

Experimental Evidence on Minority Participation and the Design of Community-Based Natural Resource Management Programs

Abstract

While community-based natural resource management (CBNRM) is a key tool for the governance of natural resources in many Global South countries, experiences with CBNRM to date suggest that members of marginalized groups are often less likely to participate in CBNRM compared to members of the dominant groups. This study provides evidence on two institutional features of CBNRM that may help to narrow this gap: (1) targeted benefits that are funded from the proceeds from CBNRM and earmarked for participants belonging to marginalized groups, and (2) mandated representation of marginalized groups on the local decision-making bodies that govern CBNRM. Evidence from a framed vignette experiment with respondents in rural Nepal suggests that these two institutional features have positive effects on intentions to join CBNRM-related groups, attend meetings, and speak up at meetings among members of marginalized ethnic and caste groups, ultimately narrowing gaps in intentions to participate.

Keywords: community-based natural resource management; participation; inequality; environmental policy; conservation.

1. Introduction

Across the Global South, community-based natural resource management (CBNRM) programs are coming of age. In Nepal, more than half of the population participates in the roughly 22,000 Community Forest User Groups (CFUGs) that own and manage more than 35% of the country's forests as collective property under a CBNRM program established through national-level legislation in 1993 (Pandey & Pokhrel, 2021). In India, hundreds of thousands of local Village Forest Committees manage more than 20 million hectares under a similar program (Elias, Grosse, & Campbell, 2020). Governments and non-governmental actors have implemented similar community-based programs for the management of forests, fisheries, and water commons in countries across the Global South (Evans, Cherrett, & Pems, 2011; Hajjar et al., 2021; Wang & Chen, 2021). Previous research suggests a key challenge facing CBNRM: Local CBNRM institutions reflect deeply entrenched inequalities (Baynes, Herbohn, Smith, Fisher, & Bray, 2015). Inequalities in participation are some of the visible manifestations of this. While voluntary participation is central to the CBNRM model, such participation is not always broadly inclusive. Experiences with CBNRM to date suggest that marginalized people—such as the rural poor, women, and members of marginalized ethnic groups, castes, or tribes—are often less likely to participate in CBNRM compared to other community members, and often participate less actively than other participants when they do participate (Agarwal, 2001, 2010, 2016a; Chhetri, Johnsen, Konoshima, & Yoshimoto, 2013; Coleman & Mwangi, 2013; Dewan, Mukherji, & Buisson, 2015; Elias et al., 2020; Mukherjee, Ray, & Bhattacharya, 2017).

The non-participation of the marginalized in the local institutions of CBNRM is a problem for at least two reasons. First, the overarching strategy of CBNRM is to involve local resource users in the management of the resources upon which they depend. In many contexts, the community members who are most reliant on local natural resources, such as forest commons, are members of marginalized groups (Agarwal, 2010; Saito-Jensen, Nathan, & Treue, 2010). Second, participants often earn excludable benefits in exchange for their participation. Inequalities in participation therefore undermine the promise of CBNRM as a livelihood source for the rural poor.

While some studies have critiqued CBNRM programs strongly on equity grounds (Essougong, Foundjem-Tita, & Minang, 2019; Kumar, 2002) and others have highlighted their various socioeconomic and environmental benefits (Luintel, Bluffstone, Scheller, & Adhikari, 2017; Oldekop, Sims, Karna, Whittingham, & Agrawal, 2019), the goal of this study is not to argue that CBNRM is inherently positive or negative from the perspective of equity or any other evaluative criterion, that it is a ‘holy grail’ policy, nor that it is necessarily preferable to another resource management arrangement. Instead, recognizing that such programs are common across the Global South and remain popular among many governments and non-governmental actors, this study examines the problem of unequal participation and tests whether such inequalities can be partially mitigated through two local institutional features: (1) rules stipulating that a share of CBNRM benefits be explicitly targeted at participants belonging to marginalized groups (hereinafter referred to as targeted benefits), and (2) rules mandating that such groups be represented on the leadership committees of local CBNRM institutions. In conceptualizing CBNRM participants as economic agents and testing the effects of economic incentives and local decision-making structures on patterns of participation, this study contributes to the literature on the political economy and microeconomics of CBNRM (Agarwal, 2009; Calfucura, 2018; Essougong et al., 2019; Tyagi & Das, 2020; Villamayor-Tomas, García-López, & Scholtens, 2020).

Empirically, the study uses data from a vignette experiment deployed with survey respondents in rural Nepal. The experiment described a hypothetical scenario framed around the village-level CFUGs responsible for governing the collectively owned forests upon which a large share of the rural population depends for energy, livelihood activities, and daily subsistence. The experiment tested the impacts of targeted benefits and minority representation on intentions to participate in CFUGs in a sample of respondents belonging to marginalized ethnic and caste minority groups, and the results indicate that those impacts were positive.

Nepal is an ideal case through which to explore the potential remedies to inequalities in CBNRM participation. There is a longstanding and broadly recognized pattern of ethnic and caste inequality in Nepal, wherein the Dalit castes in the Hindu caste system and the Janajati (or indigenous) ethnic groups tend to be

marginalized compared to members of the historically dominant Brahmin, Chhetri, and Newar ethnic and caste groups.¹ This has included discrimination against Dalits and Janajatis, and also deeply entrenched social, economic, and political disparities that fall along ethnic and caste lines. Brahmins, Chhetris, and Newars have historically been much better represented in government than Dalits and Janajatis, and Dalits and Janajatis have fared worse on average than Brahmins, Chhetris, and Newars on various measures of wealth and income, landholding, health outcomes, educational attainment, access to basic services, and subjective self-reports of empowerment and inclusion (Bennett et al., 2006).

There have also been noticeable disparities in participation in the community forestry program, which is the country's primary forest governance model. With oversight from government foresters, CFUGs make and enforce rules about how the local community forest can be used, and members engage in monitoring and patrolling, attend meetings, and perform forest maintenance activities like planting trees or cutting fire lines (Ministry of Forests and Soil Conservation, 2013). In exchange for their participation, member-households access various livelihood benefits, such as firewood and non-timber forest products from the community forest, paid employment as forest watchers, cash benefits (such as microloans or grants), and local public goods funded from the revenues of the CFUG. As previous scholars have noted, community forestry as practiced under the Forest Act of the early 1990s follows a generations-long history of forest governance through local collective action and traditional institutions in many rural communities—a history that was disrupted by a largescale forest nationalization program and other policy shocks, although traditional forest management institutions persisted in many areas (Arnold & Campbell, 1986; Gautam, Shivakoti, & Webb, 2004). In the decades following the creation of the national community forestry program, CFUGs have been lauded for helping to reverse deforestation in Nepal (Oldekop et al., 2019). At the same time, Dalit and Janajati households were found to be declining as a proportion of CFUG

¹ Newars are considered by some to be a Janajati group due to their status as the indigenous people of the Kathmandu Valley. However, because Newars do not typically face the same marginalization and structural disadvantage as many other Janajati groups (see Bennett, Tamang, Onta, and Thapa (2006)), a distinction is typically made between Newars and other Janajati groups. Hereinafter, “Janajati” refers to non-Newar Janajati groups.

member-households, according to a study of a nationally representative sample of these groups. Compared to Brahmin, Chhetri, and Newar participants, Dalit and Janajati participants were less likely to hold leadership positions in CFUGs, reported lower levels of influence over user group decisions, and generally reported participating less actively (Ministry of Forests and Soil Conservation, 2013).

Due in part to apparent inequalities and inequities in the community forestry program, the implementers of Nepalese CBNRM have experimented with a number of reforms aimed at Dalits, Janajatis, and other marginalized groups, most notably through the Community Forest Development Guidelines published by the national government in 2009 (Ministry of Forests and Soil Conservation, 2009). Two directives contained in the guidelines are of particular interest to this study, since they directed CFUGs to provide targeted benefits and representation to Dalits and Janajatis, among other marginalized groups (such as women and the poor). The guidelines directed CFUGs to adopt a rule that would set aside 35% of their revenues (generated in part through the sale of certain forest products to non-members) to be spent on benefits targeted at these marginalized groups, and stipulated that CFUGs should reserve a share of leadership seats on their elected executive committees for Dalit and Janajati candidates in proportion to their share of the local population (Ministry of Forests and Soil Conservation, 2009, 2013). There is considerable variation in the extent to which CFUGs have followed these recommendations. By 2013, data from a nationally representative sample of CFUGs suggested that less than one third of these groups had adopted a policy of providing targeted benefits in accordance with the 2009 guidelines, and Dalits and Janajatis often lacked proportionate representation on executive committees, though compliance with the government's equity-related guidelines was substantially higher in CFUGs that received part of their funding from foreign donors (Ministry of Forests and Soil Conservation, 2013). A more recent analysis corroborated these findings, showing that gender-related provisions in the 2009 guidelines were enforced unevenly in CFUGs across Nepal (Cook, Benedum, Gorti, & Thapa, 2023).

Policies such as these have gained relevance beyond the Nepalese context, within and beyond CBNRM. For example, reserved leadership seats for women and members of minority groups are mandated in some CBNRM programs in other countries (Elias et al., 2020), and are common in local governance

institutions in South Asia (Chauchard, 2017; Kulkarni, 2011). However, there is little existing evidence regarding the potential of these policy tools to strengthen the incentives for members of marginalized groups to participate in CBNRM, thereby helping to narrow disparities in participation.

2. Inequalities in participation: existing empirical evidence

Problems of inequality are recognized widely as a key threat to the success of CBNRM (Cook et al 2023) (Baynes et al., 2015; Friedman et al., 2018), and there is a broad and growing literature on issues of unequal participation, inequality, and elite capture under CBNRM and related governance approaches, in Nepal (Chhetri et al., 2013; Cook et al., 2023; Iversen et al., 2006), in South Asia more broadly (Behera & Engel, 2007; Elias et al., 2020; Mukherjee et al., 2017; Rahut, Ali, & Behera, 2015), and in other regions (Coleman & Mwangi, 2013; Essoungong et al., 2019; Kahsay & Bulte, 2021; Kahsay, Nordén, & Bulte, 2021; Persha & Andersson, 2014). Studies of community-based forest management in South Asia suggest that there are typically inequalities in participation, especially by gender, but also by ethnicity, caste, and economic status, and that these inequalities are often especially severe with regard to more active or empowering varieties of participation (Agarwal, 2001, 2010, 2016a). Other research corroborates this general story by showing that people who face marginalization tend to be less likely to participate actively in community institutions for natural resource governance, and are less likely to be empowered through their participation (e.g.: Agarwal, 2016a; Chhetri et al., 2013; Devkota, 2020; Elias et al., 2020; Mukherjee et al., 2017; Saito-Jensen et al., 2010). Some literature also acknowledges that members of marginalized groups sometimes have seemingly counterintuitive incentives to participate in arrangements that disadvantage them, due to coercion or local power dynamics, or to foster social capital (Kashwan, 2016; Mudaliar & Koontz, 2021).

Why is participation often unequal? User groups' rules often implicitly or explicitly exclude members of certain marginalized groups from group membership or participation in group decision-making (Agarwal, 2016a; Coleman & Mwangi, 2013; Meinzen-Dick & Zwarteveen, 1998). Due to social norms, elite men or members of historically dominant groups may be more likely to speak up in some local governance settings compared to marginalized participants, may be more influential when they do speak

up, and may be treated as important gatekeepers by the outside actors who implement CBNRM programs (Kashwan, 2016). The participation and influence of the marginalized are also constrained in settings where local elites have entrenched claims based on a history of prior control over natural resources (Agarwal, 2016a), and the marginalized may be less likely than the dominant groups to participate in CBNRM processes that involve navigating bureaucracies or interacting with government resource managers due to differences in literacy or in prior experience interacting with bureaucrats (Kashwan, 2016; Nightingale, 2005). Finally, members of marginalized groups may face weak incentives to participate where the cost-benefit structure associated with CBNRM does not favor them (Kumar, 2002), either due to elite capture (Persha & Andersson, 2014) or because the rules governing CBNRM privilege the typical livelihood activities of the dominant groups rather than those of the marginalized (Agarwal, 2010).

In summary, the previous literature provides wide-ranging evidence from cases around the world on the extent and nature of participation inequalities under CBNRM as well as the factors that give rise to these inequalities. Thus, the goal of this study is to generate experimental evidence on what can be done to narrow such inequalities where they do exist, and to thereby contribute to the growing literature on the institutional remedies for inequality and inequity under CBNRM (Cook et al., 2023; Kahsay & Bulte, 2021) and other common-pool resource governance arrangements (Cook et al. 2023).

3. Theoretical approach and hypotheses: demand-side and supply-side constraints on CBNRM participation among marginalized groups

This study assumes that potential participants are sensitive to the perceived material costs and benefits associated with their participation in natural resource management (Ostrom, 1990). The costs and benefits of participation, in turn, are shaped by local rules and institutions, and by the social context (Ostrom, 2005). This does not mean that the costs and benefits of participation are the *only* factors that shape participation decisions. For example, non-material values, relational concerns, and symbolic factors can also shape decisions to participate in CBNRM and other conservation programs. Nonetheless, all else equal, participation is more likely when the benefit-cost calculation is more favorable.

The main material cost associated with CBNRM participation is the demand placed on participants' time. Participants must often contribute to monitoring, resource maintenance, and governance activities such as attending meetings. The benefits associated with participation are more varied. Some benefits, such as improvements in natural resource availability due to participants' efforts to monitor and maintain the resource, may reach users regardless of their individual levels of participation in CBNRM, though the degree to which these translate into tangible benefits for individual households may vary according to factors like discount rates or the ability to use resources productively, which are themselves shaped by poverty and tenure insecurity. However, many of the benefits are excludable, and contingent upon participation in local CBNRM institutions. Participants are typically entitled to some natural resources from the common that they participate in managing—natural resources that they can sell or use for their own consumption. Furthermore, local CBNRM institutions often generate revenues from the sale of natural resources or resource extraction permits, and may use these revenues to fund certain excludable benefits to participants (such as microloans and grants).

Because participation involves substantial material costs in terms of participants' time and effort, it is reasonable to assume that people will be more likely to participate when the benefits of participation outweigh the costs. The literature reviewed in Section 2 suggests, however, that participation is not guaranteed to provide net benefits, and that the participation of members of marginalized groups, in particular, is limited by such *demand-side constraints*. Marginalized households may lack the capital and market opportunities necessary for using natural resources as productively compared to wealthier households. Furthermore, where the benefits from CBNRM are captured by local elites, or where local CBNRM institutions restrict the extraction activities that are most important to poor and marginalized households, the marginalized may see little reason to participate. These weak material incentives help to explain the somewhat puzzling finding that even in settings where the poorest households or members of marginalized groups are more reliant on natural resource commons than other community members are, they may not necessarily participate as actively in CBNRM (Agarwal, 2010). Targeted benefits like those discussed in Section 1 can counteract demand-side constraints for marginalized participants. Where

marginalized households are constrained in their abilities to use natural resources productively, cash generated by the group can provide an alternative revenue source. Where CBNRM places restrictions on livelihood activities that are important for poor or marginalized households, targeted proceeds from CBNRM can compensate these users. Where marginalized participants expect that elites might capture a disproportionate share of natural resource benefits, the earmarking of a share of benefits for the marginalized gives these participants some assurances.

The literature reviewed in Section 2 suggests, however, that in addition to the demand-side constraints already discussed, members of marginalized groups face *supply-side constraints* related to CBNRM participation. Supply-side constraints refer to the exclusionary norms and processes through which the locally dominant groups disempower the marginalized in CBNRM decision-making, which hampers the responsiveness of CBNRM to the preferences of the marginalized. Policies mandating the representation of marginalized groups in the governing council of the local CBNRM institution can strengthen participation by reducing these supply-side constraints on participation among the marginalized. There is theory and evidence to suggest that the descriptive representation of marginalized groups improves their substantive representation through multiple mechanisms, including marginalized group representatives' electoral incentives to respond to the preferences of their in-group, as well as their potentially stronger internal motivations to do so compared to representatives of the dominant groups (Sobolewska, McKee, & Campbell, 2018). In the context of CBNRM, marginalized ethnic groups, castes, and tribes may use natural resources differently than most households belonging to the dominant groups in the same village (Agarwal, 2010, 2016a). For example, in some villages, households from marginalized castes or ethnic groups may tend to prioritize the use of non-timber forest products from a communally managed forest, while members of the dominant groups tend to use fewer non-timber forest products and more timber products. In the absence of a policy mandating the involvement of minority leaders in CBNRM decisions, such as through the reservation of leadership seats on the local CBNRM governing committee, local leaders belonging to the historically dominant groups have little incentive to respond to the interests of the marginalized. More generally, participants belonging to marginalized groups may expect that they

are more likely to receive the benefits of participation noted above when distributive decisions are made by a local committee that includes marginalized group representatives.

Taken together, this all suggests that targeted benefits and representation can strengthen motivations for CBNRM participation among members of marginalized minority groups by reducing their demand-side and supply-side constraints. While both of these institutional features might also strengthen motivations for symbolic reasons, or by improving perceptions of procedural or recognition justice related to CBNRM (Friedman et al., 2018), this study assumes that these constraints are a central causal mechanism explaining the impacts of institutional features on participation, even if there are other, secondary mechanisms at play.

As previous research has noted, participation in CBNRM is multidimensional (Agarwal, 2016b). Participants engage in various participation behaviors—such as joining user groups, attending meetings, and speaking up at meetings, which are the three decisions operationalized in the experiment presented in this study. These three decisions correspond to the levels of participation that previous frameworks describe as ‘nominal,’ ‘passive,’ and ‘active’ participation, respectively (Agarwal, 2016b), and all are potentially shaped by demand-side and supply-side constraints. For example, households must often hold a user group membership in order to access the benefits offered to CBNRM participants, which means that material benefits targeted at marginalized groups create a strong incentive to join the user group. Where user group members belonging to marginalized social groups associate more benefits with their participation, they may also be more likely to attend and speak up at user group meetings, both because those material benefits offset the aforementioned opportunity costs associated with attendance, and because such meetings afford participants an opportunity to generate social capital with user group leaders and members as a way to secure access to CBNRM benefits.

Accordingly, this study tests six hypotheses:

H_{a1}: Members of marginalized groups will be more likely to join CBNRM institutions when programs offer targeted benefits.

H_{a2}: Members of marginalized groups will be more likely to join CBNRM institutions when there is mandatory representation for marginalized groups.

H_{a3}: Members of marginalized groups will be more likely to attend CBNRM meetings when programs offer targeted benefits.

H_{a4}: Members of marginalized groups will be more likely to attend CBNRM meetings when there is mandatory representation for marginalized groups.

H_{a5}: Members of marginalized groups will be more likely to speak up at CBNRM meetings when programs offer targeted benefits.

H_{a6}: Members of marginalized groups will be more likely to speak up at CBNRM meetings when there is mandatory representation for marginalized groups.

There is a higher dimension of participation that is not assessed in this study: the ability of the marginalized to influence outcomes through their participation (Agarwal). As Section 6 discusses, this dimension was deemed to be beyond the scope of the hypothetical survey experiment employed in this analysis, but it represents an important area for future research.

4. Material and Methods

4.1 Survey experiment

To test the hypotheses proposed in the previous section, this study uses an original survey experiment framed around community-based forest management that was administered to survey respondents in 100 villages in rural Nepal ($N = 1,177$, see Section 4.3). The survey experiment exposed respondents to a vignette describing a hypothetical CFUG in the respondent's village, followed by survey questions that asked respondents whether they would engage in a number of participation activities if the group existed in their village. To give respondents a sense of the costs and benefits associated with participation in the group, the vignette described the forest products to which group members gained access through their participation (free firewood, fodder, and dry leaf litter from the community forest), the management and governance activities to which members were expected to contribute (patrolling the forest,

working on forest cleaning and tree planting, and attending meetings), and the amount of time that the average group member allocated to those activities in a year (10-15 person-days per member-household). Through the vignette (shown in full in Appendix A), respondents were told other basic institutional details designed to be typical for CFUGs in the Middle Hills region where this study was implemented. CFUGs are a common, familiar institution in rural villages in the region. Respondents were randomly assigned so that the CFUG described to them in the vignette either had targeted benefits for members belonging to commonly recognized marginalized ethnic and caste groups, mandated representation of those groups on the executive committee of the CFUG, both targeted benefits and representation (the combined treatment), or a control with neither targeted benefits nor representation.

The targeted benefits treatment text shown in Table 1 described a fund maintained by the CFUG, intended to provide small grants to group members. The language stated that in order to qualify for such a grant, members must be Dalit, Janajati, or “poorer than most households in the village.” Although the purpose of this treatment was to target the hypothetical benefits to Dalits and Janajatis, the inclusion of poverty as an alternative targeting criterion was done to resemble common implementations of the targeted benefits recommended in the Community Forestry Development Guidelines described in Section 1. For the versions of the experiment without targeted benefits (the representation treatment and the control condition), the language explained that some groups in neighboring villages have a fund that provides grants to members (without describing any eligibility criteria based on ethnicity, caste, or poverty), but that this particular group described in the vignette did not.

The representation treatment text shown in Table 1 stated that four of the nine seats on the CFUG’s locally elected executive committee were reserved for members belonging to Dalit and Janajati groups as a rule,^{2,3} and described the current composition of the committee. For the versions of the experiment without

² The language states that the seats are reserved for Dalits and “non-Newar Janajatis.” See previous Footnote 1.

³ The Community Forestry Development Guidelines recommend that the proportion of seats reserved for Dalits and Janajatis should match their proportion in the local population. While basic population characteristics were collected for each site during each field visit, constraints in the field meant that those site-level data could not be fed into the proportions included in the vignette text. However, because some CFUGs in Nepal span multiple adjacent wards or

mandatory representation, the language simply stated that members from all ethnic and caste groups were free to run for the executive committee seats, and that the current executive committee was made up of Brahmins, Chhetris, and Newars. While the lack of Dalit and Janajati representation under the control condition created a strong treatment, this design was chosen to be consistent with observations in the literature in which marginalized groups are typically underrepresented in the absence of formal policy. Case studies of CFUGs in Nepal have frequently shown Dalits and Janajatis to hold few seats on the executive committee—or no seats at all—even when they are present in the general body of the group (Sunam & McCarthy, 2010; Yadav, Bigsby, & MacDonald, 2015). While this was therefore a reasonable formulation of the control condition, it is nonetheless likely that effect sizes in this experiment are larger than they would be under a design in which the treatment-control differences in representation were subtle. All versions of the vignette stated that four of the nine executive committee seats were held by women, though the age structure of the executive committee was not specified.⁴

multiple adjacent habitations, it is not unrealistic for a respondent to be exposed to a CFUG with a reservation that is higher or lower than population proportions in their own village. The proportions in the vignette were roughly similar to rural population proportions for Dalits and Janajatis in the study districts in which the individual sites were nested (see Appendix B).

⁴ Because gender balance on the executive committee was not varied, nor was the age structure of the committee specified, there is scope for future studies to explore the effects of gender reservations or executive committee age structure.

[Table 1]

4.2 Measurement of dependent variables

To measure participation intentions, respondents were asked a series of hypothetical questions following the vignette: (1) whether their household would join the CFUG described in the vignette, (2) whether the respondent would attend a meeting of the group if it were held next week in the village and their household was a member, and (3) whether the respondent would speak up at such a meeting if they attended (see Table 2). To facilitate interpretation, answers to the three survey questions shown in Table 2 were converted to dichotomous measures where “1” indicates that the respondent answered that they would “Definitely” or “Probably” take the action in question, and “0” indicates that they would “Definitely not” or “Probably not” do so.

The short-run question wording was chosen based on feedback during the initial refinement of the text, during which it seemed that longer-run questions would increase the cognitive load for respondents by asking them to make predictions farther into the future. Nonetheless, short-run survey questions have their own limitations. Specifically, some respondents might be more willing to attend meetings if such meetings are announced with more lead time. In that case, probabilities in this experiment could have been biased downward. However, reported intentions to attend meetings were high (see Section 5.2), which indicates that such bias is likely small.

[Table 2]

4.3 Field implementation and sample

The experiment was translated into Nepali by local researchers and included in a larger survey implemented by two local research firms in 100 villages in the Middle Hills region of rural Nepal for the baseline survey of a larger, in-progress impact evaluation study of community forestry policies. Households were sampled through a random walk. All interviews were conducted with informed consent, in accordance with a human subjects protocol that was reviewed and approved by the Institutional Review Board at the University of Colorado. Surveys were administered in Nepali in a face-to-face interview format in a private,

outdoor location at the respondent's house or farm. Enumerators were a mix of women and men. Appendix B describes the survey, sampling strategy, enumerator teams, and ethical considerations in greater detail.

Each respondent given the survey experiment was assigned to one of the four experimental conditions at random. The ethnicity and caste category of respondents was determined based on a survey question that tracked respondents' ethnicities and castes according to the categories tracked by the country's census (*National Population Census*, 2011). Of the 1,177 survey respondents randomly selected for the experiment, 542 (46%) reported belonging to a group that is commonly classified among the marginalized Dalit or Janajati groups, and these respondents comprise the analytic sample for the tests of the study hypotheses through the analysis presented in Section 5.1.⁵ The rest of the survey respondents belonged to the historically dominant Brahmin, Chhetri, or Newar groups, with a small number ($N = 9$) belonging to other non-Dalit and non-Janajati ethnic and caste groups (such as Muslims, or Terai middle-castes (Bennett et al., 2006)). Women comprised 60% of the analytic sample, and 22% of respondents in the analytic sample reported CFUG participation in the preceding year by answering affirmatively to the following question: "During the past 12 months, have you either held a membership, served a leadership role, or participated in any event, meeting, or activity for a CFUG?". Appendix B shows basic demographic characteristics for the respondents.

The study team piloted and refined the wording of the survey questions and experiment with local researchers, and with a similar respondent pool in rural Nepal, prior to the start of the study to ensure comprehension of the final vignette text. Respondents assigned to the experiment were also given a post-experiment comprehension check. In two separate follow-up questions, they were asked whether or not the CFUG described in the vignette had any Dalit members on its executive committee, and whether it had any Janajati members on its executive committee. Among the analytic sample, 87% of respondents answered both questions correctly.

4.4 Statistical analysis

⁵ This number of Dalit and Janajati respondents does not include Newar respondents, and Newar respondents were not included in the main analytic sample described here (see previous Footnote 1).

To estimate the effects of the treatments on the participation intentions of Dalit and Janajati respondents, the analysis presented in Section 5 uses a series of three logistic regression models that predict the dichotomous participation outcomes described in Section 4.2. The key terms on the righthand side of each equation are dummies indicating whether a respondent was given the targeted benefits treatment, the representation treatment, or the combined treatment, with the control as the omitted comparison category. To improve the precision of the estimates, the three regression models also include several pre-treatment covariates that could plausibly predict participation in CFUGs in this context based on existing theory: gender, household headship, and ethnicity (Agarwal, 2010), as well as respondents' previous participation in community forestry. Gender is captured as a dummy indicating whether or not the respondent identified as a woman, a dummy for headship is coded based on a household survey question indicating whether or not the respondent was identified as the primary household head in the household survey, and ethnicity is a dummy indicator for Janajati respondents (with Dalit respondents as the omitted comparison category). Previous participation in community forestry was captured through the dichotomous variable described in Section 4.3.

Appendix C includes calculations of statistical power and positive predictive value (PPV). Taken together, these calculations suggest that most treatment effect estimates were well-powered, and that the few underpowered estimates had high PPV and are therefore likely to reflect true effects. Appendix D re-runs the treatment effect estimation using alternative modeling approaches, including OLS, models without covariates, models that control for the proportion of households in the village who share the respondent's caste or ethnicity, and models that omit respondents who failed at least one of the comprehension checks mentioned in Section 4.4. Appendix E discusses potential limitations of the experimental design and analysis, especially the potential influence of social desirability bias or experimenter demand effects on the statistical results.

4.5 Participation profiles

In addition to estimated effects of the three experimental treatments on these three outcomes, Section 5.2 presents an additional descriptive analysis of ethnic and caste differences in participation ‘profiles,’ both with and without targeted benefits and minority representation. The participation profiles were constructed to correspond to four of the types of participation identified by established frameworks (Agarwal, 2016b), and were coded as follows: respondents were coded as ‘active’ participants if they would ‘probably’ or ‘definitely’ join the group, attend a meeting of the group, and speak up at the meeting; respondents who reported that they would ‘probably’ or ‘definitely’ join the group and attend a meeting but would ‘probably not’ or ‘definitely not’ speak up at the meeting were coded as ‘passive’ participants; if a respondent reported that they would join the group but would not attend a meeting, they were coded as a ‘nominal’ participant. Finally, ‘non-participants’ are all those who reported that they would ‘probably not’ or ‘definitely not’ join the group.

While Section 3 does not theorize about the participation decisions of members of the historically dominant groups (the Brahmin, Chhetri, and Newar groups, in the Nepalese case), Section 5.2 presents the distribution of participation profiles for Brahmin, Chhetri, and Newar respondents alongside those of Dalit and Janajati respondents. The purpose of this descriptive, exploratory analysis is to contextualize the main results of the experiment (the formal hypothesis tests described in Section 4.4 and presented in Section 5.1) by visualizing how participation inequalities appear to differ when targeted benefits and representation are in place compared to when they are not.

5. Results and Discussion

5.1 Targeted benefits and representation boost participation intentions among members of marginalized groups

Figure 1 shows the estimated effects of the three treatments in the sample of Dalit and Janajati respondents. Compared to their responses under the control scenario that lacked targeted benefits and representation, respondents were significantly more likely to report that they would join the group, attend a meeting of the group, and speak up at a meeting under the three other scenarios that had one or both of these institutional features. Compared to under the control scenario, respondents were nearly 30 percentage

points more likely to report that they would join the group, more than 20 percentage points more likely to report that they would attend a meeting of the group, and more than 15 percentage points more likely to report that they would speak up at a meeting under the combined treatment in which the group had minority representation and offered targeted benefits. Model results, shown in Appendix D, show that the treatment effect estimates are statistically significant at $\alpha = 0.05$ or above, and that they are generally robust to alternative model specifications, including those that employ linear link functions, drop covariates from the model, control for village fixed-effects, control for the proportion of households at the site belonging to the same ethnic or caste group as the respondent, and drop respondents who failed one of the two comprehension checks.

[Figure 1]

In addition to the finding that the three treatments appeared to cause Dalit and Janajati respondents to report greater intentions to participate, Figure 1 suggests at least two potentially important patterns. First, point estimates are highest for the treatment that involved both targeted benefits and representation. Second, effect estimates are generally largest for the group membership dependent variable and lowest for the dependent variable related to speaking up at meetings (with the representation-only treatment standing out as an exception to this apparent pattern) suggesting that targeted benefits may be a strong motivator for encouraging marginalized participants to join groups or attend meetings but a slightly weaker motivator when it comes to speaking up in group settings. This is unsurprising, since previous research argues that marginalized participants face deeply ingrained power dynamics that can discourage them from speaking up, confronting leaders, and making claims (Kashwan) (Agarwal, 2016a), and targeted benefits do not change these power dynamics. The reader should bear in mind, however, that the estimates are not statistically different from one another. While this is due to wide confidence bounds that may simply reflect a lack of statistical precision, the two patterns that are suggested by comparisons across treatment effects should be interpreted with caution.

5.2 Participation inequalities are less apparent with targeted benefits and representation in place

Figure 2 helps to contextualize the treatment effect estimates by showing how participation profiles are distributed under the control scenario (panel *a*) and the combined treatment with both targeted benefits and representation (panel *b*), for Dalit/Janajati respondents and Brahmin/Chhetri/Newar respondents (see Section 4.5). This descriptive, exploratory analysis suggests apparent disparities in participation disfavoring members of marginalized groups under the control scenario that lacked targeted benefits and representation. Under the control scenario, Dalit and Janajati respondents were noticeably less likely than Brahmin, Chhetri, and Newar respondents to exhibit an “active” participation profile, and noticeably more likely than Brahmin, Chhetri, and Newar respondents to report that they would not participate in the group at all.

[Figure 2]

Under the combined treatment with targeted benefits and representation, the proportion of Dalit and Janajati respondents exhibiting an active participation profile was noticeably higher than under the control scenario that lacked these features, and was roughly equivalent to the rate of active participation among Brahmin, Chhetri, and Newar participants given the same treatment. The proportion of Dalit and Janajati respondents who reported that they would not participate at all was noticeably lower under the combined treatment than it was under the control scenario. Generally speaking, when targeted benefits and representation were in place, patterns of participation for respondents belonging to marginalized ethnic and caste groups were similar to those of other respondents.

Figure 2 suggests some very small differences in participation profiles for Brahmin, Chhetri, and Newar respondents across the two experimental conditions shown. While impacts of targeted benefits and representation on the participation intentions of people belonging to the historically dominant ethnic and caste groups are not the focus of this study, the supplementary analysis in Appendix F explores the effects of the three treatments on the participation intentions of Brahmin, Chhetri, and Newar respondents (as well as a very small number of respondents belonging to the ‘Other ethnic group’ category described in Methods). Among these respondents, the two treatments with targeted benefits had substantively small, but statistically significant, positive effects on intentions to join the group, and the treatment with targeted benefits alone appears to have had a small positive effect on intentions to attend meetings. Thus, while most

treatment effect estimates were statistically insignificant for non-Dalit and non-Janajati respondents, there is evidence of some small positive effects for these respondents for a subset of the treatments and dependent variables. As discussed in Section 6, these effects among non-Dalit and non-Janajati groups could be explained through multiple theoretical mechanisms, and warrant further study.

While the participation profiles are a useful descriptive tool for visualizing *differences* in participation between the different institutional designs, the *absolute levels* of participation indicated in the experiment should be interpreted with caution. These absolute levels appear quite high, even for Dalit and Janajati respondents under the control scenario. Self-reported intentions to participate are probably somewhat inflated due to the hypothetical nature of the experiment, the fact that behavioral intentions are often overestimates of actual behavior (Webb & Sheeran, 2006), and potential social desirability bias (discussed in Appendix E). In light of this, the results of the experiment should not be interpreted as trustworthy estimates of absolute levels of participation, though the results are useful for testing the study hypotheses related to differences in participation across institutional designs.

6. Conclusion

This study provides preliminary, experimental evidence that targeted benefits and representation strengthen motivations to participate in CBNRM among marginalized ethnic and caste minority groups. As noted earlier in this paper, provisions related to targeted benefits and representation have been included in the government's Community Forestry Development Guidelines, but multiple studies show that equity-related provisions from those guidelines have been applied unevenly. This points to the importance of better monitoring and enforcement of these provisions on the part of government implementers. More generally, other countries implementing similar CBNRM programs may consider adopting and enforcing similar provisions providing targeted benefits and minority representation. The results of this study imply that such actions have the potential to bring CBNRM closer to the preferences of members of marginalized groups, thereby strengthening their participation.

While the findings from this experiment are promising, a number of outstanding questions remain:

First, more experimental evidence is needed on the *empowerment* of marginalized participants. While the results corroborate the economic theory advanced in this paper connecting institutional design to participation incentives, the inequalities that disempower marginalized people are not only economic, but also sociological (Agarwal, 2010, 2016b; Kashwan, 2017). This experiment does not test the potential effects of targeted benefits and representation on marginalized participants' abilities to influence outcomes when they do participate. This effect depends not only on marginalized individual's intentions to participate, but also on the behavior of other group members—especially local elites. Such an outcome is therefore beyond the scope of this experiment, since it is best explored in an experimental or observational setting where such group dynamics take place. While it would be possible to ask survey respondents to speculate whether, for example, they would be influential if they spoke up in group meetings, there was a conscious design choice to avoid such complex hypotheticals in this study in order to minimize the cognitive load on respondents. Questions like these represent an important area for future research.

Second, while the experimental results suggest that targeted benefits and representation enhance participation intentions among marginalized groups, a framed survey experiment cannot capture whether such effects manifest in actual changes in participation. There is therefore a need for credible impact evaluations of equity-related changes to existing CBNRM programs. While there have been notable evaluation studies of CBNRM programs themselves (Oldekop et al., 2019), such programs evolve over time in their handling of inequality and inequity problems, and rigorous evaluation studies of these *reforms* to CBNRM programs are less common. Thus, future work should validate the results of this study through randomized controlled trials of real program designs, or through quasi-experimental studies of reforms to CBNRM programs.

Third, while this study focused on participation intentions of members of marginalized groups, it is also important to understand the impacts of equity-related reforms on the attitudes and behaviors of members of the dominant groups who are not targeted by such policies. While the results of this experiment do not suggest any negative impacts of targeted benefits and representation on the participation intentions of members of the dominant ethnic and caste groups in the study context (see

Appendix F), more research will be needed to understand the potential impacts on attitudes regarding minority groups, and on intergroup relations and community cohesion by extension. Previous research in other settings suggests that such effects may be negative (Berry, Bouka, & Kamuru, 2021) or positive (Chauchard, 2017). This experiment, designed to test effects on Dalit and Janajati participation, is limited in its ability to speak to potential resistance from dominant groups. This is because participation intentions are not the most accurate measure of acceptance or resistance. If dominant groups are indeed resistant to equity-related reforms, they might signal their resistance by refusing to participate. Alternatively, they may react by participating more intensely in an attempt to assert control, which could manifest in the positive effects among dominant groups seen for some of the treatments in this experiment (discussed in Section 5.2). Future experiments should employ measures of resistance—such as attitudinal variables, or willingness to contribute—as dependent variables through which to explore the effects of these treatments among the dominant groups, though it may be difficult to elicit such resistance in a hypothetical experiment like this one.

It is also possible that dominant groups in this context are not resistant to the equity-related reforms described in the experiment. This could be because more advantaged households have better access to other livelihood opportunities (such as urban or international out-migration and other off-farm activities), or they own more private land that provides similar forest products, so that they are less likely to perceive a gain for marginalized groups in a common-pool resource setting as a loss for their own livelihoods. Alternatively, a lack of resistance could be due to inequality aversion and fairness preferences. Finally, households from dominant groups may sometimes perceive that they are potential targets of some equity-related features. For example, the targeted benefits treatment in the experiment included poverty as an alternative targeting criterion to caste and ethnicity in order to resemble real-world initiatives (see Section 4.1), and it is reasonable to assume that many Brahmin, Chhetri, and Newar households believed that they would be eligible for those funds. This would explain why, as discussed in Section 5.2, the only treatments that had apparent positive effects on the participation of Brahmin, Chhetri, and Newar households were treatments with targeted benefits.

Relatedly, how important is explicit targeting of marginalized groups? The experiment compared a scenario with minority-targeted, CFUG-funded grants to a control condition in which the CFUG did not offer grants to member-households at all. The control condition was designed in this way because this scenario is a plausible one in many contexts, but this design does not generate evidence on whether a similar basket of benefits offered to member-households *without* explicit targeting criteria would have boosted participation intentions, nor whether the apparent added value of a targeted benefits treatment is larger in this experiment than it would be when compared to a counterfactual of *untargeted* benefits. Since benefit-sharing under CBNRM tends to disfavor the marginalized, it is likely that such effects would be smaller in the absence of explicit targeting compared to in the positive discrimination scenario employed in this experiment, but there is room for future experiments to explore this. Such an analysis would be especially useful for tailoring reforms to CBNRM for contexts where explicit minority targeting might face elite resistance or stoke conflict.

There is also evidence that participation in community forestry has declined recently in some communities due to widespread out-migration from rural Nepal to urban Nepal and to other countries, and possibly due to waning interest in the program among youth (Poudyal, Paudel, Marquardt, & Khatri, 2023). While this may be a threat to the long-term resilience of the program, it also raises potential equity issues if marginalized resource users are disproportionately left behind, and if a resultant reallocation of responsibilities within the user group creates new burdens for marginalized households. These potential equity issues—which are separate from those studied in this experiment—represent an important area of future inquiry that can speak to timely policy debates in Nepal while also helping scholars and policymakers beyond Nepal understand how CBNRM programs evolve in response to societal changes in rural areas.

Finally, it is likely that the effects of the institutional design features in this study interact with other features of the local context in ways that the experiment did not capture. For example, it is possible that effects of minority representation differ depending upon whether decision-making is based on majority rule, consensus, or unanimity, especially since veto points are believed to be important for the effective representation of minority interests (McCulloch & Zdeb, 2022). This warrants future study. CBNRM may

also interact with payments for ecosystem services schemes under REDD+ to shape various outcomes. For example, in Nepal, a number of REDD+ pilot projects have been undertaken. Often, this means that carbon payments are channeled through CFUGs in order to support the governance and management of community forests and compensate groups for carbon sequestration (Devkota, 2020; Sharma et al., 2020; Sharma, Shyamsundar, Nepal, Pattanayak, & Karky, 2017). These projects often have their own equity-related design features that may bolster participation among the marginalized even in the absence of equity-related government policy reforms (Devkota, 2020). The potential interaction of equity-related provisions in CBNRM with REDD+ is therefore an important area of future experimental research.

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7. References

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Table 1: Randomly assigned experimental conditions. Survey respondents were presented with a short vignette describing a CFUG. Respondents were assigned at random so that the vignette either included (a) or (b), and were also assigned at random to either (c) or (d). Appendix A shows the full text of the vignette.

(a) With targeted benefits	“...[the group] makes a certain amount of profit each year from selling forest products to people from outside the village. In addition to using those revenues to fund the expenses of [the group] (such as hiring guards, for example), [the group’s] rules stipulate that about one third of those revenues each year go into a special fund which provides grants to households. The grants can be used for a household’s (i) educational expenses, such as tuition, (ii) emergency medical needs, and (iii) livelihood generating activities, such as buying agricultural equipment. These grants are available only to CFUG-member households that are Dalit, Janajati, or poorer than most other households in the village...”
(b) Without targeted benefits	“...[the group] makes a certain amount of profit each year from selling forest products to people from outside the village. The rules stipulate that [the group] must use those revenues to fund the expenses of [the group] (such as hiring guards, for example). While CFUGs in some neighboring villages use their funds to provide grants to member-households that can be used for the educational expenses, emergency medical needs, and livelihood generating activities of local households, [this group] does not have any rules specifically requiring such spending, and it has not provided any grants like that in the past...”
(c) With representation	“... [the group’s] rules stipulate that each time leaders are elected by local villagers, four of the nine executive committee seats must be reserved for local people from the Dalit and Janajati castes ... and the remaining five seats are open to anyone regardless of caste. Because of this rule, the executive committee currently has two Dalits and two Janajatis, and the rest are a mix of Brahmins, Chhetris, and Newars...”
(d) Without representation	“...The [group’s] rules state that local people of all castes from the village are eligible to run for election to the executive committee, including Brahmins, Chhetris, Newars, Janajatis, and Dalit people. Of the nine people currently serving on the executive committee, one is a Newar person, while all the other eight are Brahmins and Chhetris...”

Table 2: Measurement of dependent variables. Following the experimental vignette, respondents were asked three questions related to their participation decisions with respect to the hypothetical group described in the vignette. Answer choices: “Yes, definitely,” “Yes, probably,” “Probably not,” “Definitely not.”

Dependent Variable	Survey question
(a) Group membership	“Do you think your household would join [group] if it existed in your village today?”
(b) Meeting attendance	“Let's suppose that your household does indeed hold a membership in [group]. Do you think you would attend a general assembly meeting of [group] if it were held next week here in this village?”
(c) Speaking up	“Let's suppose that you are a member of [group], and that you have views on the functioning of the user group. If you attended a general assembly meeting of [group] held next week here in this village, would you speak up at the meeting to try to convince the forest user group leadership to implement changes to the rules?”

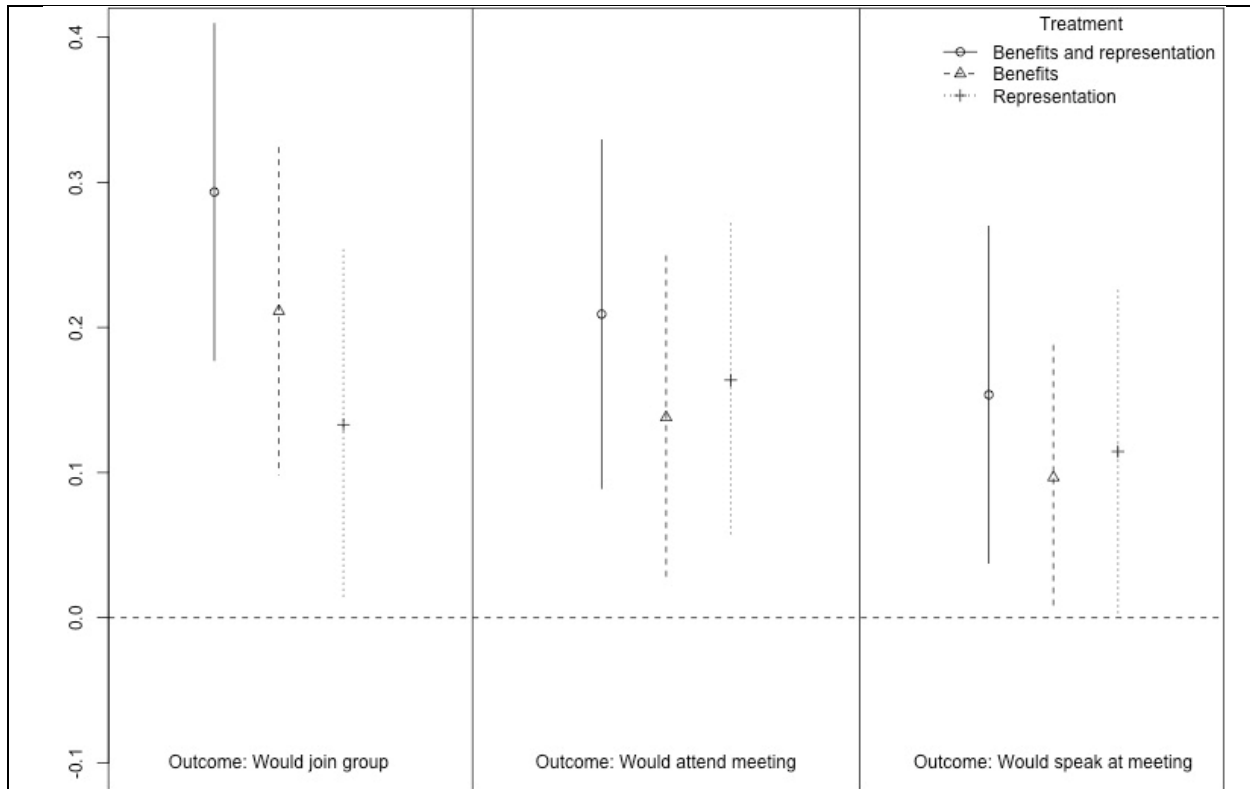


Figure 1: Estimated effects of experimental treatments on participation intentions among Dalit and Janajati respondents. Average treatment effects of targeted benefits, representation, and the combined treatment estimated with a logistic regression model and converted to the probability scale using the delta method (Gelman & Pardoe, 2007). See Section 4 for details on the estimation approach, treatments, and measurement of the dependent variables. All estimates are statistically significant at the $\alpha = 0.05$ confidence level or above (see Appendix D for full model results).

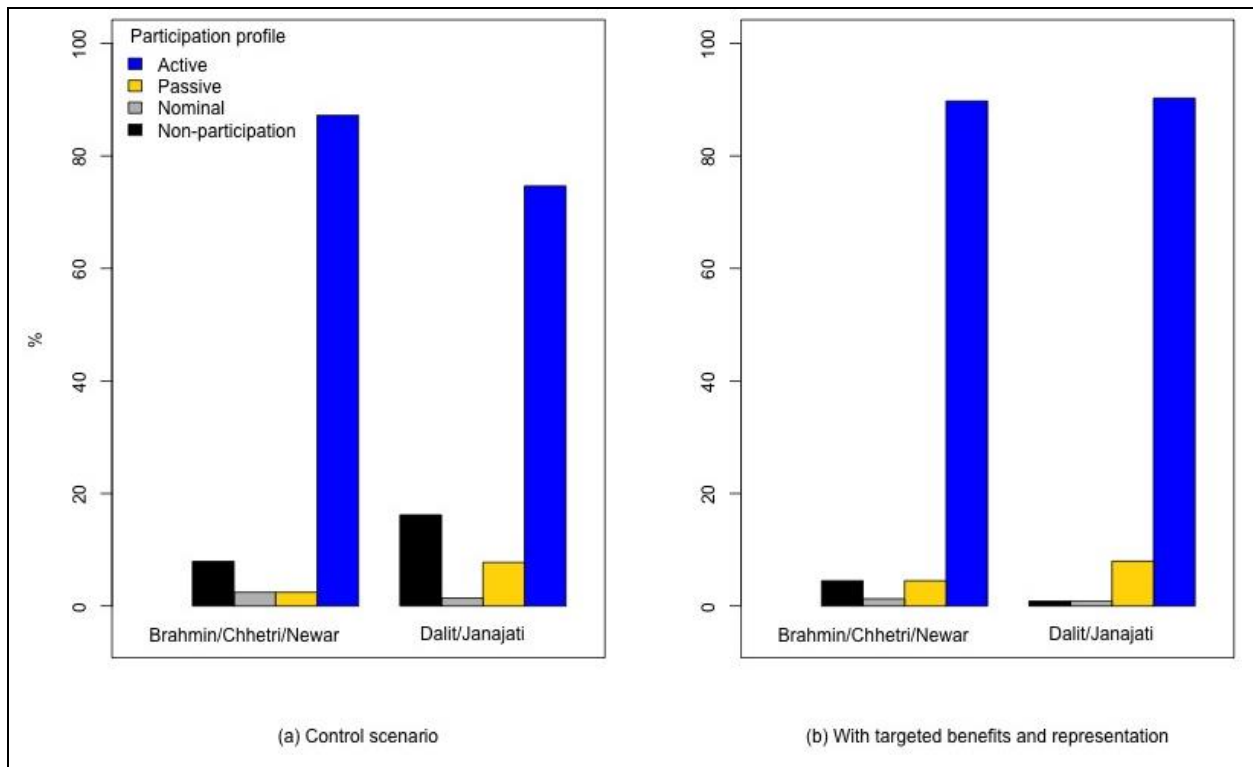


Figure 2: Comparison of participation profiles under the control scenario (a) and the combined treatment (b). ‘Active’ participants stated that they would join the group, would attend a meeting of the group, and would speak up at the meeting. ‘Passive’ participants stated that they would join the group and attend a meeting, but would not speak up. ‘Nominal’ participants stated that they would join the group but would not attend a meeting. ‘Non-participation’ indicates that the respondent said they would not join the group. See Section 4.5 for further details.