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ORIGINAL RESEARCH

Supporting Community Forestry Certification in Tropical Countries by Increasing Actor Engagement across Scales

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Abstract

For over two decades, Forest Stewardship Council (FSC) certification for community forestry has occurred in tropical countries. However, community forests represent just over 1% of the total FSC-certified forest area worldwide. Certification can promote more socially and environmentally responsible forest management while delivering economic returns to communities, but communities face challenges to obtaining, maintaining, and benefiting from it. Our analysis of the published literature finds that community forestry certification delivers many social and environmental benefits, often more so than economic returns, highlighting the importance of addressing these challenges so that potential benefits can be realized. The FSC has pursued numerous design innovations to help communities overcome challenges to certification, summarized here. We draw on case studies from Mexico, Brazil, and Tanzania to examine the roles that public and private stakeholders at different scales can play in supporting community forestry certification, and the benefits they obtain from engagement. We find that international, national, and local governments and NGOs, business partners and other market chain actors, and FSC and third-party certification bodies all have critical support roles to play. We also find that engagement often aligns with their interests, benefiting them. Systematically documenting the benefits of community forestry certification for diverse actors across scales, communicating about these benefits, and encouraging engaged actors to recruit other stakeholders may be key to helping community forestry initiatives obtain and maintain certification, and scaling it up. Doing so could help increase biodiversity conservation, sustain forest ecosystem services, and alleviate poverty in tropical countries.

Keywords Forest certification · Community forest enterprise · Forest Stewardship Council · Mexico · Brazil · Tanzania

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Introduction

Since the early 1990s, Forest Stewardship Council (FSC) certification of forests responsibly managed by community forest enterprises (CFEs) has occurred in tropical countries. FSC certification is a voluntary, market-based approach to incentivizing, verifying, and recognizing environmentally appropriate, socially beneficial, and economically viable forest management (FSC 2021a). The FSC was created in the early 1990s in response to concern about socially and ecologically destructive logging practices, particularly in the tropics. Many non-profit organizations and timber industry actors were seeking a "positive" alternative to the "negative" approach of tropical timber boycotts and company protests led by environmental activist groups in the 1980s designed to raise public awareness about companies that marketed timber from unsustainable or questionable sources (Bartley 2007). Thus, in 1993 environmental groups, social activists, and forest products companies founded the FSC as an independent, membership-based organization that would set standards for sustainable forestry practices and accredit independent certification bodies to perform third-party audits to verify compliance with those standards. The hope was, and continues to be, that FSC certification will help drive demand for forest products from sustainably managed forests, and generate market benefits – including price premiums – for certified forest managers and supply chain actors. This in turn should lead to more responsible forest management in the tropics and globally.

Forests certified under the two dominant global systems, FSC and the Programme for the Endorsement of Forest Certification (PEFC, founded in 1999), now account for roughly 10.4% of the global forest area (424 million ha) (United Nations 2019). FSC-certified forests alone covered nearly 238 million ha as of 2022 (FSC 2022). Despite the original concern about tropical forests and the fact that FSC is the primary certification system used in most tropical countries, 84% of the FSC-certified area is located in the temperate and boreal forests of Europe and North America (FSC 2019). Certification has largely occurred within the domains of industrial-scale and plantation forestry.

The number of communities with CFEs that produce timber and non-timber forest products from community forests (i.e., forests where the state has formally vested a meaningful degree of management responsibility and decision-making authority in local communities) in the tropics is growing (Burivalova et al. 2017; Charnley and Poe 2007). FSC certification could be an auspicious fit for community forestry, given that communities often aim to manage community forests in an environmentally sustainable manner that also creates local benefits (Charnley and Poe 2007). However, community forests comprise only 1.15% (2.3 Mha) of the total FSC certified forest area (FSC 2019). Communities face numerous barriers in gaining access to and maintaining forest management certification. The FSC has worked to address some of these challenges, though several remain.

Given the limited use of certification in community forestry to date, the purpose of this article is to explore how community forestry initiatives might more easily achieve, maintain, and benefit from certification through greater engagement of partners and other actors at the local, regional, national, and international scales. We focus on community forests where CFEs produce timber, though other forest prod-

ucts or services may also be produced there. We begin by reviewing the literature on community forestry certification, highlighting its social, economic, and environmental benefits. We then identify barriers to community forestry certification reported in the literature, and review how the FSC has responded by adapting some standards and procedures. Next, we draw on case studies from Mexico, Brazil, and Tanzania to examine the roles of different actors across scales in supporting community forestry certification and how doing so aligns with their interests. Our discussion and conclusions highlight findings from the literature review and cross-case comparison about these actor roles and the importance of sustaining, institutionalizing, or scaling up their engagement to expand small-scale sustainable forest management in tropical countries.

Background

Benefits of community forestry certification

Published literature from the past two decades reports numerous economic, social, and environmental impacts of community forestry certification,[1] including numerous benefits. The most frequently documented economic benefits include price premiums for certified forest products, increased income and higher net revenue from all forest products, access to new markets or other market benefits, local job creation in the forest sector, and increased competitiveness and productivity (Frey et al. 2019; Hodgdon et al. 2013; Humphries and Kainer 2006; Kalonga and Kulindwa 2017; Molnar 2004). Certification can also provide advanced or more timely payments to community members (Harada and Wiyono 2014; Lemeilleur et al. 2017), improve equity in income distribution, and stimulate development of other local projects and enterprises (Acharya et al. 2015; Kalonga et al. 2015a; Waldhoff and Vidal 2015). However, some authors report mixed results with respect to price premiums and other market benefits (Burivalova et al. 2017; Klooster 2005; Taylor 2005a), or find that certification does not result in price premiums, higher net revenues, or other market benefits at all (de Pourcq et al. 2009; Galloway and Stoian 2007; Kandel 2007; Lemeilleur et al. 2017; Murphy and Lawhon 2011; Nygren 2015; Wiersum et al. 2013). Collectively, this scholarship suggests that while it is possible for communities to obtain economic benefits from certification, more work is needed to consistently secure or maximize benefits from community forestry certification. This is also important because community anticipation of financial benefits is often a key motivator for pursuing certification (Harada and Wiyono 2014; Scudder et al. 2018).

Numerous social benefits of certification are also documented in the literature. For example, many studies suggest that certification enhances community capacity and organization, including by improving internal administrative processes and forest management knowledge (Frey et al. 2021a; Harada and Wiyono 2014; Humphries and Kainer 2006; Kandel 2007). Other studies cite increased transparency, account-

[1] For a more complete summary of the impacts of community forestry certification see Supplementary Information (SI) Table 3.

ability, and participation in forest management and policy associated with certification (Acharya et al. 2015; Bieri and Nygren 2011; Kandel 2007; Lewark et al. 2011; Nygren 2015; Quaedvlieg et al. 2014; Taylor 2005b). Some highlight how certification increases awareness and acceptance of ecosystem services and their value within communities (Acharya et al. 2015; Bieri and Nygren 2011; Kalonga and Kulindwa 2017; Kalonga et al. 2015a, b; Lemeilleur et al. 2017). Many studies also indicate that certification enhances resource rights and access, and improves awareness, implementation, and enforcement of laws and rules that protect forest resources (Acharya et al. 2015; Bieri and Nygren 2011; Burivalova et al. 2017; Kalonga and Kulindwa 2017; Kandel 2007; Lemeilleur et al. 2017; Molnar 2004; Nygren 2015). Certification has also been shown to lend legitimacy and other reputational benefits to certificate holders (Bieri and Nygren 2011; Humphries and Kainer 2006; Klooster 2005). Less commonly cited benefits include community empowerment, enhanced wellbeing and living conditions, and better labor conditions (Burivalova et al. 2017; Humphries and Kainer 2006; Lewark et al. 2011; Molnar 2004; Quaedvlieg et al. 2014). Although few studies directly counter findings on the social benefits of certification, some find that the impact of certification on resource rights and access is mixed (Humphries and Kainer 2006; Lewark et al. 2011; Wiersum et al. 2013). Much like scholarship on the economic benefits of certification, this literature points to an opportunity to improve upon the social benefits that certification provides to communities.

Studies documenting the environmental benefits of certification are less common than studies that assess its economic or social benefits. Those that do indicate that certification could reduce fire occurrence or forest area burned by wildfire, lower rates of deforestation, and improve forest structure, condition, and biodiversity (Acharya et al. 2015; Burivalova et al. 2017; Hodgdon et al. 2013; Kalonga et al. 2015b, 2016; Lewark et al. 2011). Authors even document instances where certification led to better waste management (Humphries and Kainer 2006) and more abundant and accessible forest products, such as timber, fodder, and fuelwood (Lewark et al. 2011). Much like the varied findings on the socioeconomic benefits of certification, however, some authors suggest that certification has mixed or no impacts on deforestation (Lemeilleur et al. 2017; Murphy and Lawhon 2011), forest structure, and forest condition (Burivalova et al. 2017; Ellis et al. 2019).

Taken together, this body of literature reveals the types of benefits that certification can deliver, and opportunities to better secure and maximize these benefits in the community forestry context. It also reflects a focus on certification benefits at the local (community) level. Studies that address the impacts of community forestry certification on entities at broader scales – such as surrounding communities, organizations facilitating certification, or governments – are rare. One exception indicates that certification can improve relationships between communities and government regulators, benefitting both (Humphries and Kainer 2006). Other exceptions discuss how certification may serve as a building block for other nationally or globally beneficial programs and funding sources like REDD+ (Hodgdon et al. 2013), strengthen relationships between community producers, consumers, and retailers in global trade (Nygren 2015), spur enterprise development in surrounding areas (Acharya et al. 2015; Waldhoff and Vidal 2015), and help validate governmental and non-govern-

mental organizations' efforts to regulate and conserve forest resources (Klooster 2005).

Recognizing the benefits that certification may provide at the community level is critical to promoting community forestry certification. There remains a gap in scholarship, however, with respect to the benefits that certification may provide to entities at other scales. Documenting and promoting benefits to these actors may be key in engaging them further to help communities overcome the challenges – discussed below – that limit their ability to access, achieve, and maintain certification for community forestry.

Challenges of Certification

Although the literature identifies numerous certification-related benefits, it also documents many challenges for communities that seek to access, maintain, and benefit from it.[2] If expanding certification among community forest operations is desirable, then understanding and addressing these challenges is critical.

The high cost of certification is one of the most-referenced challenges for community forestry (de Pourcq et al. 2009; García-Montiel et al. 2017; Humphries and Kainer 2006; Wiersum et al. 2013). Many communities receive at least some form of external financial support for seeking and initially obtaining certification. However, this financial support is often only partial or temporary, and typically insufficient to cover the longer-term costs of maintaining certification (Burivalova et al. 2017; de Pourcq et al. 2009; Galloway and Stoian 2007; Wiersum et al. 2013). The net cost of certification adds to other common challenges, such as the poor commercial potential of many community forests (resulting from past degradation, limited acreage, or lack of commercial species), and communities' often limited ability to cost-effectively produce certified products, access appropriate markets, compete with larger-scale producers, and sell certified goods (Ahimin and Mbolo 2010; Boström 2012; Burivalova et al. 2017; Harada and Wiyono 2014; Hermudananto and Supriatno 2020; Waldhoff and Vidal 2015).

Another common challenge and driver of high financial costs (and lower financial returns) is the additional administrative burden on communities of pursuing and maintaining certification (Alemagi et al. 2011; Bhattarai et al. 2019; Boström 2012; Hermudananto and Supriatno 2020), compounded by a lack of community capacity (including personnel, knowledge, and familiarity with certification) and legal and political barriers. Limited capacity has also affected communities' ability to access markets for certified products, reducing financial returns (Boström 2012; Harada and Wiyono 2014; Kandel 2007; Molnar 2004). External actors have, in some cases, strengthened communities' administrative and market-related capacities, but this support has often been inadequate or short term. Legal and political barriers, especially intricate, unclear, and/or volatile forest policies associated with community land tenure remain a major barrier to certification (Alemagi et al. 2011; Bieri and Nygren 2011; Harada and Wiyono 2014; Hodgdon et al. 2013; Waldhoff and Vidal 2019).

[2] For a more complete summary, see SI Table 4.

These numerous challenges reveal opportunities to improve community forestry certification. Below we discuss FSC efforts to address some of these barriers. The case studies that follow explore the roles that other actors might play, and why it would be in their interests to do so.

FSC actions to adapt certification for small-scale forestry

The FSC has taken several actions to make certification more accessible and beneficial for small-scale and community forestry initiatives over the past two decades (Bulkan 2020). In 2002, the FSC began working on a social strategy aimed at increasing certification among smallholder and community producers as a way to encourage, recognize, and reward responsible forestry for these forest owners and managers (FSC 2003). Through strong partner support, mostly from governments and non-governmental organizations (NGOs), the number of smallholder and community forest certificates grew to approximately a quarter of FSC's forest management certificates by 2004 (UNEP et al. 2004), or 3–5% of certified forest area. But this area has stayed under 5% ever since (FSC 2019). Because many certified CFEs have not received the anticipated market benefits of certification, FSC members have directed FSC over the years to develop initiatives making certification more accessible and beneficial for "small and/or low-intensity managed forests" (SLIMFs) and community forests. Most recently, these efforts have been organized under the ongoing Community and Family Forests Program (originally the New Approaches to Smallholder and Communities Certification Program) launched in 2016 (FSC 2021f). This work has focused on making FSC policies and standards more applicable, affordable, and understandable for small-scale and community producers; finding ways for these producers to secure more market benefits from certification; and, more recently, intentionally engaging partner organizations (e.g., NGOs, governments, businesses) to help communities implement responsible forest management and get certified (FSC 2021f). These approaches are described below and summarized in Table 1.

Several approaches aim to make the certification process less cumbersome. In group certification, an organizing entity (e.g., company, cooperative, or other partner) manages or co-manages with forest owners/managers one certificate covering several CFEs or community forests, creating an economy of scale in which each individual entity does not have to undergo the certification process independently (FSC 2020). A second approach – forest certification indicators specifically for SLIMFs – makes it possible to tailor indicators so that they are more achievable and meaningful in specific local contexts. These can either be alternative indicators within regional or national standards that apply to all types of forest management units, or a separate set of regional or national standards only for SLIMFs. Under certain circumstances, a third strategy – streamlined auditing procedures for SLIMFs – makes it possible to reduce the number of in-person audits required within the five-year certificate duration, reducing audit costs. Another approach, the "continuous improvement procedure" (formerly the "modular approach"), is currently being piloted as a way to allow SLIMF and community producers who achieve a subset of core standards to market their products as certified while working towards full compliance with FSC standards (FSC 2021e). Finally, fees generated from the certification of industrial operations

Table 1 FSC approaches to increasing accessibility of certification for small-scale and community forestry initiatives

Approaches	Challenges addressed
Certification process	
Group certification: multiple smallholder or community forests/CFEs are certified under one certificate that is held and managed by a single entity such as an NGO or company partner	• Financial costs and administrative burden of getting and maintaining certification • Understanding certification standards • Communication with certification bodies
SLIMF indicators: National/regional forest certification indicators specific to community and/or small or low intensity producers	• Difficulty complying with standards designed for industrial operations • Cost of audits • Complexity of certification • Lack of capacity to meet standards
SLIMF audit procedures: Reduce number of in-person audits required during the certification period after meeting requirements	• Cost of audits • Difficulty visiting remote rural communities • Reduce time investment in certification
Continuous improvement procedure: Producers that meet a set of core FSC standards get certified while working towards full compliance with FSC standards	• Capacity limits • Up-front certification costs
Smallholder Fund: Established a fund to help pay the cost of preparing for and/or benefitting from certification for SLIMFs *(discontinued)*	• Cost of preparing for certification • Cost of marketing certified products
Market-oriented	
Smallholder and community label option: An FSC label indicating the product is "from well-managed forests of small or community producers"	• Difficulty accessing markets • Difficulty obtaining price premium
Marketing campaign for the smallholder and community label option: Launched a "made with heart" campaign to promote certified forest products from small and community producers *(inactive)*	• Difficulty accessing markets • Difficulty obtaining price premium
Ecosystem services procedure: Offers an opportunity for certified operations to gain additional recognition for the provision of five types of ecosystem services, verified by independent certification bodies	• Lack of high-quality timber products • Limits on timber harvest quantity
Holistic/Cross-cutting	
Collective impact methodology: Engage diverse stakeholders to collectively identify and help overcome barriers to, and scale up enabling conditions for, responsible community/family forest management and improved livelihoods	• Unfavorable conditions for CFEs, especially related to national and state policies, government support, infrastructure, capacities, production scales, access to finance

were used by FSC International to finance a Smallholder Fund from 2013 to 2017 (FSC 2013) that helped communities prepare for and/or benefit from certification.

FSC's efforts to improve market opportunities for certified community producers include distinctive product labeling to highlight the community origin of certified products, and more recently, promotion of ecosystem services claims for community enterprises. From 2009 to 2012 the FSC developed a smallholder and community

label option for certified products from these sources, but it has had limited uptake. A related campaign focused on labelling was discontinued. FSC also developed a short-lived pilot project to undertake joint certification and labeling with Fairtrade International (see Wiersum et al. 2013). In 2018 the FSC introduced another market-oriented approach, the Ecosystem Services Procedure, designed to help managers of all types of FSC-certified forests "demonstrate and communicate about the positive impact of responsible forest management" on five types of ecosystem services: biodiversity, carbon, water, soil, and recreation (FSC 2021b). Certified forestry operations request verification of claims regarding ecosystem services with the goal of increasing recognition of, and potential market benefits (e.g., sale of carbon credits, company sponsorships) from, their responsible forestry practices.

Finally, several tools have been tested under the Community and Family Forests Program in an effort to reduce barriers to, and promote enabling factors for, certification of small-scale forestry. These initially focused on producers in general as well as specific producers to help with problems like improving market access and creating development plans and business cases, but gradually shifted to focus on country-specific value-chain models under The Good Wood Program. This program aimed to "create a global market for wood products from locally controlled and sustainably managed natural forests in the global South" (Eco-Innovation Foundation n.d., p. 5). Most recently, in 2019–2021, FSC piloted an effort to utilize the global (yet locally adaptable and inclusive) and systemic approach of collective impact methodology (FSC 2021d). This methodology entails "the commitment of a group of important actors from different sectors to a common agenda for solving a specific social problem" (Kania and Kramer 2011, p. 36). FSC, in collaboration with ISEAL (a global membership organization that supports sustainability systems) and other organizations, is using this methodology for three pilot projects with smallholders and communities in Chile, Brazil, and several Mesoamerican countries. The projects harness a diversity of stakeholders (CFEs, governments, NGOs, companies) as partners in addressing contextual barriers to practicing responsible forestry (e.g., national policies, funding) and/or value-chain challenges (FSC and ISEAL 2021; ISEAL 2020).

In sum, FSC has tried numerous approaches to improve certification processes and benefits for community and other small-scale forestry initiatives. The collective impact methodology pilots in particular are a positive step towards a more concerted effort to engage partners in the certification process and help address problems faced in certifying community forestry. Yet more could be done, and more actors could be involved.

Methods

To investigate how communities in tropical countries could more easily obtain and maintain community forestry certification, we examined published literature on the topic and reviewed what FSC had already done to make certification more accessible for small scale and community forestry, summarized above. We then identified gaps in the literature and reflected on what we had observed through our own research and work experiences related to community forestry and certification in Mexico, Brazil,

and Tanzania. For Mexico, Frey in 2010–2011 played a support role in dialogues between the World Bank and Government of Mexico about programs for community forests. He subsequently (2012–2019) assisted in the design and analysis of research to understand the competitiveness of timber production from community forests, and led an analysis of the impact of support programs and certification in Mexico. Engbring conducted her doctoral research in Oaxaca, Mexico, where she worked with three community forests over the course of three years (2016–2018) that were previously certified or had certification at the time of her research. Humphries has done research in Mexico since 2005, with extended fieldwork in 2008 on CFE operational models and market engagement. She has also conducted research on CFEs in Brazil since 2003, with extended fieldwork on CFE financial viability, forest policy, and forest certification from 2004 to 2008. In addition, Humphries worked as the Social Policy Manager at FSC International Center from 2009 to 2012; has been an FSC forest management auditor for a certification body; and provided input on FSC standards for communities and smallholders in Brazil and Mexico. During 2017–2018, Charnley and Frey conducted research in southeastern Tanzania to assess the costs, benefits, and financial viability of CFEs that produce timber from 14 community forests certified as sustainably managed by the FSC, and factors influencing success.

Through authors' group discussions comparing findings from the literature review, review of FSC's work, and knowledge of the three country cases, we identified a major gap: there is little published about the roles that diverse stakeholders at local, regional, national, and international scales play in community forestry certification, and their motivations for and benefits from doing so. Yet their engagement was a key factor enabling certification in the three countries where we conducted research. We therefore set about addressing this gap, drawing on our own research and observations from the three countries as well as the published and gray literature. The Mexico case provides a national perspective and is based largely on published literature combined with personal observation and analysis. The Brazil case is regional and based on the published and gray literature, ongoing personal communications with individuals involved in certification and community forestry there since 2004, and personal observations. The Tanzania case offers a more local example based on published and gray literature and personal observation and analysis.

We analyzed each country case by investigating the history of community forestry and certification there, the benefits and challenges of certification for community forestry initiatives, and then identifying key actors in the certification process and their supporting roles. We also examined their motivations for and interests in engagement, and benefits from doing so (actual or potential). In the absence of existing literature or other data sources, we inferred some motivations and benefits based on our knowledge of the actor organizations. We then performed a cross-case comparison (Yin 2014) of actors of similar types at similar scales, comparing their roles, motivations, and benefits. This comparison enabled us to identify common roles and opportunities for sustaining and broadening the engagement of different categories of actors in supporting certification of community forestry initiatives that could be more broadly applicable.

Case Studies

Mexico

The Mexican Revolution of 1911 and subsequent agrarian land reforms throughout the 20th century formalized rural common-pool resource management in Mexico, though participatory governance and communal tenure long pre-date these reforms in many indigenous communities (Magaloni et al. 2019). Agrarian land reforms culminated in the 1992 reform to Article 27 of the Mexican Constitution, which prevented parcelization of forestlands and devolved greater authority over management to local communities (Bray et al. 2006). Approximately 40 million hectares of forest, or 60% of the total forest nationwide, are owned under a community-based "social property" framework known as "*ejidos*" and "*comunidades*" (Madrid et al. 2009). As of 2011, an estimated 992 had formed some type of CFE to generate income from the sale of forest goods and services, primarily timber (Cubbage et al. 2015). Many other communities own forestlands but lack an authorized forest management plan that would allow them to legally commercialize them.

NGOs, notably the Mexican Civil Council for Sustainable Silviculture (CCMSS) and Rainforest Alliance's SmartWood Program, initially promoted FSC certification of community forests in Mexico. These NGOs provided financial and technical support to help three community forest groups in the southern Mexican states of Quintana Roo and Oaxaca achieve certification in the mid-1990s (Anta Fonseca 2006; Gerez-Fernández and Alatorre-Guzmán 2005). In some cases, multiple communities also formed inter-community alliances to facilitate resource management and associated efforts (including certification) by sharing information, costs, personnel, and equipment. One such organization, the Union of Zapotec and Chinantec Forestry Communities (UZACHI), was among the earliest certificate holders in Mexico, becoming officially certified in 1996 (Markopoulos 1999).

Initially, government agencies were skeptical of certification, but within a few years the newly established Ministry of Environment and Natural Resources (originally SEMARNAP, now SEMARNAT) and National Forestry Commission (CONAFOR) aligned more closely with civil society views on certification. With support from the World Bank, these agencies created programs to provide subsidies for communities to pursue certification. NGOs such as the World Wildlife Fund and CCMSS also offered financial and technical assistance to communities (Anta Fonseca 2006). Market requests from the United States and Europe for certified wood eventually reached actors in the northern Mexican states of Chihuahua and Durango (Anta Fonseca 2006). As of 2021, we estimate that 84% of active FSC forest management certificates in Mexico are linked to community forests.[3]

[3] FSC database of forest management certificates in Mexico shows 105 single-entity and 4 group certificates total. A search by organization name revealed 68 with the word "*ejido*", 17 with "*comunidad*", 2 with "*bienes comunales*" (communal property), 1 with "*aprovechamiento forestal comunal*" (communal forest use). All four group certificates included members with the above words. After checking for double counting, we determined 92 of the 109 certificates had organization names that connected them to community forestry.

The benefits received from certification have been diverse and at multiple levels. The Mexican national government (SEMARNAT and CONAFOR) has supported certification because of the sense that it lends credibility to the Mexican forest sector and validation to the rural land governance regime, and fits within a decentralized view of federal governance (Anta Fonseca 2006; Gerez-Fernández and Alatorre-Guzmán 2005; Wiersum et al. 2013). Environmental NGOs and the World Bank have gained a mechanism for ensuring that some forests are sustainably managed. Communities have gained power and prestige with the government and external actors, validation of their forest management, and a better relationship with the CFEs they host (Anta Fonseca 2006; Gerez-Fernández and Alatorre-Guzmán 2005; Wiersum et al. 2013). CFEs in some areas have increased access to certain markets, and generally experienced better administration, higher productivity, and lower costs per unit of timber (Cubbage et al. 2015; Frey et al. 2019).

Despite these benefits, concrete challenges remain. Most CFEs have not received a price premium for certified wood (Anta Fonseca 2006; Gerez-Fernández and Alatorre-Guzmán 2005; Markopoulos 1999). Only a few of the largest CFEs are able to access markets for certified wood in Europe or the United States. Certification also requires substantial administrative capacity to meet standards and respond to corrective action requests (CARs).[4] One study of a sample of Mexican CFEs showed that certified CFEs had lower harvest levels and lower overall profits per hectare than uncertified CFEs (Cubbage et al. 2015). Additionally, NGOs have been unable to muster the financial and technical support needed for many CFEs nationwide to become certified, as they did for the initial pilots in the 1990s. Thus, despite an overall environment that promotes community forest certification, tangible financial and technical capacity barriers in the present paired with less tangible future benefits have made obtaining certification appear risky. For certified CFEs, once field operations and administration have improved, greater recognition has been achieved, and opportunities for investments from NGOs disappear, certification may seem dispensable.

The main source of continued financial support for certification of CFEs in Mexico has come from government programs, mainly CONAFOR with partial World Bank financing, and occasionally from other state and federal programs (Gerez-Fernández and Alatorre-Guzmán 2005). These subsidies support certification in two ways: directly financing some costs of certification, and making certified CFEs a priority for other support programs. Many support programs are intended to build administrative and operational capacity to improve the chances for obtaining and maintaining certification (Frey et al. 2019). The Mexican government has also helped create markets for certified wood by requiring federal government agencies to purchase third-party certified products when procuring wood, furniture, or office supplies (Estados Unidos Mexicanos 2007). Technical assistance still comes from national and international NGOs and local private technical service providers, often with financial support from a government program. Mexico also created an *ad hoc* stepwise certification system to help communities build capacity to undergo future certification. A "technical pre-

[4] A CAR is an official notification from the certifying body (the auditors) to the forest management organization of a non-compliance with the FSC standard that must be addressed within a fixed timeframe. Failure to address a CAR can result in suspension of the certificate.

ventative audit" ensures compliance with Mexican laws and helps familiarize CFE employees with auditors and auditing techniques. This preventive audit is frequently used as a "pre-certification" program, or a precursor to certification under the government-run Mexican Forest Certification System (*Norma Mexicana*). The *Norma Mexicana* in turn is viewed as a pathway to achieving international FSC certification (García-Montiel et al. 2017). From local inter-community alliances to supportive national policies and international assistance, Mexico's case demonstrates the largely positive role that actors at multiple levels can play in supporting community forestry certification. However, it also demonstrates challenges in scaling up efforts to the national level and maintaining certification over the long term.

Brazil

Early efforts at community-based forest management for timber production in the Amazonian state of Acre, Brazil involved two groups: farming families living in a large agrarian settlement (Humphries and Kainer 2006); and extractivist families in several agroextractive settlement projects who subsisted by selling non-timber forest products and small-scale farming (Amaral and Amaral Neto 2005; Stone-Jovicich et al. 2007). In both cases, families formed associations to coordinate management of individual family forest areas. Initial support for community forestry in Acre came through the regional ProManejo project implemented by Brazil's natural resource agency, Instituto Brasileiro para o Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA). The project lasted from 1999 to 2007 and was funded by the World Bank and the governments of Germany, the United Kingdom, and Brazil as part of the Pilot Program to Conserve the Brazilian Rainforest (World Bank 2005). Funds were used in part to set up three pilot projects for sustainable community timber production in Acre (of a total of 14 in the Amazon region) as an innovative way to promote forest conservation and rural community development, and to create a national working group on community forestry (IBAMA 2007).

Government legislation regarding community forestry developed over the years according to type of landholding, scale, and intensity of forest management (Costa et al. 2018; dos Santos Pacheco and de Barros Azevedo-Ramos 2019). The main requirements were that communities have legally established entities (e.g., associations, cooperatives), implement rigorous forest management planning, obtain permits for harvesting and transporting timber products, use reduced impact logging techniques, and provide buyers legal timber product sales receipts. A 2018 study estimated that 118 CFEs were then operating in the three main Amazonian states in Brazil with community forestry (Acre, Amazonas, Pará) (Costa et al. 2018).

CFEs wanting to legally produce and profitably sell timber in Acre (and the Amazon region) faced many disadvantages. These related to the high costs of bureaucratic requirements and operational processes; lack of economies of scale; and the Brazilian timber market, long dominated by timber from large industrial operations, illegal loggers, and forest clearing for agriculture (Cardoso and Souza 2020). Local supporters of community forestry saw certification as key to helping CFEs obtain better prices from discerning buyers in national and international markets, and increase financial viability (Drigo et al. 2009; Stone-Jovicich et al. 2007). Between 2002 and 2016,

various actors were instrumental in helping six CFEs in Acre become certified (FSC 2021c). They included ProManejo, World Wildlife Fund Brazil, Centro de Trabalhadores da Amazonia (CTA), which had designed and was helping CFEs implement innovative community forestry models, and the state government. The state government was led by a forester who put forest-based rural development and certification at the center of state policies (Kainer et al. 2003; Lima et al. 2008). He also directed the state's forestry agency to aid CFEs with certification. World Wildlife Fund Brazil, the state government, and Imaflora – a Brazilian certification body that certified the CFEs – paid certification audit costs for many years (Araújo de Aquino and Gouvêa Perelli da Gama e Silva 2020).

Price premiums related to certification varied over time for the Acre CFEs. Early sales fetched a 300% premium for some communities' wood (Humphries and Kainer 2006). However, by 2007 there was no significant difference between market access or prices for wood from certified versus non-certified CFEs in Acre (Lima et al. 2008). The situation apparently improved between 2008 and 2011, with price premiums of 67–125% for certified timber (Araújo de Aquino and Gouvêa Perelli da Gama e Silva 2020). In addition to economic benefits, certified CFE participants identified a range of social, technical, and environmental benefits of certification (Humphries and Kainer 2006; Lima et al. 2008). These included better cooperation with state government, better forest management techniques, increased use of protective equipment, improved trash management, and wildlife protection.

The certified CFEs' partners tried many innovative ways to overcome market-related challenges. A Community Forest Producers Group was set up in 2003 (Amaral and Amaral Neto 2005) and for a few years succeeded in pooling and selling sawnwood from certified CFEs to small furniture makers in southern and southeast Brazil. This approach facilitated the aforementioned price premium for early sales of certified wood (Humphries and Kainer 2006; Stone 2004), but logistics were challenging (Humphries observation). In 2005–2006, the state and other CFE supporters transformed the Community Forest Producers Group into a cooperative, "Cooperfloresta", to help organize and formalize the certified CFEs (Piketty et al. 2014; Stone-Jovicich et al. 2007). Acre state worked simultaneously to establish an industrial park on the outskirts of its capital city, Rio Branco, with wood product companies interested in certified wood (ANBA 2006), and to install a flooring factory near several certified CFEs (Government of Acre 2012). FSC Brazil also advocated for wood from certified CFEs to be used in construction projects for the World Cup (2014) and Summer Olympics (2016) (Humphries observations).

In addition to difficulties sustaining market benefits, other challenges have faced certified CFEs in Acre, especially related to the certification process. Although partners helped cover certification audit costs, the transaction costs for CFE participant engagement in certification-related meetings and activities (~3–30 days annually per person) potentially cancelled out financial benefits (Araújo de Aquino and Gouvêa Perelli da Gama e Silva 2020). Meeting certification standards and responding to CARs was also onerous and expensive (Humphries and Kainer 2006; Lima et al. 2008).

The certified CFEs were fortunate to have help selling certified products and meeting certification requirements over time from the state and NGOs whose goals

aligned with keeping communities certified. For NGOs, supporting communities with certification helped them meet their environmental and social goals, and helped them obtain funds from donors (e.g., the World Bank, ProManejo). State government benefits from supporting community forestry certification included positive public image, strategic links to national government policy, and, presumably, improved access to international financing (e.g., Inter-American Development Bank 2002; 2013). However, many local actors and researchers expressed concern about CFEs' high level of dependence on state and NGO partners (Drigo et al. 2009; Humphries and Kainer 2006; Lima et al. 2008).

After roughly 15 years, not a single CFE in Acre is currently FSC certified. By 2021, only three cooperatives in the Brazilian Amazon remained certified: two in Pará state and one in Amazonas (FSC 2021c). Technically, certification was discontinued because CFEs and Cooperfloresta didn't comply with several CARs within the allotted time period. This was partially related to a significant decrease in the state government's role in helping CFEs and Cooperfloresta maintain certification, and reflects changing government priorities and declining support for community forestry and certification in Acre.

Tanzania

"Participatory forest management" in Tanzania was formally adopted with passage of the 2002 Forest Act following growing decentralization of forest management since the 1990s. Under the Act, communities can establish Village Land Forest Reserves (henceforth "community forests") managed by Village Natural Resource Committees (VNRCs), part of locally elected Village Councils. Communities with an approved community forest management plan retain 100% of revenues from forest products harvested there (Ball and Makala 2014).

Community forestry developed in southeastern Tanzania from international conservation initiatives in the 1990s to conserve East African Blackwood *(Dalbergia melanoxylon)*, known as "mpingo" in Kiswahili (MCP 2006). Mpingo is highly valued on international markets for manufacturing woodwind instruments such as clarinets, oboes, and bagpipes, and for wood carving by Tanzanian artists; there is no good substitute (Nakai et al. 2019). Southern Tanzania and Mozambique are the only places in Africa where a commercial trade in mpingo remains viable (Ball and Makala 2004; Barstow 2020). Mpingo is a flagship species for the broader conservation of East African coastal forests in southeastern Tanzania, considered a global biodiversity hotspot (MCP 2006).

Community forestry in southeastern Tanzania began to be implemented in 2001 through a project funded by Denmark's international development agency, DANIDA, with one focus on Kilwa District, Lindi Region (MCP 2006). When the project ended, the Mpingo Conservation Project (later renamed Mpingo Conservation and Development Initiative, MCDI) formed in 2004 to continue this work in collaboration with the local District Council. Early funding support came from the Conservation Leadership Programme (a partnership of international conservation organizations) (MCP 2006) and The Darwin Initiative (funded by the UK government) (MCDI 2021c).

By 2019, MCDI had supported 43 villages in southeastern Tanzania in conducting sustainable forest management through community forestry (MCDI 2021b). Of these, 15 villages with community forests totaling 181,676 ha were participating in a FSC group certificate (MCDI 2021d). MCDI obtained the group certificate in 2009, with the Environment Africa Trust (a UK-based non-profit organization) spearheading efforts to raise funding support, and is responsible for managing it (MCDI 2021c). It was the first, and to date only, FSC certificate for community-managed natural forest stands in Africa. MCDI's motivations for pursuing certification were to promote responsible and sustainable forest management, increase access to timber markets, command a price premium for timber harvested, and verify legality of timber harvested from community forests (MCDI 2021a). An FSC National Forest Stewardship Standard for Tanzania was adopted in 2018 that includes SLIMF indicators for community forests (FSC 2018).

MCDI has been the main entity providing financial and technical support for community forestry and certification in southeastern Tanzania for nearly two decades. The Tanzanian government has provided little if any financial support for community forestry (Trupin et al. 2018). Roughly 90 to 95% of MCDI's annual income comes from grants (MCDI 2017, 2018, 2019) from international NGOs including World Wildlife Fund and Fauna and Flora International, and international governments including the United States, United Kingdom, and Finland (MCDI 2017, 2018, 2019). Although CFEs pay 5% of timber sale revenues to MCDI in exchange for support services, MCDI pays 88% of total forest management costs for the certified community forests (Frey et al. 2021b). To date, timber production has not been profitable on its own (without external support) and certified wood has rarely sold for a premium. As of 2018, only one of 14 certified community forests had the potential to be financially independent (Frey et al. 2021b).

The main challenge to obtaining and maintaining FSC certification is financial cost, with the largest expense being the cost of audits (Frey et al. 2021b). This cost is borne by MCDI, meaning efforts to maintain and expand community forest certification are almost wholly reliant on financial assistance provided by international organizations. This assistance fluctuates, causing MCDI to consider discontinuing the group certificate. However, community members value certification for its non-monetary benefits (Frey et al. 2021a). These benefits include improved safety of forest workers, better recognition by government, increased capacity for forest management and administrative tasks, community pride, and protecting forests for future generations. Moreover, certification helps attract international donor financing (Frey et al. 2021a).

Cost barriers to certification could be addressed by increasing profitability of CFEs. One way is to pursue value-added processing. In 2016, The Addax and Oryx Foundation, a Swiss non-profit organization, provided funding for MCDI to purchase a portable sawmill and additional funding from World Wildlife Fund made it possible to acquire a solar kiln (MCDI 2018). We lack information about effects on profitability.

Other strategies are to expand markets for certified wood and obtain price premiums. Domestically, a barrier to both is competition with uncertified wood legally harvested, and illegally harvested wood, both of which are cheaper than certified wood

Table 2 Actors that support community forestry certification in Mexico, Brazil, or Tanzania and their roles

Actor	Support Role	Motivation/Interests/Benefits
Local		
Government	• Provide direct financial support to communities to help pay costs related to establishing community forests and obtaining and maintaining certification • Help enforce forest management bylaws so CFEs can maintain certification • Provide technical support for community forestry	• Implement state policy direction • Fulfill political agenda relating to forest conservation and rural development • Deter illegal harvesting of forest products • Obtain a percentage of revenues generated from timber sales • Obtain donor funding
NGOs	• Provide technical and financial support to CFEs to obtain and maintain certification and support community forestry more broadly • Serve as conduit for financing of certification by national or international donors • Facilitate partnerships with supportive external organizations (international NGOs, universities, business partners, FSC, multi- and bi-laterals)	• Fulfill mission
Service Providers	• Assist CFEs on as-needed basis to provide expertise and services and help them build capacity for certification	• Benefit financially as forest sector businesses; if certified CFEs persist and do well, they may obtain long-term employment opportunities
National & sub-national		
Government	• Create favorable policy environment supportive of community forestry and certification • Financially support CFEs to subsidize certification costs and build capacity and infrastructure • Create national certification system that encourages stepwise certification to international standards, i.e. FSC • Oversee, coordinate, and help facilitate projects funded by international donors that support certification • Enforce forestry laws to reduce illegal timber harvest and maintain favorable prices for certified wood • Favor certified wood in government procurement	• Support forest biodiversity conservation, sustainable forestry, and rural development • Increase credibility of forestry sector nationally • Attract international donor financing • Obtain revenues associated with legally harvested timber • Contribute to subnational and/or national commitments regarding forest legality, climate change, etc.
NGOs	• Provide financial and technical support to help CFEs obtain certification • Serve as conduit for financial support from international donors • Serve as certification body • Advocate for government policies that help CFEs obtain and maintain certification • Coordinate, leverage, and direct resources to support certification at local level	• Fulfill mission relating to environmental and rural development goals

Table 2 (continued)

Actor	Support Role	Motivation/Interests/Benefits
Wholesalers/retailers	• Facilitate purchase of certified wood for domestic niche markets	• Fulfill business model based on using wood from communities practicing responsible forest management • Meet corporate sustainability goals
International		
Multi- and bi-lateral donor organizations	• Leverage government funding to help finance and provide technical support for projects that support certification, thereby helping countries address environmental and socioeconomic needs	• Aligns with country goals and interests that address global issues, e.g., poverty reduction, biodiversity conservation, and sustainable forestry
NGOs	• Coordinate, leverage, direct, and donate resources to support community forestry and certification • Provide technical support to help CFEs get and maintain certification • Work with national governments to improve policies and programs favorable to certification • Encourage wholesalers and retailers to purchase certified wood	• Use certification as a lever to promote their conservation and community development agendas and organizational missions
Wholesalers/retailers	• Purchase certified wood, helping CFEs gain access to markets and income for their products	• Economic benefits from access to international markets for certified wood to meet consumer demands or create a favorable public image
Business partners	• Invest in certified CFEs to help them build capacity, improve product quality, promote sustainable wood production, assist with value added processing, and widen market access, increasing income to communities	• Procure a sustainable supply of quality wood to support continuous manufacturing of products they sell • Create a favorable public image • Fulfill business model • Meet corporate sustainability goals
FSC and auditors	• Ensure communities are managing community forests to meet FSC certification standards • Assist with market connections for certified wood • Develop strategies for making certification more accessible for community forestry	• Mission fulfillment – want communities to benefit from certification so they will maintain it and continue managing local forests sustainably for forest conservation

(Trupin et al. 2018). In the early 2000s, Milledge et al. (2007) estimated that only 4 to 22% of timber harvested in southern Tanzania was harvested legally, reducing potential government revenue by up to 96%. Certified wood from community forests is sold at government floor prices, as is uncertified (legal) wood, despite higher transaction costs associated with meeting certification standards (Kalonga et al. 2015a).

The Tanzanian government could be more proactive in enforcing current laws governing timber harvest from government and village lands to deter illegal harvesting and make certified wood more competitive domestically (Trupin et al. 2018). Government incentives for doing so include capturing tax revenues lost from illegal timber harvests, promoting sustainable forestry operations and biodiversity conservation, and creating economic opportunities for rural communities (Milledge et al. 2007; Trupin et al. 2018). Research from southeastern Tanzania indicates that enforcement of bylaws and sanctions is much higher in FSC-certified community forests than in forests where government forest officers are responsible (Kalonga et al. 2015a), and that FSC-certified community forests are positively related to biodiversity conservation (Kalonga et al. 2016).

Increasing international business partnerships could help expand international market share, improve wood prices, and increase efficiency (Trupin et al. 2018). In 2018, Sound and Fair Limited – a timber trading company based in the UK – completed construction of a fixed sawmill in MCDI's project area (Trupin et al. 2018). It is also assisting with international marketing, consistent with its mission to supply wood from FSC-certified, community-managed forests in Tanzania and paying a price premium for it (Sound and Fair n.d.). The Yahama Group, based in Japan, began developing a business partnership with MCDI in 2017 with help from the Japan International Cooperation Agency (JICA and Yamaha 2019). To date, Yamaha has built tree nurseries, helped villagers raise and plant mpingo seedlings in community forests, worked to improve material yield in the manufacturing process at the Sound and Fair sawmill, and trained villagers to propagate mpingo and manage forests to produce high quality wood (Yamaha n.d.). This business partnership helps Yamaha fulfill their goals for using certified wood in manufacturing, and ensure they have a sustainable procurement source of high quality mpingo for instrument manufacturing (Yamaha n.d.)

The Tanzanian case demonstrates the critical role that an NGO with a long-term, local presence, local government, national policy, international donors, and business investors can play in supporting certification.

Cross-case comparison

The cases from Tanzania, Mexico, and Brazil help fill a gap in existing literature by identifying actors other than communities and CFEs that support forest certification, their roles, and their motivations (Table 2). At the local to national scales, the most common actors are government entities and NGOs. NGOs often work as partners with communities and CFEs in implementation. Governments formulate policy, help enforce regulations, and provide financial and technical assistance. Key benefits include promoting forest conservation and rural development, and financial benefits ranging from international donor financing to royalties on forest products.

Internationally, the main actors are multi- and bi-lateral donor organizations that help fund certification; NGOs that provide funding, technical assistance, policy support, and help increase market access; business partners and other supply chain actors whose investments help with financing, marketing, and building local capacity for producing certified products; the FSC, which develops certification policies and stan-

dards for communities; and certifiers, who ensure CFEs meet certification standards. These international organizations may also have a national-level institutional presence. They benefit from community forestry certification in different ways, often to fulfill organizational missions relating to conservation and poverty reduction.

The cases as described here do not capture all actor roles in community forestry certification in each country owing to a need for additional research. Nonetheless, taken together, they illustrate the kinds of roles that different actors at different scales can play in supporting community forestry certification, and why it is in their interest to do so. Based on our analysis, Fig. 1 represents the actors that could engage at different scales to support community forestry certification more broadly.

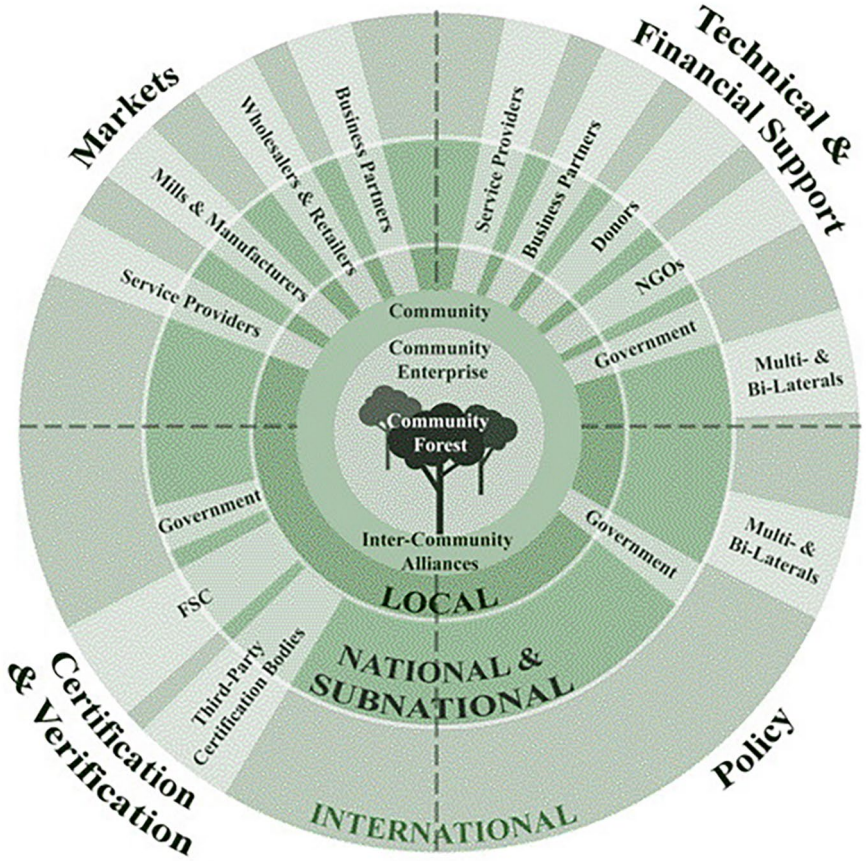

Fig. 1 Actors in community forestry certification

Discussion and conclusions

Certification is a promising tool that can promote more socially and environmentally responsible forest management in tropical countries while delivering economic returns. However, community forests represent just over 1% of the global forest area that is FSC-certified, despite the growing number of communities formally managing local forests for timber production. Communities and CFEs involved in certified community forestry face numerous challenges in adopting, maintaining, and benefitting from certification. Our literature review revealed major barriers, including financial costs, administrative requirements, community capacity limits, marketing challenges, and unsupportive government policies. Case studies from Mexico, Brazil, and Tanzania provide examples of these barriers. It is important to examine how these challenges might be overcome so that the potential socioeconomic and environmental advantages of certification can be more consistently realized.

The literature review and case studies indicate that community forestry certification may deliver social and environmental benefits more often than economic returns. This occurs despite certification being a market-based tool designed to deliver financial benefits to certified entities to incentivize sustainable forestry. Social benefits include building community capacity related to forest management and administration; improving the transparency, accountability, and legality of forest management activities; and reputational advantages. Environmental benefits include decreasing deforestation, improving forest health, conserving biodiversity, and reducing unwanted wildfires. One implication of this finding is that efforts to assess the "success" of certification for communities and CFEs should go beyond commonly used economic indicators to include environmental and social indicators.

The FSC has pursued numerous design innovations to help communities realize these benefits, make the certification process easier for communities, and improve marketing of their certified products, and continues to pilot new approaches. The recently piloted collective impact methodology that engages diverse stakeholders to collectively find ways to overcome barriers and enable responsible forestry in specific small-scale forestry settings aligns with our findings. Our results suggest emphasizing the interests of diverse actors across scales (Fig. 1) in the success of community forestry certification to increase and broaden their engagement and attract new and diverse sources of support. International, national, and local governments and NGOs, business partners and other market chain actors, and FSC and third-party certification bodies all have a potential supporting role to play. The country cases highlight the importance of these roles.

For example, the three cases illustrate the critical roles of international bi-lateral and multi-lateral donors and NGOs in providing funding support for community forestry certification. These actors may be drawn to certification more for the environmental and social safeguards it provides related to their investments – such as validation of forest conservation or protection of vulnerable people, and reassurance that their funds are not being used for illegal or unsustainable activities – than for certified timber production, per se. One example is World Bank support for community forestry programs including certification in Mexico. Similarly, community forestry certification favors the organizational mission of many international NGOs related to

biodiversity conservation and sustainable natural resource use. The World Wildlife Fund, which provided critical funding support for certification in the Tanzania and Brazil cases, is an example. Although these two examples feature organizations that have engaged for a relatively long period of time, these and many other organizations still struggle to maintain the long-term community support that may be needed if certification is not profitable on its own.

National and local NGOs also have an important role to play. In Mexico and Tanzania, respectively, national and local NGOs spearheaded initiatives to obtain FSC certification of community forests and have continued to provide financial and technical support as well as play coordinating and facilitating roles. These relations have been ongoing for over a decade and remain crucial to the continued viability of community forestry certification in these countries.

The role of government in supporting certification is also critical. Financial support from the Mexican government makes it possible and worthwhile for CFEs to maintain certification even with few or no market benefits. The Mexican government also increased domestic markets for certified wood through its procurement policies and created an *ad hoc* step-wise certification system to help CFEs get certified. Initial federal and longer-term state government support was also critical for CFEs in Acre, Brazil to obtain and maintain certification for 15 years. A reduction in state government support was partially responsible for CFEs there dropping certification in 2018. Government policy in Tanzania contributes to the financial viability of certification by enabling certified CFEs to retain all revenues from timber production. For governments, certification provides many potential benefits, from reducing illegal logging and associated lost government revenues, to increasing sustainable forest management, to demonstrating environmental performance to discerning finance institutions, corporations, and other jurisdictions looking for forest sinks to offset their carbon emissions. As such, governments could prioritize long-term or permanent support for community forestry and certification as a win-win for actors across scales.

Business partners and other supply chain actors also have an important role to play. For example, they can help communities increase the efficiency and value of certified forest products, and expand international markets for certified wood, as partnerships between MCDI, Sound and Fair, and Yamaha demonstrate in the Tanzania case. In turn, certification helps ensure these partners have a sustainable wood supply to support their business operations, and confers reputational advantages. Financial investing by supply chain actors to help support certified CFEs as partners can promote long-term economic success for investors as well as communities.

These stakeholder support roles, and benefits to stakeholders from engagement, are rarely acknowledged in the literature, which focuses on the CFE- and community-level economic impacts of certification. Additional research is needed on this broader set of benefits, who experiences them, and how different actors can help facilitate community forestry certification. Systematically documenting and quantifying the benefits of certification for actors across scales may be key to promoting and justifying their increased engagement. Additional efforts are also needed to communicate about these benefits to diverse stakeholders to recruit and/or broaden their support. Already engaged actors in particular places could play a proactive outreach role to entities that are less engaged to garner this support, be it financial, technical,

policy, or otherwise. Ultimately, leveraging long-term support for community forestry certification from diverse public and private stakeholders could help increase biodiversity conservation, sustain forest ecosystem services, and alleviate poverty in tropical countries.

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Code Availability Not applicable.

Declarations

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Ethics approval Research was carried out in accordance with the U.S. Department of Agriculture's Scientific Integrity Policy and CITI Program training protocols for research with human subjects.

Consent to participate The informed consent process to participate in this research was carried out in a manner consistent with the research with human subjects protocols of the authors' affiliated institutions.

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