

UC Santa Barbara

UC Santa Barbara Previously Published Works

Title

Can information outreach increase participation in community-driven development? A field experiment near Bwindi National Park, Uganda

Permalink

<https://escholarship.org/uc/item/903665q2>

Journal

World Development, 106(C)

ISSN

0305-750X

Authors

Buntaine, Mark T
Daniels, Brigham
Devlin, Colleen

Publication Date

2018-06-01

DOI

10.1016/j.worlddev.2017.10.029

Peer reviewed

**Can Information Outreach Increase Participation in Community-Driven Development?
A Field Experiment near Bwindi National Park, Uganda**

Mark T. Buntaine
University of California,
Santa Barbara
buntaine@bren.ucsb.edu

Brigham Daniels
Brigham Young University
danielsb@law.byu.edu

Colleen Devlin
University of California,
Santa Barbara
cdevlin@bren.ucsb.edu

11 October 2017

Abstract. Decentralization and community-driven development intend to bring public decisions closer to the people, yet elites often capture local institutions. One way that local elites capture community-driven development is to limit information about opportunities for citizens to shape group decisions. We investigate whether sending citizens targeted and timely information about when and how they can participate in the planning of community-driven development projects increases knowledge, participation, and satisfaction with local institutions. We implemented a pre-registered randomized field experiment in partnership with the Uganda Wildlife Authority that involved sending residents in randomly selected villages near Bwindi National Park approximately 60 messages by mobile phone over eight months about how a park-sponsored revenue sharing program worked and how and when residents could participate. We do not find evidence that the information increased perceived knowledge, participation, perceived efficacy, or satisfaction with local institutions. Exploratory findings suggest that among women, who are often disenfranchised in Ugandan society, the information treatment backfired. More positively, we find that reaching more people in a community with information led to promising results. We conclude that informational treatments are unlikely to empower participation on average, unless they are deployed broadly and in ways that promote collective action.

Keywords: Community-driven development; capture; participation; information;

Acknowledgements. The authors are grateful to Jacob Skaggs and Jeremiah Nahamya for their contributions to the design and implementation of this research as project managers based in Uganda. This project was conducted in partnership with the Uganda Wildlife Authority and we gratefully acknowledge the guidance and engagement of Pontius Enzuma, Raymond Kato, Aulea Tumwebaze, and Joseph Arinaitwe. This project was reviewed and approved by the UCSB Human Subjects Committee (protocol ESMS-BU-MA-031-4N), the Uganda Mildmay Research Ethics Committee (protocol 0703-2015), the Uganda National Council for Science and Technology (protocol IS 111), and the Uganda Office of the President (ref: ADM 154/212/03). This project was funded by grants from the UCSB Institute for Social, Behavioral, and Economic Research and from the UCSB Faculty Senate, both to MB. We pre-registered our hypotheses and plan for testing them prior to the assignment of treatment or collection of data at the Evidence in Governance and Politics Registry (registration [20160517AD](#)). We received helpful feedback on earlier drafts from Katrina Kosec and workshop participants at the University of California, Santa Barbara and the International Food Policy Research Institute. The author contributions are as follows: MB is lead author. MB and BD designed the research; CD managed implementation of the research design, with MB and BD; MB analyzed the data; MB drafted the paper; MB and BD edited the paper, with CD.

Introduction

Proponents for decentralization and community-driven development point to the promise of bringing public decisions closer to the people. There is evidence that devolving authority for development to the local level will involve decision-makers with more and higher-quality information about local demands ([Alderman 2002](#)), increase local participation and support for collective projects ([Heinrich and Lopez 2009](#)), and improve the targeting of development resources ([Coady et al. 2004](#)). Accordingly, many development professionals believe community-driven development programs “make poverty reduction efforts more responsive to demands, more inclusive, more sustainable, and more cost-effective than traditional centrally led programs” ([Dongier et al. 2003](#), 303). Owing to these purported benefits, development practitioners around the world have pursued community-driven development with enthusiasm ([Mansuri and Rao 2012](#)).

Yet, decentralized planning often relies on local institutions that privilege elites, sometimes resulting in the capture of development resources ([Bardhan 2002](#): 192-193; [Chavis 2010](#); [Baird et al. 2013](#); [Platteau and Gaspart 2003](#)). So, even as decentralization might make room for some locals to more effectively pursue their interests, it might also lock out others ([Gugerty and Kremer 2008](#); [Fritzen 2007](#); [Platteau et al. 2014](#)). When community-driven development programs allocate excludable goods, the potential for capture increases ([Galasso and Ravallion 2000](#)). While locals acutely experience the dysfunctions of local institutions, these challenges are often invisible to outside development actors like government agencies and international donors, which tend to have contact mostly with local elites ([Rao and Ibáñez 2005](#)).

We theorize that control over information can facilitate elite capture of community-driven development. When few intended beneficiaries of development initiatives have knowledge about how collective decision-making should work, elites can limit participation and/or control the agenda in ways that are advantageous to themselves. Indeed, local elites often use their exclusive contacts with governments or development agents to shape projects to their advantage ([Baird et al. 2013](#); [Platteau et al. 2014](#)). We predict that more equitable flows of information can increase participation and limit capture.

Specifically, we hypothesize that informing people about their rights and opportunities to participate in local decision-making will increase knowledge, raise perceptions of efficacy, increase participation, and improve satisfaction with local institutions. Many assert that information helps citizens pursue their interests ([Aftergood 2009](#); [Fenster 2006](#); [Kagan 2001](#)). Yet, scholars have paid little attention to the sort or quantity of information required to mobilize the public for community-driven development, which often involves attending community meetings and speaking up about the activities that a community should pursue. Instead of focusing on information, existing research has focused on the characteristics of participants in community-decision making (e.g., [Gurney et al. 2016](#)).

We designed a randomized field experiment to test for the empowering effects of information about local institutions near Bwindi Impenetrable Forest National Park in Uganda, where local residents can design community-driven development projects funded by the gate fees of tourists ([Ahebwa et al. 2012](#)). To this point, residents have often lacked critical information about administration of the revenue sharing program. We co-created the Bwindi Information Network with park management and sent SMS-messages over eight months to 1,924 local residents in 100 villages. Residents in half of the villages assigned randomly received approximately 60 messages outlining the revenue sharing process and highlighting key points when residents could participate to shape local projects. For control villages, we partnered with a non-governmental hospital to send residents placebo messages about public health and devoid of information about revenue sharing.

Contrary to our expectations, we do not find a positive effect of the informational treatment on knowledge, self-reported participation, administrative measures of attendance at community revenue-sharing meetings, or satisfaction with local institutions on average. We conclude that information about rights and opportunities to participate is unlikely to offer a quick solution to the challenges that arise in community-driven development. Exploratory findings, however, point to the possibility that increasing the share of a community receiving information leads to limited positive effects. When only a small share of a community received information, exploratory analyses reveal that the treatment heightens a perception of exclusion, perhaps by making exclusion salient. This backfire effect is particularly large among women. Policy-makers

need to think carefully about how to target information to challenge the capture of local institutions, enable collective action, and empower vulnerable members of communities.

Theory

Consider the decision individuals face in whether to participate in a planning process for community-driven development. Individuals have beliefs about the benefits that they or their in-group will receive if they participate and if they do not. They will participate when they expect to benefit, as compared to the outcome that they expect if they do not participate. The expected value of participating may depend on whether collective action is required to realize benefits, such as forming a coalition to push for a beneficial collective project. The costs of coordination, including possible retribution from elites for challenging the *status quo*, will factor into an individual's decision to participate. In addition to these costs, we assume that individuals face an opportunity costs for participation in terms of foregone time.

With this framework, we can turn our attention to how information about rights and responsibilities might drive participation. Most directly, the decision outlined above is not available to individuals who do not know how to participate. Thus, we expect that providing information about *how* and *when* to participate in community-driven development will increase participation among uninformed individuals. Related work in Uganda demonstrates that cleavages in communities can significantly limit the spread of basic information about opportunities to participate in community events. Larson and Lewis ([2017](#)) find that information about a community event in three days time that would allow people to gain a valuable payment reached 62% of people surveyed in an ethnically homogenous village, while it reached only 9% of people surveyed in an ethnically heterogeneous village. In Uganda, local leaders are the primary sources of information about local politics and governance for 70% of residents, which heightens the potential for capture ([Azfar et al. 2001](#), 40). Thus, to the extent that an informational treatment about opportunities for participation can cut across cleavages and/or create new information flows unconstrained by the interests of local leaders, it should increase participation.

When a choice about participation is known, information might drive participation in two ways. First, the expected benefits of participation are likely based on an individual's perceived efficacy in shaping the outcomes of community-driven development (e.g., [Speer 2012](#)). The more an individual must move a group's decisions away from the *status quo* to benefit, the more perceived efficacy will matter. Knowing rights and opportunities related to participation might improve efficacy. In a relevant study, Breuer and Groshek ([2016](#)) find that a number of factors are associated with local political participation in Togo, including perceptions of being able to improve the community and to influence the actions of local governments. Grossman et al. ([2016](#)) find that encouragement from officials to submit reports about public services in Uganda boosted reporting and attribute this effect to increased efficacy. When information increases knowledge about how to shape group decisions, it might similarly raise efficacy and thus encourage participation.

Second, the expected benefits to participation are likely based on the ability of the individual to organize with others to overcome capture (i.e., collective efficacy), which elites often resist ([Fritzen 2007](#); [Sheely 2015](#); [Lund and Saito-Jensen 2013](#); [Classen et al 2008](#); [Cornwall 2003](#)). To the extent that potential participants are excluded from the group of beneficiaries of community-driven development under the *status quo*, they are unlikely to expect benefits from individual participation. Information may help individuals within a community act collectively to secure more publicly-oriented benefits or to overcome capture. Indeed, public mobilization and collective action have been key to overcoming capture in other settings ([Dasgupta and Beard 2007](#)). However, this kind of mobilization may risk retribution from elites, especially if it fails to overcome capture, all of which will be factored into costs. Indeed, in laboratory settings, common knowledge is important for "risky" coordination, which entails benefits for successful coordination but losses for unsuccessful attempts at coordination ([Thomas et al. 2014](#)). Overcoming capture seemingly fits into this class of coordination problems.

To the extent that information helps individuals overcome collective action problems involved with opposing capture, it may raise the expected benefits to participation. Part of the assessment an individual makes about the durability of the *status quo* will take into account whether an individual believes that other individuals are similarly aware of opportunities to

participate and achieve collective gains. The more individuals with this knowledge, the smaller the transaction costs are for collective action, which might change the logic of collective action. This expectation leads to a corollary: information is more effective at increasing participation in community-driven development when disseminated widely among potential participants and when broad dissemination is common knowledge.

Based on these reasons, there have been calls to assess informational interventions as pathways to greater participation in settings subject to capture. For example, Baird et al. (2013) find that a community-driven development program in Tanzania is often captured by more affluent and connected community members. They hypothesize that “a variety of community-driven development programs require their potential beneficiaries to be aware of and fully participate in the entire process, but the ability to do so is not equitably distributed across the population” (39) and recommend interventions that raise awareness of opportunities for participation through “outreach and sensitization” (27). Yet, existing studies have produced little evidence about the effectiveness of such efforts.

There are a number of reasons, however, to be skeptical that information about rights to participate in community-driven development will increase participation. Where elite capture, clientelism, and corruption are common, information that highlights these problems might reinforce rather than alter the collective assessment about the durability of the *status quo* (see Rao and Ibáñez 2005, 809-810). Information about how participatory institutions *should* work may lower an individual’s evaluation about his or her impact on community decision-making, which in turn potentially works to undermine participation. For example, voters in local elections exposed to information about government corruption were less likely to turnout and decreased in their trust in government in Mexico (Chong et al. 2015).

Second, even when the information itself is not negative, general experience with dysfunctional institutions may limit the effect of information on participation. In another study on voter participation, Marx et al. (2013) provided voters in Kenya information by SMS messages about how to participate in the electoral process. While the messages resulted in a slight increase in turnout, the voters soured in their trust in government. Marx et al. report, “the information campaign backfired: the messages decreased trust in the Electoral Commission on

average. This effect is most pronounced for constituencies where some election-related violence was recorded, and for individuals on the losing side of the political spectrum” (28). Indeed, information about how community-driven development processes are *supposed* to work may create similar feelings of disillusionment, as entrenched problems like capture, corruption, and exclusion demobilize potential participants.

Any of these reasons may explain why informational treatments have not always yielded increased participation. In a study somewhat similar to our own, Banerjee et al. (2010) attempt to generate community monitoring of local schools through informational treatments: they provide residents information on how to participate in village education committees. They find no evidence that the information treatment increased community involvement in local education or improved outcomes for students. The only positive effects come from organizing remedial training outside of schools, leading the authors to conclude that “it was possible to encourage effective collective action by providing a specific pathway to influencing outcomes that was not reliant on transforming the existing political or educational system” (27).

Given the mixed evidence about the relationship between decentralization, the devolution of decision-making, and the quality of development activities (Azfar et al. 2001), more evidence is needed about interventions that can harness the advantages of community-driven development in contexts characterized by weak institutions and capture.

Experimental Design

Setting

Bwindi Impenetrable Forest National Park sits in southwestern Uganda and is surrounded by 90-100 frontline villages, depending on the evolving village boundaries (Figure 1). In Uganda, villages (Local Council I's or LC I's) are the lowest level administrative unit and have an elected chairperson who addresses local disputes and interfaces with sub-county (LC III) and district (LC V) governments. Villages are the point of entry for citizen involvement in public affairs. In our study area, the average village is comprised of about 200 households. Most LC I's regularly hold community meetings to discuss local affairs. They represent the prototypical

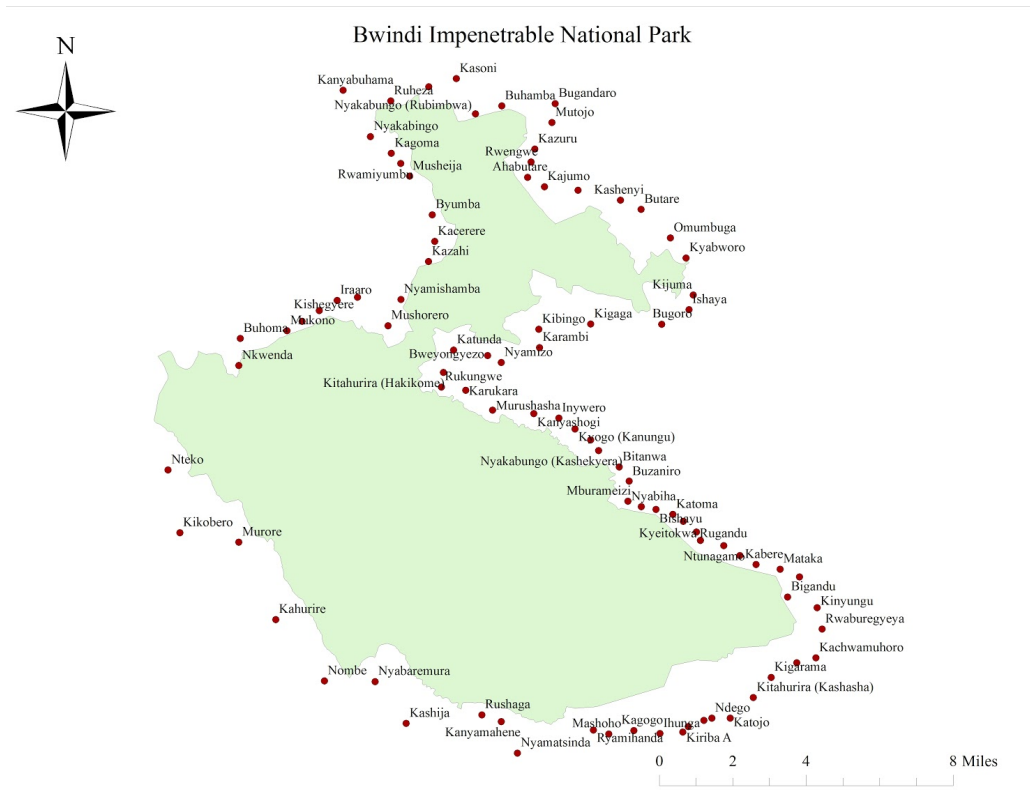


Figure 1. Map of Bwindi National Park and the locations of the 98 villages in our experimental sample as determined by field-based GPS readings.

“community” as conceived in the literature on community-driven development since they are the point of beneficiary involvement in development planning ([Mansuri and Rao 2003](#)).

Most of the residents in our study area live a life of rural poverty and engage in smallholder farming. The majority of households subsist on less than 300 USD a year and the average household has seven children ([Unrepresented Nations and People 2013](#)). Until now, due to lack of information, many people living in these villages have had little opportunity to effectively participate in decisions about park management. While the area is quite small (less than 20 miles from the furthest point to another), due to the mountainous terrain and the poor roads, vehicles cannot circle the park in a day, and many villages are not directly accessible by roads, limiting the amount of outreach by the park. Historically, very few people had access to long-distance communication other than communal radios, which cannot transmit village-specific information. Often residents are unaware when park-funded development

programs are misdirected or funds are lost to corruption. During our intake effort, many residents reported limited opportunities to get information about Revenue Sharing.

Yet, the potential of revenue sharing is real and valuable for the communities living near the park. Revenue sharing funds support projects worth 1,272 USD per village annually on average, or the equivalent of approximately four annual incomes of average households. Previous revenue-sharing projects have included purchasing dozens of sheep, goats, or pigs for villages, installing gravity-fed water supply and irrigation systems, improving health centers and schools, grading roads to decrease transportation times, and purchasing land for the establishment of community forestry plots. These projects are intended to lay the foundation for more long-lasting development.

Bwindi National Park provides an excellent setting to examine the role of information in facilitating participation and improving attitudes about local institutions. Mobile technologies have recently become common among residents in our study area, providing new way to increase the amount of information available to residents. People in the area are not yet inundated with commercial messages. New information flows by mobile phone are thus novel and unlikely to be disregarded because residents do not consume many sources of information.

Park managers report that one of their greatest challenges is finding ways to gain the goodwill of the communities that surround it. The revenue sharing program seems the ideal vehicle to accomplish this, but the park's efforts have been frustrated by corruption and misdirection of funds of government units outside of the park, which manage the funds after projects are approved. We thus have strong commitment from a governmental partner, ensuring the informational treatments are targeted based on long-standing local knowledge.

The problems of capture common to community-driven development scheme (e.g., [Fritzen 2007](#); [Platteau 2004](#), 228; [Eversole 2003](#)) are evident in the study area. When asked about problems with corruption related to revenue sharing via a micro-poll on their mobile phone, a majority of residents who responded perceive corruption (Figure 2). This allows us to test informational interventions in the context of weak, decentralized institutions. Subject responses to our SMS micro-polls suggest that elite capture occurs in many villages, potentially diminishing the development impact of Revenue Sharing. Most responses pointed to the project

management committees as the source of the problem. Villages are asked to form a project management committee and hold open meetings with all residents to decide on the types of projects to pursue once the Uganda Wildlife Authority announces the allocation of funds. Subjects have criticized their committees for never disclosing the time and place of meetings:

“The problem we face in our area is that these top officials are the ones that choose for the entire community the project to do not including the whole community in decision making” (received 6/24/16)

“For those of us who live near the park, what stops us is that the chairman left us behind?” (received 7/13/16, translated from Rukiga).

Project management committees are supposed to be composed of community members elected by the villagers. Elite capture and a lack of transparency allow revenue sharing control to remain in the hands of the village elite, who are likely in less need of assistance. Another common grievance is that committee members keep disbursed revenues or funded items for themselves or expect bribery:

“Our village chairperson took two goats whereas some other members went empty handed” (received 7/1/16, translated from Rukiga).

“People who benefit from revenue sharing are selected under unclear circumstances. When you go to receive these funds, you in most cases find your name has been altered in favour of that person that the [chairman] prefers” (received 7/1/16, translated from Rukiga).

“In our village the management committee is demanding money from the names that are going to benefit in the coming year” (received 12/28/16).

Given the flexibility of revenue sharing to address different types of local demands, participation in planning a revenue sharing project has the potential to lead to significant benefits for residents, but elite capture is hindering program success.

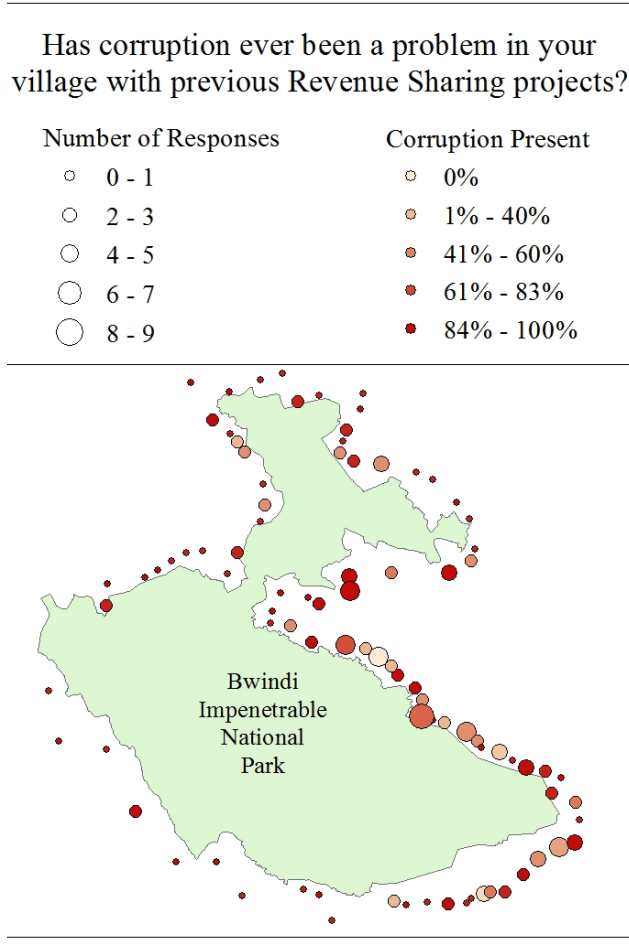


Figure 2. Resident responses to micro-poll about corruption in the revenue sharing process

In partnership with Bwindi National Park, we created a communication platform based on mobile phones that allowed our collaborative team to send targeted, village-specific information about the process involved with selecting a village-level project and the ways that local people can shape those decisions. All subjects were informed that the platform is operated in partnership with the Uganda Wildlife Authority but that individually-identifiable information would never be shared with UWA (see SI, Appendix A for a copy of consent script). The

platform also allows residents to send their preferences about park policy by messaging in their preferred language from their mobile phones. Indeed, over the course of the study period reported here, we polled residents on several occasions about relevant park decisions and policies as requested by our UWA partners (see, for example, Figure 2).

Our experiment is particularly significant against the backdrop of new information and communication technologies. In other contexts, researchers have suggested that ubiquitous mobile phones even in the poorest countries might decrease barriers of cost, distance, time that limit information access by the public ([Bertot et. al 2010](#); [Rotberg & Aker 2013](#)). Many barriers prevent disadvantaged people from participating in governance, but new information and communication technologies are now more universally accessible ([Bertot et. al 2010](#); [Ndou 2004](#); [Grossman et al. 2014](#)). Understanding their potential and limits is important for developing new approaches to enhancing participation in community-driven development.

Planning for Revenue Sharing

The messages sent by the Bwindi Information Network went out during the planning phase of the revenue sharing program. During this period, community conservation rangers employed by UWA attempt to visit every frontline village. While there, rangers sensitize communities to methods of preventing human-wildlife conflict and gather feedback from communities about any challenges they face related to living near the park boundary. Though not the focus of their annual visits, rangers inform local communities about an upcoming allocation of revenue sharing funds derived from park gate fees paid by tourists. They often discuss ways that these funds might address conflicts with wildlife (e.g., planting thorn hedge or non-palatable tea crops along the park boundary) or promote local development in ways that alleviate pressure on resources inside the park (e.g., animal husbandry, forestry plantations).

Community Conservation Rangers (CCR) are only able to visit each village once during this process (and some years they cannot visit every village). Each year apart from CCR visits, the village is responsible for forming a project management committee of five residents, who have the primary responsibility of steering the request for funds and incorporating the input of residents about the community project. Prior to the announcement of the final village allocations,

which are determined formulaically based on village population and the length of the park edge for the village, the management committee sends the Bwindi Park Headquarters a tentative project proposal, which is subject to revision based on the final village-level allocation of funds. Following the approval of revised proposals, according to Ugandan statute, the Uganda Wildlife Authority releases funds to district governments, which pass the funds to sub-county governments, which eventually pass the funds to villages and/or hire contractors to complete the project that is proposed by the community.

Sample of Subjects

In June and July 2014, we conducted a field-based intake of approximately 3,300 adults from every one of the 100 villages adjacent to Bwindi Impenetrable National Park. We offered subjects an opportunity to receive future updates from the park management and to provide input into park decisions, though no specifics about the (still developing) project was provided nor was informed consent obtained at that time. We recorded only subjects' first names, mobile phone numbers, and preferred language. Our pool of subjects is comprised entirely of people who want to receive information from the park and who have access to a mobile phone.

The reception of residents for the opportunity to receive even general information was striking. In some villages, after hearing about the platform, people clambered to record their name and contact information, sometimes running off to a distant house to invite friends or family to sign up. We encountered virtually no disinterest during intake. The intake process likely resulted in both local elites and ordinary residents signing up, though our research team did not measure the social status of the participants.

During 2015, we worked with telecommunication vendors in Uganda to procure a toll-free shortcode and software that allowed us to manage a two-way flow of messages. We were able to reach 1,924 residents based on the information provided at intake and gain their informed consent during later baseline call centers to participate in the platform and study. Of the individuals who provided information at intake, only 116 did not provide consent to participate when reached with the opportunity to do so; the majority of attrition from intake to study recruitment occurred because we could not reach the person using the number obtained during

intake. The advantage of having a separate intake and study recruitment processes is that we excluded likely non-compliers from the pool of subjects.

Of the 1,924 subjects who provided informed consent, 252 subjects were removed from the sample after treatment assignment because their villages were excluded from Revenue Sharing based on new UWA audits of village boundaries with the park edge, leaving an effective sample of 1,672 subjects. Of the nine villages that were excluded from the sample, four were in the placebo condition and five were in the treatment condition.¹ While we did not contact subjects in these villages for outcome measures, they still received public health announcements in accordance with their expectations of benefiting from the Bwindi Information Network.

Of the effective sample, we were able to reach 999 subjects as part of the endline survey. We do not have extensive demographic data on our subjects because we avoided long surveys. Regardless, we do not detect any problems with imbalance in the effective sample following attrition and do not detect differential attrition by treatment condition or differentially by treatment status with regard to pre-treatment measures (Table 1; SI, Appendix E contains a detailed analysis ruling out problematic attrition on observables).

The subjects in our sample may be different from poor, smallholder farmers in other settings. First, many of our subjects are exposed to extreme wealth in the form of tourists who are spending on a daily basis to visit Bwindi many times more than the annual income of the typical household. Second, routine roadwork is better in this area than elsewhere to facilitate the movement of tourists. We do not have reasons to expect that these differences will condition treatment effects but may be important when comparing our results to other studies.

¹ Due to naming errors in our data files, we mistakenly split three villages as part of the randomization and thus have three villages with mixed treatment. This original assignment process is maintained for randomization inference analysis (described below).

Table 1. Demographic data collected during endline survey by treatment group

Measure	Treatment	Placebo
<i>Male</i>	0.777	0.760
<i>Age</i>	37.8	39.0
<i>Partial or Full Literacy</i>	0.886	0.899
<i>Monthly Income (median)</i>	20,000 - 100,000 UGX ²	20,000 - 100,000 UGX
<i>Subjects</i>	797	875
<i>Endline Survey Participants³</i>	465	534

Treatment and Treatment Assignment

We randomly assigned subjects in the 100 villages surrounding the park to receive one of two treatment conditions at the village level: **(1)** messages about the revenue-sharing program (treatment); and **(2)** messages about public health in the area (placebo). This design ensures that all subjects receive potentially beneficial information. We assigned treatment by forming village-pair blocks within sub-counties based on the number of participating subjects and then assigning one village in each block to each treatment condition. We formed a special block of all sub-counties with only one village in the sample and when necessary we formed a triple-village block for sub-counties with an odd number of villages.

Over eight months, subjects in the treatment villages received text messages through the Bwindi Information Network in their preferred language informing them about opportunities to participate in designing village revenue-sharing project. These messages were sent while villages were actively planning and proposing projects. We partnered with a local non-governmental hospital to send placebo villages messages on public health issues. Placebo messages were designed to not directly influence subjects' opinions about the park or revenue sharing. Below

² This is range is approximately equivalent to 5-27 USD in 2017.

³ Not all subjects agreed to take the endline survey.

we list of the types of messages that subjects living in treatment villages received (see SI, Appendix B for the full list of messages sent to the treatment and placebo groups):

1. Information about the goals and organization of the revenue sharing program:
 - The goals, objectives, and sources of funding of revenue sharing;
 - The responsibilities of the project management and community procurement committees;
 - Projects previously implemented in the village and benefits received by the community;
2. Information about how subjects can participate in the revenue sharing program:
 - The purpose of upcoming village revenue sharing meetings;
 - The village and sub-county officials who receive feedback and provide documentation about revenue-sharing projects;
 - The names of members of village-level planning and implementation committees;
3. Benefits that the park and its revenue sharing program provide to the community:
 - Historical, cultural, and natural resource benefits

Comparison to existing interventions

Past research has examined interventions that change the process of selecting community-driven development projects (e.g., [Heinrich and Lopez 2009](#); [Olken 2010](#)), but not informational interventions that support community-driven development within institutions that are already present. The most analogous interventions that have been studied pertain to training citizens for effective participation in planning ([Kumar 2002](#); [Gillespie 2004](#)), but such interventions are relatively expensive and difficult to scale, as compared to the approach that we study, which can be delivered inexpensively, broadly, and timed specifically to maximize knowledge.

Our design relates somewhat to prominent field experiments in Uganda, which have organized participatory groups and provided information on service quality to enable them to monitor service providers ([Björkman and Svensson 2009](#)), organized monitoring groups without

providing information on service quality ([Björkman and Svensson 2017](#)), or publicized information about the quality of public services in an attempt to promote accountability from local officials who handle public funds ([Reinikka and Svensson 2005](#); [Reinikka and Svensson 2011](#)). Unlike the interventions studied in these field experiments, we deploy information about how to participate in existing local institutions, without organizing new forms of participation or providing information about the outcomes of revenue sharing. Still, these studies illustrate that introducing information in Uganda can help improve failing institutions, curb corruption, and overcome capture. Even though the Bwindi Information Network functions with government cooperation (unlike the mechanisms that introduced information in these other studies), these studies provide hope that the Bwindi Information Network might overcome some of these same issues within existing participatory institutions.

Measurement

In April 2016, prior to deploying treatment, we implemented a baseline survey by call center to collect pre-treatment measures of the study's outcomes, including: satisfaction with park management; perceptions of meaningful input; reports of participation in community meetings; perceived knowledge about ways to participate; perceptions that community voices are effective at shaping village revenue sharing projects; among other types of survey questions. In November 2016, we implemented an endline survey by call center to collect outcome data that allows us to test our hypotheses. The survey focuses on the remeasurement of items collected at baseline (see SI, Appendix C). We also collected field data on the number of residents in attendance at village-level revenue sharing meetings as recorded on sign-in sheets collected by many of the LC 1 chairpersons (68 of 91 villages submitted attendance sheets; 12 of 91 villages planned clustered sub-county projects and did not have village-specific planning meetings; 11 of 91 villages did not submit attendance sheets) and delivered remotely to community conservation

rangers.⁴ We also examine the number of responses submitted to UWA's queries about local management issues through the Bwindi Information Network.

Estimation

For each of our hypotheses, we first report unadjusted difference-in-means (Figure 3). Our main specification for estimating individual-level treatment effects is an OLS regression based on the following estimating equation for all binary or continuous outcome measures, with standard errors on the estimated treatment effect derived from randomization inference:

$$(1) \quad y_{ij} = \alpha + \tau_1 t_j + \beta X_i + v_h + \varepsilon_h$$

where y_{ij} is the outcome for individual i in village j , τ_1 is the average treatment effect, t_j is a treatment indicator assigned at the village level, β is a vector of individual-level coefficients on covariates, X_i is a matrix of individual-level covariates including importantly the pre-treatment value of the outcome of interest collected through the baseline survey, v_h is a sub-county fixed effect, and ε_h is an error term clustered on sub-county h .⁵ To compute standard errors for τ_1 we

⁴ While we cannot completely rule out falsification of these data by LC1 chairpersons, the sign-in sheets contain many unique signatures and specific names that could be cross-checked by the CCRs in principle. Among villages that planned for a village specific project, we do not find differential rates of attendance sheet submission by treatment condition.

⁵ We did not anticipate that several of the villages in our sample would lose eligibility for Revenue Sharing during the study period and thereby be removed from the sample. Our pre-specified estimating equation (1) included matched-pair block fixed effects, rather than sub-county fixed effects. Since the exclusion of villages leaves several blocks with no variation in treatment assignment, we instead use sub-county fixed effects and add as a covariate the number of subjects per village, the sole measure we use to create matched-pair blocks within sub-counties. We find that the number of subjects per block is never prognostic of outcomes, so dropping blocks from the estimating equation causes no loss in precision. This is the closest deviation that uses all of the outcome data in a way that is consistent with our pre-specified

assume a sharp null hypothesis, exactly replicate our randomization procedure, and use the standard deviation of resulting sampling distribution of τ_1 (Ho and Imai 2006).⁶ As pre-registered, we modify all ordinal scales (e.g., on level of satisfaction) into a continuous scale for estimation and we use village-mean imputation for missing covariates. Also as pre-registered, we test for differential attrition by treatment status and differential predictors of attrition within treatment status, but find no evidence of problematic attrition (SI, Appendix E). We take no further steps to modify our analysis for attrition. As part of the endline survey, we confirmed that 92% of both the treated and placebo subjects reported seeing and reading the messages, so we are not concerned that non-compliance affects our results and analyze all treatment effects by assignment, rather than receipt of treatment.

Spillover

One major concern about our research design is interference between units, whereby villages might be affected by the treatment status of nearby villages. As pre-registered, we test for interference by creating a spillover treatment indicator S_j that indicates whether none, one, or both of the contiguous villages are treated, a value that is also randomly assigned since each village has only two contiguous neighbors. We perform robustness checks where the spillover indicator is the number of treated villages within larger bounds of contiguity (SI, Appendix D). We find no consistent evidence of spillover and modeling spillover never substantively alters the findings (see SI, Table D4 for all results with and without spillover indicators).

Hypotheses

We pre-registered three sets of hypotheses. First, the core of the Bwindi Information Network that we implemented with the Uganda Wildlife Authority involved sharing of factual

analysis. Additionally, one village in Rutenga sub-county was moved to the “Singles” subcounty block, since its matched-pair was removed from the sample by our UWA partners, which left it as the only village within that sub-county.

⁶ For this estimation strategy, the other parts of the estimated models are not relevant and thus not reported. These can be recovered from the replication data for the interested reader.

information. We expect people who received information about revenue sharing and the ways that they could participate in it would report higher levels of perceived knowledge about revenue sharing. Indeed, other field studies employing information treatments have shown increases in knowledge about specific programs and policies (e.g., [Green et al. 2011](#)). An increase in *perceived knowledge* about the revenue sharing program is the most basic of the effects that we expected to observe in this study.

H1a: Villages who receive the transparency treatment will evince greater average levels of knowledge about the revenue sharing program.

H1b: Individuals who receive the transparency treatment will be more likely to know how to participate effectively in the revenue sharing program.

Second, we expect that an increase in perceived knowledge about the administration of the revenue sharing program will increase *participation* among treated subjects. Previous research has found that education and knowledge about policy and politics are often predictive of citizen participation ([Galston 2001](#)). Citizens with greater perceived knowledge might feel more confident not only about their rights and responsibilities, but also about the content of group-level decision-making, which we expect to increase attendance at community-level Revenue sharing meetings and in engagement by mobile phones in discussion about community-level projects.

H2: Individuals who receive the transparency treatment will be more likely to participate in the revenue sharing program.

Finally, as perceived knowledge and participation increase, we expect residents who receive the informational treatment to express increased *satisfaction* with the revenue sharing program and with park management, and increased support for conservation activities that have been perceived by many people as competing with local livelihoods. These effects might come

about after residents see a government agency making efforts to enhance their participation in community projects. However, knowledge and participation do not necessarily promote trust in government, highlighting the need for transparency interventions to yield results that people care about ([Grimmelikhuijsen 2010](#); [Grimmelikhuijsen 2012](#)). Here we test whether beneficial outcomes can be achieved through informational outreach alone, before projects are delivered.

H3a: Individuals who receive the transparency treatment will be more likely to have increased satisfaction with the management of Bwindi National Park.

H3b: Individuals who receive the transparency treatment will be more likely to have increased satisfaction with the revenue sharing program.

H3c: Individuals who receive the transparency treatment will evince a greater support for conservation activities.

Results

We report three sorts of findings. First, we present confirmatory findings that we registered in our pre-analysis plan. Second, we discuss a number of robustness checks that are meant to verify the reliability of the pre-registered results. Third, we report exploratory results that extend the analyses that we originally planned. This exploratory analysis attempts to contextualize results in the main analysis and generate hypotheses for future testing.

Pre-Registered Results

As outlined in our pre-analysis plan, we first report the unadjusted difference-in-mean for treatment and control groups on all measures (Figure 3). Of the ten survey measures, we find significant difference in means for the endline values on two measures. First, we find that treated subjects perceive fewer opportunities to participate in planning for revenue sharing as compared to control subjects who received placebo messages (t-test, $p=0.03$). Second, we find that treated subjects are less likely to state that they know how revenue sharing works within their village (t-test, $p=0.10$). We cannot reject the null of no difference between experimental groups for any

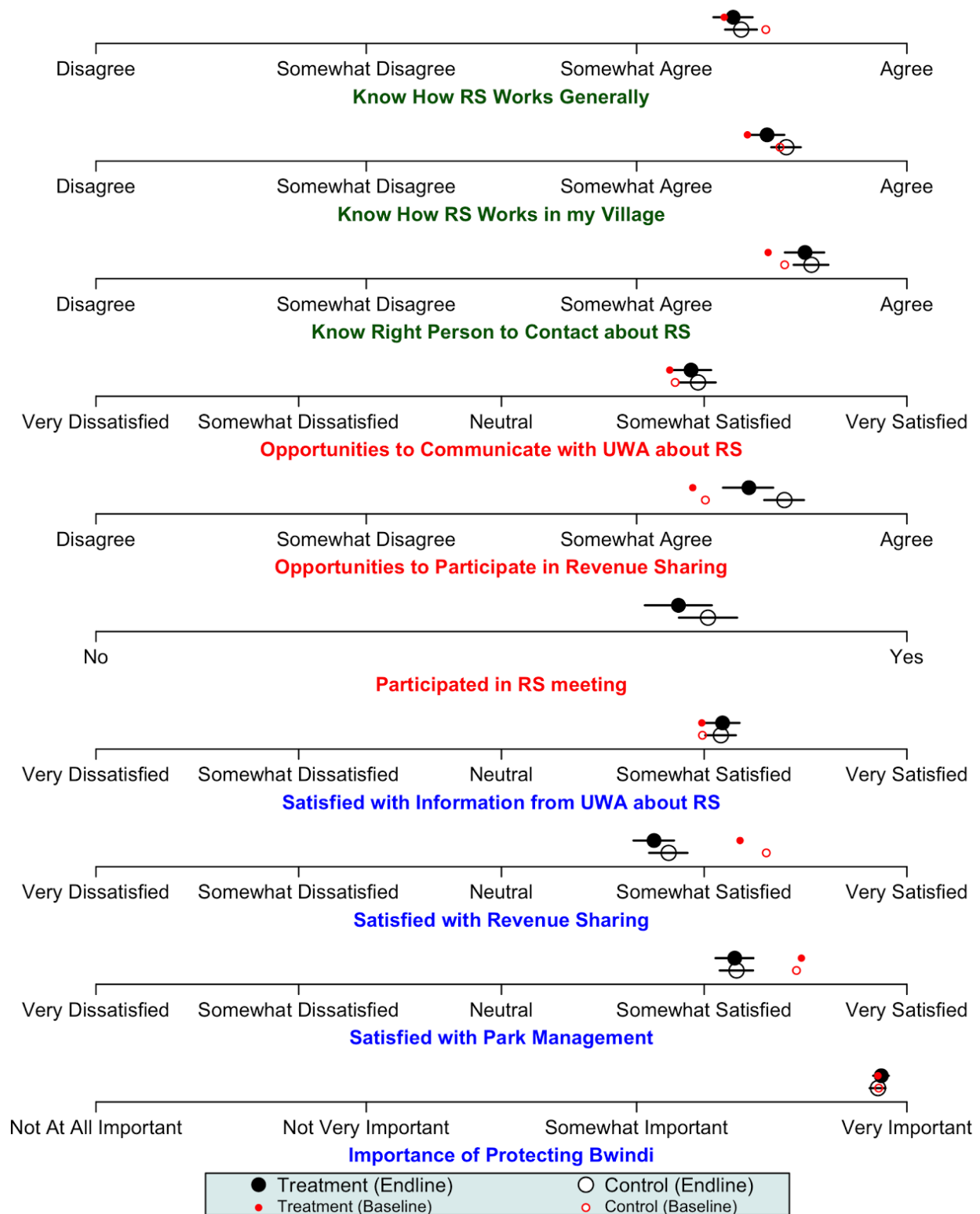


Figure 3. Unadjusted means for survey-based outcomes measures by treatment condition. *Note:* Bars show 95% confidence intervals computed by bootstrapping.

of the other endline survey items, not adjusting for baseline values. Note in Figure 3 that we do see some systematic differences between baseline and endline values on some survey items in *both* treatment and control groups, but these differences do not move systemically in one direction, which rules out the possibility that our treatment is having a positive effect, but that we cannot detect it because our placebo messages also induce a systematically positive effect across survey items. For both treatment and control group, the planning process seems to have decreased levels of satisfaction with Revenue Sharing and management of the park.

Turning to our pre-registered estimating equation for treatment effects, we fail to reject the null hypothesis for most of the survey items collected at endline after adjusting for subject-level covariates, including baseline values of the outcome (Figure 4). Recall that we expect treatment to positively affect these measures. Yet for both general attitudes — like satisfaction with park management — and for specific items that were closer to the information provided — like self-reported participation in revenue sharing meetings — we fail to find any *positive* effects that are inconsistent with random chance.

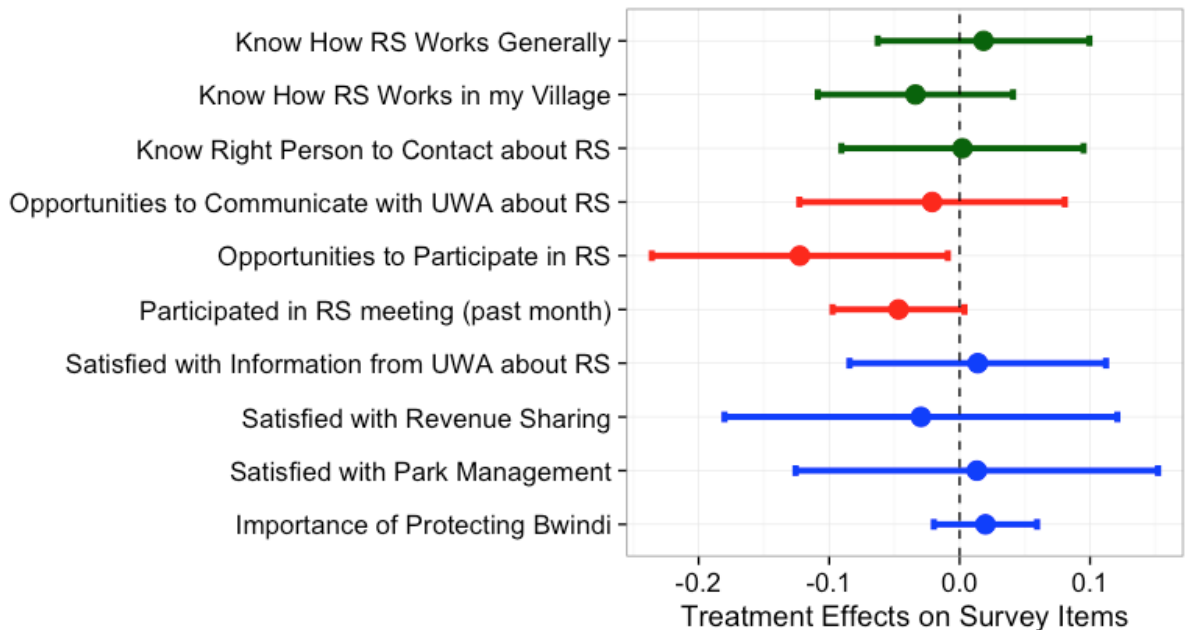


Figure 4. Treatment effects on survey items about knowledge (green), participation (red), and satisfaction (blue). Bars show 90% confidence intervals, computed from standard errors from randomization inference over model (1).

Figure 4 indicates what appears to be a “backfire” effect, where subjects treated with information have *lower* perceptions of opportunities to participate in revenue sharing ($p=0.07$, two-tailed).⁷ Likewise, we see marginal evidence that self-reported participation was lower for subjects in treated villages ($p=0.13$, two-tailed). These results may indicate that highlighting how the planning process for revenue sharing *should* work makes salient the more structural features of local institutions that prevent equitable influence on community decisions. We take up the potential significance of this backfire effect in our exploratory analyses.

Measures gathered from the Bwindi Information Network similarly failed to show positive effects of treatment for digital engagement (Figure 5). Subjects who received the treatment messages about the revenue sharing program were less likely to send on-topic responses to prompts for information about management of the park generally and the revenue sharing program specifically, perhaps highlighting the greater salience of health information in driving sustained engagement by the subjects in this project.

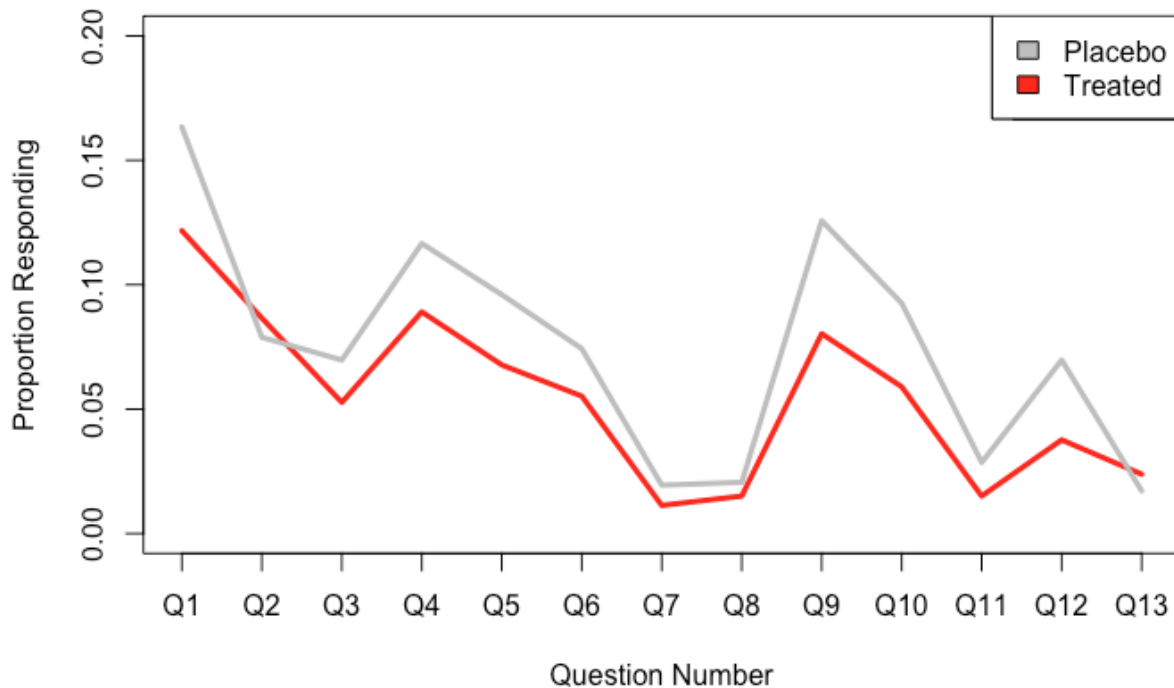


Figure 5. Digital engagement, in terms of responses to prompts sent from the Bwindi Information Network for information relevant to management of the park.

⁷ This result should be interpreted as suggestive in the context of multiple measures, since it fails to stand up to correction for multiple hypothesis testing.

To corroborate self-reported data and as described above, we worked with the Community Conservation Rangers to compile the attendance sheets taken at the planning meeting for revenue sharing held in each village. During these meetings, residents who attend brainstorm potential projects and also nominate and then elect members to a project management committee that is responsible for formalizing the community bid. These meetings are usually chaired by the village chairperson, and staff from UWA are not typically in attendance. Since this meeting is the most visible opportunity for community input and direction setting, and because our messages highlighted the opportunity to shape this meeting, we wanted to understand whether attendance is higher in treated villages, as compared to control villages. We cannot detect any difference between treated and control villages.

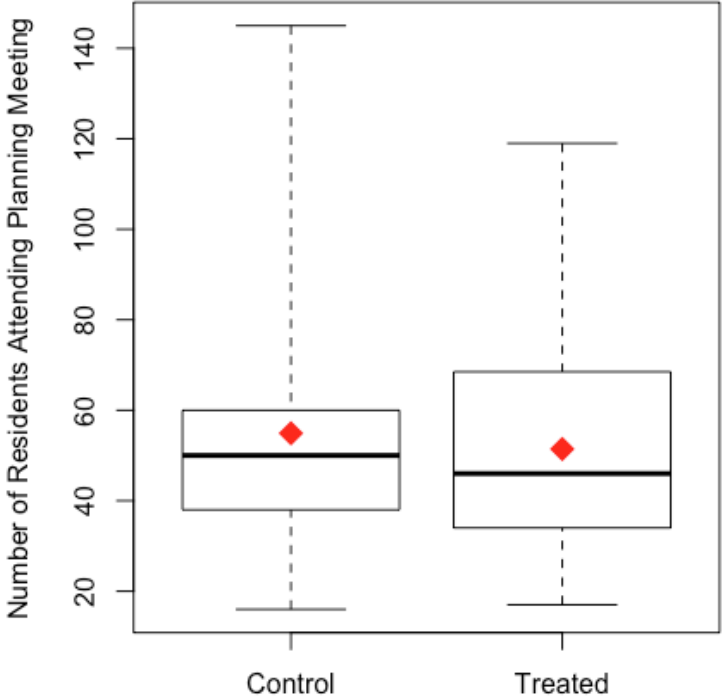


Figure 6. Village-level participation in revenue sharing planning meeting. *Note: whiskers display range, boxes quartiles, horizontal line median, red point mean.*

Robustness Checks

Our pre-analysis plan included a strategy to detect spillover from treated communities to control communities. Given that subjects interact in more regional markets and/or have personal relationships with nearby households, we examine whether responses are systematically different

when there are more or fewer treated villages in close proximity. When we test for this possibility by creating an indicator variable of the number of treated, contiguous villages to each village in our sample and including it in each model, we find that the spillover indicator never changes our estimates of treatment effects (see SI, Appendix D).

We completed additional robustness checks to probe the main result that our treatment messages about opportunities to participate in local revenue sharing meetings did not increase knowledge, participation, or satisfaction with local institutions. First, a ceiling effect may have dampened treatment effects, since the baseline and endline values of many of the survey items indicate relatively high levels of perceived knowledge about revenue sharing and participation (contrary to our interviews scoping the project). This might leave less room to have a more positive effect on our main outcome measures, as a positive treatment effect can only be found when fewer subjects decrease in their evaluation. To address this challenge, we re-analyze treatment effects on all the survey items using the subgroup of respondents who at baseline report actions or perceptions on the bottom half of each respective scale and thus would not be subject to a ceiling effect, while including all baseline survey items displayed in the figure as covariates in each of the models to address imbalances.

We find that treated subjects are experience marginal negative effects across almost all items. As shown in Figure 7, treated subjects in this subgroup express lower perceived knowledge about how revenue sharing works generally ($p < 0.01$, two-tailed). Likewise, point estimates of treatment effects of knowledge about how revenue sharing works in the specific village, perceived opportunities to communicate with UWA, and perceived opportunities to participate in planning for Revenue Sharing are lower, but outside conventional levels of statistical significance ($p = 0.10-0.25$). These results largely rule out a ceiling effect. While this analysis was not pre-registered and is exploratory in nature, it nonetheless points out the potential for information to heighten perceptions of exclusion and disenfranchisement.

To address the issue of power more systematically, we also conducted reverse power calculations for all of our measures (SI, Appendix G) and find that we can detect small to medium sized *positive* effects on almost all items. Also in Appendix G, we form multiple items

in each hypothesis group into indices to boost power to detect effects. Even with the significant boost in power, we do not detect positive treatment effects, ruling out problems with power.

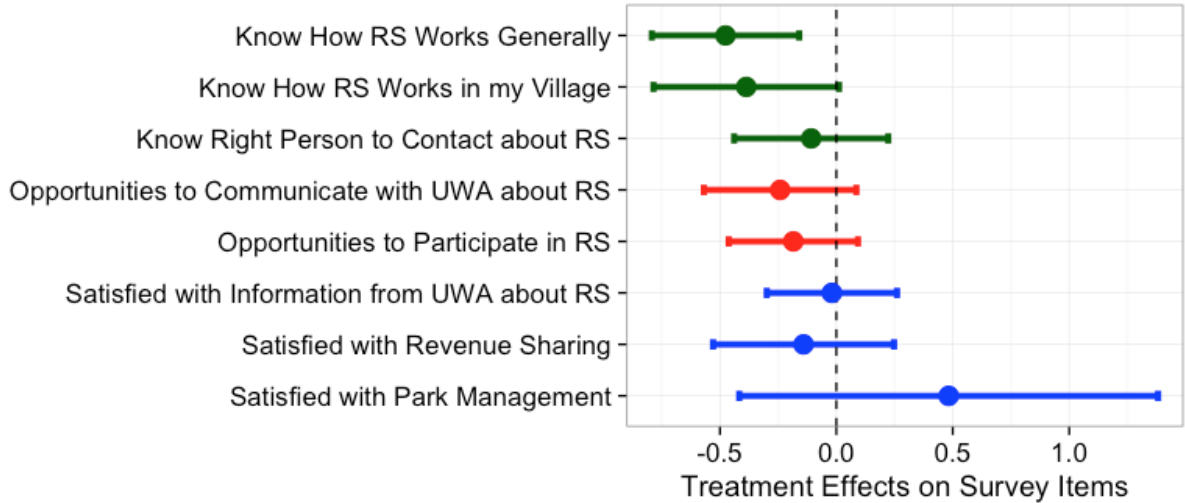


Figure 7. Reanalyzed treatment effects for subgroup of subjects on neutral and negative side of item scale during the baseline survey for each of the survey items. Bars show 90% confidence intervals, computed from standard errors from Eq. (1) within subgroup.

Exploratory Results

Backfire Effect. We did not anticipate the possibility of a backfire effect in our pre-analysis plan, and therefore we did not include a specific plan to explore it. With a marginal negative result arising from the main analysis about perceptions of opportunities to participate, we extend our analyses to shed light on when and why this might be occurring. At the same time, we approach the interpretation of a backfire effect and other heterogeneous treatment effects with caution, since they are effects in particular subgroups not identified in advance.

First, we examined whether the negative effect of treatment on perceptions about opportunities to participate varies by gender and find much stronger evidence of a backfire effect among women. Indeed, when genders are disaggregated, we do not find any evidence of backfire among men. The backfire effect among women is strong ($te=-0.44$, $p=0.002$, two-tailed), with approximately half of the female subjects being lowered one point on the scale by the treatment. None of the other outcomes show evidence of a backfire effect among women (Figure 8).

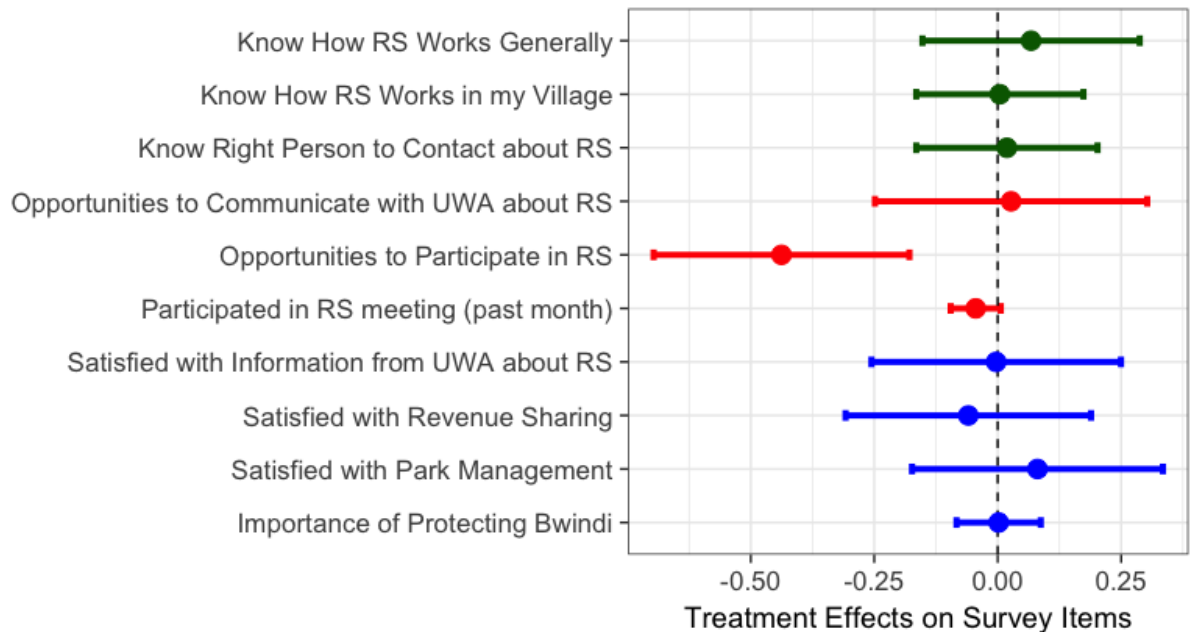


Figure 8. Reanalyzed treatment effects for *women*. Bars show 90% confidence intervals, computed from standard errors from randomization inference over model (1) within subgroup.

This result provides stronger evidence that highlighting how participation in revenue sharing *should* work among groups that face systematic exclusion can heighten the recognition of exclusion. Indeed, a large body of research has addressed how the experience of various participatory development schemes is not equivalent across gender and that “the very projects that appear so transformative can turn out to be supportive of a status quo that is highly inequitable for women” (Cornwall 2003, 1329; see also Mayoux 1995; World Bank 2012).

Uganda has its own problems with promoting gender equity in development planning and more generally in participation in public life (Wordofa 2004; Howes 1997). Close to the topic of our study and more recently, Hampson et al. (2017) investigate radio-based extension services in Uganda and find that gender dynamics significantly moderated the effectiveness of the services, both because women have less access to radios and because in some cases husbands prevented their wives from participating in radio events that aimed to reach women. The results showing that a backfire effect is driven entirely by women highlights how ICT-empowerment schemes will need to address the deeper roots of exclusion of women in revenue sharing.

Saturation Effect. Another area that we identified for further investigation is that treatment effects are more likely to emerge when more subjects are treated with information. Other studies have found that the creation of common knowledge is often important to mobilizing for collective goods ([Chwe 1998](#)). In our context, it may be that when we reached more subjects with the information treatments, subjects were better able to coordinate around planning for revenue sharing and more likely to overcome capture of the process by local elites.

We find that for some of our measures, positive treatment effects emerge in the villages where we reached more subjects. Differences in the number of subjects per village is mainly due to the number of residents with mobile phones at the time of intake and the number of people we reached by phone to obtain informed consent, which is largely a function of network quality and the availability of electricity to keep phones charged.⁸ While we do not have strong reasons to believe that either of these factors influence participation in community meetings, we cannot by design rule out the possibility for confounding, requiring due caution with interpretation.

Regardless, Figure 9 displays the marginal effects plot for participation in Revenue Sharing meetings, satisfaction with information from UWA, satisfaction with park management, and support for the conservation of Bwindi National Park, based on the number of subjects we reached with information. We do not find the same conditional effects for the other six items collected through our survey, but these four measures are surprisingly consistent (SI, Appendix H, Table H2 shows the parameter estimates in tabular format for all outcomes). For these four measures, we find positive effects in villages with many subjects reached by treatment.

To rule out the possibility that the function form of our models are driving these results, we specify a binning estimator suggested by Hainmueller, Mummolo, and Xu ([2017](#)) and examine treatment effects within quartiles of the moderator independently. These results suggest that boosting recruitment could improve the effectiveness of our treatment through intra-village coordination effects. The results on backfire effects are less inconsistent with random chance, though still confirming the limited efficacy of reaching only a few people with the treatment.

⁸ We confirm in SI, Appendix H, Table H1 that the number of subjects per village is not associated with other observable characteristics of the villages in our sample, increasing confidence in the plausibility of exogeneity on this dimension.

Thus, these exploratory results suggest that although the average treatment effect for our main results is not distinguishable from zero, greater saturation of information will likely result in more positive effects. We intend to test such propositions as we build on the results of this study in future phases of our partnership with UWA.

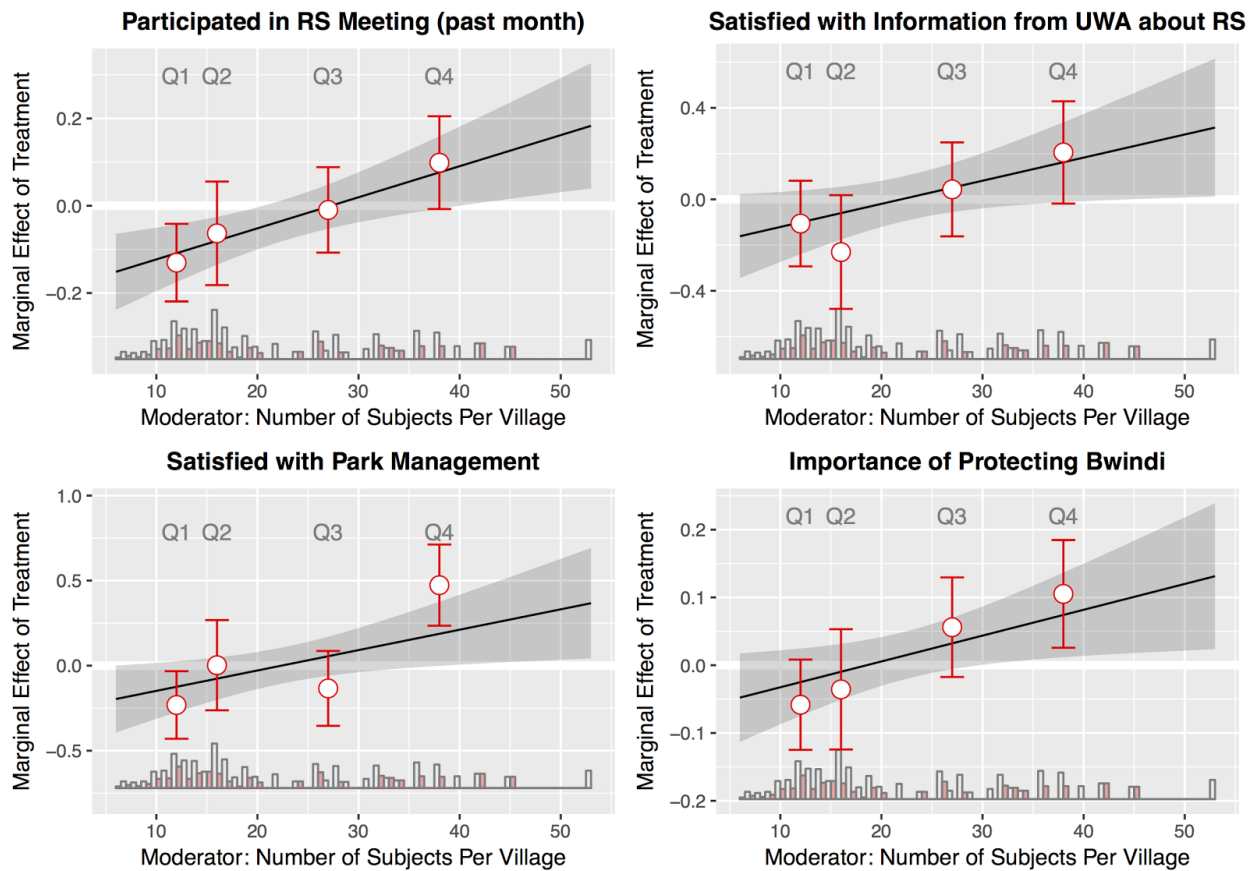


Figure 9. Conditional treatment effects by number of subjects reached with messages at the village level. *Note: 90% confidence interval plotted.*

Interviews with Residents Reporting Disempowerment

To assist with interpretation of the findings, we conducted 20 semi-structured interviews with subjects who stated disagreement with the following statement during the endline survey: *People like me have opportunities to participate in the planning of the revenue sharing program for my village.* This was a minority position in the endline survey, with only 75 of 999 subjects reached at endline disagreeing with the statement (another 73 subjects somewhat disagreed with

the statement). We chose a random sample of subjects who disagreed with the statement and asked them to give us an interview, with the goal of shedding light on barriers to participation in revenue sharing and the role the Bwindi Information Network might (or might not) play in empowering participation. Because of the sampling design, these interviews only shed light on the views of subjects who perceive systematic barriers to participation.

We conducted these interviews approximately three months after enumerating the endline survey. After obtaining informed consent by phone, our local project manager conducted the interviews in the local language Rukiga. Paraphrased and quoted responses were recorded in English at the conclusion of each interview. The full list of responses (with identifying information redacted) is available in our SI, Appendix F. Our enumerator used the following semi-structured template to guide each interview:

- 1. In a recent survey, you said that you did not perceive many opportunities to participate in planning for revenue sharing. Can you please explain?*
- 2. What are the key barriers that prevent you from participating in revenue sharing?*
- 3. In your opinion, how might those barriers be overcome in the future?*
- 4. What role, if any, might the Bwindi Information Network play in overcoming the barriers that you identified?*
- 5. Is there anything else that you would like to share with us about participation in revenue sharing?*

Subjects gave a variety of explanations for their disagreement with the statement that there are opportunities to participate, including: geographic isolation from main village area; being part of a minority coalition within the village; exclusion from revenue sharing meetings; local leaders overruling the will of residents in the selection of projects; lack of opportunity to effectively shape projects within the UWA guidelines; and work obligations that take them away from the village during planning. Many interviewees choose not to participate because they had grown disillusioned with the revenue sharing process and the lack of benefits that it had

delivered over many years or the lack of ability to meaningfully shape the kind of projects chosen by the village.

One subjects stated that they never received any benefits from revenue sharing and felt “annoyed to hear about that program” when receiving messages through the Bwindi Information Network about planning. Some subjects expressed directly a perception of capture, with one subject stating: “the chairman only calls his family, and you see the meeting is attended by one family.” Another expressed a perception of capture by the village project management committee: “Now we have the PMC which is also full of corrupt members who want to benefit with their relatives all the time. That’s why some one can get four goats when one has not even got a single goat.” One woman stated that only her husband participates in planning meetings, perhaps indicating gender imbalance in opportunities to participate.

In terms of more specific barriers to participation, the lack of outreach and information about the place and location of revenue sharing meetings was a common theme among our interviewees. A lack of time was another common theme, particularly for subjects who did not expect to benefit from engaging in the planning of revenue sharing projects. Indeed, when local institutions are captured, the opportunity costs involved with participation are likely to outweigh the value of participation. Many subjects stated that they no longer see the value in participating in these meetings, given that they are unlikely to benefit from the projects that eventually emerge. As one interviewee stated directly: “If it was you and you went to a meeting where your opinions are rejected, would you go back?” These types of responses suggest that information is unlikely to change the incentives for participation when elite capture is present.

Several subjects expressed pessimism that the barriers to their participation could be overcome apart from outside intervention (for example, by UWA). Excluded from the benefits of revenue sharing, several subjects stated that they would not to participate until the selection of beneficiaries within villages was made more equitable. Several interviewees suggested that a representative from UWA attend the village meetings to ensure that the project put forward reflected the will of the people, rather than only local leaders. Some subjects advocated for more information to be made available about the meetings, possibly by radio or flyers posted in public

places like local churches. Multiple subjects could not see any way to overcome the barriers that limited their participation absent attention from higher levels of government.

Surprisingly, several of the interviewees were quite positive about the messages that they received through the Bwindi Information Network and advised UWA and our research team to continue sending information about revenue sharing, which is curious given the lack of positive overall findings of the messages. While we did not obtain information from the interviews that suggest a positive effect from the messages during the study period, the positive perceptions of the treatment itself may indicate that in the longer term the treatment could create the potential for overcoming capture, perhaps prompting sufficient collective action.

The one suggestion for improvement that appeared multiple times was to send out the exact time and location of the planning meetings for revenue sharing within each village. We had tried to collect this information from our counterparts at UWA and by calling LC I chairpersons during the course of this study, but perhaps due to capture, we found it impossible to obtain this information systematically. Instead, we told subjects that the planning meeting was upcoming in the immediate future and that they should ask their LC I chairperson or members of the village project management committee about the timing and location. If local institutions were captured in the ways reported by the interviewees, these kinds of messages were unlikely to empower participation.

In terms of our open-ended prompt for additional information, many subjects expressed concern about embezzlement in the upcoming disbursement of funds and a lack of information about the projects that had ultimately been selected in their community. The next phase of this project (not reported here), is to assess whether information outreach can promote accountability by local officials and the delivery of projects to villages as planned.

Discussion

Our results indicate that informing people about the process of local selection of projects and about who they can contact within their community for more information does not have a positive effect on perceived knowledge, participation, or satisfaction with management of Bwindi National Park, as compared to residents who received placebo information about public

health. These are surprising results given the enthusiasm with which the platform that we co-created with the UWA was received by local residents and the demand for information about management of the park. These results run counter to the prevailing wisdom that targeted outreach can create opportunities for participation ([White House 2016](#); [United Nations Development Group 2014](#); [Hock et al. 2013](#)). Our findings have several implications for the practice of community-driven development.

First, if people are excluded from decision-making for informal or structural reasons, highlighting the formal rules that are *supposed* to allow for equitable participation is likely to discourage rather than encourage potential participants. Exploratory results suggest that this backfire effect is driven mostly by the experience of women. Such a backfire corroborates results obtained in other settings that indicate citizens are often disheartened to learn how public administration works ([Bauhr and Grimes 2014](#); [Chong et al. 2015](#); [de Fine Licht 2011](#)). We may be observing a similar effect in our study.

Second, our study reinforces the idea that information alone is not likely an effective strategy for empowerment when citizens face more fundamental economic, social, or institutional barriers to effective participation. In our study, gender discrimination serves as an institutional barrier. Just knowing *how* to participate does not necessarily translate into a strong sense of efficacy about participating. Information alone is only likely effective at driving participation among those not facing exclusion from local institutions. For example, Zérah ([2009](#)) describes how participatory governance in India mostly benefits the affluent with political connections, rather than low-income residents.

Third, these results point to the need to tailor information to address the structural barriers to participation ([Breuer and Groshek 2016](#)). Information might focus on creating opportunities for collective action among those who feel they are unlikely to benefit from community-driven development. As the technology advances, it may allow these people to find each other, for example; however, unintended consequences like conflicts within communities may also arise. Alternatively, perhaps technology could assist residents in securing external allies in their pursuit of inclusive development. Several of the interviewees, for example, stated a

desire for UWA to provide oversight of community decisions. Technologies could facilitate such long-distance oversight, for example, by allowing residents to alert higher authorities to capture.

Indeed, one of the main exploratory findings from our study is that positive treatment effects emerge only when the information about how and when to participate is disseminated widely within a community (see Figure 8). When elite capture of local institutions is pervasive, overcoming it may require a large coalition. Using communication technologies like the one that we employ might massively expand access to information. Access to mobile phones is accelerating in even the poorest places in the world, which should enable more people to find the necessary information to form coalitions and overcome the kind of exclusion that we explore. What remains to be seen is how the powerful will use the same tools.

Similarly, exploratory results suggest that finding a way to better engage women in the revenue sharing process will be important. Related research has found that addressing the deeper institutional roots of gender-based exclusion from participation is not likely to be transformative at the project-level, but there may be ways to have a greater impact ([Mayoux 1995](#)). First, gender-specific outreach and training is a strategy that is commonly employed in other settings ([Agrawal 1997](#)). More broadly, efforts might be focused on creating a culture and expectation for addressing the needs of the most vulnerable through revenue sharing, such as women and frontline households. The frequent contact with residents enabled through a platform like the Bwindi Information Network might be well-suited to introducing and sustaining these attitudes.

Finally, our study points toward other kinds of interventions that might address unequal opportunities for participation in, or worse exclusion from, community-driven development. Revenue sharing is often used to support excludable goods, such as the allocation of goats to certain families and not others. When development interventions are focused on these types of poorly divisible goods, participation is only likely to take place to the extent that these goods can be obtained at the individual or household level. The results from our field experiment and the data that we obtained from interviews suggests that changing program rules to focus more on public goods like roads, schools, and community forestry plots might overcome more fundamental barriers to participation. Likewise, rules might be put in place to bar incumbency of access to the goods disbursed as part of the program.

Overall, our results suggest that information about rights and opportunities to participate is unlikely to offer a quick solution to the challenges facing community-driven development, despite suggestions for more testing of outreach and informational campaigns. Beyond information about participation, policy-makers should explore how information can be used to prevent capture of local institutions charged with delivering collective goods. This study provides a tension. We find null results across many measures and conclude that the treatments employed here are unlikely to prove effective on average and even seem to backfire among those already disenfranchised. Still, our study reveals that ensuring treatments are deployed broadly in ways that promote collective action potentially empowers participation.

References

- Abraham, A., & Platteau, J. P. (2004). Participatory development: Where culture creeps in. In *Culture and Public Action*, edited by V. Rao and M. Walton. Stanford: Stanford Social Sciences, 210-233.
- Aftergood, S. (2009). Reducing government secrecy: Finding what works. *Yale Law and Policy Review*, 27, 399-416.
- Alderman, H. (2002). Do local officials know something we don't? Decentralization of targeted transfers in Albania. *Journal of Public Economics*, 83(3), 375-404.
- Azfar, O., Kähkönen, S. & Meagher, P. (2001). *Conditions for Effective Decentralized Governance: A Synthesis of Research Findings*. University of Maryland, Center for Institutional Reform and the Informal Sector.
- Baird, S., McIntosh, C., & Özler, B. (2013). The regressive demands of demand-driven development. *Journal of Public Economics*, 106, 27-41.
- Banerjee, A. V., Banerji, R., Duflo, E., Glennerster, R. & Khemani, S. (2010). Pitfalls of Participatory Programs: Evidence from a randomized evaluation in education in India. *American Economic Journal: Economic Policy*, 2(1), 1-30.
- Bardhan, P. (2002). Decentralization of governance and development. *The Journal of Economic Perspectives*, 16(4), 185-205.

- Bauhr, M., & Grimes, M. (2014). Indignation or resignation: the implications of transparency for societal accountability. *Governance*, 27(2), 291-320.
- Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. *Government information quarterly*, 27(3), 264-271.
- Björkman, M., & Svensson, J. (2009). Power to the people: evidence from a randomized field experiment on community-based monitoring in Uganda. *The Quarterly Journal of Economics*, 124(2), 735-769.
- Breuer, A., & Groshek, J. (2016). Assessing the potential of ICTs for participatory development in Sub-Saharan Africa with evidence from urban Togo. *International Journal of Politics, Culture, and Society*, 1-20.
- Chavis, L. (2010). Decentralizing development: Allocating public goods via competition. *Journal of Development Economics*, 93(2), 264-274.
- Chong, A., De La O, A. L., Karlan, D., & Wantchekon, L. (2014). Does corruption information inspire the fight or quash the hope? A field experiment in Mexico on voter turnout, choice, and party identification. *The Journal of Politics*, 77(1), 55-71.
- Chwe, M. S. Y. (1998). Culture, circles, and commercials: publicity, common knowledge, and social coordination. *Rationality and Society*, 10(1), 47-75.
- Classen, L., Humphries, S., FitzSimons, J., Kaaria, S., Jiménez, J., Sierra, F., & Gallardo, O. (2008). Opening participatory spaces for the most marginal: learning from collective action in the Honduran hillsides. *World Development*, 36(11), 2402-2420.
- Coady, D., Grosh, M. E., & Hoddinott, J. (2004). *Targeting of transfers in developing countries: Review of lessons and experience*. Vol. 1. Washington, D.C.: World Bank Publications.
- Cornwall, A. (2003). Whose voices? Whose choices? Reflections on gender and participatory development. *World development*, 31(8), 1325-1342.
- Dasgupta, A., & Beard, V. A. (2007). Community driven development, collective action and elite capture in Indonesia. *Development and change*, 38(2), 229-249.
- de Fine Licht, J. (2014). Policy area as a potential moderator of transparency effects: An experiment. *Public Administration Review*, 74(3), 361-371.

- Dongier, P., Van Domelen, J., Ostrom, E., Ryan, A., Wakeman, W., Bebbington, A., ... & Polski, M. (2003). Community driven development. *World Bank Poverty Reduction Strategy Paper*.
- Eversole, R. (2003). Managing the pitfalls of participatory development: some insight from Australia. *World development*, 31(5), 781-795.
- Fenster, M. (2006). The Opacity of Transparency. *Iowa Law Review*, 91, 885-943.
- Fritzen, S. A. (2007). Can the design of community-driven development reduce the risk of elite capture? Evidence from Indonesia. *World Development*, 35(8), 1359-1375.
- Galasso, E., & Ravallion, M. (2000). *Distributional Outcomes of a Decentralized Welfare Program*. Vol. 2316. Washington, D.C.: World Bank Publications.
- Galasso, E., & Ravallion, M. (2005). Decentralized targeting of an antipoverty program. *Journal of Public economics*, 89(4), 705-727.
- Galston, W. A. (2001). Political knowledge, political engagement, and civic education. *Annual review of political science*, 4(1), 217-234.
- Gillespie, S. (2004). Scaling up community-driven development: a synthesis of experience. *World Bank Social Development Paper*, 69, Washington, D.C.: World Bank.
- Green, D. P., Aronow, P. M., Bergan, D. E., Greene, P., Paris, C., & Weinberger, B. I. (2011). Does knowledge of constitutional principles increase support for civil liberties? Results from a randomized field experiment. *The Journal of Politics*, 73(2), 463-476.
- Grimmelikhuijsen, S. G. (2010). Transparency of Public Decision-Making: Towards Trust in Local Government? *Policy & Internet*, 2(1), 5-35.
- Grimmelikhuijsen, S. (2012). Linking transparency, knowledge and citizen trust in government: An experiment. *International Review of Administrative Sciences*, 78(1), 50-73.
- Grossman, G., Humphreys, M., & Sacramone-Lutz, G. (2014). "I wld like u WMP to extend electricity 2 our village": On Information Technology and Interest Articulation. *American Political Science Review*, 108(3), 688-705.
- Grossman, G., Michelitch, K., & Santamaria, M. (2017). Texting Complaints to Politicians: Name Personalization and Politicians' Encouragement in Citizen Mobilization. *Comparative Political Studies*, 50(10), 1325-1357.

- Gugerty, M. K., & Kremer, M. (2008). Outside funding and the dynamics of participation in community associations. *American Journal of Political Science*, 52(3), 585-602.
- Gurney, G. G., Cinner, J. E., Sartin, J., Pressey, R. L., Ban, N. C., Marshall, N. A., & Prabuning, D. (2016). Participation in devolved commons management: Multiscale socioeconomic factors related to individuals' participation in community-based management of marine protected areas in Indonesia. *Environmental Science & Policy*, 61, 212-220.
- Hainmueller, J., Mummolo, J., & Xu, Y. Q. (2017). How much should we trust estimates from multiplicative interaction models? Simple tools to improve empirical practice. Working Paper, 13 February 2017: <http://yiqingxu.org/software/interaction/main.pdf>.
- Hampson, K., Leclair, M., Gebru, A., Nakabugo, L., & Huggins, C. (2017). "There is No Program Without Farmers": Interactive Radio for Forest Landscape Restoration in Mount Elgon Region, Uganda. *Society & Natural Resources*, 30(5), 642-657.
- Heinrich, C. J., & Lopez, Y. (2009). Does community participation produce dividends in social investment fund projects?. *World Development*, 37(9), 1554-1568.
- Ho, D. E., & Imai, K. (2006). Randomization inference with natural experiments: An analysis of ballot effects in the 2003 California recall election. *Journal of the American Statistical Association*, 101(475), 888-900.
- Hock, S., Anderson, S., & Potoski, M. (2013). Invitation phone calls increase attendance at civic meetings: Evidence from a field experiment. *Public Administration Review*, 73(2), 221-228.
- Howes, M. (1997). NGOs and the development of local institutions: A Ugandan case-study. *The Journal of Modern African Studies*, 35(1), 17-35.
- James, O. (2010). Performance measures and democracy: Information effects on citizens in field and laboratory experiments. *Journal of Public Administration Research and Theory*, 21(3), 399-418.
- Kagan, E. (2001). Presidential administration. *Harvard Law Review*, 114, 2245-2385.
- Kumar, S. (2002). *Methods for Community Participation: A Complete Guide for Practitioners*. New Delhi: Vistaar Publications.

- Larson, J. M., & Lewis, J. I. (2017). Ethnic networks. *American Journal of Political Science*, 61(2), 350-364.
- Lund, J. F., & Saito-Jensen, M. (2013). Revisiting the issue of elite capture of participatory initiatives. *World Development*, 46, 104-112.
- Mansuri, G., & Rao, V. (2003). *Evaluating Community-Based and Community-Driven Development: A Critical Review of the Evidence*. Washington, DC: World Bank Publications.
- Mansuri, G., and Rao, V. (2012). *Localizing development: Does participation work?* Washington, D.C.: World Bank Publications.
- Marx, B., Pons, V., & Suri, T. (2016). Voter Mobilization Can Backfire: Evidence from Kenya. Unpublished Working Paper (2016). Available at: www.povertyactionlab.org/sites/default/files/publications/SMS%20Experiment_NBER.pdf (Accessed 23 March 2017).
- Mayoux, L. (1995). Beyond naivety: women, gender inequality and participatory development. *Development and change*, 26(2), 235-258.
- Ndou, V. (2004). E-Government for developing countries: Opportunities and challenges. *The electronic journal of information systems in developing countries*, 18, 1-24.
- Nyqvist, M. B., de Walque, D., & Svensson, J. (2017). Experimental Evidence on the Long-Run Impact of Community-Based Monitoring. *American Economic Journal: Applied Economics*, 9(1), 33-69.
- Olken, B. A. (2010). Direct democracy and local public goods: Evidence from a field experiment in Indonesia. *American political science review*, 104(2), 243-267.
- Platteau, J. P. (2004). Monitoring elite capture in Community-Driven development. *Development and change*, 35(2), 223-246.
- Platteau, J. P., & Gaspart, F. (2003). The risk of resource misappropriation in community-driven development. *World development*, 31(10), 1687-1703.
- Platteau, J. P., Somville, V., & Wahhaj, Z. (2014). Elite capture through information distortion: a theoretical essay. *Journal of Development Economics*, 106, 250-263.

- Rao, V., & Ibanez, A. M. (2005). The social impact of social funds in Jamaica: A 'participatory econometric' analysis of targeting, collective action, and participation in community-driven development. *Journal of Development Studies*, 41(5), 788-838.
- Reinikka, R., & Svensson, J. (2005). Fighting corruption to improve schooling: Evidence from a newspaper campaign in Uganda. *Journal of the European Economic Association*, 3(2-3), 259-267.
- Reinikka, R., & Svensson, J. (2011). The power of information in public services: Evidence from education in Uganda. *Journal of Public Economics*, 95(7), 956-966.
- Rotberg, R. I., & Aker, J. C. (2013). Mobile phones: uplifting weak and failed states. *The Washington Quarterly*, 36(1), 111-125.
- Sheely, R. (2015). Mobilization, participatory planning institutions, and elite capture: Evidence from a field experiment in rural Kenya. *World Development*, 67, 251-266.
- Speer, J. (2012). Participatory governance reform: a good strategy for increasing government responsiveness and improving public services?. *World Development*, 40(12), 2379-2398.
- Thomas, K. A., DeScioli, P., Haque, O. S., & Pinker, S. (2014). The psychology of coordination and common knowledge. *Journal of personality and social psychology*, 107(4), 657.
- Unrepresented Nations and Peoples Organizations (2013). Batwa: Bwindi Hospital initiative to fight malnutrition in Uganda, available at: <http://www.unpo.org/article/16332>.
- United Nations Development Group (2014). UNDG Communications and Advocacy Working Group (Comms WG): Terms of Reference.
- White House (2016). *United States of America Midterm Self-Assessment Report for the Open Government Partnership: Third Open Government National Action Plan 2015-2017*.
- Wordofa, D. (2004). Poverty-reduction policy responses to gender and social diversity in Uganda. *Gender & Development*, 12(1), 68-74.
- World Bank (2012). *World Development Report 2012: Gender Equality and Development*. Washington, D.C.: World Bank Publications.
- Zérah, M. H. (2009). Participatory governance in urban management and the shifting geometry of power in Mumbai. *Development and Change*, 40(5), 853-877.

Supporting Information

- A** Consent Script
- B** Treatment and Placebo Messages
- C** Baseline and Endline Survey Instruments
- D** Spillover between Villages
- E** Attrition
- F** Interview Transcripts with Disempowered Subjects
- G** Reverse Power Analyses and Minimum Detectable Effects
- H** Heterogeneous Treatment Effects Number of Subjects Per Village

Appendix A: Consent Script (information identifying authors redacted)

Hello, may I please speak with <<insert name>>?

Hi, I am calling to tell you about the Bwindi Information Portal that you signed up for in July 2014. Do you have a few minutes for me to remind you about the portal and update you on the research project?

The Bwindi Information Portal will allow you to receive and send messages about the Bwindi National Park.

The Bwindi Information Portal is part of a research project that aims to understand how local residents interact with Bwindi National Park.

If you sign up, you will receive SMS messages containing information about the park and questions about your life near the park.

All SMS messages that you send and receive are free for you, so don't worry about using your own airtime.

You will receive questions about yourself, your opinions, and your experiences. Your responses are welcomed, but you never have to answer any question.

All of the responses that you send are confidential. We will not share your individual responses with anyone. We will not tell anyone if you participate or not.

If you are concerned that your message is sensitive, you may consider deleting it from your own phone. We cannot do that.

We will share summaries of all the responses received from your village with the Uganda Wildlife Authority, so that they can respond to local concerns.

Because we will keep your individual responses confidential, we do not anticipate any risks to participation. If we discover risks, we will alert you to them.

[REDACTED] are heading this project. They are based at universities in [REDACTED] and spend some time near Bwindi.

If you have any problems from participating in the Bwindi Information Portal, you can send the free message "HELP" at any time to a shortcode (for example *999#) you will receive when the Information Portal beings. These professors or their staff will call or SMS you back promptly.

If you want to call them (which isn't free), [REDACTED]. Because of the time difference, they are most likely to be in their offices when [REDACTED]. You can also contact the local project manager, [REDACTED].

The local Research Ethics Committee – Mildmay Uganda Research Ethics Committee - that oversees this research can be reached at 0312210200. You can contact them about any concerns.

The Bwindi Information Portal may last as long as three years. It is possible that it will not last that long.

Sometimes we may not provide the same information or ask the same questions to every participant. When this happens, it is based on chance.

Other than free SMS messages, you will not receive any money for participating. We will enter you into a weekly lottery for airtime if you respond to questions.

The benefit to participating is that Bwindi National Park will better understand your preferences and you will have more information about park decisions.

Please understand, your participation is voluntary. If you do not want to participate, send the message “STOP” at any time to a shortcode you will receive when Information Portal begins.

Expect to receive an SMS message in the coming weeks that will allow you indicate if you are interested in participating in the Bwindi Information Platform.

Do you have any questions about the Bwindi Information Platform?

Appendix B: Treatment and Placebo Messages

Treatment	Placebo
Thank you for joining the Bwindi Information Network. All messages from us will come from the number 8988.	
You can respond to our messages using the number 8988. Your responses are toll-free and will not reduce your airtime.	
The Bwindi Information Network will send you 5-7 messages a week providing useful information and seeking feedback to help UWA manage the national park.	
If you have family or friends who would like to receive these messages, tell them to text "JOIN" to 8988.	
Bwindi National Park has a program to share park revenues with communities around the park. It is called the Revenue Sharing Program.	Research suggests that households which open a savings account are better able to save for school fees and books.
The goals of the Revenue Sharing Program are to improve livelihoods in your community and increase support for wildlife conservation.	Studies in Uganda suggest that men who are circumcised have a lesser chance of acquiring HIV.
The Revenue Sharing Program receives funding from park entrance fees, gorilla trekking permits, and other donations.	For the first 6 months, newborn children should only receive breastmilk. Feeding food too early can expose children to infections and poor digestion.
You are receiving this message because this phone is shared by more than one participant. When you respond to messages, please include your answer and your name	
Where would be the most convenient location in your village to hold meetings to discuss Bwindi National Parks' Revenue Sharing Program?	
The funding from the Revenue Sharing Program is shared between the 98 villages that directly surround Bwindi National Park.	Breastfeeding a child within its first hour of life provides important nutrients and warmth and helps the child build a strong immune system.
Revenue Sharing projects in your village are carried out by a Project Management Committee. The committee reports to the	Research suggests that going for check-ups before giving birth can help reduce complications after the pregnancy.

LC1.	
The Project Management Committee is made up of 5 members of your community. At least 2 of the members must be women.	Research suggests that engaging in regular physical activity helps prevent heart disease.
The Project Management Committee work together with the Sub County Chief to manage the finances of the revenue sharing projects.	Studies in Uganda show that when parents read in English to their children on a regular basis, their students receive higher marks.
District and Sub County officials keep 5 percent of the revenue sharing funds to cover the costs of monitoring.	Keeping domestic animals in the house increases the chance of infections like asthma and infestations from lice, ticks and jiggers.
You are receiving this message because this phone is shared by more than one participant. When you respond to messages, please include your answer and your name	
How do you typically learn about upcoming meetings to discuss Bwindi National Park's Revenue Sharing Program?	
A Community Procurement Committee in your village is responsible for purchasing goods and services for the revenue sharing project.	In addition to being fed breast milk, children over 6 months should be fed a variety of foods in addition to just maize, posho or matoke.
Members of the Project Management Committee are not paid for their work to manage revenue sharing projects.	Studies have found that smoking predisposes someone to infections like hypertension and lung cancer.
If managed correctly, 95 percent of your village's total revenue sharing funds should be delivered to your Sub county Chief, named @sub-county chief name.	Drinking at least 2-3 liters of water per day helps to cleanse the body.
Every year starting in May, your village holds several meetings that you can attend to help make decisions on the Revenue Sharing Program.	To avoid the spread of malaria, it is important to use durable nets that have been treated with insecticide.
If you have family or friends who would like to receive these messages, tell them to text "JOIN" to 8988.	
You are receiving this message because this phone is shared by more than one participant. When you respond to messages, please include your answer and your name	

Is there anything stopping you from attending meetings to discuss Bwindi National Park's Revenue Sharing Program?	
Revenue Sharing meetings are your opportunity to choose committee members, select a project, and decide who benefits from the project.	Taking children for immunizations can help prevent diseases like polio.
Your LC1 and the Project Management Committee can tell you when and where these meetings happen in your village	Indoor air pollution, such as smoke from a fire or kerosene lantern, can increase one's chances of getting respiratory tract infections.
At revenue sharing meetings, you can help select a project that benefits the entire community, or one that benefits people that most need the support.	Giving severe punishment to young children can negatively affect their mental development.
To get updates on your village's revenue sharing project, ask any members of your village's Project Management Committee or your LC1.	Excessive drinking of alcohol predisposes someone to mental illness.
You can also get updates on your village's revenue sharing project by asking your LC1 for reports written by the Project Management Committee.	Studies show that drinking unboiled milk increases the chances of developing Tuberculosis.
Please respond to the question messages on the same phone you receive them.	
Are you interested in participating in Bwindi National Park's Revenue Sharing Program?	
Asking your Project Management Committee or LC1 for information on a revenue sharing project can improve project results and reduce corruption.	Using family planning methods can help you to produce fewer children, which are easier to support and look after.
If you think that revenue sharing funds are being misused, write your Chief Administrative Officer, copying the Conservation Area Manager.	Studies show that people who eat half-cooked meat have a higher chances of getting worm infestations.
The forests of Bwindi National Park provide your community with the fertile	Many studies have suggested that delivering from a health facility can reduce

soils that support the productive agriculture in your village.	the chance of the death of newborn children
Bwindi National Park protects a forest that supported many generations of Bakiga and Batwa communities.	Sick children should be given food and liquids frequently. Feeding sick children less food and liquids can be dangerous to their health.
Thank you for participating in the Bwindi Information Network. Each week people that respond to messages are entered into a lottery to win airtime of 30,000 UGX	
Has corruption ever been a problem in your village with previous Revenue Sharing projects?	
For the past four weeks, the winners of the lottery are Damian from Katojo, Evasi from Nakabungo, Feredian from Kabere, and Elias from Katojo.	
Please respond to questions each week for a chance to win airtime of 30,000 UGX from the Bwindi Information Network. Thank you for supporting the project	
Ask your LC1 or any member of your Project Management Committee about other ways you can participate in the Revenue Sharing Program.	Each year children should receive de-worming medication.
Most villages around Bwindi National Park have already held meetings to select members of the Project Management Committees for the Revenue Sharing program.	Many studies have suggested that excessive drinking of alcohol is one of the major causes of poverty in Uganda.
Most villages have started holding meetings to plan for the Revenue Sharing program. Talk to your LC1 to learn about the next meeting.	Diarrhea diseases like dysentery, cholera, typhoid are infections that are one of major causes of death for children in Uganda.
Please respond with “T” for True, “F” for False, or “DK” for Don’t Know: I have spoken with a member of my village’s Revenue Sharing Committee about the program in the last three months	
Previous revenue sharing projects completed in your village include <project12/projectruk12>, and <project14/projectruk14> .	Research suggests that breastfeeding a child for at least 18 months can boost a child’s immune system.
Since 2012, your village should have	Studies in Uganda show that children

received a total of <sum1214> UGX to carry out revenue sharing projects.	whose parents strongly encourage them to attend school, attend school more often.
We hope you have found the Bwindi Information Network useful. Is there any way we can make the service more valuable?	
The winners of the lottery are Alex from Kachwamuhoro, Ferediana from Mburameizi, and Remegio from Karambi	
We hope you found the Bwindi Information Network valuable. We will be calling you again soon with additional questions. Thank you.	

Wave 2

Treatment	Placebo
Thank you for your continued participation in the Bwindi Information Network. Communication with the network, on the number 8988, is toll free and will not reduce your airtime.	
If you have family or friends who would like to receive these messages, tell them to text "JOIN" to 8988. If you do not want to participate, send the message "STOP" at any time to 8988.	
The Bwindi Information Network will send you 5-7 messages a week providing useful information and seeking feedback to help UWA manage the national park.	
Each week, people that respond to questions are entered into a lottery. The winner receives 30,000 UGX of airtime	
The purpose of the Bwindi Information Network is to exchange of information between the frontline villages and officials at Bwindi Park	The Bwindi Community Hospital will have a general medical camp where all medical conditions will be assessed for free
Thanks to your reports using this network, park officials were informed of common methods of corruption during procurement, such as purchasing weak goats.	Contact your VHT for more information about the Bwindi Community Hospital general medical camp
Bwindi officials advise villages vote for projects that benefit everyone, like problem animal management.	Bwindi Community Hospital will have a Fistula Camp in October. All mothers with this condition can undergo a free operation.
Everyone in your village has a right to participate in the planning for the revenue	Fistulas should be kept clean and dry. It is best to expose them to air, not keep them

sharing funds allocated to your village.	covered.
At this time, frontline communities are planning the projects to implement as soon as funds arrive. Ask your LC1 chairman for details.	Bwindi Community Hospital's management of malnutrition is absolutely free of charge for every child under the age of 5 years.
Revenue sharing funds are intended to build strong partnerships between protected area management, frontline communities and local government.	There is a health insurance plan at Bwindi Community Hospital where one can pay a little money in advance and get services at much lower costs when sick.
The goal of the revenue sharing program is to demonstrate the economic value of the park and the importance of park conservation to neighboring communities	For more information about the hospital health insurance plan, contact the scheme manager, Brian, at 0782445471.
Funds are not yet announced. Frontline villages should be critically looking at potential projects which are in line with conservation and income generation.	Immunizations for children are free. They are provided by the government.
The revenue sharing funds for this year were delayed because some districts have not submitted last year's accountabilities. Villages cannot receive funds until all districts do this.	Vaccines protect children from immunizable diseases like polio, measles, diphtheria, whooping cough, tetanus (omuraramu), and pneumonia
Villages are advised to select their projects cautiously. Once a project is submitted and approved, it's usually not acceptable to change.	Any health facility can offer immunization services, be it private or government run
UWA determines the amount of funds each village receives based on the length of the village's park boundary and the village population.	HIV testing and counseling is a routine package for every woman accessing Antenatal care services.
If you need help understanding the funds calculation, you should ask your CCR to explain it.	Abstinence from sex, use of condoms or being faithful to one sexual partner can help reduce your risk of contracting HIV
What previous Revenue Sharing projects have you been pleased with in your village? If none, respond with "none."	

As a policy, the Chief Warden deposits the Revenue Sharing funds to the District account and then the CAO transfers the funds to the sub county's account and then to the frontline villages.	Prevention of diseases at a household level can reduce health related expenditure and increase individual productivity.
What kind of project in your village do you want most this year as part of Bwindi's revenue sharing program?	
Many people like you can decide on the most convenient place to hold meetings for discussing Revenue sharing. Talk to your LC1 if you have a preference	HIV testing is free of charge at any health facility.
Every person or household that lives in a village that shares a boundary with the Park is entitled to benefit from the Revenue Sharing program.	HIV can be contracted a number of ways, including having unprotected sexual intercourse with an infected person or sharing needles with an infected person.
Two lottery winners for the last two questions were Dina from Kigarama and Samuel from Nteeko	Two lottery winners for the last two questions were Dina from Kigarama and Samuel from Nteeko
Revenue sharing funds are shared among three districts by 13 sub counties, 27 parishes and 94 villages that neighbor the Bwindi National Park.	Using a family planning method can help someone have a reasonable number of children that they can afford to look after.
5% of the Revenue Sharing funds remains in the local government for monitoring and evaluation of projects selected by your community.	Most family planning methods in Uganda are free and accessible from all health facilities
Revenue sharing funds are supposed to be monitored and accounted for by the sub-county chief and the LC chairman. The money must pass through the district and sub-county before it can reach the village.	Delivering from a health facility can help to save the life of the child and mother in case of delivery related complications.
5 members of your community make up the Project Management Committee. They carry out local RS projects, report to the LC1 and work with the Sub County Chief to manage project finances.	You can lower your risk of malaria by clearing bushes around the home. This helps to reduce places where mosquitos can breed.

The responsibilities of the UWA's Community Conservation Rangers are to strengthen conservation in communities.	Malaria is one of the leading causes of death in children under five years in Uganda.
The major role of your CCR is to bring you conservation related information from the Park officials and report on your feedback for their action.	Hand washing is especially important when there is illness in the household
The planning meetings for revenue sharing funds are supposed to be chaired by your LC1 chairman. The CCR does not need to be at this meeting.	Abstinence from sex, use of condoms or being faithful to one sexual partner can help reduce your risk of contracting HIV
Please respond with "T" for True, "F" for False, or "DK" for Don't Know: I have spoken with my village's CCR about the program in the last three months.	
UWA officials were informed of the projects individuals reported wanting for their villages, They would like to remind everyone that revenue sharing projects should focus on human-wildlife conflict.	Redness, swelling, foul smells, pain, and yellow or green drainage are symptoms of infections. Keeping an infection clean can help, but medical attention may be needed.
All villages should have met to select which project(s) is to be implemented with the Revenue sharing funds. During these meetings, PMCs and CPCs are also selected.	Monitor bites from animals for pain, redness, stiffness or swelling around the area.
Last week's lottery winner was Beda from Mataka	
Everyone who lives near the park has a responsibility of protecting the Bwindi forest for its sustainability.	Maintaining cleanliness on a water source prevents contamination of water with vectors that carry disease-causing microorganisms.
The Community Conservation Ranger for your zone is <CCR> and can be contacted using <CCR Contact>	Keeping sharp instruments like knives, pangas, and razor blades out of the reach of children can reduce the risk of them cutting themselves and other related accidents.
What information do you lack about revenue sharing?	
PMCs have a tendency of approving unfinished projects. The contractor and the committee keep all remaining money. This is corruption at a village level which you and	Milk contains various nutrients including calcium which helps develop strong bones.

your neighbors should help prevent by watching over projects	
Do not accept money from project contractors instead of the UWA approved project. Contractors keep money that should be spent on the project and beneficiaries are worse off. This is corruption and is common in Mpungu and Ruhija.	Fruits and vegetables contain vitamins that protect the body from contracting diseases by strengthening the body's immunity.
Last week's lottery winner was Bibiana from Bugoro	
Goat rearing is reported to be the kind of project with the most problems involving corruption. We received reports about problems in 16% of frontline villages.	Green, orange, and yellow vegetables contain vitamins and minerals that are good for health
10% of respondents reported they are not pleased with any part of the revenue sharing process	A choking person should not be given liquids.
Which part of the revenue sharing process would you say you are the least satisfied with: project selection, project set-up, or project implementation?	
Bwindi wildlife attracts tourists. Poaching can decrease tourism, reducing park revenue and therefore the revenue shared. Please encourage your neighbors to protect the park.	If someone is choking, but able to talk, encourage them to cough
Growing tea on the park edge can help keep animals away because of its unpleasant taste. It is also a cash crop that attracts income for households.	If someone is choking and cannot talk, hit them hard with a flat hand between the shoulder blades
Last week's lottery winner was Innocent from Mburameizi	
You can protect your crops by planting the Mauritius thorn hedge. This can be selected as a project and funded by the revenue sharing funds.	Do not break blisters. This puts them at a higher risk for infection.
Your Project Management Committee members << [are, ..., and.....] OR [have not been reported. Please hold your LC1 and CCR accountable]>>	Wearing shoes can help prevent injuries and the spread of parasites

<p>Would you like to share an anonymous message with your LC1 about revenue sharing? We won't pass on your name, but we will send your note.</p>	
<p>UWA would like remind you that community projects should focus on problem animal management and elevating livelihood.</p>	<p>Taking 5 minutes to concentrate on your breathing can reduce stress</p>
<p>Many of the projects proposed to UWA require more funds than UWA is able to allocate</p>	<p>Encourage your children to play with other children. This helps them develop important skills like sharing and cooperation</p>
<p>UWA will use the village's revenue sharing funds to pay for as much of the selected project as possible</p>	<p>Small children should sit while eating to prevent choking</p>
<p>When revenue sharing funds cannot pay for the entire project requested, UWA expects the village to distribute the funds or projects fairly</p>	<p>Talking to your children can help with their brain development</p>
<p>Every revenue sharing project should involve community contributions for the completion or success of the project</p>	<p>Babies should never be shaken. They have very weak neck muscles that cannot support their head. Shaking a baby could cause brain damage or death.</p>
<p>We hope you found the Bwindi Information Network valuable. Please message 8988 with any suggestions to make this service more useful.</p>	
<p>You will be contacted soon for a short survey. Messages will start again in a few weeks.</p>	

Appendix C: Baseline and Endline Survey Instruments

Baseline and Endline Survey Items

B1) Did the subject refuse to participate in the survey?

- a) Yes
- b) No

B2) How satisfied are you with the overall management of Bwindi National Park?

- a) Very dissatisfied
- b) Somewhat dissatisfied
- c) Neutral
- d) Somewhat satisfied
- e) Very satisfied
- f) Don't know
- g) Refused to answer

B3) How satisfied are you with Bwindi National Park's Revenue Sharing Program?

- a) Very dissatisfied
- b) Somewhat dissatisfied
- c) Neutral
- d) Somewhat satisfied
- e) Very satisfied
- f) Don't know
- g) Refused to answer

B4) Has your community ever directly benefited from Bwindi National Park's Revenue Sharing Program?

- a) No
- b) Yes
- c) Don't know
- d) Refused to answer

B5) Have you or your family ever directly benefited from Bwindi National Park's Revenue Sharing Program?

- a) No
- b) Yes
- c) Don't know

- d) Refused to answer

B6) In your opinion, how important is it to protect the forest and wildlife in Bwindi National Park?

- a) Not at all important
- b) Not very important
- c) Somewhat important
- d) Very important
- e) Don't know
- f) Refused to answer

B7) How satisfied are you with the amount of information the Uganda Wildlife Authority has provided about Bwindi National Park's Revenue Sharing Program?

- a) Very dissatisfied
- b) Somewhat dissatisfied
- c) Neutral
- d) Somewhat satisfied
- e) Very satisfied
- f) Don't know
- g) Refused to answer

B8) How much do you agree or disagree with the following statement: Based on all of the information that is available to me, I can generally explain how Bwindi National Park's Revenue Sharing Program works.

- a) Disagree
- b) Somewhat disagree
- c) Somewhat agree
- d) Agree
- e) Don't know
- f) Refused to answer

B9) How much do you agree or disagree with the following statement: Based on all of the information that is available to me, I can explain how the Revenue Sharing Program works in my village specifically.

- a) Disagree
- b) Somewhat disagree
- c) Somewhat agree
- d) Agree
- e) Don't know

- f) Refused to answer

B10) How much do you agree or disagree with the following statement: People like me have opportunities to participate in the planning of the Revenue Sharing Program for my village.

- a) Disagree
- b) Somewhat disagree
- c) Somewhat agree
- d) Agree
- e) Don't know
- f) Refused to answer

B11) How satisfied are you with your current opportunities to communicate with the Uganda Wildlife Authority about the Revenue Sharing Program?

- a) Very dissatisfied
- b) Somewhat dissatisfied
- c) Neutral
- d) Somewhat satisfied
- e) Very satisfied
- f) Don't know
- g) Refused to answer

B12) How much do you agree or disagree with the following statement: I know the right person [in my village or at UWA] to contact if I have concerns about the Revenue Sharing Program.

- a) Disagree
- b) Somewhat disagree
- c) Somewhat agree
- d) Agree
- e) Don't know
- f) Refused to answer

B13) In your opinion, how valuable are the economic benefits provided to your village through the Revenue Sharing program?

- a) Not at all valuable
- b) Not very valuable
- c) Somewhat valuable
- d) Very valuable
- e) Don't know
- f) Refused to answer

Endline-Only Survey Items

E4) Did you participate in any RS meetings during the last several months?

- a) Yes
- b) No
- c) No Reply

E5 (Compliance): Did you see the messages that we sent to you during the last several weeks?

- a) Yes
- b) No
- c) No Reply

Other endline measures used for covariate adjustment

Age, Sex, Income, Literacy

Appendix D: Spillover between Villages

One major concern about our research design is interference between units, whereby villages might be affected by the treatment status of nearby villages. Since the information that we provide is often village-specific, we do not expect that the treatment assigned to one village will affect the behavior of subjects in another village. For example, learning who the members of the project management committee are in a neighboring village does not contain useful information about who control subjects should contact.

Despite the village-specific nature of the treatment information, it is plausible that hearing about the treatment information from a nearby village will motivate residents in control villages to action. As we pre-registered, we generate an indicator S_j for each village for whether none, one, or both contiguous villages are treated. We then include this indicator in our estimating equation and test for improved model fit (Table C1). Modeling spillover in this way never changes substantively our estimates of treatment effects, when we include the indicator in models where it improves fit (Figure C1). The same result holds when we instead model spillover using an indicator of the number of treated villages within the four closest villages (Table C2 / Figure C2) and the number of treated villages within the six closest villages (Table C3 / Figure C3), which we pre-registered as further robustness checks.

Table D1. Results for F-Test of Improved Model Fit with 2-Village Spillover Indicator

Outcome Measure	F (Df)	p
Importance of Protecting Bwindi	0.30 (2)	0.74
Satisfied with Revenue Sharing	4.60 (2)	0.01
Satisfied with Park Management	0.25 (2)	0.78
Know Right Person to Contact about RS	0.23 (2)	0.80
Opportunities to Communicate with UWA about RS	0.28 (2)	0.76
Participated in RS Meeting	2.55 (2)	0.08
Opportunities to Participate in RS	1.26 (2)	0.28
Know How RS Works in my Village	0.46 (2)	0.60
Know How RS Works Generally	0.53 (2)	0.59
Satisfied with Information from UWA about RS	0.65 (2)	0.52

Table D2. Results for F-Test of Improved Model Fit with 4-Village Spillover Indicator

Outcome Measure	F (Df)	p
Importance of Protecting Bwindi	0.82 (4)	0.51
Satisfied with Revenue Sharing	3.14 (4)	0.01
Satisfied with Park Management	1.29 (4)	0.27
Know Right Person to Contact about RS	1.46 (4)	0.21
Opportunities to Communicate with UWA about RS	1.79 (4)	0.13
Participated in RS Meeting	0.24 (4)	0.91
Opportunities to Participate in RS	1.01 (4)	0.40
Know How RS Works in my Village	0.70 (4)	0.59
Know How RS Works Generally	1.07 (4)	0.37
Satisfied with Information from UWA about RS	0.83 (4)	0.51

Table D3. Results for F-Test of Improved Model Fit with 6-Village Spillover Indicator

Outcome Measure	F (Df)	p
Importance of Protecting Bwindi	1.30 (5)	0.26
Satisfied with Revenue Sharing	1.89 (5)	0.09
Satisfied with Park Management	0.57 (5)	0.72
Know Right Person to Contact about RS	0.90 (5)	0.48
Opportunities to Communicate with UWA about RS	2.04 (5)	0.07
Participated in RS Meeting	1.64 (5)	0.15
Opportunities to Participate in RS	0.51 (5)	0.77
Know How RS Works in my Village	1.32 (5)	0.25
Know How RS Works Generally	0.81 (5)	0.54
Satisfied with Information from UWA about RS	0.84 (5)	0.52

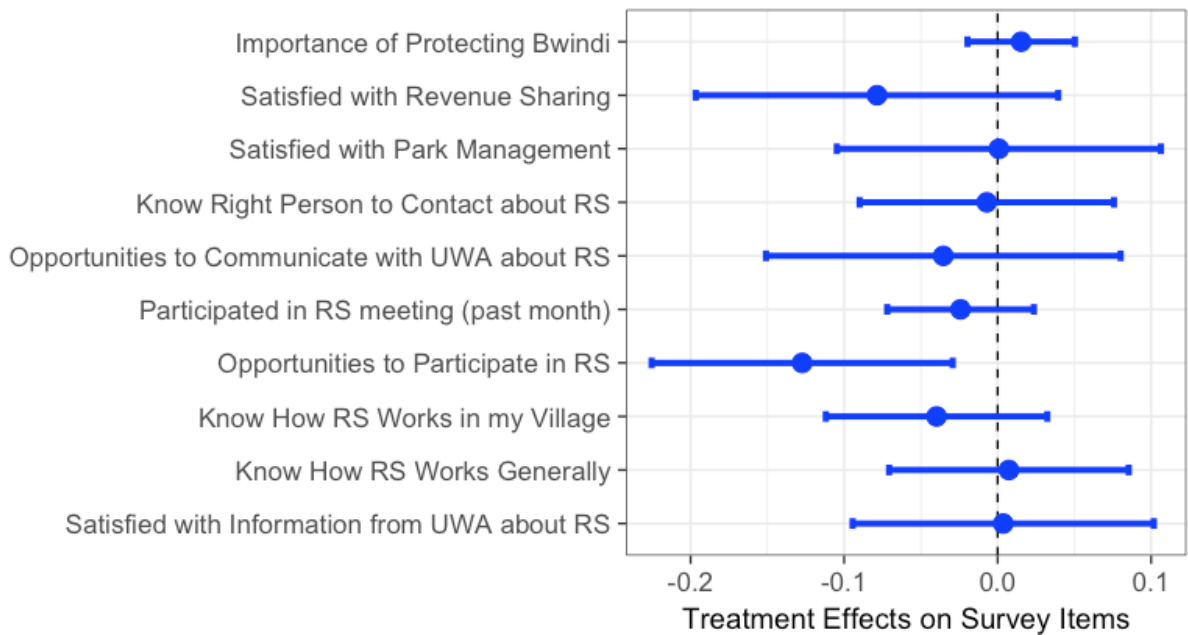


Figure D1. Estimated treatment effects updated to account for 2-village spillover when detected

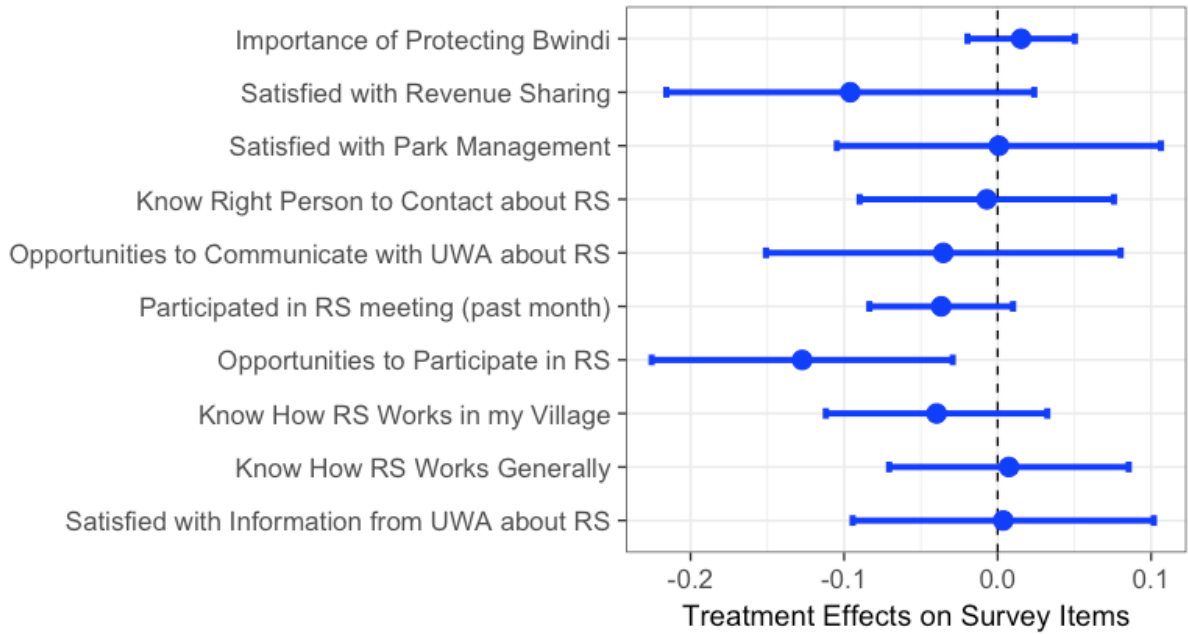


Figure D2. Estimated treatment effects updated to account for 4-village spillover when detected

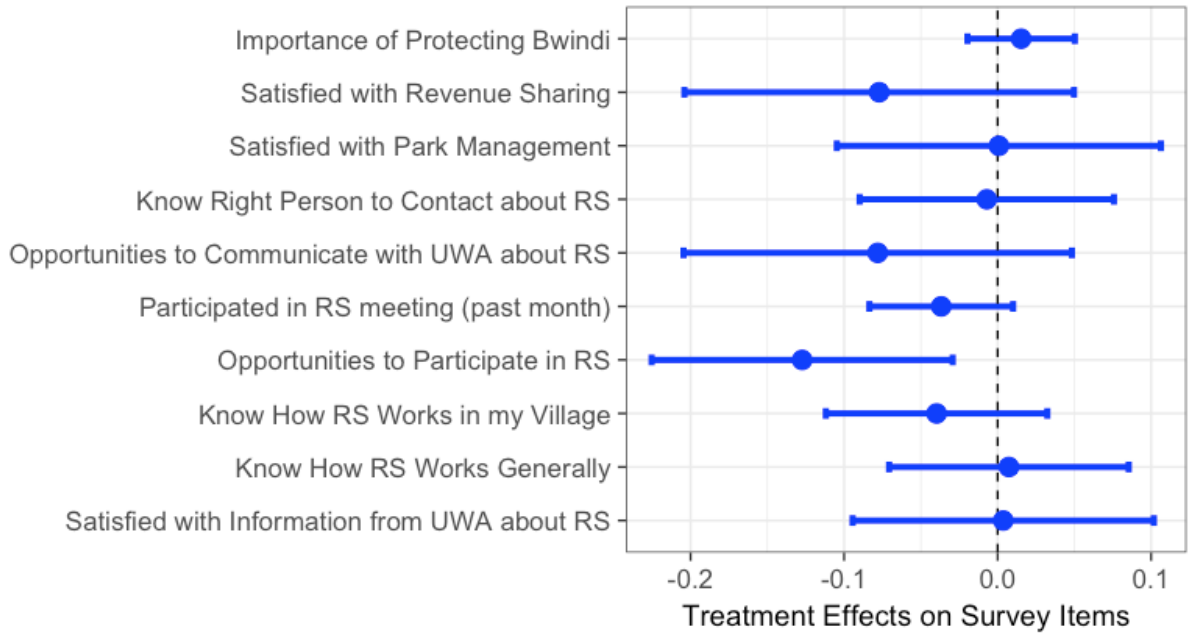


Figure D3. Estimated treatment effects updated to account for 6-village spillover when detected

Summarizing this information, Table D4 shows the treatment effects with and without the various spillover indicators, together with the estimated parameter value on spillover indicator

and its standard error. This table further reinforces the finding that spillover is not a concern in our context.

Table D4. Treatment effects under the base specification and adjusted for spillover

Item	Estimand	Base	S_j(2)	S_j(4)	S_j(6)
Know How RS Works Generally	<i>treatment</i>	0.018 (0.052)	0.012 (0.058)	0.004 (0.060)	0.008 (0.067)
	<i>spillover 1</i>	--	-0.049 (0.089)	-0.262 (0.118)	--
	<i>spillover 2</i>	--	-0.014 (0.088)	-0.279 (0.109)	-0.202 (0.145)
	<i>spillover 3</i>	--	--	-0.292 (0.102)	-0.233 (0.130)
	<i>spillover 4</i>	--	--	-0.288 (0.114)	-0.223 (0.151)
	<i>spillover 5</i>	--	--	--	-0.199 (0.133)
	<i>spillover 6</i>	--	--	--	-0.215 (0.153)
Know How RS Works in my Village	<i>treatment</i>	-0.034 (0.038)	-0.028 (0.043)	-0.047 (0.046)	-0.041 (0.050)
	<i>spillover 1</i>	--	0.011 (0.080)	-0.014 (0.184)	--
	<i>spillover 2</i>	--	0.087 (0.076)	-0.021 (0.197)	-0.172 (0.050)
	<i>spillover 3</i>	--	--	-0.065 (0.165)	-0.219 (0.044)
	<i>spillover 4</i>	--	--	-0.190 (0.216)	-0.157 (0.093)
	<i>spillover 5</i>	--	--	--	-0.158 (0.084)
	<i>spillover 6</i>	--	--	--	-0.401 (0.072)
Know Right Person to Contact about RS	<i>treatment</i>	0.002 (0.043)	0.000 (0.050)	-0.012 (0.052)	-0.029 (0.055)
	<i>spillover 1</i>	--	0.003 (0.058)	-0.185 (0.040)	--
	<i>spillover 2</i>	--	-0.042 (0.066)	-0.270 (0.080)	-0.114 (0.135)
	<i>spillover 3</i>	--	--	-0.264 (0.059)	-0.132 (0.161)
	<i>spillover 4</i>	--	--	-0.220 (0.104)	-0.199 (0.157)
	<i>spillover 5</i>	--	--	--	-0.125 (0.172)

	<i>spillover 6</i>	--	--	--	-0.345 (0.199)
Opportunities to Communicate with UWA about RS	<i>treatment</i>	-0.021 (0.073)	-0.029 (0.076)	-0.050 (0.076)	-0.063 (0.072)
	<i>spillover 1</i>	--	-0.042 (0.113)	-0.285 (0.165)	--
	<i>spillover 2</i>	--	-0.050 (0.126)	-0.315 (0.211)	-0.357 (0.098)
	<i>spillover 3</i>	--	--	-0.343 (0.178)	-0.427 (0.107)
	<i>spillover 4</i>	--	--	-0.742 (0.154)	-0.390 (0.163)
	<i>spillover 5</i>	--	--	--	-0.230 (0.169)
	<i>spillover 6</i>	--	--	--	-1.043 (0.157)
Opportunities to Participate in RS	<i>treatment</i>	-0.122 (0.052)	-0.121 (0.049)	-0.148 (0.064)	-0.123 (0.073)
	<i>spillover 1</i>	--	-0.031 (0.067)	0.168 (0.267)	--
	<i>spillover 2</i>	--	0.081 (0.109)	0.127 (0.304)	-0.132 (0.144)
	<i>spillover 3</i>	--	--	0.000 (0.314)	-0.038 (0.212)
	<i>spillover 4</i>	--	--	-0.061 (0.343)	-0.080 (0.224)
	<i>spillover 5</i>	--	--	--	0.009 (0.231)
	<i>spillover 6</i>	--	--	--	-0.316 (0.266)
Participated in RS Meeting	<i>treatment</i>	-0.047 (0.025)	-0.033 (0.021)	-0.039 (0.023)	-0.029 (0.032)
	<i>spillover 1</i>	--	0.072 (0.050)	0.115 (0.138)	--
	<i>spillover 2</i>	--	0.103 (0.031)	0.154 (0.154)	0.097 (0.054)
	<i>spillover 3</i>	--	--	0.154 (0.132)	0.109 (0.075)
	<i>spillover 4</i>	--	--	0.136 (0.091)	0.186 (0.099)
	<i>spillover 5</i>	--	--	--	0.144 (0.082)
	<i>spillover 6</i>	--	--	--	-0.032 (0.098)
Know How RS Works Generally	<i>treatment</i>	0.014 (0.055)	0.000 (0.043)	-0.013 (0.045)	-0.039 (0.030)
	<i>spillover 1</i>	--	-0.089 (0.072)	-0.092 (0.191)	--
	<i>spillover 2</i>	--	-0.030 (0.107)	-0.131 (0.176)	0.006 (0.249)

	<i>spillover 3</i>	--	--	-0.209 (0.161)	-0.087 (0.269)
	<i>spillover 4</i>	--	--	-0.310 (0.131)	-0.169 (0.277)
	<i>spillover 5</i>	--	--	--	-0.115 (0.278)
	<i>spillover 6</i>	--	--	--	-0.359 (0.256)
Satisfied with RS	<i>treatment</i>	-0.030 (0.082)	-0.076 (0.068)	-0.088 (0.084)	-0.073 (0.098)
	<i>spillover 1</i>	--	-0.284 (0.086)	-0.058 (0.272)	--
	<i>spillover 2</i>	--	-0.283 (0.225)	-0.051 (0.220)	0.524 (0.182)
	<i>spillover 3</i>	--	--	-0.316 (0.219)	0.469 (0.233)
	<i>spillover 4</i>	--	--	-0.464 (0.222)	0.353 (0.278)
	<i>spillover 5</i>	--	--	--	0.432 (0.466)
	<i>spillover 6</i>	--	--	--	0.041 (0.275)
Satisfied with Park Management	<i>treatment</i>	0.013 (0.079)	0.006 (0.087)	-0.002 (0.089)	0.021 (0.088)
	<i>spillover 1</i>	--	-0.036 (0.126)	-0.365 (0.389)	--
	<i>spillover 2</i>	--	-0.049 (0.145)	-0.204 (0.379)	-0.230 (0.201)
	<i>spillover 3</i>	--	--	-0.303 (0.384)	-0.143 (0.213)
	<i>spillover 4</i>	--	--	-0.313 (0.338)	-0.139 (0.240)
	<i>spillover 5</i>	--	--	--	0.034 (0.431)
	<i>spillover 6</i>	--	--	--	-0.263 (0.244)
Importance of Protecting Bwindi	<i>treatment</i>	0.020 (0.027)	0.024 (0.030)	0.014 (0.025)	0.010 (0.023)
	<i>spillover 1</i>	--	0.027 (0.053)	-0.118 (0.038)	--
	<i>spillover 2</i>	--	0.024 (0.039)	-0.094 (0.036)	-0.033 (0.037)
	<i>spillover 3</i>	--	--	-0.117 (0.042)	-0.097 (0.052)
	<i>spillover 4</i>	--	--	-0.108 (0.055)	-0.064 (0.040)
	<i>spillover 5</i>	--	--	--	-0.085 (0.057)
	<i>spillover 6</i>	--	--	--	-0.124 (0.043)

Note: the (standard errors) are derived from the linear model with clustering at the subcounty, rather than randomization inference. The number of contiguous villages within the contiguity band is a discrete indicator.

Appendix E: Attrition

As pre-registered, we test for differential attrition of subjects by treatment status. We fail to reject the null hypothesis of no differential attrition with respect to treatment status (Chi-squared test, $p=0.29$).

Table E1. Attrition in endline survey by treatment condition

	<i>No Attrition</i>	<i>Attrition</i>
<i>Placebo</i>	534 (61.0%)	341 (39.0%)
<i>Treatment</i>	465 (58.3%)	332 (41.7%)

To further verify a lack of problematic attrition, we model attrition as a function of treatment status and the pre-treatment measures that we collected. In our study, we only collected baseline values of the outcome measures pre-treatment. This is advantageous in terms of ruling out problematic attrition, since they are outcomes and differential attrition on unobservables that would confound our results should load onto these measures. We specify two models with a binary indicator of attrition as the outcome: one with treatment status and the levels of all nine baseline outcome measures and the number of subjects per village as predictors; one that interacts treatment status and the levels of all nine baseline outcome measures and the number of subjects per village. An F-Test on the difference in fit between these models provides an opportunity to reject the null that some types of participants are no more likely to attrite in treatment as compared to the control condition.

Because the number of levels in this model is large, it is impractical to display the results in tabular form. The interested reader can reproduce the results using the replication code that accompanies this article. For the model of attrition without interaction terms, neither the treatment status nor any of the levels of the baseline outcome measures predict attrition at $\alpha=0.05$. For the model of attrition with treatment by covariate interaction terms, of the 82 modeled parameters, only missingness on the baseline measure of knowledge about how Revenue Sharing works generally predicts attrition. However, none of the levels across nine of the baseline measures show evidence of differential attrition by treatment status. Using an F-Test to compare these models, we fail to reject the null of no differential attrition within subgroups by treatment status ($p=0.48$). Because we find no evidence for differential attrition, we take no additional steps to account for attrition in our analysis.

To display the results on attrition in a more intuitive way, Table E2 shows the proportion of baseline measures that are missing with bootstrapped standard errors both before and after endline attrition. Again, these descriptive data do not provide reason to be concerned about differential attrition or imbalances in the sample of subjects either at assignment or endline. Table E3 shows the balance in the values of the baseline survey measures both at baseline and after attrition, conditional on non-missingness.

Table E2. Balance on missingness in *pre-treatment* measures before and after endline attrition

Item (proportion baseline obs. missing)	Treatment (Baseline)	Control (Baseline)	Treatment (Endline)	Control (Endline)
Know How RS Works Generally	0.384 (0.017)	0.395 (0.017)	0.271 (0.021)	0.249 (0.019)
Know How RS Works in my Village	0.379 (0.017)	0.391 (0.017)	0.269 (0.021)	0.245 (0.019)
Know Right Person to Contact about RS	0.380 (0.017)	0.402 (0.017)	0.267 (0.020)	0.258 (0.019)
Opportunities to Communicate with UWA about RS	0.373 (0.017)	0.391 (0.016)	0.265 (0.020)	0.245 (0.019)
Opportunities to Participate in RS	0.374 (0.017)	0.393 (0.016)	0.262 (0.021)	0.249 (0.019)
Satisfied with Information from UWA about RS	0.373 (0.017)	0.390 (0.017)	0.262 (0.021)	0.243 (0.018)
Satisfied with RS	0.375 (0.017)	0.391 (0.017)	0.265 (0.020)	0.245 (0.018)
Satisfied with Park Management	0.371 (0.017)	0.391 (0.017)	0.262 (0.020)	0.245 (0.019)
Importance of Protecting Bwindi	0.370 (0.017)	0.390 (0.016)	0.260 (0.021)	0.243 (0.018)

Table E3. Balance on values of *pre-treatment* measures, conditional on non-missingness

Item (mean)	Treatment (Baseline)	Control (Baseline)	Treatment (Endline)	Control (Endline)
Know How RS Works Generally	3.34 (0.042)	3.50 (0.031)	3.30 (0.050)	3.48 (0.036)
Know How RS Works in my Village	3.43 (0.038)	3.53 (0.032)	3.42 (0.045)	3.53 (0.037)
Know Right Person to Contact about RS	3.49 (0.044)	3.55 (0.039)	3.47 (0.054)	3.56 (0.044)
Opportunities to Communicate with UWA about RS	3.84 (0.052)	3.85 (0.049)	3.83 (0.064)	3.87 (0.058)
Opportunities to Participate in RS	3.23 (0.047)	3.27 (0.045)	3.20 (0.058)	3.26 (0.051)
Satisfied with Information from UWA about RS	4.02 (0.045)	4.01 (0.045)	3.99 (0.055)	4.01 (0.053)
Satisfied with RS	4.20 (0.048)	4.32 (0.042)	4.15 (0.061)	4.33 (0.049)
Satisfied with Park Management	4.53 (0.040)	4.48 (0.042)	4.48 (0.053)	4.47 (0.049)
Importance of Protecting Bwindi	3.90 (0.018)	3.89 (0.016)	3.89 (0.022)	3.90 (0.018)

Appendix F: Interview Transcripts with Disempowered Subjects

The following contains the exact transcript of interviews that we received from our project manager, who enumerated and translated all of the response by phone. The subject number is held constant across all interview questions. Identifying place names and other information that might identify the interviewees has been redacted from the record here, per our human subjects protocols. We order the transcripts by question number:

1. *In a recent survey, you said that you did not perceive many opportunities to participate in planning for revenue sharing. Can you please explain?*

[1] Our side of the village was cut from [REDACTED] just because we don't live near the park but we have our land and gardens at the edge. We even haven't been considered for this year's RS project but we are in a frontline village so a few households benefit.

[2] We know that there are opportunities to participate in the planning of RS but we are usually out voted by the majority during meetings. Am actually a [REDACTED], the other village members refused to consider us when choosing beneficiaries. [REDACTED]. We have never been considered on beneficiary list of any project.

[3] Its true we have opportunities but they are only during the planning. During procurement and distribution, all that the local leaders do is totally different from what we planned for. Another issue is that some people benefit consecutively before others get even once.

[4] I don't perceive any opportunity of participating in the planning for my village's revenue sharing because "meetings are hidden and you cant know when and where the meetings happen". "I have never been called for any revenue sharing meeting, we only meet people pulling goats and they tell us that they have got them from Revenue sharing"

[5] We have always had problems with the local leaders especially when it comes to project selection. They want us to do a project that benefits them like goat rearing where they buy weak goats and keep the rest of the funds for their own. So when we select a project like tea planting, they tell us that it's not a good one so we should change and we end up doing a project which is not of our choice.

[6] "My village was cut from [REDACTED] and now our is not a frontline village and therefore I don't perceive any opportunity of participating in the program". However, many people in the neighboring villages complain a lot about their sub county chief's corruption in the administration of the RS funds. "If I was living in a frontline village, I would advocate for projects whose funds are embezzled minimally like [REDACTED]".

[7] They cut our village [REDACTED] into two and ours was excluded therefore we no longer have opportunities of participating in the planning of the Park. But I remained in the [REDACTED] and we have also been allocated some amount of money to buy [REDACTED].

[8] I have never benefited from RS and I have lived in this village for more than 30 years. I don't see any purpose of participating in the planning of something that doesn't benefit me.

[9] I think it's only the educated people who attend meetings to plan for revenue sharing but for me I didn't go to school at all so I don't go to the meetings. But one time I received a goat and they told me it was from Revenue sharing. For me I think that planning for the RS program should be by village leaders not everyone.

[10] "I am no longer interested in the program because I have never received anything from the Park but every time you call me to ask me questions concerning the park. I feel annoyed to hear about that program."

[11] I have one problem concerning the planning of revenue sharing. We go to meetings at the village level and decide on what we should do with the funds but after that UWA officials dictate on projects. For example we had selected goat rearing but when we sent the application, they told us that UWA officials advised that we include other projects like tea planting, bee keeping but we have no enough land for tea planting instead we need food crops. Also some projects are dangerous like bee keeping, they can kill our children.

[12] I just see that the only opportunity I have is going to the meetings for planning whose resolutions end there without implementation. For example my wish could be that the revenue

sharing funds should be standby for any crop raid that occur. Immediately, the damage should be valued and the affected person be compensated accordingly but that's not what happens. I live exactly at the extreme park edge but I have never been compensated for the losses I get from vermins.

[13] I am [REDACTED] so am always busy and moving therefore I have not had an opportunity of attending meetings for revenue sharing or contributing to the planning of the program. But my neighbors attend these meetings and share the RS benefits only that for me I have always wanted the whole amount to be directed to human-wildlife conflict.

[14] "I have never received anything from the Revenue sharing program, the local leaders ask for bribes from one who wishes to become a beneficiary". They even personalise meetings, "you can be there and see people coming from a meeting but you can't know when they were informed, the chairman only calls his family and you find the meeting is attended by one family".

[15] I have never benefitted from revenue sharing. But last month but one we had a meeting with the CCR after which we selected beneficiaries of the coming RS project and I was among the beneficiaries. Our leaders in the villages are greedy to the extent of collecting money from beneficiaries claiming that it is going to pay for transport to take the application to the sub county and if one doesn't pay this money, they are scraped off the list of beneficiaries.

[16] "What I see in my village is an opportunity to attend meetings but we end at attending meetings. For example selection of beneficiaries is done from the sub county and they only

consider their friends and they select groups not individuals". "They tell us to make groups of like 20 households but of course usually, the beneficiary group is known to the selectors".

"Personally I head our group but we have spent like 3 years without winning".

[17] "Our chairman is not active to the extent that people over power him during meetings and a few end up deciding for many". "Now we have the PMC which also full of corrupt members who want to benefit with their relatives all the time. That's why some one can get four goats when one has not even got a single goat".

[18] My husband always attends the meetings and is the only one in the family that usually participates in the revenue sharing program of our village. I have nothing much to do with the program but at one time he brought a goat and told me its from the park.

[19] "I have always wanted to participate in the planning of revenue sharing in my village but I got a job away from home [REDACTED] so I no longer have chance to participate. But for me I am always happy with the program because previously they even gave us goats and I still have mine and it is doing well".

[20] "I would perceive opportunities to participate in the planning of my village's revenue sharing program but I have one concern". "Our leaders (LC and PMC) select a project of their choice and they submit its proposal to the sub county without our knowledge". "They only call

us to the planning meeting to select PMCs but when it comes to project selection, they personalise it". "The distribution of items is somehow fair, so we don't complain".

2. What are the key barriers that prevent you from participating in revenue sharing?

[1] It's only because we don't share on the funds so we are like tired of attending the meetings.

Infact, Revenue sharing has no importance to me.

[2] We do volunteer work but we feel discriminated as if we don't live in a frontline village. Our voice has never been considered even by our local leaders.

[3] The local people's voices are not considered so we feel like our participation is wasteful.

[4] There is a barrier of lack of information. "Let them inform my father if they don't want to inform all of us".

[5] The major barrier here is local leaders deciding for the locals in their favor.

[6] "I am only barred by the fact that I don't live in a frontline village. Otherwise I like the revenue sharing program and all that it brings in frontline villages".

[7] The barrier is that we are no longer a frontline village.

[8] People are selfish when it comes to the distribution of benefits.

[9] I didn't know that I can also participate in the planning of Revenue sharing in my village.

[10] *[Subject skipped question]*

[11] We have no big barriers stopping us from participating but the major issue is dictatorship on which projects to do with Revenue sharing funds by UWA officials.

[12] The only barrier I see is that even if I go to the meetings, my opinions are not going to be considered and addressed.

[13] I don't have time to attend meetings or participate anyhow.

[14] "The problem is that we are always willing to participate but we are not informed".

[15] The major barrier is that mobilisation for village meetings is not done at all especially for people who stay far from the LC chairman. And of course they can't chose you as a beneficiary when you have not attended the meeting.

[16] "If it was you and you went to a meeting where your opinions are rejected would you go

back?" "I have always advocated for random selection of beneficiaries in my village for the revenue sharing projects but I have been failed by leaders". "I may opt not to attend again".

[17] "There is usually a lot of chaos in most of our village meetings for the revenue sharing program. That's why I opt not to attend sometimes so I just follow what comes out of the meeting whether good or bad".

[18] I am usually occupied with housework so I don't have time.

[19] "The only barrier for me is the distance because I don't even know when meetings happen so am not up to date as far as the RS program is concerned".

[20] "The barrier I see here is lack of transparency where local leaders hide some important information about the RS program. Like now we don't know how much has been allocated to our village and I also heard that they were filling forms but we don't know which project our village has requested for".

3. *In your opinion, how might those barriers be overcome in the future?*

[1] The park officials should instruct our local leaders to share the funds among all households living in frontline villages not a few.

[2] I don't think this barrier can be overcome because we have approached the local leaders on this issue but in vain. Maybe the park officials should put a separate budget for [REDACTED] members.

[3] They should give each person once until the whole village gets.

[4] "They should put village meeting announcements in churches and over the radio to raise awareness, but their problem is that they want to inform a few who are their friends and end up stealing more money".

[5] UWA officials should attend project selection meetings to confirm people's choices.

[6] "May be if there is away in which we can be reconsidered as frontline villages but I don't see any other way".

[7] If the RS funds can be shared at a parish level as in the past, we would also benefit.

[8] The distribution of these items should be free and fair. This should be done by local leaders of the village.

[9] I don't know.

[10] [*Subject skipped question*]

[11] UWA officials should allow people exercise their freedom in selecting RS projects of their choice.

[12] The compensation policy should be implemented as soon as possible and when someone calls for help, it should be immediate because they don't want us to kill their animals.

[13] I don't see any way.

[14] "UWA officials should put radio announcements as soon as funds arrive and when the villages are going to receive the money".

[15] I think UWA officials like the CCRs should monitor the distribution of the items for every year to prevent greedy people from getting more than once when others haven't got.

[16] "The only thing to help us here is the intervention of park officials in the selection of beneficiaries for all villages. However I don't know how other villages do it. May be our leaders can learn from there".

[17] "To avoid this vice, the park officials should take charge of the beneficiaries while considering those at the extreme park edge and others later".

[18] I don't mind because both of us can't attend the meetings.

[19] "I don't see any way how this can be overcome".

[20] "I would suggest that the project proposal applications should have signatures of all the villagers to improve on transparency and accountability".

4. What role, if any, might the Bwindi Information Network play in overcoming the barriers that you identified?

[1] You should advocate for the people who have land near the park to also share not necessarily the ones who live there.

[2] More sensitization messages should be sent out to our village [REDACTED] members informing them that [REDACTED] don't have any direct benefit from the park and are also village members who should also share on the RS funds as any other person.

[3] I don't see anything you can do to help here.

[4] The Bwindi information network should send out message informing people of when and

where the meetings are going to happen. "You also need to send us the phone contact of someone who receives the RS money at the village.

[5] Nothing.

[6] "We like your messages especially those ones that talk about conservation of the Park".

[7] Keep mobilising people in frontline villages about the conservation of the park whether one lives or has land at the edge.

[8] Teach local leaders on how they can distribute the funds/ items equally such that all people benefit.

[9] Inform us when meetings are going to happen and where.

[10] [*Subject skipped question*]

[11] Nothing.

[12] Inform Park officials about how animals destroy people's crops such that they can take action.

[13] You can always send me updates on my phone especially what UWA is planning for people who live in frontline villages.

[14] "I don't know if you can know when meetings of different villages are going to happen. You would send us messages including the venue and date of the meetings to avoid selfish meetings by the chairmen LC1s"

[15] You are doing very well, keep it up.

[16] "You can also see a way of approaching our leaders on this issue, because we have always told our CCR but he is not helping".

[17] Nothing.

[18] Nothing.

[19] "I have always received messages from the network so I beg that you continue sending me updates about the program".

[20] "Send us messages containing which projects have been approved for different villages"

5. Is there anything else that you would like to share with us about participation in revenue sharing?

[1] Nothing.

[2] It should be the CCRs to guide people on such things during sensitization but they are also out-voiced by villagers during the sensitization meetings.

[3] We appreciate but more effort is needed.

[4] Why don't you send to us the revenue sharing funds via mobile money to avoid embezzlement?"

[5] We want the money to be directed to the thorn edge.

[6] "I have heard my neighbors [REDACTED] wondering whether the Revenue sharing funds were cut off because they say that even last year they didn't receive anything from revenue sharing".

[7] Nothing.

[8] We have not had a meeting to decide on what we are going to do with the funds.

[9] Compensation for crop raid.

[10] [*Subject skipped question*]

[11] We had finished the project selection process and submitted the application but they told us to re-apply and include problem animal management so we added red pepper planting at the park edge and re-submitted.

[12] Revenue sharing should only benefit people whose households live at extreme edge of the park because they suffer more.

[13] I am always opposed to one-off benefits like goats. Long term projects like roads are better

[14] "I don't have any other issue".

[15] Nothing, but we need to know how much has been allocated to our village this year excluding taxes.

[16] Nothing.

[17] "Thanks for keeping us upto date as far as revenue sharing is concerned. I am grateful for you but you need to get time and come again to visit our villages, not only sending us messages".

[18] The revenue sharing process needs to be speeded up because it has been long since I started hearing that the money has been announced but no one has benefitted.

[19] "If I may ask, has the money for the Revenue sharing been released?"

[20] "I wanted to know if I can act as your ambassador in my village such that I can report any corruption acts by our leaders".

Appendix G: Reverse Power Analyses and Minimum Detectable Effects

Individual Items

One concern about our analyses is power to detect the positive treatment effects, given that many of our survey measures may be susceptible to ceiling effects, with the modal response bunched at the high end of scale. Here we explore the implications of a possible ceiling effect for the main survey items that we use as outcomes. For this analysis, we assume that the realized values of the outcome measures at endline are realized under a sharp null, that is, the observed values would have been realized regardless of treatment status. We then assume various positive treatment effects, which in this case are proportions of treated units that move up the scale by 1-point, had the scale not been censored at the upper end of the scale. We add these treatment effects to the treated units at random under different permutations of the random assignment. To the extent that the treatment effects move the resulting outcome value off the scale for an individual observation, that value is censored to the maximum value on the scale. Thus, we are able to calculate power for different levels of treatment effects that will not be observed because of censoring. We calculate power as the proportion of permutations in this process that yield an estimated treatment effect large enough to be significant at the $p=0.05$ level, as determined by the corresponding value of the treatment effects within the sampling distribution of treatment effects under the sharp null.

The survey item least susceptible to ceiling effects is satisfaction with Revenue Sharing, which had the lowest mean value at endline. In this case, we the minimum detectable effect with censoring is 0.32 at power of 0.80, which is the effect of moving 32% of subjects up one category on the ordinal scale of the outcome (Figure G1). This is equivalent to a 0.290

standardized effect size, calculated by dividing this minimum detectable effect by the standard deviation of the baseline group. Thus, in the best case we still have reasonable power to detect a small to medium effect even after censoring decrease the observed treatment effect.

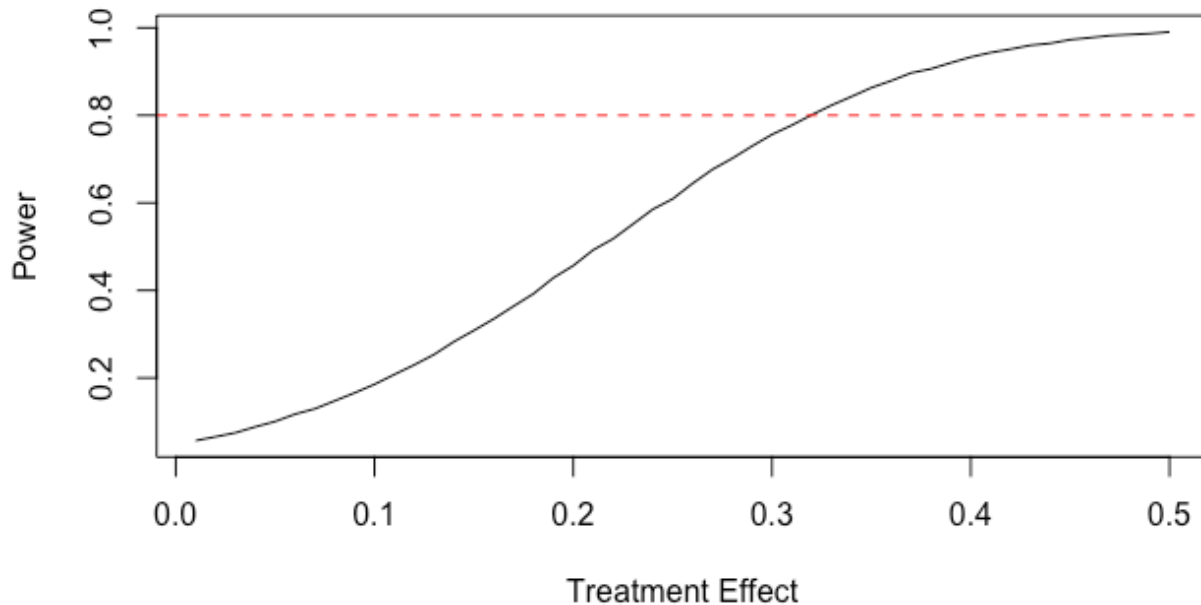


Figure G1. Reverse power calculation for different effect sizes of satisfaction with revenue sharing assuming the outcome data is the baseline, with treatment effect subject to a ceiling effect at the scale maximum.

The survey item most susceptible to ceiling effects is agreement with the importance of protecting Bwindi National Park, which has the highest mean value at endline (906 of 998 observations are at the ceiling value at endline). In this case, we need to observe an effect of at least 0.039 to reject the sharp null hypothesis in any single test, translates to a minimum detectable effect of 0.06 at 80% power. While this value does not seem large and indeed is among the smallest of the MDEs for any item, after accounting for censoring the effect would

have to be 0.60, which is very large relative to the variance in the outcome measure and almost certainly would not be effectively detected in our experiment.

Between these two extremes in the number of observations potentially affected by ceiling values, we explore the power to detect positive effects and the *minimum detectable effect with censoring* for each of the individual survey items (Table G1). The results of this exercise show that even with censoring, we are able to detect small to medium effects with censoring for most of our items, though some items only enable us to detect large positive effects. It is important to note that the proportion of ceiling observation is only one factor influencing power, with the variance in the outcome measure exerting an important influence as well. In fact, some of the items most susceptible to ceiling effects have low variance in the outcome as a consequence, which boosts power. Overall, however, this analysis show that we are sufficiently powered even with the possibility of ceiling effects.

Table G1. Minimum Detectable Positive Effect for Each Survey Item

Item	MDE	Prop. ceiling endline	MDEC	Std. Effect Size (MDEC)
Know How RS Works Generally	0.12	0.51	0.25	0.36
Know How RS Works in my Village	0.12	0.61	0.30	0.47
Know Right Person to Contact about RS	0.14	0.77	0.60	0.80
Opportunities to Communicate with UWA about RS	0.16	0.37	0.25	0.24
Opportunities to Participate in RS	0.17	0.71	0.57	0.67
Participated in RS Meeting	0.08	0.74	--	--
Satisfied with Information from UWA about RS	0.15	0.36	0.23	0.26
Satisfied with RS	0.23	0.29	0.32	0.33
Satisfied with Park Management	0.21	0.44	0.37	0.38
Importance of Protecting Bwindi	0.06	0.91	0.60	1.74

Notes: MDEC (Minimum Detectable Effect with Censoring) is effect detectable at power of 0.8 at $\alpha=0.05$ for a one-tailed test using the primary estimating equation, adjusted for censoring.

An Index-Based Approach to Boost Power

A further possibility for assessing the power of our experiment to detect positive treatment effects is to form indices related to our three conceptual outcomes: knowledge, participation, and satisfaction. By combining all of the survey items into a single index, we are able to decrease ceiling effects and cut down on unexplained variance introduced by the peculiarities of measurement on single items when these error processes average to zero at the respondent level.

We form indices on each of the three types of outcomes by equally weighting each of the items contributing to that outcome (see also color coding in the main figures), transforming each measure linearly onto the scale of the item with the most outcome values and summing the items. We do the same for the baseline values so that we can pursue the same estimation strategy as reported in the main text. Table G2 displays the resulting average treatment effects, standard errors, and one-tailed p -values for a positive effect of the treatment on these classes of outcomes. None of the index outcomes show evidence for a positive effect of the treatment. The negative effect of treatment on participation is marginally inconsistent with random chance (two-tailed $p=0.13$; one-tailed $p=0.06$), which is more consistent with a backfire effect than a positive treatment effect.

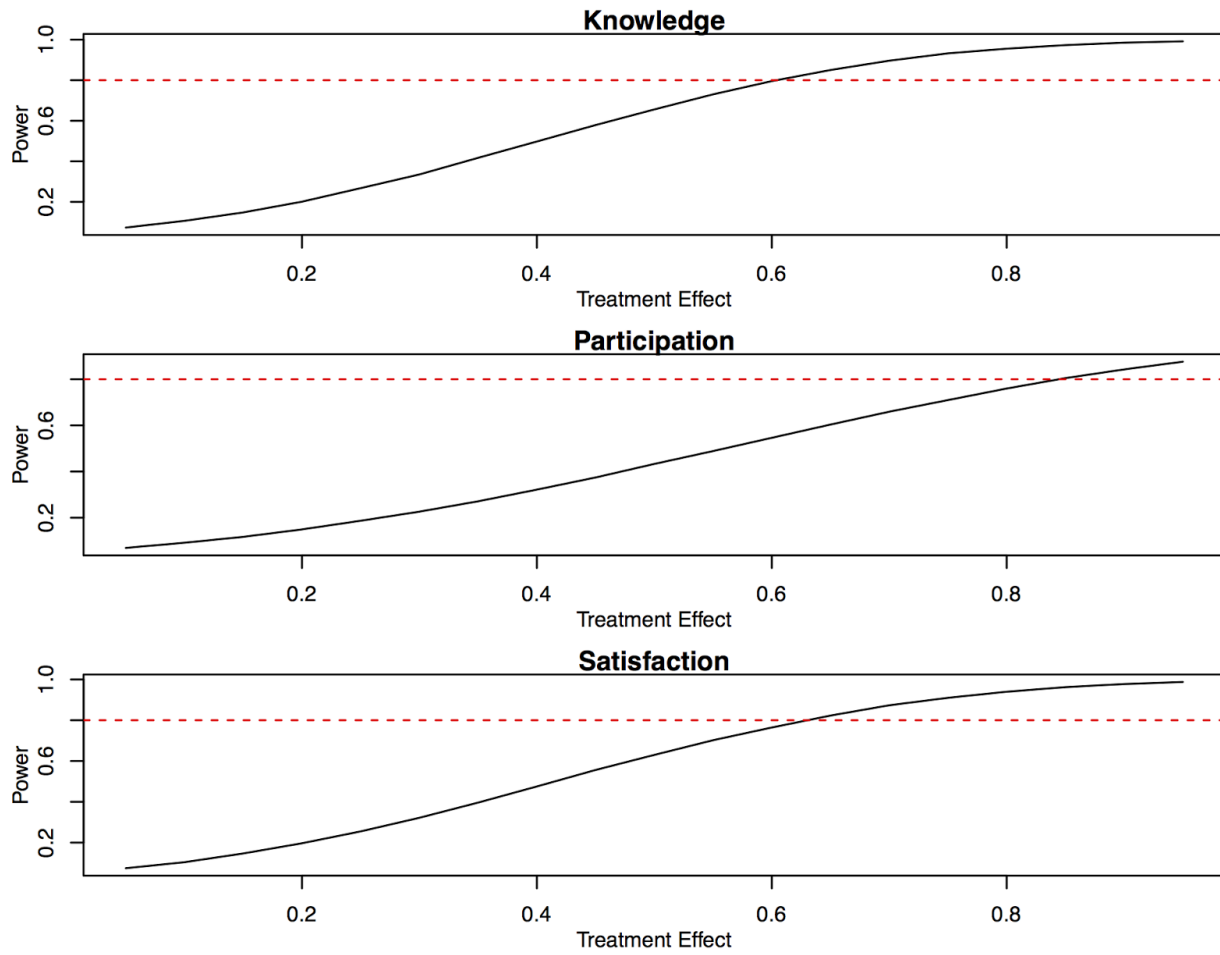
Table G2. Treatment Effects on Indices of Knowledge, Participation, and Satisfaction

Index	ATE	S.E. (RI)	p (one-tailed)	Proportion ceiling obs
Knowledge	-0.006	0.148	0.52	0.39
Participation	-0.381	0.252	0.94	0.26
Satisfaction	0.012	0.221	0.48	0.13

Using the same indices, we can conduct a reverse power calculation by assuming a sharp null hypothesis — that is that the outcome would have been the same under treatment or control. We can then calculate the positive value that would be necessary to detect a positive treatment effect with power of at least 0.8 at a one-tailed $\alpha=0.05$. Like the reverse power calculations above, we distribute the positive treatment effect randomly across the observations and then

ensor any value that exceeds the index ceiling. Figure G2 show power using the index-based outcomes at various treatment effects. The minimum detectable true effect, accounting for censoring at the upper end of the index value is 0.603 for knowledge, 0.845 for participation, and 0.631 for satisfaction. All of these effects are easily detectable given the mean values of the respective indices (knowledge = 13.19 (of 15); participation = 12.04 (of 15); satisfaction = 16.94 (of 20)) and their ceiling values. Recall that these minimum detectable effects must be formed back to their original scales to interpretation.

Figure G2. Power on Family-Based Indices



Appendix H: Heterogeneous Treatment Effects Number of Subjects Per Village

One concern about our analysis of heterogeneous treatment effects in terms of the number of subjects by village is that this moderator might be confounded. As mentioned in the main text, our expectation is that the number of subjects per village is explained primarily by mobile network quality, which should be exogenous to other characteristics about the villages. To further probe this concern, we create a village-level dataset and attempt to use observable characteristics of the villages to predict the number of subjects per village (those who provided informed consent by phone call and thus were eligible for inclusion in our sample). We form the same variables used as covariates in our main analyses into village-level means or proportions: baseline index of knowledge, baseline index of participation, baseline index of satisfaction, age, proportion of female subjects, proportion of fully literate subjects, proportion of subjects who have incomes of less than 100,000 UGX monthly and are thus in absolute poverty. We find that these factors collectively explain none of the variation in subjects per villages, with a F-Test of model fit yielding $p=0.39$ and an adjusted R^2 of 0.0053. Thus, we are more confident that the number of subjects that we reach is truly moderating the treatment effect.

Table H1. Modeling number of subjects per village as a function of village-level characteristics

<u>Outcome: Subjects Per Village</u>	
<i>(Intercept)</i>	30.57 (19.70)
<i>Baseline Knowledge Index</i>	-2.16 (1.12)*
<i>Baseline Participation Index</i>	-0.46 (1.40)
<i>Baseline Satisfaction Index</i>	0.72 (1.16)
<i>Age (mean)</i>	0.08 (0.23)
<i>Female (proportion)</i>	3.24 (5.89)
<i>Fully literate (proportion)</i>	2.42 (5.36)
<i>Poverty (proportion)</i>	4.17 (5.60)

Observations = 91; Adjusted R² = 0.0053; F-test p=0.39
Parameter (Standard Error); **p<0.05, *p<0.1

Table H2. Heterogeneous Treatment Effects by Number of Subjects Per Village

Item	Treatment	Subjects Per Village	Interaction
Know How RS Works Generally	-0.098 (0.112) [0.38]	-0.000 (0.003) [0.93]	0.005 (0.005) [0.30]
Know How RS Works in my Village	-0.160 (0.104) [0.12]	-0.004 (0.003) [0.20]	0.005 (0.004) [0.20]
Know Right Person to Contact about RS	-0.046 (0.119) [0.70]	-0.006 (0.004) [0.09]	0.002 (0.005) [0.69]
Opportunities to Communicate with UWA about RS	-0.044 (0.167) [0.79]	0.000 (0.005) [0.93]	0.000 (0.007) [0.96]
Opportunities to Participate in RS	-0.190 (0.141) [0.18]	-0.004 (0.004) [0.33]	0.003 (0.006) [0.61]
Participated in RS Meeting	-0.194 (0.067) [0.00]	-0.007 (0.002) [0.00]	0.007 (0.003) [0.01]
Satisfied with Information from UWA about RS	-0.222 (0.141) [0.12]	-0.008 (0.004) [0.07]	0.010 (0.006) [0.08]
Satisfied with RS	-0.145 (0.167) [0.38]	-0.101 (0.005) [0.04]	0.005 (0.007) [0.43]
Satisfied with Park Management	-0.268 (0.152) [0.08]	-0.007 (0.005) [0.11]	0.012 (0.006) [0.05]
Importance of Protecting Bwindi	-0.071 (0.050) [0.16]	-0.002 (0.002) [0.20]	0.004 (0.002) [0.06]

Notes: Estimate; (Standard Error); [two-sided p-value]