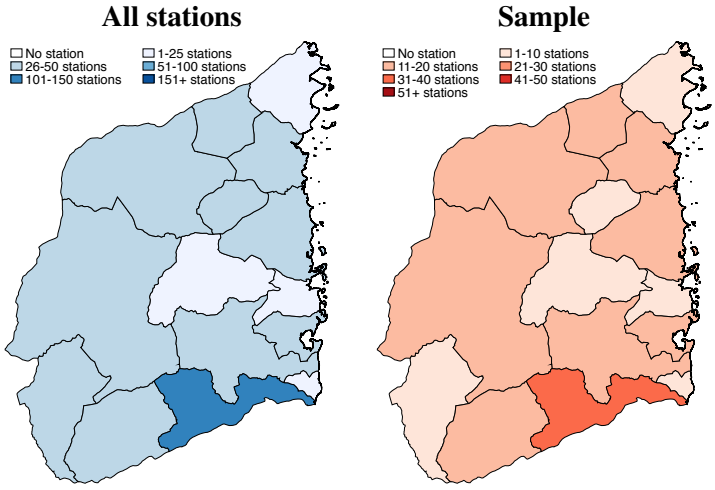
- *Household characteristics*. We build for each community the mean household by averaging the gender, age, education and income of the respondents, their household size, the share of Muslim households, the share of households from different ethnic groups (Macua, Maconde, Mwani), an asset index averaging 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). We also control for the 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 characteristics*. We include 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*. To capture additional community heterogeneity, we construct two indices averaging binary variables, one related to quality of infrastructures and the other depicting the presence of natural resources.

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.

C Multiple hypothesis testing procedure

This section presents the procedure for multiple hypothesis testing relating to the coefficients in the tables of the main text. We follow the Studentized k-StepM Method for Two-Sided Setup (Romano and Wolf, 2005; Romano et al., 2008). Our data is represented by a data matrix X_N, where N is the number of observations, which is 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. We perform multiple hypothesis testing at the level of the table and, therefore K is the number of outcomes in the table and, $S = 3K$, the total number of hypotheses tested in the table. 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, we also consider analogously the test of the difference between treatment effects. For each set of outcomes considered in tables 1-7, we implement the following procedure:

1. Let $\hat{\theta}_N$ denote an estimator of θ (with standard error $\hat{\sigma}_{N,t,k}$) computed from the original data matrix X_N using the specifications presented in Section 7.

2. For each hypothesis $H_{t,k}$, we compute the absolute studentized test statistics $|z_{N,t,k}| = \left|\hat{\beta}_{N,t,k}/\hat{\sigma}_{N,t,k}\right|$ from the data matrix X_N and we relabel them in descending order: r_1 corresponds to the largest absolute studentized test statistic and strategy r_S to the smallest one, e.g., $z_{N,r_1} \geq z_{N,r_2} \geq ... \geq z_{N,r_S}$.

3. Generate M bootstrap data matrices $X_N^{*,m}$ with $1 \leq m \leq M$. Since the design of the experiment is a cluster randomized controlled trial, we generate bootstrap data matrices clustered at the community level. We use $M = 2000$. We exclude iterations where at least one estimation cannot be performed due to lack of variation in the dependent variable.[3]

4. From each bootstrap data matrix, we compute estimates $\hat{\beta}^{*,m}_{N,t,1}, ..., \hat{\beta}^{*,m}_{N,t,K}$ and standard errors $\hat{\sigma}^{*,m}_{N,t,1}, ..., \hat{\sigma}^{*,m}_{N,t,K}$ using the same specifications as in Step 1. Then set $j = 1$ and $R_0 = 0$.

5. For $1 \leq m \leq M$, we compute $max^{*,m}_{N,j} = max_{R_{j-1}+1 \leq s \leq S} \left(\left| \hat{\beta}^{*,m}_{N,r_s} - \hat{\beta}_{N,r_s} \right| / \hat{\sigma}^{*,m}_{N,r_s} \right)$.

6. 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}. We consider $\alpha = 0.1$.

7. 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 5.

[3] Since for community-level outcomes we make use of a maximum of 206 observations, bootstrap can produce iterations in which the dependent variable has no variation.

D Additional Analysis

D.1 Balance checks

For each outcome of household/leader i living in community j, Y_{ij}, we test for balance by first 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 groups 1 (information to leader), 2A (information to leader and citizens), or 2B (information to leader and citizens, plus deliberation) and ϵ_{ij} is an individual-specific error term which is assumed to be clustered at the community level. We then look at balance specifically within each treatment group, by estimating the following specification:

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

where $T1_j$, $T2A_j$ and $T2B_j$ are indicator variables for living in a community in treatment groups 1, 2A, and 2B and ϵ_{ij} is an individual-specific error term which is assumed to be clustered at the community level. We test for jointly-significance of β_1, β_{2A} and β_{2B} by using an F-test. Table D1 presents randomization checks for respondent, leader, and community characteristics.

Table D1: Descriptive Statistics

		Treatment Group:				
	Control Group (1)	Any treatment (2)	T1 (3)	T2A (4)	T2B (5)	Joint test [3-5] (6)
	mean [std.dev.]	diff. (std.err.)	diff. (std.err.)	diff. (std.err.)	diff. (std.err.)	p-value [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	0.227	0.303	0.655	-0.285	0.882
	[16.860]	(1.010)	(1.298)	(1.255)	(1.178)	[2057]
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) present a joint test of significance of the coefficients for each treatment dummy. *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 centre, 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.

D.2 Knowledge of the natural gas discovery

To analyze knowledge of the natural gas discovery, we build an index 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 D2 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. We average the answers to each individual questions 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.[4]

Table D2: 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	0.020	0.047	0.091**	0.043	0.073	206
Knows whether exploration started	0.163**	0.070	0.166**	0.064	0.021	206
Knows whether government receives revenues	0.022	0.082	-0.001	0.074	0.945	206
Knows expected start of extraction	0.060	0.084	0.141*	0.076	0.170	206
Knows companies involved	0.023	0.015	0.025*	0.013	0.132	206
Citizens' knowledge						
Knows the location of discovery	0.040	0.026	0.234***	0.021	0.000	2070
Knows whether exploration started	-0.005	0.034	0.241***	0.028	0.000	2070
Knows whether government receives revenues	-0.033	0.026	0.094***	0.025	0.000	2070
Knows expected start of extraction	0.036*	0.020	0.181***	0.022	0.000	2070
Knows companies involved	0.005	0.022	0.155***	0.015	0.000	2070

Note. Estimates based on OLS regression (see equation 1). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at community level. Each variable ranges from 0 to 1, where 0 indicates zero knowledge, and 1 indicates full knowledge. 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.

This knowledge index can also be used to understand the determinants of knowledge about natural resources at the baseline. Table D3 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.

[4]To build the index, we exploit the open-ended nature of these questions and we build 15 indicator variables capturing whether the respondent provides an answer and whether it is correct. We assign value 1 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. We then average the 15 indicators into a single index.

Table D3: Correlates of awareness and knowledge at baseline

Dep.Var.	Awareness		Knowledge	
	(1)	(2)	(3)	(4)
Female respondent	-0.184***	-0.205***	-0.124***	-0.141***
	(0.025)	(0.024)	(0.017)	(0.016)
Age in years	0.014***	0.014***	0.010***	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)
Household size	0.014***	0.010***	0.009***	0.006***
	(0.004)	(0.003)	(0.002)	(0.002)
Primary education	0.069***	0.081***	0.055***	0.058***
	(0.023)	(0.021)	(0.016)	(0.014)
Secondary or higher education	0.380***	0.338***	0.286***	0.238***
	(0.038)	(0.037)	(0.028)	(0.024)
Muslim	0.135***	0.001	0.093***	-0.012
	(0.026)	(0.026)	(0.018)	(0.017)
Macua ethnic group	-0.287***	-0.031	-0.225***	-0.024
	(0.040)	(0.033)	(0.032)	(0.023)
Maconde ethnic group	0.131***	-0.023	0.043	-0.023
	(0.048)	(0.053)	(0.036)	(0.035)
Group Membership	0.153***	0.147***	0.100***	0.102***
	(0.025)	(0.025)	(0.016)	(0.016)
Infrastructure index		-0.089		-0.071
		(0.103)		(0.077)
Natural resources index		-0.134		-0.121
		(0.218)		(0.140)
Village has a market		0.031		0.018
		(0.029)		(0.019)
Polling Station size		0.004		0.005
		(0.008)		(0.005)
Below median distance from Palma		0.045		0.053
		(0.055)		(0.037)
Leader's age		-0.003		-0.002
		(0.010)		(0.007)
Leader's age (squared)		0.000		0.000
		(0.000)		(0.000)
Leader has Primary education		0.048		0.031
		(0.077)		(0.046)
Leader has Secondary or higher education		0.021		0.013
		(0.079)		(0.049)
Observations	1958	1950	1958	1950
R^2	0.244	0.349	0.257	0.400
Community controls	No	Yes	No	Yes
Household controls	Yes	Yes	Yes	Yes

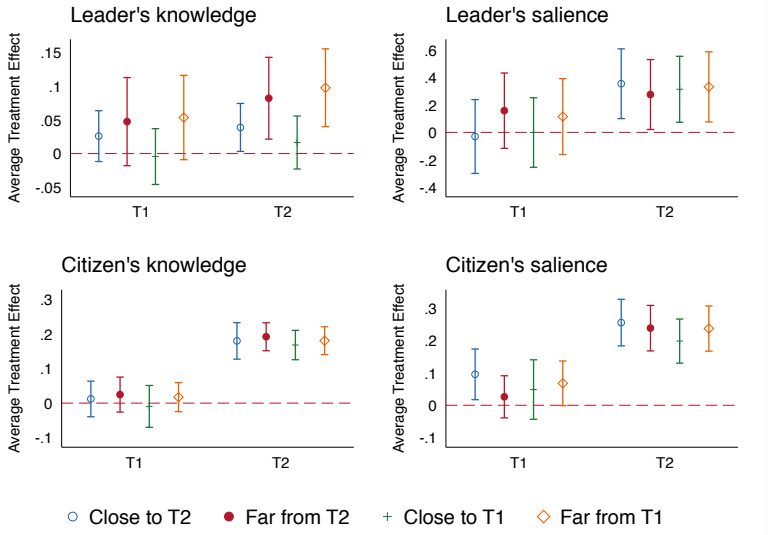
Note: Estimates based on OLS regression (see equations 1 and 2). *** p<0.01, ** p<0.05, * p<0.1. Standard errors are reported in parenthesis and clustered at the community level. Depending on the column, the dependent variables are defined by the following: (1)-(2) Awareness: indicator variable equal 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. The full list of controls is presented in section 7.

D.3 Information spillovers and the evolution of the control group

We now look at whether the effect of treatments on the awareness and knowledge of the natural gas discovery among leaders and citizens differs in communities that are closer or more distant to communities in which the information was provided to a community leader only (T1) or also to citizens (T2). We split the sample in communities close to (far from) another community in T1 and in communities close to (far from) another community in T2. We define being close to or far from

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. We then estimate the effect of each treatment for each sub-group. Figure D3 presents the results by focusing on 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). We cannot find evidence for the presence of spillover effects since estimates are not statistically different across sub-groups.[5]

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

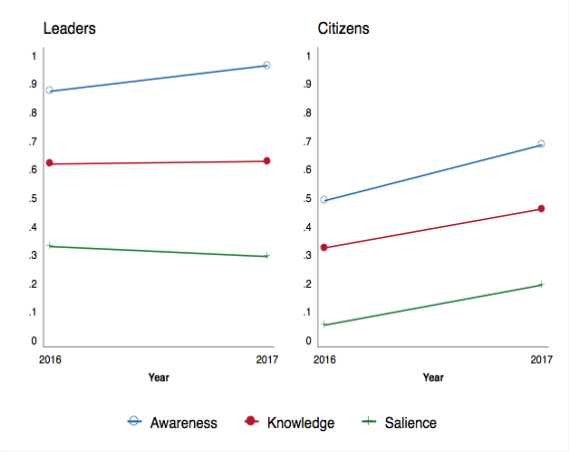


Note: *Close to* and *Far from* are based on the sample median of the minimum distance of a community to another community in T1 and in T2. We split the sample in communities closer than the median minimum distance (*close to*) and further away (*far from*). Minimum median distances are 12.01 km to T1 and 9.65 km to T2. Estimates based on OLS regression (see equations 1). Confidence intervals are built using a 95% of confidence. Standard errors are clustered at the community level.

Figure D4 shows the evolution over time, namely between our baseline and endline surveys, of average awareness, knowledge, and salience of the natural gas discovery in the control group. Left panel focuses on leaders, while 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. For leaders, knowledge tends to remain constant, while salience is slightly reduced. Since we do not evidence of contamination across communities, this pattern suggests that, in the absence of any information campaign, news about the discovery reach citizens (in particular) through alternative sources.

[5] A similar conclusion is achieved when looking at awareness of the natural gas discovery. We omit estimates since, in communities close to T2, all leaders are aware of the discovery, and therefore treatment effect cannot be estimated for that group.

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

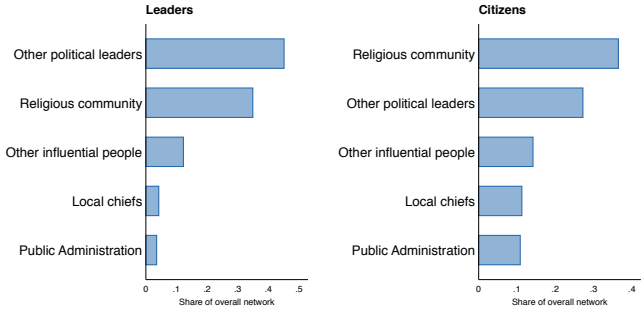


Note: The figure shows average awareness, knowledge, and salience of the natural gas discovery at baseline and follow-up restricted to the control group. The left panel focuses on leaders, while the right panel focuses on citizens.

D.4 Network and interaction with local leaders

To measure interaction between citizens and leaders, we asked respondents to list community leaders, members of the district or provincial government, religious leaders, and other influential people that they could personally contact if they wanted to. We collected this information for both citizens and community leaders. For each respondent, we collected up to 20 individuals, including information about their role in the community and their interaction with the respondent, such as how frequently they meet or they talk over the phone. Using names and roles, we identify unique individuals within and across communities, building the network between citizens and local leaders. For the baseline survey, this generated around 3500 individuals composing the network of the roughly 2000 citizens interviewed and around 1000 individuals composing the network of the 206 local leaders interviewed. For ease of presentation, we group individuals in these networks into 4 major categories: local chiefs, other political leaders, public administration, religious community and other influential people.[6] Figure D5 shows the relative importance of each of these categories in the networks of leaders and citizens.

Figure D5: Interaction with leaders



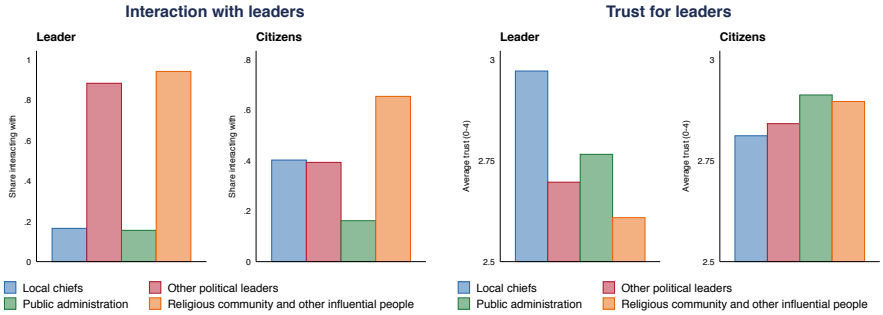
Note: The figure presents the composition at baseline of the network of all respondents (leaders in the left panel and citizens in the right panel). Categories are ordered from top to bottom in terms of relative importance within the network.

To understand how citizens and leaders interact with the individuals in their networks, we looked at whether they talked or called any of these individuals in the 6 months previous to the interview (left panel in figure D6). We also analyze average trust towards these individuals (right panel in figure D6). The community leader tends to interact primarily with other political leaders and with the religious community, while citizens interact mainly with the religious community, and has equal

[6] *Local chiefs* includes the village chief, his deputy and the chiefs for sub-units of the community, such as neighborhood chiefs. *Other political leaders* includes all higher level politicians (such as district and province government), and all other individuals involved in the political life of the community, such as the members of the party, the members of the community council, and all traditional leaders. *Public administration* includes all individuals working in the public administration, including teachers, doctors, judges and the police. *Religious community* includes all religious leaders (imans and priests), religious teachers, and other individuals being part of the religious community. Finally, *other influential people* is a residual category in which we list people reported as influential, such as the elderly in the community.

interaction with local chiefs and with other political leaders. In terms of trust, the community leader has higher trust for local chiefs mainly, possibly his closest collaborators, while citizens tend to have a comparable level of trust across the different types of leaders.

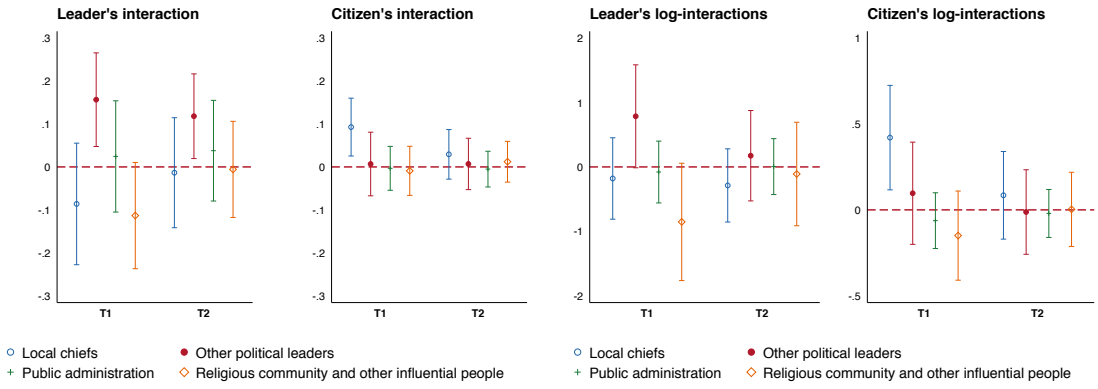
Figure D6: Network and interaction with local leaders



Note: The left figure shows the share of respondents that interacted with leaders in the corresponding category (for leaders and citizens). We define interaction 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). Sample is restricted to the baseline survey.

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 D7: Interaction with leaders and the effect of the interventions



Note: Estimates based on OLS regression (see equation 1). Confidence intervals are built using statistical significance at the 5 percent 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 called or talked with a leader in the corresponding category in the 6 months previous to the interview. In the right panels, dependent variable is the total number of times the respondent interacted with leaders in the corresponding category. 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.

D.5 Heterogeneous effects

Table D4 presents an analysis of heterogeneous effects employing age of respondents, distance from Palma, and knowledge of local leaders. Outcomes are grouped in indices that are built using the procedure followed by Kling et al. (2007).

Table D4: Heterogeneous effects: summary

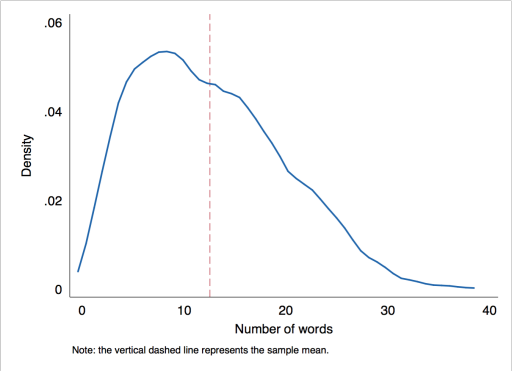
	T1		T2			T1		T2		
Outcome variable	Coeff. (1)	S.E. (2)	Coeff. (3)	S.E. (4)	N (5)	Coeff. (6)	S.E. (7)	Coeff. (8)	S.E. (9)	N (10)
	Younger citizens (< 35 y.o.)					**Older citizens (≥ 35 y.o.)**				
Citizen-level outcomes										
Citizen's knowledge	-0.11	0.10	0.51***	0.07	552	0.11*	0.06	0.56***	0.05	1513
Rent-seeking among citizens	0.11*	0.06	0.00	0.04	540	0.10**	0.04	0.06	0.03	1485
Citizen's mobilization	0.05	0.08	0.13*	0.07	498	0.04	0.06	0.13**	0.06	1356
Trust and accountability	-0.07	0.06	0.07	0.05	430	-0.02	0.04	0.04	0.03	1138
Self-reported violence	-0.13	0.10	-0.17**	0.08	501	0.13**	0.05	0.01	0.04	1352
	Below median distance from Palma					**Above median distance from Palma**				
Citizen-level outcomes										
Citizen's knowledge	0.07	0.06	0.34***	0.05	1039	0.07	0.08	0.77***	0.06	1026
Rent-seeking among citizens	0.17***	0.05	0.11**	0.04	1013	0.02	0.05	-0.02	0.04	1012
Citizen's mobilization	0.05	0.08	0.05	0.07	949	0.04	0.10	0.18*	0.10	905
Trust and accountability	0.05	0.04	0.06	0.04	721	-0.06	0.05	0.07*	0.04	847
Self-reported violence	0.04	0.07	0.01	0.05	969	0.09	0.06	-0.09	0.05	884
Community-level outcomes										
Leader's knowledge	-0.06	0.10	-0.00	0.09	104	0.46**	0.18	0.94***	0.17	102
Leader's perceived benefits	0.04	0.23	0.10	0.21	104	0.17	0.28	-0.40	0.27	100
Elite capture	0.14*	0.08	-0.03	0.07	102	0.26**	0.11	0.01	0.10	101
Rent-seeking among leaders	0.15	0.18	0.24	0.17	103	-0.32*	0.18	-0.24	0.16	101
Violence	-0.29	0.20	-0.34*	0.18	104	-0.08	0.06	-0.05	0.06	102
	Does not know community leaders					**Knows community leaders**				
Citizen-level outcomes										
Citizen's knowledge	0.01	0.11	0.33***	0.09	435	0.09	0.06	0.60***	0.04	1629
Rent-seeking among citizens	0.19***	0.07	0.08	0.06	431	0.09**	0.04	0.05	0.03	1592
Citizen's mobilization	0.10	0.08	0.27***	0.07	391	0.02	0.07	0.10	0.06	1461
Trust and accountability	-0.09	0.09	-0.02	0.09	214	-0.01	0.04	0.08***	0.03	1352
Self-reported violence	-0.01	0.10	0.01	0.09	383	0.08	0.06	-0.06	0.04	1468

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 specification includes 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 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.6 Content analysis of postcards

Figure D8 shows the distribution of number of words per postcard in the sample. For each postcard, the number of words is computed after cleaning the string by removing prepositions and articles to highlight content. Table D5 presents estimates of the treatment effects on different types of 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 D5: 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	-0.132*	-0.007	0.010	-0.031	-0.021	0.079***
	(0.078)	(0.015)	(0.009)	(0.029)	(0.020)	(0.026)
(T2) Information to Leader and Citizens	-0.136**	-0.003	0.021**	-0.023	-0.000	0.044**
	(0.065)	(0.014)	(0.009)	(0.027)	(0.015)	(0.019)
Observations	1700	1698	1698	1698	1698	1698
R^2	0.084	0.049	0.027	0.039	0.086	0.138
Mean (control group)	2.443	0.044	0.011	0.103	0.963	0.076
T1 = T2 (p-value)	0.948	0.695	0.226	0.685	0.307	0.197
Lagged Dependent Variable	No	No	No	No	No	No

Note. Estimates based on OLS regression (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.7 Participation in the information campaign and deliberation meeting: IV estimates

To measure the effect of participation in the information campaign and the deliberation meeting, we make use of individual-level information on whether the person was present during the meeting of information campaign ($info_{ij}$) and during the deliberation meeting ($delib_{ij}$). We indicate attendance using two dummy variables equal to 1 if the citizen was present and 0 otherwise. We consider outcome variables defined as Y_{ij}, i.e., for location j and individual i and we estimate the effect of participation 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 which we cluster at the community level to account for correlated errors within the community. Since participation is endogeneous, we estimate equation (6) using 2SLS and instrumenting $info_{ij}$ and $delib_{ij}$ using the treatment indicators. Table D6 presents the results grouped by categories of outcomes.

Table D6: 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	0.522***	0.045	0.027	0.068	0.000	2065
Rent-seeking among citizens	-0.008	0.027	0.009	0.042	0.951	2025
Citizen's mobilization	0.003	0.046	0.295***	0.092	0.002	1854
Trust and accountability	0.099***	0.022	-0.075*	0.045	0.000	1568
Self-reported violence	-0.078**	0.037	0.011	0.059	0.060	1853

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.