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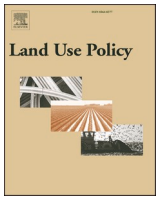

Women and timber management: From assigned cook to strategic decision-maker of community land use

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ABSTRACT

Numerous studies on community forest and land use show clear benefits of including women in natural resource management. Women's empowerment in collaborative timber management, however, is understudied and rarely achieved on the ground. We focused on women's participation in seven community-based timber projects within three Brazilian Amazonian extractive reserves, asking: 1. What resources (actual allocations, future claims and expectations) have shaped women's roles in collaborative timber management? 2. How do community women perceive their role in collaborative timber management? 3. Have community members and partner organizations perceived gender equity in collaborative timber management? Over 15 months, we carried out in-depth interviews with 52 respondents, conducted participant observation, and led focus group discussions that included community concept drawing activities. We uncovered that while these collaborative timber management projects still centered on male workers, in two of the three extractive reserves, empowerment processes ultimately opened spaces for greater engagement by women overall in strategic administrative and logging coordinator positions. We added to the scholarly conceptualizations of women's empowerment, demonstrating that 'power through' can lead to more permanent empowerment levels. Although normative values associated with gender (i.e. men stronger than women) were subtly embedded in the actual allocation of both human and social resources (capacity building and networks, respectively) for collaborative timber management, integration of a few women in male-centered training efforts provided venues for transformative agency towards women's placement in strategic timber management positions. Supporting such transformative processes to empower women in community land use and forestry requires awareness of gender-based discriminatory attitudes and practices on the part of men and women, as well as innovations by policymakers, community members, government, and non-governmental organizations.

1. Introduction

Women's roles in natural resource management and governance are a critical theme in land use and forest research and policy (Dugasseh et al., 2021; FAO, 2014; Nandigama, 2020), and in gendered literature on women's empowerment discourse and practice (Arora-Jonsson, 2014; Bose et al., 2017; Mandawali et al., 2021; Sell and Minot, 2018). Within a binary gendered model, gender determines what is expected, allowed, and valued in a woman or a man, in a given context (Colfer, 2021). Gender norms within natural resource and land use settings often assign women to reproductive roles (including food production to provide for the family), while men are primarily responsible for productive activities that generate cash income (Sharp et al., 2003), shaping power dynamics based on economic resources. Furthermore, women and men have different spaces in which they exercise decision making power. Importantly, in public collective forums, this power (or authority) is often assigned to male members (Agarwal, 2001, 2015). However, gendered norms that guide what men and women are expected to accomplish are socially constructed, reflecting the society in which they are embedded. This also means that gender norms and roles are not only context-specific, but also changeable over time, as societies evolve.

Within the context of sustainable timber management, women's

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participation is understudied and seldom achieved on the ground (Colfer and Minarchek, 2012; Schmink and Gómez-García, 2015). This applies where forest lands are owned outright by local communities (Antinori and Bray, 2005) and in collaborative management (or co-management) settings, whereby communities share forest management rights and responsibilities with government and sometimes other actors (RRI, 2020). While co-management of community-owned forests is a crucial pragmatic strategy in the operationalization of efforts to decentralize and devolve forest tenure rights to local communities (Aggarwal et al., 2021; Baynes et al., 2015; Doss and Meinzen-Dick, 2020), conditions to collaborate are rarely extended to women. For example, programs and policies seeking to promote community timber management often focus material resources and training to male community members and, perhaps unwittingly, marginalize women, and inappropriately limit gender roles and responsibilities at the community level (Schmink and Gómez-García, 2015; Veuthey and Gerber, 2010). When considered, women's roles in collaborative timber management tend to be restricted. Women often are assigned normative positions to provide food for male timber workers, and they often are poorly supported by policymakers and forestry extension services (Carr et al., 2021; Rainforest Alliance, 2015). Ultimately, timber-focused community projects centered on male timber workers can perpetuate exclusion of the knowledge, talents, and labor that approximately half of the community population could bring to the forest management table. An exclusive male focus in timber projects also excludes women from local decision-making bodies regarding community land use (Mai et al., 2011) and impedes gender disaggregated data that could provide a more complete understanding of forest use and local livelihoods (Doss, 2014). It also hampers successful development of land use policy, such as with Reducing Emissions from Deforestation and Forest Degradation (REDD+) (Alcorn, 2014), forest restoration, and integrated, efficient governance of non-timber forest products - NTFPs (Cazzolla Gatti et al., 2014; Guariguata et al., 2009). The latter are particularly important to women's livelihoods (Sunderlin et al., 2008; Wunder et al., 2014) providing economic returns and enhancing human well-being at the individual, household and community level (Vázquez-García and Ortega-Ortega, 2017).

Existing research on gender equity and women's empowerment in the forest sector tends to examine factors that determine women's participation or empowerment in forestry institutions (Agarwal, 2015, 2001; Coleman and Mwangi, 2013; Mai et al., 2011), demonstrating the importance of interactive gender participation (Agarwal, 2001) in decision-making and forest use (Mai et al., 2011; Nandigama, 2020). Another set focuses on outcomes of women's role in forest management (Agarwal, 2010), with special emphasis on women's role in collection and production of NTFPs (Bose et al., 2017; FAO, 2014; Neumann and Hirsch, 2000; Sunderland et al., 2014). Yet, studies rarely explore the resources (actual allocations, future claims and expectations) that prevent or improve gender equity in the management of timber resources (Carr et al., 2021), pointing to a gap in the literature and practice that we seek to fill. We thus ask:

1. What resources (actual allocations, future claims and expectations) have shaped women's roles in collaborative timber management?
2. How do community women perceive their role in collaborative timber management?
3. Have community members and partner organizations perceived gender equity in collaborative timber management?

While gender equality and women's empowerment are critical Sustainable Development Goals (SDGs) for women and girls (Carr et al., 2021; United Nations, 2017), centering attention first on gender equity (women and men treated fairly in accordance with their respective needs) helps focus on the specific, often different needs for achieving women's rights and benefits. This can include equal or dissimilar treatments, and often requires integrated measures to compensate for both historical and social disadvantages women have faced (Kabeer, 2005). In our study, we use gender equity in collaborative timber management, understanding that community women (versus men) in the forest sector historically have different needs, perspectives, and tools to access and use forest resources (Colfer and Minarchek, 2013).

Our inquiry was motivated originally by observations of seven community-based timber co-management operations within three extractive reserves in the Brazilian Amazon. In these settings, local "timber workers" (*manejadores* in Portuguese) refers to community members, applied almost solely to men, who occupy timber management positions, typically within logging operations and/or as timber management leaders. We sought to shed light on the low number of women participating as timber workers, and highlight how, against the odds, a few became "*manejadoras*" (female timber workers in Portuguese). Although results cannot be generalized to other populations, our study brings valuable insights about women's roles, gender equity, and women's empowerment in collaborative timber management, wherein a male-dominated perspective still prevails among community members, practitioners, and policymakers (Colfer, 2021).

2. Overview of theoretical foundations and conceptual framework

Empowerment is a process of change wherein individuals or organized groups acquire the ability to make strategic life choices when such ability was previously denied or restricted by predefined social norms and/or unequal power relations (Ali, 2014; Ibrahim and Alkire, 2007; Kabeer, 1999; O'Hara and Clement, 2018). For women with forest-based livelihoods, that process may enable greater access to and use of the forest and increased ability to decide among select alternatives that will impact their lives and those of others. The possibility of change is embedded in pre-conditions (resources, broadly defined) that allow enabling processes (agency) to happen, and result in tangible, desirable outcomes (achievements). *Resources* (Fig. 1, magenta boxes and arrows) may include material goods (income or forest resources, for example), social resources, such as networks, or human resources, such as education (Coleman and Mwangi, 2013) and/or management skills (Mello and Schmink, 2017). Moreover, resources may include actual allocations - those immediately accessible to an individual at a given time - as well as future claims and expectations - investments in formal (i.e., general schooling) and informal education (i.e., training for natural resource management) that can result in prospective knowledge and skills to a achieve a determined function in an institution (Williams, 2016). Access to these resources – the actual allocations and future claims and expectations – allows an individual to exercise agency. *Agency* (Fig. 1; orange boxes and arrows) refers to the motivation and ability to act individually or collectively based on self-defined goals and personal or common interests (Galiè and Farnworth, 2019). *Achievements* (Fig. 1; red box) refers to the conjunction of resources and agency that results in empowered actions (Fig. 1; green box) and ultimately, desired well-being outcomes (Kabeer, 1999).

Of particular interest in our work, agency can be operationalized as decision-making ability (Kabeer, 1999) expressed in different forms of power. For instance, 'power within' refers to personal self-confidence and guides the meaning, motivation, and purpose of an individual to act upon defined goals and interests. 'Power to' is the power to act towards a transformative outcome or to resist a change, described by Kabeer (1999) as transformative and effective agency, respectively. Other expressions of power also can help explain women's empowerment (O'Hara and Clement, 2018). For instance, 'power with' refers to power obtained from an alliance of individuals to act in mutual support toward common interests. 'Power over' is about domination, coercion, or control that a given individual or social actor can exert over another. More recently, Galiè and Farnworth (2019) added a new concept of power to the feminist empowerment literature: 'power through' (Fig. 1; blue box and dotted arrow), which is often temporary power that is exercised without agency. It is the power that an individual may attain,

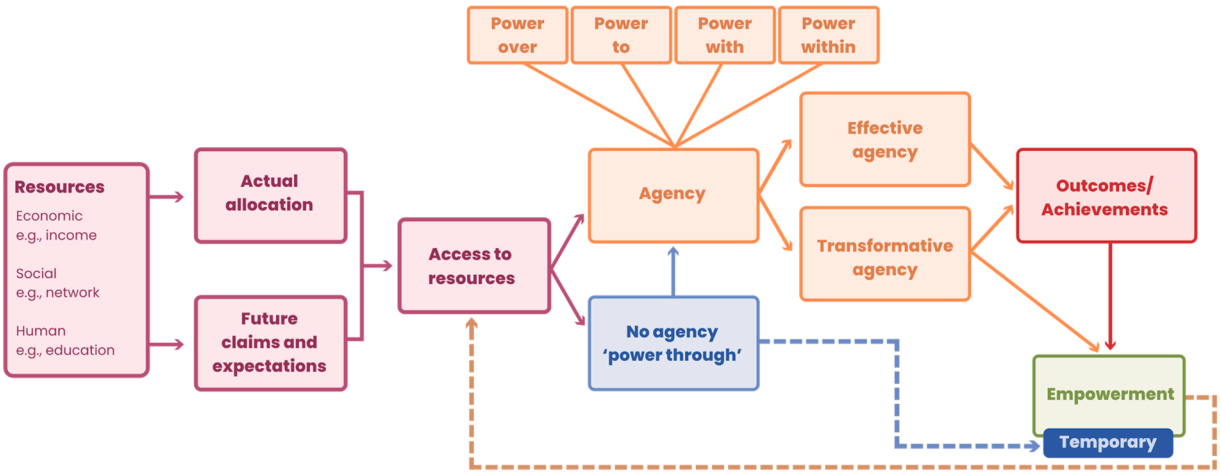

Fig. 1. Conceptualizations of women's empowerment used to guide this study based on the foundational conceptual map of Williams (2016, p. 69) and works of Galiè and Farnworth (2019) and Kabeer (1999). Magenta boxes and arrows highlight pre-conditions (resources, broadly defined) that allow enabling processes (agency – boxes and arrows highlighted in orange) to happen, and result in tangible, desirable outcomes (achievements – box highlighted in red) that leads to empowerment (box highlighted in green).
Source: Authors' elaboration.

and then may lose "through changes in the empowerment status of others, or through relating to others" (Galiè and Farnworth, 2019, p. 14). 'Power through' "allows the experience of empowerment and disempowerment to remain distinctive and personal to an individual, yet is mediated through the existence of others" (Galiè and Farnworth, 2019, p. 14). While empowerment 'through' can be temporary, we argue that women can use this temporary relational power to access previously inaccessible resources (Fig. 1; brown dotted arrow) that can then result in agency, and ultimately the exercise of different dimensions of power such as 'power within', 'power with', and 'power to' and, desired individual and collective well-being outcomes.

3. Research methodology

Extractive reserves in the Brazilian Amazonian are relevant research sites to examine the ascension of rural women in managing natural resources within collective land use systems (Schmink and Gómez-García, 2015; Shanley et al., 2018). Extractive reserves are sustainable use protected areas - public lands administered by the federal government and designated for communal use by traditional peoples (PNAP, 2006). They emerged as a land tenure proposition spearheaded by Amazonian rubber tappers, their corresponding social movement, and allies (Gomes et al., 2018). The struggle of these local forest users, both men and women, gained worldwide attention during the 1980's for their bold proposal to secure massive forest areas under public ownership while maintaining their rights over natural resources to agricultural subsistence and sustainable commercial use of natural resources (Allegretti, 1990, 1992). Widespread application of this concept led the International Union for the Conservation of Nature (IUCN) to establish Category VI: Protected area with sustainable use of natural resources (Maretti, 2005). Nowadays, extractive reserves cover more than 15 million ha in a variety of Brazil's biomes, ranging from forest to marine areas (Prado and Seixas, 2018). They are embedded in the land tenure legal framework of the Brazilian National System for Conservation Units (SNUC, 2000) wherein State and reserve residents share rights, responsibilities, and benefits over natural resources. Local people living within these reserves collectively hold renewable long-term concessions through community-based associations to sustainably use the reserves' natural resources (PNAP, 2006).

Timber is an important asset in terrestrial reserves. Residents often had logged individual trees traditionally for housing and other buildings, and sometimes, for commercialization as part of their multiple use of forest resources (Espada and Sobrinho, 2019; Humphries et al., 2020). Because the latter had intensified (Miranda et al., 2020), the federal government established a specific legal framework, Normative Instruction No 16/2011 (hereafter Norm 16/2011) to approve community-based timber management projects (ICMBio, 2011). This reinforced government recognition of local management rights, but also created settings for collaborative timber management arrangements between communities and the federal agency that oversees protected areas management, Chico Mendes Institute for Biodiversity Conservation - ICMBio (Santos, 2017). ICMBio approves, monitors, and oversees community-based timber management projects (hereafter timber projects), while the community association is legally responsible for the project, and its members, the reserve residents, are expected to implement the project's operational and administrative activities. That local communities were given explicit, legal authority to collaboratively manage their timber was considered a huge step forward toward community empowerment (Santos, 2017). Legal and institutional frameworks did not differentiate use rights by gender, meaning that men and women, in theory, had the same rights to access, use, and manage forest resources, including timber.

3.1. Research sites

To examine women's participation in this recent co-management scheme applied specifically to reserve timber resources, we studied seven timber projects within three extractive reserves: Chico Mendes, Ituxi, and Verde para Sempre (Fig. 2).

Most strategic decisions related to natural resources use, including timber, were made by the State and reserve residents during biannual, reserve-specific and multiple-day Deliberative Council meetings that included diverse levels of government actors, researchers, the private sector, resident communities, and their local institutions. The seven timber projects in our study were the first ones approved under Norm 16/2011. At the time of data collection, these seven were the only ones that had completed at least one annual timber harvest, meaning that reserve residents were effectively implementing the timber plan approved by ICMBio. While all were located within Amazonia, forest resources within each of the three reserves varied, as did timber management arrangements, which depended on diverse factors including regional markets, local associations, and resident capacity to organize and manage resources (Table 1).

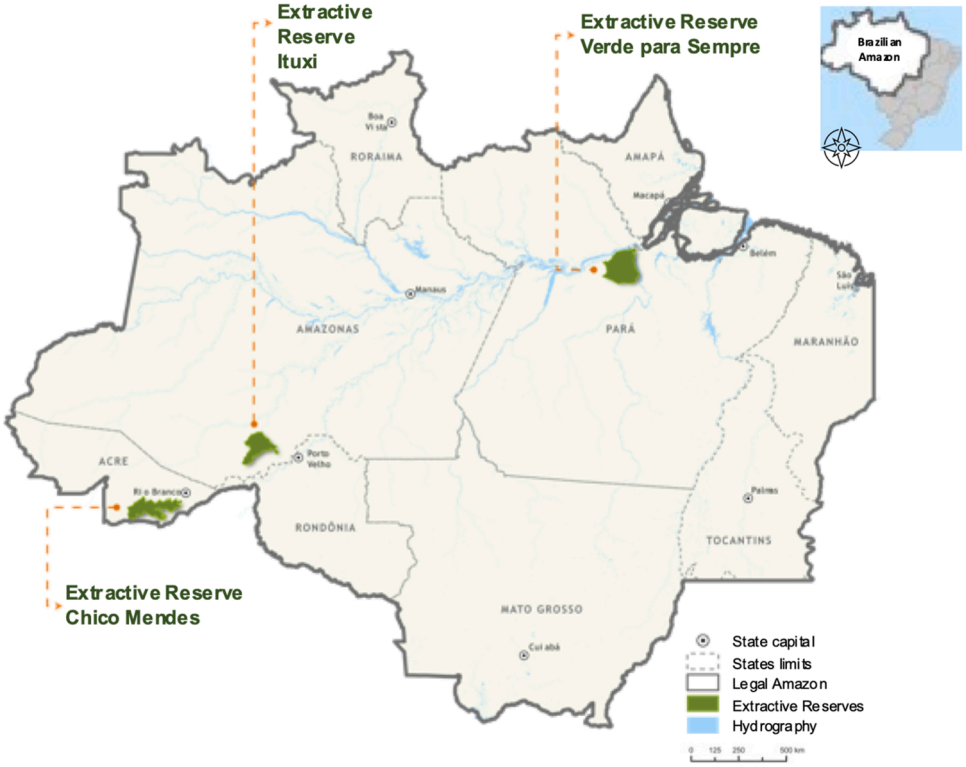

Fig. 2. Locations of the three extractive reserves in the Brazilian Amazon, which housed the universe of seven community-based timber co-management projects examined in this study.
Source: authors' elaboration.

4. Methods

Our research design involved an embedded multiple-case design (Yin, 2009), using three criteria for study inclusion: (1) located within an extractive reserve, (2) approved under Norm 16/2011, and (3) completed at least one timber harvesting season. This universe of seven community associations each co-manage their timber resources within three extractive reserves.

We used mixed methods, integrating multiple sources of evidence to analyze these cases (Baxter and Jack, 2008; Leech and Onwuegbuzie, 2008; Yin, 2009): (1) In-depth semistructured individual interviews (Flick, 2009); (2) Focus group discussions (Morgan, 1996) with a) diverse local users as part of a forest-based community exchange, and b) women only in one reserve; and (3) Participant observation (Bernard, 2006). Field data was collected from May 2018 to September 2019, and all methods complied with research ethics overseen by the University of Florida's International Review Board and were approved by IRB201800341 and by the Brazilian Ministry of Environment (SISBio 62191–1).

4.1. In-depth semi-structured individual interviews

To investigate the resources (actual allocation, future claims and expectations) that have shaped women's roles in collaborative timber management, we followed a guided questionnaire and carried out 52 face-to-face, in-depth semi-structured individual interviews (Flick, 2009) with 39 community members (women = 17) from the three extractive reserves and 13 representatives of partner organizations. The latter, all men, worked in government, timber markets, private forest service providers, or non-governmental organizations (NGO). At participant convenience and comfort, nine of these 17 interviews were conducted solely with the woman present, while diverse family members joined the other eight. We specifically asked these female interviewees if they participated in the timber projects and if yes, which roles they occupied (e.g., decision-maker or timber worker), subsequently exploring their personal trajectories to understand what they did and how they secured the opportunity to participate.

To explore perceptions of partner organizations about gendered participation and empowerment in collaborative timber management, we specifically asked individuals within partner organizations (n = 13) to explain their understanding of community empowerment and disempowerment, including the elements and conditions for a community to be considered empowered or disempowered. We targeted these individual external actors to explore if gender equity would surface in their understanding of empowerment and disempowerment. We asked the same questions to community members, not as individuals, but during focus group discussions. Overall, individual interviews took an average of 1 ½ hours to complete, with the longest lasting 4 h and the shortest 30 min; all was recorded with permission from participants.

4.2. Focus group discussions

4.2.1. Women, men and mixed groups

We organized a focus group discussion during a larger 3-day community information exchange activity (Espada and Kainer, 2020). The 3-day exchange grew out of a previous workshop (Fonseca et al., 2020) and specific request from community members themselves who wanted more information flow about timber co-management experiences in Brazilian Amazonian extractive reserves. The focus group discussion was implemented specifically to explore gendered perceptions of community empowerment within collaborative timber management. Exchange participants were recruited through a volunteer sampling technique. We advertised to leaders and in meetings that community members select participants under the following criteria 1) knows the timber projects and its historical processes; 2) is motivated to share his/her experience to a large group; 3) gender balance; and 4) age

Table 1
Relevant characteristics of the extractive reserves and the seven community-based timber co-management projects.

Characteristics	Extractive Reserve		
	Chico Mendes	Ituxi	Verde para Sempre
General extractive reserve characteristics			
Municipality (State)	Xapuri (AC)	Lábrea (AM)	Porto de Moz (PA)
Total area (hectares)	931,537	776,323	1,289,000
Predominant forest type[1]	Upland Ombrophilous Forest and Open Ombrophilous Forest	Dense Lowland Ombrophilous Forest	Dense Upland Ombrophilous Forest
Main commercial products	Brazil nuts; Timber; Cattle[2]; Manioc flour	Brazil nuts; Manioc flour, Fish; Tree oils; Timber	Timber; Manioc flour; Brazil nuts; Fish
Relevant timber project features			
Number of timber projects approved	1	1	5
Year of timber project approval	2014	2016	2016
Logging area size (hectares)	24,589	1403	40,602
Commercial timber basal area	Low	Low	High
Harvesting intensity to date	8 m^3/ha	10 m^3/ha	25 m^3/ha
Timber product commercialized	Round wood	Sawn wood	Round wood
Timber management arrangements	Community association and its members sold timber as standing trees to a timber cooperative that hired some community members	Community association executed all logging activities, retained control over timber sales, and processed sawn timber	Community association hired logging companies for skidding activities and association retained control over timber sales
Relevant characteristics of timber workers			
Hours of RIL training received	32	96	127 (for each project)
Number of internal resident workers	5	19	127 (total for the 5 timber projects)
Number of external (outside reserve) workers	~24	None	None
% Female workers	None	32% (n = 6)	26% (n = 33)

1 Based on Pires and Prance (1985). [2] Cattle raising is an authorized activity according to local regulations agreed upon by the federal government, reserve residents, and partner organizations.

balance. This resulted in a focus group composed of 27 community member participants (17 male, 10 female) from all three cases studied: Chico Mendes, Ituxi, and Verde para Sempre. We asked specifically for their understanding of what community empowerment and disempowerment means and how it occurs, using an adaptation of Community Concept Drawing (McOmber et al., 2021, 2015) elaborated in five stages. First, we asked participants if they had heard of the word/concept of community empowerment. Second, we split participants in three small groups (5–6 individuals): only women, only men, and a mixed group of men and women. Third, we asked each group: (a) to define what community empowerment means to them, (b) to define the elements and conditions for an empowered community, and (c) to present results of their discussion to the plenary group, opening dialogue among groups. Fourth, participants went back to their small groups and were asked to define what community disempowerment means to them, and then, to define the elements and conditions for a disempowered community. Fifth, each group presented the results of their discussion to the large group. The participants used flipcharts and colored markers to express their definitions through diverse formats: word lists, drawings, and drawings with collages. These activities took three hours to complete.

4.2.2. Follow-up women only group

To further explore women's perceptions of their roles in collaborative timber management, we organized an additional focus group discussion (Morgan, 1996) – this time among 28 community women who resided in one Verde para Sempre timber project community. Here, we also applied an adaption of the Community Concept Drawing, but in four stages rather than five: First, we asked focus group participants if they had heard of the words/concepts of empowerment and disempowerment. Secondly, we divided participants into groups of seven individuals, asking: (a) What are men capable of doing in timber projects? and (b) What are women capable of doing in timber projects? We made this adaptation to facilitate debate about the concepts of empowerment and disempowerment by using a proxy concept 'to be able to' as expressed in McOmber et al. (2015). Third, we asked participants to present results of their discussion in plenary, opening dialogue among all participant women. Fourth, we guided debate about women's actual and potential future roles in the timber project. Participants used flipcharts and colored markers to express their definitions of empowerment and disempowerment through diverse formats, including word lists and drawings. The entire process took four hours.

4.3. Participant observation

The first author used participant observation to cross-check and to note systematically gendered perceptions of timber co-management capabilities. Our protocol consisted of descriptive and reflective annotations guided by qualitative criteria such as: 1) How individuals articulated women's roles in the timber projects; 2) When men spoke for women, how women's roles were referred to; and 3) Who openly agreed or disagreed (Moreira and Caleffe 2008). Participant observation was applied during overnight stays in communities of all three extractive reserves (up to one month each in Extractive Reserves Chico Mendes and Ituxi and 6 months in Verde para Sempre) and visits to five logging sites. The latter included an overnight stay in one logging area, which generated data on interactions between community-based timber workers. Observations also were made during the community exchange and during several general timber project meetings held with community members and external actors.

4.4. Data analysis

In-depth interviews were transcribed to Microsoft Word® documents and categorized in the following sequence: type of data collection, sequential order that individuals were interviewed, gender, typology or sector of organization they belonged to, and case study. Data from interviews and participant observations were coded through classical content analysis (Leech and Onwuegbuzie, 2008) using MAXQDA 2020 (VERBI Software, 2019) from the transcribed documents. Data analysis involved, first, deductive coding to identify specific ideas in the individual responses about resources (actual allocation, future claims and expectations), women's roles in collaborative timber management, and perceptions of gender equity. Secondly, thematic coding was applied to group similar codes into themes: actual allocation and future claims and expectations. Using this approach, we identified resources that shaped women's roles in the studied timber projects. We used latent content analysis (Leech and Onwuegbuzie, 2008) to examine the drawings and free listings that originated in the two focus group discussions, applying MAXQDA 2020 (VERBI Software, 2019) to code specific items from the drawings or free-listed words. Codes referred to both women's roles and perceptions of gender equity in collaborative timber management.

5. Results

5.1. Actual allocations of resources: support to male timber workers

In all cases, most training for collaborative timber management targeted men. They were the focus for reduced-impact logging (RIL) training (International Tropical Timber Organization, 2004), which is required to work in operational functions of timber projects. Still, some women from Ituxi and Verde para Sempre did participate intermittently in some aspects of RIL training, and a few women from these two cases also received training in administrative functions that was offered by partner NGOs. On average, community women constituted 18% of the workforce (Table 1), but that average masks that no Chico Mendes women participated in any project activities. Overall, however, women respondents (n = 17) reported that, unlike male residents, they did not have equal access to social and human resources, such as RIL training and the social networks which may have allowed them to participate in whatever activity they wanted in the timber projects. In addition, these respondents mentioned that they did not have previous experience managing timber resources, as had their husband and other male relatives. Nonetheless, community women from Ituxi and Verde para Sempre who were assigned as cooks for their local timber projects were considered 'timber workers', a term typically reserved for those working directly with timber operations. From all research respondents (n = 52, men and women), we also identified that the prevailing perceived role of women in the timber projects was to support the male timber workers. Foremost, women's supporting role included childcare, homecare, and agricultural work, while male members (husband, son, or other relatives) conducted logging activities. We identified that some women worked as cooks during the timber harvest season either in the logging camp lodge and/or for community meetings organized around collaborative timber management. Usually, women received a daily rate when working in the camp. For community meetings, women's work was either considered a community counterpart to partner organization contributions or women were remunerated by these organizations, typically NGOs. We also identified that community men adopted two main discourses regarding women's role in collaborative timber management. First, that women were not interested, as evidenced by a man who said, "Women do not go (to logging activities) because they have other commitments; they do not want to go". Second, that logging activities required strength and endurance, which women presumably did not have, rationalizing that women should assume cook positions. One woman affirmed circulation of this disempowering male discourse:

This was a complaint from the NGO, because the women did not go (to the skills training), but some women did want to go. But then the men said that the work was hard, that women were not going to be able to climb over logs and they (the women) ended up not going. So, there is this whole intimidation thing, but I think it is more of a strategy by them (the men) to leave women at home taking care of the house (II22-F-Rout-LP-VS).

We observed that some women believed that women themselves did not want to do this work. A female research participant said:

No, I don't think there is a barrier. What prevents them (women) is that they themselves really do not want to go, the majority don't want to. They think it might be difficult to leave the house and their children. People (NGOs) that come from outside (the village), they always fight to have the participation of women, and [the staff say that they need] 50% of women, we give opportunities to women but they (women) don't believe they are competent, they think they are incapable, or maybe because they themselves do not really want to leave the house (II33-F-Rin-NLP-VS).

Other women reported different points of view, as illustrated:

In other communities, it is their own men who do not believe that women have the capacity to perform that role of being a field coordinator, of doing a forest inventory, and even of being a chainsaw operator, because there are women who know how to saw, but men already think that it is hard work (II22-F-Rout-LP-VS).

5.2. Future claims and expectations: capacity building and role models

From women respondents (n = 17), we identified several future claims and expectations. Women from Ituxi and Verde para Sempre affirmed that while NGOs motivated community women to participate in actual capacity building activities, particularly those related to administrative tasks, the women themselves had expectations for training to undertake more diverse timber management positions. One respondent went further, providing detailed considerations for future training invitations:

When we send the invitation (for the meeting) saying that they (women) have to come, they come because AAA (NGO staff) said 'I don't think that will work, you have to say that their participation is mandatory'. Another thing, you have to send a specific invitation to them (the women), because when you send the invitation to the (community) president, he just puts it in his backpack, then he'll inform [the women] at the last minute [that they can come], and they also can't prepare then, they [the women] have children and all that stuff (II22-F-Rout-LP-VS).

These respondents also suggested the need for role models to motivate other women, which could come from within or outside the communities, as reported by a female respondent:

So, I think it is more chauvinism and, for us nowadays, it is very important to involve women; these days we are allowed in any male job where we are; for me, it is very important, because we no longer have that frustration, but before no, this work could only be done by men. When timber management started, the boys did not want us to even go to the forest. In the first inventory, they did not want us to go and then AAA [male SFB* officer] said 'no, there is no reason why the women shouldn't go, the women can go', and they [male community members] said 'no, it is very tiring, it is very hard.' But during the second forest inventory of the area, a woman came, BBB [SFB officer] who was a female forest engineer and then when she came, then we were saying 'look, you see, she is an engineer' (II48-F-Rout-LP-IT). *SFB = Brazilian Forest Service.

In Extractive Reserve Verde para Sempre, specifically, the five community timber projects had local role models in the extant female leadership in Arimum, a community within the same extractive reserve that had engaged in timber co-management since 2006 (more about this case in Humphries et al., 2022). Arimum, located in Verde para Sempre, has practiced collaborative timber management since 2007. The Forest Stewardship Council (FSC) certified Arimum in 2016, signaling third-

party international recognition of good forestry practices. A NGO respondent articulated the importance of community women serving as role models, particularly for women's participation in the timber projects:

And speaking about AAA, about her mother during that time and another very interesting thing from Arimum, was the leadership of these women who were there at the head of everything, in the predominantly masculine supply chain. But these women were leading, they said the following (to the community men): 'what password can I use to access the timber?' It was very interesting, their defiance (of the male community members) (II42-M-NGO-VS).

The trajectory of another role model reveals lessons regarding actual resource allocations that fell short and suggests possible futures that better address women's claims and expectations (Box 1).

5.3. Women's perceptions of their timber co-management capabilities

Overall, the focus group with only women participants perceived that women were capable of working in a variety of timber management activities (Table 2). These included those related to office tasks, such as treasurer or document organization, as well as those related to field-based activities, such as forest inventories, mapping, driving, and even felling trees. Nonetheless, one focus subgroup succinctly dismissed women's field capabilities by saying that women are too sensitive for field-based activities.

Most subgroups also suggested that men were capable carrying out all timber management activities, including those often traditionally assigned to women, such as to cook. Latent content analysis of workshop flipcharts (Fig. 3) revealed that across the four subgroups, respondents attributed to men more elements of field-based activities than to women, even for those groups that stated that women can do whatever timber project activities they want (see Groups 2 and 4 in Table 2).

In reality, across all timber projects examined, women were assigned domestic (e.g., cook) and office (e.g., treasure, notetakers) roles, and men were assigned technical, operational, and commercialization roles.

5.4. Actor perceptions of empowerment/disempowerment in collaborative timber management

Partner organizations. During in-depth semi-structured interviews, external actors were asked individually about the meaning of empowerment/disempowerment. Their responses focused on three major meanings: 1) Ownership of natural resources - when the community has all rights to decide and manage their lands; 2) Institutional capacity, when the community has technical and administrative capacity to manage and sell timber products; and 3) Decision-making power, when the community can decide if and how to manage timber resources vis-à-vis other organizations. When asked about the meaning of disempowerment, three major meanings were uncovered: 1) Lack of decision-making power, when the community cannot decide if and how to manage timber resources vis-à-vis other organizations; 2) Disorganized, when the community does not have the social and/or productive organization to manage timber resources; and 3) Incomplete ownership of natural resources, when the community does not have all rights to decide and manage their lands. When partner organizations were asked what elements and conditions were important for a community to be considered empowered and/or disempowered within the collaborative

Table 2
Perceptions of what men and women are capable of doing in collaborative timber management as articulated by participants of a women only focus group held in one timber project studied.

Focus subgroup	Men are capable of:	Women are capable of:
1	Men do heavier management work, such as building roads and cutting down trees. But men also do the office work.	Women can cook, clean stuff, make maps, be coordinator and do office work.
2	Men can do all activities.	Women are the same as men. They are capable of anything. They cut down trees, as we know from an example of other communities, but it can be dangerous. Women can also drive, help the chainsaw operator, and cook.
3	Men are stronger, being capable of field-based activities.	There are activities that women cannot do, such as cut down trees. Women cannot do everything. Women are more sensitive.
4	There was one man who cooked in the timber management project.	Women can do anything they want; it depends on her. Women can conduct forest inventories, make maps, and cook.

Box 1
Exemplificative story.

Mary (fictitious name), a 35-year old female community member from one of the studied research sites, stood out in the collaborative timber projects studied. Mary had completed high school, making her an outlier, given that most rural Brazilians, including forest-based dwellers, achieve only primary education; only 27% have completed secondary education (Pereira and Castro, 2019). Additionally, Mary was an excellent cook, and was accustomed to welcoming external partner organizations to her community. Between 2011 and 2014, several timber project planning and implementation meetings among community organizations, the government, and NGOs took place in Mary's community. In the beginning, Mary was assigned by the community association representative, a male community member, to prepare meals for those meetings. While these diverse participants were taking a break from the meeting, NGOs representatives discovered that Mary was formally educated and literate. These external actors began inviting Mary to take notes during the meetings - to document decisions made in reports shared with the community association and government officials. Mary was also proactive, providing suggestions to improve the timber project. As she gained familiarity with the topics discussed and trust from NGO representatives and government officials, Mary's participation expanded, and she began representing the community association, in both internal and external events (seminars, trainings) as a participant, rather than simply as a cook or notetaker. Furthermore, her natural leadership skills were noted by NGO staff and they sought to enrich these skills with increased capacity building. Mary engaged with the timber project and became part of the collaborative timber management team, assuming diverse and complementary strategic positions, such as coordinating the agenda for a newly established community-based timber cooperative. Proactively, Mary also maintained communications with partner organizations by monitoring and reporting joint project activities.

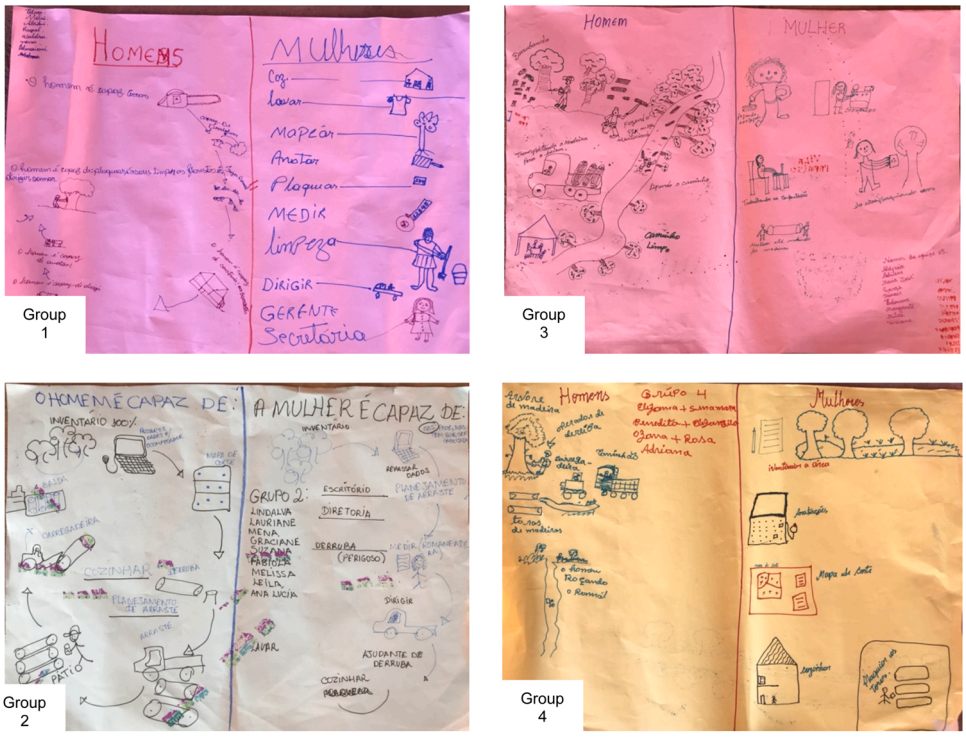

Fig. 3. Results of women only focus group discussions, showing through illustrations women's perceptions of their timber capabilities in community timber projects.

timber management context, not one interviewee volunteered that gender equity was important for community empowerment.

Community members. From the focus group discussions during the exchange workshop (women only, men only, mixed), participants articulated their understandings of community empowerment and disempowerment. When these exchange participants were asked about their understanding of what elements and conditions were necessary for a community to be considered empowered within the collaborative timber management context, all groups (women only, men only, mixed) responded that women must be involved. Similarly, all groups responded that a disempowered community lacked women's participation and equity in timber management. Overall, this collective perspective of community members explicitly reported gender equity as an important element and/or condition for a community to be empowered in the context of collaborative timber management.

6. Discussion

Over a decade ago, Normative Instruction No 16/2011 outlined how communities should engage with the Brazilian government to collaboratively manage (co-manage) timber resources in Brazilian extractive reserves. Our findings detail how women's participation in timber co-management unfolded in three such reserves under this legal framework, which does not differentiate use rights by gender. Following, we situate our data within larger discussions of gender equity, expanding on conceptualizations of women's empowerment (Fig. 1) and demonstrating processes that led to women's empowerment within this context (Fig. 4).

6.1. Collaborative timber management, but women's constrained inclusion

When timber management in Brazilian extractive reserves shifted to formalized collaborative efforts between government and communities, partner NGOs working in Ituxi and Verde para Sempre began building community capacity of a cadre of timber workers (Espada, 2021).

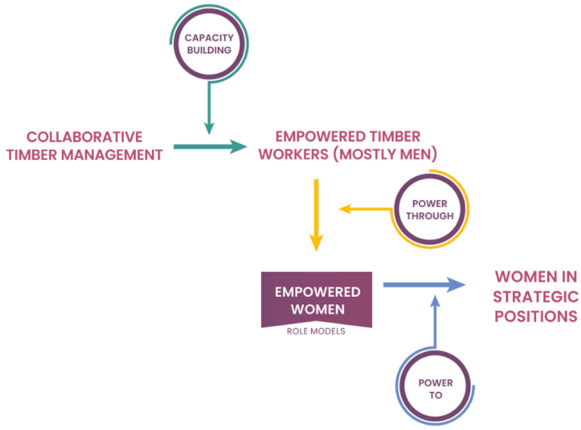

Fig. 4. Representation of 'power through' and 'power to' empirically applied in the context of collaborative timber management in three extractive reserves of Brazilian Amazon. Green arrows highlight capacity building as a resource that empowered timber workers. Yellow arrows highlight the process wherein women associated with male timber workers were empowered through them. Blue arrows highlight how women who were 'empowered through' could exercise their agency (power to) and achieve strategic positions in the community timber projects, serving as role models and leading to more permanent levels of women's empowerment.
Source: authors' elaboration.

Although men were the focus of targeted trainings, actual resource allocations were more broadly distributed because of internal NGO policies and/or donor requirements that women also participate in timber meetings and capacity building (Torre et al., 2019). The logic of these gendered mandates is supported by Elias et al. (2020) who found that such NGO involvement in forest co-management meant greater collaboration between government staff and local people, including forest-based women. Furthermore, in the Brazilian Amazon, Mello and Schmink (2017) also cited NGOs as an important asset for women to

succeed in forest-based economic activities. They reported that NGO and/or church-based programs stepped up to support women-based collective microenterprises, particularly when government programs failed to address women's needs. In our cases, while NGOs (and their donors) had created some spaces for women to participate, they simultaneously reproduced social norms often seen in timber management, "since timber was closely associated with men and forestry as a male activity" (Arora-Jonsson, 2014, p. 300). Women were mostly assigned as "cooks", reflecting the prevailing perception that women's roles were to support male timber workers. Such external promotion of rural women, both in its absence and presence, can be critical in supporting or thwarting gender equity (Arora-Jonsson, 2014, 2013; Christie and Giri, 2011).

Community women were not only overlooked as timber workers in operational harvest activities by NGOs, but also by government and by community members, mainly because of normative values that perpetuated gendered divisions of labor and land use rights, as observed in Yokying and Lambrecht (2020) and Nara et al. (2021). Traditional roles of women as responsible for family care, household reproduction and community activities played a major role in the actual allocation of resources (de la Torre-Castro et al., 2017). In addition, we found that community men made use of "overt strategies to discourage the participation of women" (Evans et al., 2017, p. 44) to reinforce a social construction that timber activities were for men, in which physical strength was seen as central for successful logging (Colfer, 2021). This discouragement discourse adopted by male community members was echoed in women's lack of confidence and identification (sense of belonging) with timber management; some women adopted the same discourse. Our data that captured women's perceptions of their capabilities revealed that timber field-based activities were predominantly attributed to men. Discriminatory attitudes and practices rooted in cultural norms (Coleman and Mwangi, 2013) and espoused in the timber projects, may have undermined women's role in timber decision-making and use (Carr et al., 2021; Mashapa et al., 2020). We do not, however, attribute male dominance of timber management to insecurity in men's traditional masculine identity in the forest sector, as might be expected (Colfer, 2021; Evans et al., 2017). After all, community men accepted women's attendance in meetings with partner organizations and their cooking roles in logging camps for the male timber workers. Furthermore, we did not observe any type of ostracism or sanctions at the community level – by men or women – to those women that participated in these activities, as documented in some studies (Elias et al., 2020; Evans et al., 2017). Nonetheless, in all three reserves, women were mostly excluded from key spaces that trained timber workers and made decisions.

6.2. Empowered timber workers (mostly men)

Initial NGO expressions to include women as timber project participants in *some* way helped stimulate an increased number of women gaining access to decision-making and timber use. It did not, however, necessarily shape the quality of this participation (Agarwal, 2010). In the beginning, collaborative timber management did empower community members through capacity building, but mostly male members (Fig. 4). Mostly men received training in reduced-impact logging (RIL), a skillset considered central to operationalization of timber management that also imparts critical spaces to build networks for future resource claims and expectations. Thus, while RIL training was associated with overall community empowerment (Hennink et al., 2012) as reported by our research respondents, it mainly benefited and empowered the majority male timber work force.

Although women requested to participate in the timber management process, they were largely assigned to passive participation (see more about typology of participation in Agarwal, 2010, p. 101) as cooks and as notetakers in decision-making meetings. Arora-Jonsson (2013) observed that bringing women into existing structures and organizations (e.g., forest committees), rather than calling on both men and women to rethink those structures and organizations (Agarwal, 2010), can perpetuate gender disparities and reinforce privileges of male-dominated timber production (Vázquez-García and Ortega-Ortega, 2017):

> "Women have often been expected to join organizations and accommodate themselves to existing norms and structures rather than that the structures be changed to accommodate their subjective positions, needs and ideas to redress disadvantage" (Arora-Jonsson, 2013, p. 187).

Still, some women received training in administration, and a few participated intermittently in RIL training, which provided some exposure to timber management concepts and vocabulary. When women joined such NGO activities (meetings, trainings), however, there was tension related to what roles were appropriate for whom (Michalscheck et al., 2020). Normative values influenced what women could access (timber resources) and the roles (work in the timber projects) that they could undertake (Basnett et al., 2017; de la Torre-Castro et al., 2017).

In our cases, partner organizations and community members alike, both men and women, initially seemed to reinforce a social construction that timber activities were for men. However, according to our observations and interviews, this tendency waned over time, as diverse roles of women became more normalized, as also observed by Dugasseh et al. (2021) in Northern Ghana community forests. We argue that in our Brazilian cases, over time, some women also became empowered 'through' their association to male community members who were being trained to be timber workers (Fig. 4).

6.3. Power through and power to: women's empowerment in collaborative timber management

Galiè and Farnworth (2019) introduced the concept of 'power through' in their study of Syrian women who were individually empowered by their association to male family members. 'Power through' men with prestigious or influential assets occurred because the broader community associated the characteristics of that male individual not only with him, but also with his family members, even if female. We argue that in two of our three study cases, Ituxi and Verde para Sempre, women were empowered by their association to male community members who were being trained to be timber workers. These men were targeted for training (Fig. 4, green arrows) by external NGOs that had technical knowledge and funding, which greatly increased men's knowledge of sustainable timber management and logging operations. Women associated with these male timber workers were seemingly empowered temporarily in a process beyond the women's personal sphere. That is, these women attained 'power through' (Fig. 4, yellow arrows) their association with male workers, initially by simply being exposed to timber management conversations. In Chico Mendes, we did not observe such empowerment processes. Indeed, no women from this case were engaged at all with the community timber project (Table 1).

Galiè and Farnworth (2019) noted that women empowered through others also can lose their newly gained power if their associates lose their assets in the view/opinion of their social group (i.e., family, local community). That is to say, empowerment through someone else can shift to an opposite direction, disempowered through. Alternatively, this involuntary empowerment can provide preconditions to agentic forms of future empowerment.

> "Having a higher social status was considered to improve the 'potential' scope of their future personal agency and therefore empowerment. That is to say, women felt that an increase in their social status through that of others enhanced their own 'involuntary empowerment' because it created the preconditions for the enactment of an agentic form of future personal empowerment" (Galiè and Farnworth, 2019, p. 15).

We observed this phenomenon in our analysis. When women associated with male timber workers through timber meetings, capacity building activities, and/or family ties, opportunities emerged for them to gain additional space in timber projects, even if just for short periods. As these few women started to participate in these activities, space opened for future claims and expectations, with some even gaining space to receive intermittent RIL training. The small number of pioneer women who were empowered through male timber workers managed to both keep and improve their status, becoming female timber workers who reached strategic administrative and logging coordinator positions (Box 1). These women were able to capture resources and demonstrate their assets to the timber management efforts in the view of male timber workers, the whole community, the NGOs, and the government (ICMBio).

6.4. *Manejadora: a new cycle begins empowering other women*

We observed then a secondary phenomenon when women who had achieved strategic positions became role models, motivating other women to participate in co-management of timber within their communities. In South Asia, early women who participated in forest-focused executive committees increased the likelihood that additional community women would attend forest decision-making meetings, leading to greater attendance rates and advancing to obtain critical mass (Agarwal, 2010). We found similar snowball effects. In 2019, a woman was selected by both men and women to be the Ituxi logging operations coordinator after almost five years of men dominating this strategic position to plan and monitor logging operations and make forest management decisions. As found in Agarwal (2010) in South Asia, the greater presence of women in Ituxi and Verde para Sempre decision-making forums resulted in greater articulation of women's participation in collaborative timber management, not just nominally (i.e., attending meetings, making notes, cooking) but effectively (i.e., having voice and influencing decisions). They became *manejadoras* (female timber workers) in their own right.

As these few pioneer women began to actively participate in decision making, opportunities opened for women to advocate for women. Increasingly, women joined timber projects in diverse positions, exercising 'power to' (Fig. 4, blue arrows). For instance, a newly established community-based cooperative in Verde para Sempre that aggregated four communities to collaboratively manage timber boasted as many (or more) women as men on its executive board and fiscal council. The presidency and vice-presidency both were occupied by women. The dual treasurer position was occupied by a man (primary) and a woman (secondary), and both primary and secondary secretary positions were occupied by women. Finally, the fiscal council was composed of six community members - three were occupied by women.

In sum, these women demonstrated individual agency ('power to', as well as alternative ways to attain empowerment in community forestry) when normative values and their associated inequalities seemed to be a consequence of preferential choices, rather than dictated by inequalities, denial of alternatives, or denial of choice (Kabeer, 1999). In our case, timber management had been considered an activity solely for men, who were perceived uniquely to have the physical strength to develop the resource (Colfer, 2021) or who had control over production tools (Veuthey and Gerber, 2010). However, women can successfully carry out these forestry activities side by side with men, as has been demonstrated in practice (Espada and Vieira, 2019; Miranda et al., 2018) and research (Andersson and Lidestav, 2016; Aziz et al., 2021). Finally, this expansion of community-based timber management actors could have further consequences. In Lithuania, Balezentis et al. (2021) found that young women, versus young men, had a greater tendency to innovate and expand their participation in activities beyond the traditional agricultural domain, corroborating that women's integration in both land use and land use decision making can lead to innovation and sustainable use of natural resources.

7. Concluding remarks and guidance for multiple stakeholders

This study expands on Kabeer's conceptualization of women's empowerment focused on resources, agency and achievements (Fig. 1), detailing how 'power through', a new concept of women's empowerment introduced by Galiè and Farnworth (2019), operates and can lead to more permanent levels of women's empowerment. Although collaborative timber management can provide better opportunities for women's participation, it also unwittingly can reproduce normative values that reinforce gender roles and inequalities in community forestry, particularly in activities related to timber. Our findings uncovered that NGOs' capacity-building initiatives attempted to include women in decision-making meetings and skills training early on, while concurrently respecting and/or perhaps reinforcing, normative gendered values. Additionally, local women did not initially exercise their agency to decide what timber positions to assume, rather they were assigned and accepted roles as notetakers and cooks. Normative values associated with gender (e.g. men are stronger than women) were subtly embedded in the actual allocation of resources, perpetuating male-dominant capacity-building programs. Excluding women from collaborative timber management in either decision-making and/or direct use of timber resources makes overall outcomes worse for everyone (Elias et al., 2020; Veuthey and Gerber, 2010). For instance, the resistance applied by rural women's organizations to commercial logging in Cameroon forests allowed women's appropriation of new production tools usually dominated by men, promoting the conservation of local tree species important for non-timber use (Veuthey and Gerber, 2010).

Government and NGOs should include women-orientated focus groups discussions, not only for their valuable input, but also to generate gender-disaggregated data to properly inform capacity-building programs formulation and implementation. Donors could include targeted capacity-building resources focused on gender issues involving both men and women from the communities, extension services, and policymakers. This has the potential to raise awareness about the normative values that have perpetuated gender inequalities in community forestry. However, these suggestions come with the resounding message that inviting women to participate in decision making and skills training should be accompanied with strategies to create conditions that allow women to be truly included in these activities. This means creating basic sustained support for transportation and childcare, as well as generating conversations and perhaps incentives to reveal to their husbands and local leadership that women's participation is crucial for the betterment of all involved. Addressing these conditions collectively and openly puts the responsibility of women's participation on individuals and groups that often claim that women are not interested in participating in such activities.

Empowering participation (Agarwal, 2010, 2001) of women in timber management rights would mean a transformative process and achievement beyond purely breaking normative values that still perpetuate gender inequalities in the forestry sector. Women in forestry can do more influential activities, beyond their often-supportive roles to men's activities. Women can generate strategic managerial ideas, plan and develop field-based activities, collaborate with partners organizations, negotiate among multisector stakeholders for the access and use of timber resources, as well make critical decisions regarding the multiple use of forests and forest lands. However, supporting such transformative processes to empower women in community timber management will require awareness of gender-based discriminatory attitudes and practices in forestry on the part of all actors involved, sensitivity of policymakers and extension services regarding local contexts and cultures, and innovations in forest policy interventions in the world's numerous community forests.

Declaration of Competing Interest

We declare that we do not have competing financial interests or personal relationships that could inappropriately influenced our work reported in this paper.

Data Availability

Data will be made available on request.

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References

Agarwal, B., 2001. Participatory exclusions, community forestry, and gender: an analysis for South Asia and a conceptual framework. World Dev. 29, 1623–1648. https://doi.org/10.1016/S0305-750X(01)00066-3.

Agarwal, B., 2010. Does women's proportional strength affect their participation? Governing local forests in South Asia. World Dev. 38, 98–112. https://doi.org/10.1016/j.worlddev.2009.04.001.

Agarwal, B., 2015. The power of numbers in gender dynamics: illustrations from community forestry groups. J. Peasant Stud. 42, 1–20. https://doi.org/10.1080/03066150.2014.936007.

Aggarwal, S., Larson, A., McDermott, C., Katila, P., Giessen, L., 2021. Tenure reform for better forestry: an unfinished policy agenda. For. Policy Econ. 123. https://doi.org/10.1016/j.forpol.2020.102376.

Alcorn, J.B., 2014. Alcorn, Janis B. 2014. Lessons Learned from Community Forestry in Latin America and Their Relevance for REDD+. USAID-supported Forest Carbon, Markets and Communities (FCMC) Program. Washington, DC, USA. Lessons 74.

Ali, R., 2014. Empowerment beyond resistance: cultural ways of negotiating power relations. Women's Stud. Int. Forum 45, 119–126. https://doi.org/10.1016/j.wsif.2013.05.019.

Andersson, E., Lidestav, G., 2016. Creating alternative spaces and articulating needs: challenging gendered notions of forestry and forest ownership through women's networks. For. Policy Econ. 67, 38–44. https://doi.org/10.1016/j.forpol.2016.03.014.

Antinori, C., Bray, D.B., 2005. Community forest enterprises as entrepreneurial Firms: economic and institutional perspectives from Mexico. World Dev. 33, 1529–1543. https://doi.org/10.1016/j.worlddev.2004.10.011.

Arora-Jonsson, S., 2013. Gender, Development and Environmental Governance: Theorizing Connections. Routledge, London & New York.

Arora-Jonsson, S., 2014. Forty years of gender research and environmental policy: where do we stand. Women's Stud. Int. Forum 47, 295–308. https://doi.org/10.1016/j.wsif.2014.02.009.

Aziz, N., Ren, Y., Rong, K., Zhou, J., 2021. Women's empowerment in agriculture and household food insecurity: evidence from Azad Jammu & Kashmir (AJK), Pakistan. Land Use Policy 102, 105249. https://doi.org/10.1016/j.landusepol.2020.105249.

Balezentis, T., Morkunas, M., Volkov, A., Ribasauskiene, E., Streimikiene, D., 2021. Are women neglected in the EU agriculture? Evidence from Lithuanian young farmers. Land Use Policy 101, 105129. https://doi.org/10.1016/j.landusepol.2020.105129.

Basnett et al., 2017. Gender matters in Forest Landscape Restoration: A framework for design and evaluation. CIFOR/CGIAR, f[WWW Document]. URL forestsnews.cifor.org.

Baxter, P., Jack, S., 2008. Qualitative case study methodology: study design and implementation for novice researchers. Qual. Rep. 13, 544–559.

Baynes, J., Herbohn, J., Smith, C., Fisher, R., Bray, D., 2015. Key factors which influence the success of community forestry in developing countries. Glob. Environ. Change 35, 226–238. https://doi.org/10.1016/j.gloenvcha.2015.09.011.

Bernard, H.R., 2006. Research methods in anthropology: qualitative and quantitative approaches. ed, East African Medical Journal, foutth ed. AltaMira Press, New York, NY.

Bose, P., Larson, A.M., Lastarria-Cornhiel, S., Radel, C., Schmink, M., Schmook, B., Vázquez-García, V., 2017. Women's rights to land and communal forest tenure: a way forward for research and policy agenda in Latin America. Women's Stud. Int. Forum 65, 53–59. https://doi.org/10.1016/j.wsif.2017.10.005.

Carr, J.A., Petrokofsky, G., Spracklen, D. v, Lewis, S.L., Roe, D., Trull, N., Vidal, A., Wicander, S., Worthington-Hill, J., Sallu, S.M., 2021. Anticipated impact directions of achieving SDG Targets on forests - a review. In: Forest Policy and Economics, 126, 102423. https://doi.org/10.1016/j.forpol.2021.102423.

Cazzolla Gatti, R., Castaldi, S., Lindsell, J.A., Coomes, D.A., Marchetti, M., Maesano, M., Di Paola, A., Paparella, F., Valentini, R., 2014. The impact of selective logging and clearcutting on forest structure, tree diversity and above-ground biomass of African tropical forests. Ecol. Res. 30, 119–132. https://doi.org/10.1007/s11284-014-1217-3.

Christie, M.E., Giri, K., 2011. Challenges and experiences of women in the forestry sector in Nepal. Int. J. Sociol. Anthropol. 3, 139–146.

Coleman, E.A., Mwangi, E., 2013. Women's participation in forest management: a cross-country analysis. Glob. Environ. Change 23, 193–205. https://doi.org/10.1016/j.gloenvcha.2012.10.005.

Colfer, C.J.P., 2021. Masculinities in Forests: Representations of Diversity, 1st ed. Routledge, Abingdon, Oxon; New York, NY.

Colfer, C.J.P., Minarchek, R.D., 2012. Forest research and gender: a review of available methods for promoting equity. For., Trees Livelihoods 21, 1–20. https://doi.org/10.1080/14728028.2012.761011.

Colfer, C.J.P., Minarchek, R.D., 2013. Introducing "the gender box": a framework for analysing gender roles in forest management. Int. For. Rev. 15, 411–426. https://doi.org/10.1505/146554813809025694.

Doss, C., 2014. Collecting sex disaggregated data to improve development policies. J. Afr. Econ. 23, i62–i86. https://doi.org/10.1093/jae/ejt023.

Doss, C., Meinzen-Dick, R., 2020. Land tenure security for women: a conceptual framework. Land Use Policy 99, 105080. https://doi.org/10.1016/j.landusepol.2020.105080.

Dugasseh, F.A., Aapengnuo, C., Zandersen, M., 2021. Land tenure regimes for women in Community Resource Management Areas (CREMAs) in Northern Ghana: opportunities and threats. Land Use Policy 109, 105602. https://doi.org/10.1016/j.landusepol.2021.105602.

Elias, M., Grosse, A., Campbell, N., 2020. Unpacking 'gender' in joint forest management: Lessons from two Indian states. Geoforum 111, 218–228. https://doi.org/10.1016/j.geoforum.2020.02.020.

Espada, A.L.V., 2021. Collaborative community timber management; a comparative analysis of actors' roles and perceptions, power. Dynamics, and Women's Empowerment in the Brazilian Amazon. University of Florida.

Espada, A.L.V., Kainer, K., 2020. An ITTO Fellowship in the Brazilian Amazon has helped a doctoral researcher organize a community exchange among users of six sustainable use forests and promote social learning on community-based forest management. ITTO Tropical Forest. Update 20–24.

Espada, A.L.V., Sobrinho, M.V., 2019. Logging community-based forests in the Amazon: an analysis of external influences, multi-partner governance, and resilience. Forests 10, 1–23. https://doi.org/10.3390/f10060461.

Espada, A.L.V., Vieira, A.C., 2019. Women and forests: progress and challenges in recognizing the role of women in forest governance in the Amazon region. Braz. J. For. 39, 100.

Evans, K., Flores, S., Larson, A.M., Marchena, R., Müller, P., Pikitle, A., 2017. Challenges for women's participation in communal forests: experience from Nicaragua's indigenous territories. Women's Stud. Int. Forum 65, 37–46. https://doi.org/10.1016/j.wsif.2016.08.004.

FAO, Food and Agricultural Organization of the United Nations, 2014. Women in Forestry: Challenges and Opportunities. Rome, Italy. [WWW Document] URL http://www.fao.org/3/a-i3924e.pdf.

Flick, U., 2009. An Introduction to qualitative research, 4th ed. ed, SAGE Publications. SAGE Publications, Inc., Thousand Oaks, California.

Fonseca, F.L., Espada, A.L.V., Cooper, N., Kainer, K.A., Gomes Mello, D.M., Wadt, L.H. de O., 2020. Manejo Madeireiro Comunitário em Áreas Protegidas da Amazônia: Aprendizados e Recomendações de como Facilitar a Troca de Experiências entre Comunidades e Organizações, Documentos 168, Documentos.

Galiè, A., Farnworth, C.R., 2019. Power through: a new concept in the empowerment discourse. Glob. Food Secur. 21, 13–17. https://doi.org/10.1016/j.gfs.2019.07.001.

Gomes, C.V.A., Alencar, A., Vadjunec, J.M., Pacheco, L.M., 2018. Extractive Reserves in the Brazilian Amazon thirty years after Chico Mendes: Social movement achievements, territorial expansion and continuing struggles. Desenvolv. Meio Ambient. 48, 74–98. https://doi.org/10.5380/dma.v48i0.58830.

Guariguata, M.R., Licona, J.C., Mostacedo, B., Cronkleton, P., 2009. Damage to Brazil nut trees (*Bertholletia excelsa*) during selective timber harvesting in Northern Bolivia. For. Ecol. Manag. 258, 788–793. https://doi.org/10.1016/j.foreco.2009.05.022.

Hennink, M., Kiiti, N., Pillinger, M., Jayakaran, R., 2012. Defining empowerment: perspectives from international development organisations. Dev. Pract. 22, 202–215. https://doi.org/10.1080/09614524.2012.640987.

Humphries, S., Holmes, T., Fernandes, D., Andrade, C., de, Mcgrath, D., Batista, J., 2020. Searching for win-win forest outcomes: Learning-by-doing, financial viability, and income growth for a community-based forest management cooperative in the Brazilian Amazon. World Dev. 125, 104336 https://doi.org/10.1016/j.worlddev.2018.06.005.

Ibrahim, S., Alkire, S., 2007. Agency and empowerment: a proposal for internationally comparable indicators. Oxf. Dev. Stud. 35, 379–403. https://doi.org/10.1080/13600810701701897.

ICMBio, 2011. Instrução Normativa ICMBio No 16. Instituto Chico Mendes de Conservação da Biodiversidade, Brasília, DF, Brasil.

International Tropical Timber Organization, 2004. Reduced impact logging [WWW Document]. URL http://www.itto.int/feature15/.

Kabeer, N., 1999. Resources, agency, achievements: reflections on the measurement of women's empowerment. Dev. Change 30, 435–464. https://doi.org/10.1111/1467-7660.00125.

Kabeer, N., 2005. Gender equality and women's empowerment: A critical analysis of the third Millennium Development Goal. Gender and Development 13, 13–24. https://doi.org/10.1080/13552070512331332273.

Leech, N.L., Onwuegbuzie, A.J., 2008. Qualitative data analysis: a compendium of techniques and a framework for selection for school psychology research and beyond. Sch. Psychol. Q. 23, 587–604. https://doi.org/10.1037/1045-3830.23.4.587.

Mai, Y.H., Mwangi, E., Wan, M., 2011. Gender analysis in forestry research: looking back and thinking ahead. Int. For. Rev. 13, 245–258. https://doi.org/10.1505/146554811797406589.

Mandawali, J., Wadley, D., Turia, R., 2021. Realizing the opportunities of REDD+: the importance of including women's roles in Papua New Guinea's first national forest inventory. Case Stud. Environ. 5, 1–9. https://doi.org/10.1525/cse.2021.1448736.

Mashapa, C., Zisadza-Gandiwa, P., Libombo, E., Mhuriro-Mashapa, P., Muboko, N., Gandiwa, E., 2020. An assessment of women participation in community-based natural resource conservation in Southeast Zimbabwe. Open J. Ecol. 10, 189–199. https://doi.org/10.4236/oje.2020.104013.

McOmber, C., Ryley, T. d'Auria, McKune, S., Russo, S., 2015. Community Concept Drawing: Application of a participatory tool for analyzing empowerment across African contexts (No. 136), CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark: CGIAR.

McOmber, C., McNamara, K., Riley, T., d'Auria, McKune, S.L., 2021. Investigating the conceptual plurality of empowerment through community concept drawing: case studies from Senegal, Kenya, and Nepal. Sustainability 13, 3166. https://doi.org/10.3390/su13063166.

Mello, D., Schmink, M., 2017. Amazon entrepreneurs: women's economic empowerment and the potential for more sustainable land use practices. Women's Stud. Int. Forum 65, 28–36. https://doi.org/10.1016/j.wsif.2016.11.008.

Michalscheck, M., Groot, J.C.J., Fischer, G., Tittonell, P., 2020. Land use decisions: By whom and to whose benefit? A serious game to uncover dynamics in farmland allocation at household level in Northern Ghana. Land Use Policy 91, 104325. https://doi.org/10.1016/j.landusepol.2019.104325.

Miranda, K.F., Amaral, W.R., Amaral Neto, A.M., Sousa, R.P., Coelho, R., de, F., 2018. Mulheres e o planejamento do manejo florestal comunitário e familiar na Reserva Extrativista Verde para Sempre. In: Anais, V.I., CLAA, X. (Eds.), CBA e V SEMDF. Cadernos de Agroecologia, Brasília, DF..

Miranda, K.F., Amaral Neto, M., Sousa, R., da, P., Coelho, R., de, F., 2020. Manejo Florestal Sustentável em Áreas Protegidas de uso comunitário na Amazônia. Soc. Nat. 32, 778–792. https://doi.org/10.14393/SN-v32-2020-51621.

Morgan, D.L., 1996. Focus groups. Annu. Rev. Sociol. 22, 129–152.

Nandigama, S., 2020. Performance of success and failure in grassroots conservation and development interventions: gender dynamics in participatory forest management in India. Land Use Policy 97, 103445. https://doi.org/10.1016/j.landusepol.2018.05.061.

Nara, B.B., Lengoiboni, M., Zevenbergen, J., 2021. Assessing customary land rights and tenure security variations of smallholder farmers in northwest Ghana. Land Use Policy 104, 105352. https://doi.org/10.1016/j.landusepol.2021.105352.

Neumann, R., Hirsch, E., 2000. Commercialisation of non-timber forest products: review and analysis of research, First edit. ed, Commercialisation of non-timber forest products: review and analysis of research. Center for International Forestry Research, CIFOR, Bogor, Indonesia. https://doi.org/10.17528/cifor/000723.

O'Hara, C., Clement, F., 2018. Power as agency: a critical reflection on the measurement of women's empowerment in the development sector. World Dev. 106, 111–123. https://doi.org/10.1016/j.worlddev.2018.02.002.

Pires, J.M.; Prance G.T. 1985. The vegetation Types of the Brazilian Amazon. In: G.T. Prance & T.E. Lovejoy (Ed.), Key environments: Amazonia, pp. 109–145. Perganon Press, Oxford.

Prado, D.S., Seixas, C.S., 2018. From the forest to the coast: co-management instruments and the institutional legacy of Extractive Reserves. Desenvolv. e Meio Ambient. 48, 281–298. https://doi.org/10.5380/dma.v48i0.58759.

Rainforest Alliance, 2015. A Woman in Charge: From Cook to Community Leader [WWW Document]. URL https://www.rainforest-alliance.org/articles/a-woman-in-charge-from-cook-to-community-leader.

RRI, Resources and Rights Initiative, 2020. Forest and Land Tenure [WWW Document]. RRI's Forest Tenure Database. URL https://rightsandresources.org/tenure-tracking/forest-and-land-tenure/.

Santos, C.E.N. dos, 2017. Proposta de normativa técnica para elaboração de Plano de Manejo Florestal Sustentável Comunitário em unidades de conservação federais das categorias Resex, RDS e Flona (Trabalho de Conclusão de Curso (Mestrado Profissional em Biodiversidade em Unidades de Conservação). Instituto de Pesquisas Jardim Botânico do Rio de Janeiro. https://doi.org/CDD 634.920981.

Schmink, M., Gómez-García, M.A., 2015. Under the canopy Gender and forests in Amazonia, CIFOR Occasional Paper.

Sell, M., Minot, N., 2018. What factors explain women's empowerment? Decision-making among small-scale farmers in Uganda. Women's Stud. Int. Forum 71, 46–55. https://doi.org/10.1016/j.wsif.2018.09.005.

Shanley, P., Silva, F.C., da, Trilby, M., Silva, M., da, S., 2018. Women in the wake: expanding the legacy of Chico Mendes in Brazil's environmental movement. Desenvolv. Meio Ambient. 48, 140–163. https://doi.org/10.5380/dma.v48i0.58834.

Sharp, J., Briggs, J., Yacoub, H., Hamed, N., 2003. Doing gender and development: Understanding empowerment and local gender relations. Trans. Inst. Br. Geogr. 28, 281–295. https://doi.org/10.1111/1475-5661.00093.

Sunderland, T., Achdiawan, R., Angelsen, A., Babigumira, R., Ickowitz, A., Paumgarten, F., Reyes-García, V., Shively, G., 2014. Challenging perceptions about men, women, and forest product use: a global comparative study. World Dev. 64, S56–S66. https://doi.org/10.1016/j.worlddev.2014.03.003.

Sunderlin, W.D., Dewi, S., Puntodewo, A., Müller, D., Angelsen, A., Epprecht, M., 2008. Why forests are important for global poverty alleviation: a spatial explanation. Ecol. Soc. 13 https://doi.org/24.

Torre, J., Hernandez-Velasco, A., Rivera-Melo, F.F., Lopez, J., Espinosa-Romero, M.J., 2019. Women's empowerment, collective actions, and sustainable fisheries: lessons from Mexico. Marit. Stud. 18, 373–384. https://doi.org/10.1007/s40152-019-00153-2.

de la Torre-Castro, M., Fröcklin, S., Börjesson, S., Okupnik, J., Jiddawi, N.S., 2017. Gender analysis for better coastal management – increasing our understanding of social-ecological seascapes. Mar. Policy 83, 62–74. https://doi.org/10.1016/j.marpol.2017.05.015.

United Nations, U., 2017. The Sustainable Development Goals Report, United Nations. New York. https://doi.org/10.18356/3405d09f-en.

Vázquez-García, V., Ortega-Ortega, T., 2017. Gender, local governance and non-timber forest products. The use and management of *Satureja macrostema* in Oaxaca's central valleys, Mexico. Women's Stud. Int. Forum 65, 47–52. https://doi.org/10.1016/j.wsif.2016.08.003.

VERBI Software, 2019. MAXQDA 2020 [computer software].

Veuthey, S., Gerber, J.F., 2010. Logging conflicts in Southern Cameroon: a feminist ecological economics perspective. Ecol. Econ. 70, 170–177. https://doi.org/10.1016/j.ecolecon.2009.09.012.

Williams, R.J., 2016. The gift of more time: the influence of eco-stove improved cookstoves on women's time poverty and agency in indigenous lenca communities in intibucá. Honduras. Dissertation. University of Florida. https://doi.org/10.1017/CBO9781107415324.004.

Wunder, S., Angelsen, A., Belcher, B., 2014. Forests, livelihoods, and conservation: broadening the empirical base. World Dev. 64, S1–S11. https://doi.org/10.1016/j.worlddev.2014.03.007.

Yin, R.K., 2009. Case study research: design and methods, 4th ed. ed. SAGE Publications, Thousand Oaks, CA.

Yokying, P., Lambrecht, I., 2020. Landownership and the gender gap in agriculture: insights from northern Ghana. Land Use Policy 99, 105012. https://doi.org/10.1016/j.landusepol.2020.105012.