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Climate change mitigation in forests:

Conflict, peacebuilding,
and lessons for climate security

Rodd Myers,
Cecilia Luttrell
Rahayu Harjanthi
Micah R. Fisher
Mary Menton
Peter Läderach
Eva Wollenberg

AUTHORS

Rodd MYERS^{1,2}
Cecilia LUTTRELL¹
Rahayu HARJANTHI¹
Micah R. FISHER^{1,3}
Mary MENTON¹
Peter LÄDERACH⁴
Eva WOLLENBERG⁵

¹ The Dala Institute, Jakarta, Indonesia.

² Center for International Forestry Research (CIFOR), Bogor, Indonesia.

³ The East-West Center, Honolulu, United States of America.

⁴ CGIAR FOCUS Climate Security, CGIAR, Dakar Senegal.

⁵ CGIAR Research Program on Climate Change, Agriculture and Food Security, University of Vermont, USA.

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CONTACT

CGIAR FOCUS Climate Security
climatesecurity@cgiar.org

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EXECUTIVE SUMMARY

There is growing awareness of the link between climate change and security. Most of the climate security debate has focused on the ways that climate change exacerbates geopolitical and state security matters through ‘threat multipliers’, especially in terms of intra-state, inter-group and sub-national conflicts. At the same time, 64 per cent of climate finance was allocated to mitigation and 25 per cent to adaptation between 2013 and 2019 (OECD 2020; OECD 2021). Despite this, **the dynamics between climate change mitigation and security remains a less-explored topic.** As climate security attracts increasing attention in research and policy, our entry point into reviewing the links between climate change mitigation and security is rooted in studies of conflict and peace in environmental governance.

Because forests are a global focus of climate change mitigation, we focus our review on initiatives that directly affect, or are implemented in, forest areas in low- and middle-income countries. Forests have complex governance contexts and are prone to conflict due to histories of colonization and ongoing resource extraction that lead to disputes over who has authority to make decisions, how different actors are compensated, and whose priorities and claims dictate actions in forest areas. CCMI related to forests are often inserted into these long-standing conflicts. Many of these tensions over rights and resources are located in fragile states and some in armed conflict and post-conflict contexts. Conflict and weak institutional governance are often associated with deforestation but have also been shown to protect forest resources when insurgent forces are compelled to do so.

The two guiding questions of the review are:

1. What are the ways in which CCMI and peace/conflict influence one another?
2. How do different dynamics result in different impacts for people and forests?

We also explore CGIAR's contribution to the literature on peace/conflict and climate change mitigation in forests, and what the future research opportunities might be for CGIAR. The framework we developed for this review considers various types of CCMI and influences of peace/conflict. We began by defining variables and search parameters from the literature, and followed the contours of an integrative literature review that aims to study complex relations. We reviewed 1,147 publications that addressed climate change mitigation and peace/conflict. The geographic scope spanned Asia, Africa, and the Americas. Then, using filtering protocols, we selected 42 that robustly addressed the relationships between the two. We focused on 18 key case studies and three literature reviews that addressed the focus of the review most and used additional literature as needed. Our key case studies focus mostly on a particular set of programmatic interventions that include payments for ecosystem services (PES) like Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD+) and Nature-Based Solutions. We also briefly touch on renewable energy initiatives that have implications for forests.

Our review reveals four main dynamics through which CCMI interact with peace/conflict. **The first dynamic relates to access and tenure rights and how these influence the peace/conflict outcomes of the introduction of CCMI.** There is evidence that well-functioning carbon markets require secure land tenure. As a result, the growing interest in CCMI, especially REDD+, helped civil society forums to recognize land rights specifically for Indigenous peoples and other local communities. However, many of our case studies show the ways in which the application (and sometimes design) of CCMI leads to dispossessory and exclusionary effects for marginalized people due to the loss of tenure rights and access, violations of customary land claims, and other disempowerment of customary authorities over forest land and management practices. Some literature suggests that increased tenure security will be a co-benefit of CCMI; others argue that risks will be reduced only when tenure security precedes their implementation. Further, evidence suggests that collective tenure has a stronger effect on meeting objectives of deforestation initiatives and enhances security by alleviating conflict.

The second dynamic captures how the distribution of benefits and burdens associated with CCMI has implications for peace/conflict and highlights the importance of equity. Carbon emission reduction projects that burden people living in and near forests often promise compensation with new sources of finance and other benefits. However, there are also arguments to say that these mechanisms have failed to overcome the legacy of colonial power dynamics and, in many cases, have reinforced them. Our case studies identify that although there are some cases of CCMI improving livelihoods, benefit sharing often triggers conflict. The quantity of benefits has been limited, and failing to deliver on anticipated benefits heightens existing tensions or creates new ones. Lack of accountability is a key factor that leads to unfulfilled, reduced, or delayed commitments, exacerbated by high transaction costs and low carbon prices. Some case studies suggest that the type of benefits from a CCMI also matters. Not all communities are incentivized by financial rewards. Many instead prefer tenure security, management rights, and access to forests. Initiatives to protect forests by restricting

local people's access are shown to create new food security concerns that lead to conflict. Loss of livelihoods resulting from changes in access and management rights to forests and changes to land use also create conflict and instability. Costs and benefits accrue differently in time (when and how payments materialize), space (which locations are selected for benefits), and scale (often accruing among international actors or national institutions). Community conflicts over benefit sharing related to inequitable distribution of benefits (especially for marginalized groups, Indigenous peoples, and women) are shown to lead to instability. The uncertain nature of the markets and unstable market relations also present significant risks of uncertainty for CCMI proponents.

The third dynamic captures the ways in which new agendas and interests are reshaping forms of governance by introducing external objectives to local levels that involve a new constellation of powerful actors. Implications for peace and conflict centre around clashes between notions of a global public good and local objectives related to livelihoods. In several cases, new agendas and interests resulted in assemblages that undermined Indigenous peoples' rights and wider human rights. International attention was shown to support local agendas, but it also presents increased vulnerability and exposure for actors who attract international attention that challenges powerful interest groups. Market-based mechanisms for carbon trade, for example, have been closely linked to deepening neo-colonial relations, due to the logics premised on lack of local tenure recognition, inattention to legacies of global inequity, and development systems that favour elites. While international actors gain influence over national and subnational forest-related activities through CCMI, the power of the central state in forests is often consolidated, leaving less influence for marginalized people. These power shifts have implications for security at national and local levels, driven by international requirements for coherence and upward accountability. An increase in the level of state centralization and involvement is shown in the literature to bring the benefits of subsidization and increased input of capacity, but can also lead to conflict due to the undermining of local autonomy and community institutions. In post-conflict settings, some CCMI are associated with increased military presence, and elsewhere facilitate 'land grabbing'. Together, these dynamics are linked with the notion of carbon violence. Some case studies suggest that the need for centralization can also be used as a rationale for, and a means of, strengthening state control and/or other political agendas. Militarization of forest areas is manifested locally but is often related to national and international security agendas. Some cases suggest that conflicts are rooted in the ways in which the objectives of climate change mitigation are being used to further other (non-environmental) agendas, such as militarization and strengthening of the state. Actions in the name of climate change mitigation are shown to be used by political actors to grab power over large swathes of forest land, involving dispossession and the capture of greater benefits. Reforestation initiatives are claiming strengthened state authority, especially when contrasted with blame directed at shifting cultivators through local-scale logging initiatives and fire bans.

The fourth dynamic explores how the lack of attention to existing and potential new conflicts accentuates the security context of CCMIIs. Cases highlight the lack of attention to conflict mitigation mechanisms in CCMIIs. Without ways to deal with conflict, key opportunities are missed to address pre-existing tensions, prevent conflicts, or resolve conflicts. The literature suggests that conflict resolution has traditionally focused on the endpoint rather than on addressing the elements that create the conflict. However, more current approaches to peace have shifted to looking more at the root causes of, and different responses to, conflict. Modes of conflict resolution and peace-building provide opportunities to deepen this type of engagement, whether related to human rights, governance, or targeted socio-economic interventions. Indeed, the environmental peace-building literature has introduced a distinct lens for exploring ways to build common ground and identify areas of collaboration to address complex environmental challenges. More normative, planning and practice-based traditions have also innovated approaches to building local partnerships such as adaptive collaborative management, multi-stakeholder process, and participatory action research. Some authors suggest that peace-building efforts have helped to create conditions favourable to the implementation of CCMIIs in conflict-affected areas. Attention to mitigating conflict has taken the form of the development of ‘safeguards’. Strengthening stakeholder engagement, dialogue and inclusive processes were often highlighted in the literature as key elements of peace-building processes. Our findings show that participation was often tokenistic and exclusionary, resulting in further entrenched elite control of natural resources and forest land. The strong critiques of participation and other forms of ‘safeguards’ illustrate the varied ways in which conflict mitigation is considered by different practitioners, policy-makers and scholars.

Commodification of nature emerged as a central theme for understanding the linkages between peace/conflict and CCMIIs across the case studies. With the onset of external actors attracted to economic benefits from forests, tensions emerge among those with different perspectives on who has the right to benefit from forests and forestlands. New market opportunities have sometimes been shown to offer financial benefits, but much of the literature highlights adverse effects on livelihoods for marginalized people, Indigenous peoples and women. In most cases we reviewed, external market-based interventions tend to magnify power imbalances. Based on our literature review, we found three perspectives on commodification of forests. The first is based in neoliberal logics and assumes conservation can potentially be more profitable than deforestation. A second perspective suggests a more ‘civic’ approach emphasising the need for safeguards for marginalized people. A third perspective is more radical and critical, indicating that interventions deepen neo-colonial relations and facilitate dispossession. The core of this latter critique questions whether green markets can solve a problem that is premised on operating within and expanding capitalist relations in ways that misrepresent local values of the forest.

Another theme emerging from the cases in fragile or (post-)conflict contexts is how the design of CCMIIs is, in many cases, inappropriate for these contexts. Different forms of fragile states have different security issues and require different responses. Introducing ‘rule

of law' based initiatives in contexts where implementation of the law is weak is challenging, and there are hazards of assuming law will be implemented in fragile state contexts.

The report presents recommendations synthesized from the literature and based on our own analysis. Recommendations from the literature we reviewed can be summarized into the following key areas:

1. Integrate a conflict-sensitive approach into CCMI
2. Design CCMI for the local context
3. Design CCMI to be pro-poor and inclusive and to promote the key role of Indigenous peoples
4. Integrate land tenure, access and management rights for marginalized and Indigenous peoples into CCMI
5. Strengthen existing effective, legitimate, and accountable institutions to better address peace/conflict
6. Enhance governance systems and benefit-sharing schemata toward greater equity, and strengthen transparency and accountability of CCMI
7. Explicitly integrate gender equity into CCMI to reduce inequality gaps leading to instability through differential power relations
8. Propose alternatives to neoliberal climate change mitigation solutions
9. Encourage more research on the linkages between climate change mitigation and security.

Following more critical perspectives, several authors suggest that mitigation might be better focused on other sectors as CCMI in forest areas are so problematic, despite their critical role in achieving climate goals. Some view problems associated with CCMI as solvable, placing high importance on the role of safeguards. Others take a more political ecology approach, suggesting that **technical solutions do not always work in the politicized context of forest governance and power dynamics need to be addressed**. Lessons can be gleaned from these contradictory perspectives, pointing to the need to address political dynamics to allow a more nuanced exploration of the complexities of CCMI. Understanding more about the complexity of the interest groups involved can lead to a questioning of the theory of change behind PES and other market-based CCMI and the tendency within CCMI to assume that financial incentives can fully and equitably compensate stakeholders for what are often non-financial 'costs'. Our review suggests a complex relationship between financial rewards and technical solutions which, in many cases, do not directly address the underlying drivers and power dynamics that create insecurity and drive many of the conflicts analysed in this report. A shift towards understanding some of the core issues in relation to the dynamics between peace/conflict and climate change responses could make the importance of conflict-sensitive approaches to climate change more apparent to policy-makers and implementers, leading to reduced instability and increased security at international, national and subnational levels. The rise of interests, studies and policy initiatives aimed at articulating and framing climate security raises concerns that, without careful consideration of these dynamics, they could potentially exacerbate conflict dynamics.

ACRONYMS AND ABBREVIATIONS

CCMI	Climate change mitigation initiative
CIFOR	Center for International Forestry Research
ES	Ecosystem services
EU	European Union
FLEGT	Forest Law Enforcement, Governance and Trade
FPIC	Free, Informed, Prior Consent
ITP	Industrial tree plantation
LMIC	Low and middle income countries
MRV	Measurement, Reporting and Verification
NEPA	National Environmental Protection Act
NGO	Non-Governmental Organization
NbS	Nature-based Solutions
OECD	Organisation for Economic Co-operation and Development
PES	Payment of Environmental Services
REDD+	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
UNDRIP	UN Declaration of the Rights of Indigenous Peoples



Photo: Natasha Elkington/CI-FOK

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1. INTRODUCTION AND BACKGROUND

Climate change is widely recognized as a global threat to security (Rüttinger et al. 2015), with ‘security’ defined as the state of being free from danger or threat. Security depends on a wide range of highly dynamic social, cultural, economic, environmental and political factors, and may be experienced differently by different actors (Adger et al. 2014; Ide 2017). The exacerbating effect of climate change and associated climate variability on insecurity is increasingly recognized in academia, policy and development circles (Peters, Mayhew, et al. 2020). However, a common understanding of mechanisms and impact dynamics between climate change and security or insecurity is still lacking (Ide 2017; Mirumachi et al. 2020). This review focuses on responses to climate change, and, in particular, on mitigation initiatives in forest areas. We explore linkages and dynamics between climate change mitigation initiatives (CCMIs), peace, conflict and security, by examining types of mitigation in forest areas and different forms of security in low- and middle-income countries (LMICs). This review examines both how CCMIs might exacerbate, reshape, or resolve security issues, and how the security context affects CCMIs in forests.

Set within a wider debate on climate security, this review defines, approaches, and explores ‘security’ specifically in terms of conflict and peace. Furthermore, by drawing on lessons from peacebuilding and conflict resolution literature, the review also identifies ways in which safeguards can be formulated to address conflict and facilitate peace-positive and responsive CCMIs.

The two guiding questions of the review are: (1) What are the ways in which CCMI and security influence one another? (2) How do different dynamics result in different impacts for people and forests? We also aimed to explore CGIAR's contribution to the literature on security and climate change mitigation in forests, and what the opportunities for CGIAR might be for future research directions. Therefore, the three main concepts that ground this review are: (1) **security** related to (2) **climate change mitigation** interventions in (3) LMIC **forest** areas. In the following sections, we explore these concepts to clarify the boundaries and objectives of the review. We start by introducing the concept of climate security and then elaborate on why we focus on peace and conflict in order to conceptualize 'security'.

Before exploring these concepts, we acknowledge that there are many technical and institutional definitions of what a forest area is (see Chazdon et al. 2016 for a summary of these notions) for the purposes of this review, when a literature item refers to forests, we accept it as a forest. This includes references to natural and planted forests, and agroforestry in forest areas. The only distinction we will make is that the forest, however it is defined or used in the literature, is terrestrial or mangrove forests rather than a kelp forest.

1.1. CLIMATE SECURITY: a focus on conflict and peace

The term 'climate security' is broadly applied in the literature and corresponding policy perspectives. While the term has been used since the 1990s, it gained political momentum in 2007 and has been used increasingly since then (Campbell et al. 2007; Dalby 2013). In general, the term is taken to refer to the risks induced, directly or indirectly, by changes in climate patterns and climate change overall (Dellmuth et al. 2018). The phrase has traditionally been dominated by issues of nation-state and international security related to diplomacy (e.g. McDonald 2013; Burke et al. 2015; Busby 2021). Our formulation aligns with discussions around environmental conflict concerned with the relationship between security (e.g. armed conflict, grievances and tensions, protests) and the natural environment (Barnett 2003; Dalby 2013; e.g. McDonald 2018; Schilling et al. 2020). Others have explored debates around human security with a focus on risk, vulnerability, and resilience (Adger et al. 2014; e.g. Mach et al. 2020; Schilling et al. 2020) with more emphasis on sustainable development and the 'plight of the most disadvantaged' (Floyd 2008). Many authors also note the way in which 'climate security' itself is a politicized term (Deudney 1990; Selby and Hoffmann 2014; Dellmuth et al. 2018). On a policy level, the UN Security Council is beginning to stake out a position on the role of the climate crisis, integrating language and policy into its deliberations complementary to the UNFCCC, calling for greater understanding of the links between climate and security and noting the threat-multiplier dimensions of climate change (Security Council Report 2021).

In this review, we focus on an underdeveloped area of analysis in the climate security debate: the linkages between one set of responses to climate change – that of CCMI in forest areas – and the insecurities that may occur on a number of levels (individual, civil war, interstate following Mach et al. 2020). To better understand the implications of security however, we focus on long-

standing concepts and debates around conflict and peace as our specific interests in CCMI in LMIC forest areas. Although this may have created limitations on the extent to which we could explore the security literature, insights into the very limitations of framing climate problems and solutions in terms of security become more apparent. Our approach draws on a range of literature from political ecology and environmental justice as well as national security and international relations; human security, risk, vulnerability, and resilience; and a variety of more normative literature on conflict resolution and peacebuilding in the context of climate change mitigation.

Linkages between climate security and peace/conflict are underexplored in the literature (Mirumachi et al. 2020). For the purposes of this review, we conceptualize ‘security’ from the perspectives of peace and conflict. According to Galtung (1976), peace is, at its simplest, the absence of (non-normal) violence (see below for more on normal violence), but can be nuanced to include agreed-upon and sometimes complex social goals. Galtung (2009) defines conflict as “actors in pursuit of incompatible goals” (Galtung 2009: 23). According to Patel et al. (2013: 345), a “conflict situation is one in which the impairing behaviour from one actor is experienced by another, while factors or conditions that drive such are considered the sources of impairment.” We consider **conflict to include both violence** (Scheffran et al. 2012) and **non-physical (symbolic) violent perpetuation of inequalities** (Zeitoun and Warner 2006). We recognize non-violent conflict as “normal and healthy in a pluralistic society. But without mechanisms to resolve conflict, it can easily lead to violence” (DFID 2010: 15; see also Work et al. 2019; and as in Peters, Dupar, et al. 2020). In their study of climate change and violence, Scheffran et al. (2012) categorized definitions of violence as linked to intentional killings of people or destruction of property. While many studies of violence focus on direct physical violence against people or property, violence is also understood more broadly, as per Galtung’s triangle of violence: physical, psychological, and cultural (Galtung 1990), as well as explorations of the multi-dimensional nature of violence (Navas et al. 2018) and the intersectional nature of violence as experienced by marginalized populations (Menton et al. 2021). In our definition of conflict, we include conflicts that “are usually violent in nature (although they need not be in all cases); they may involve individuals or groups; they may be organized or disorganized; and they may be personally, politically, or otherwise motivated” (Burke et al. 2015: 579). Using this definition, conflict may therefore include overt acts of large-scale violence such as war, as well as smaller-scale tensions that **manifest in physical violence or forcible dispossession, inequalities or other violation of rights** (see Mirumachi et al. 2020).

There are two broad perspectives on violence. The first aligns with the World Health Organization definition as “the intentional use of physical force or power, threatened or actual, against oneself, or against a group or community that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation” (WHO global consultation on violence and health, 1996 in WHO 2014: 2). The second is aligned with the notions of violence developed by Galtung (1969) and others, in which violence is considered as a violation of rights and therefore is “any avoidable action that constitutes a

violation of a human right, in its widest meaning, or which prevents the fulfilment of a basic human need” (Salmi 1993 p 7 in Bufacchi 2005: 197). An OECD publication builds on these definitions to consider both political and social violence. The former is concerned with physical force toward a political end and includes state military, rebel activity and terrorist acts. The latter is a broader manifestation of grievances, criminality and interpersonal violence (OECD 2016). We favour this broader perspective of violence as it enables a more comprehensive understanding of violence that may not always be evident in acts of brute force. We consider both acts and threats of violence in our review. We also acknowledge that violence is sometimes a mechanism of dispute resolution when all other forms of resolution have been exhausted (Yasmi et al. 2009).

In armed conflict contexts (e.g. Democratic Republic of Congo, Nigeria, and Myanmar) **‘militarization’ is an emerging theme.** Militarization is a process in which the legitimacy of phenomena is derived from association with objectives of armed forces, and, in so doing, that object of militarization increases in value (Enloe 2004; see also Gilbert 2012). While some work has been done on linkages between climate change and militarization, much less has been done on climate change mitigation and militarization in conflict areas (see also Duffy 2001; Mirumachi et al. 2020). Militaries have a high degree of interest in addressing climate change, especially in terms of protecting natural resources against degradation, as it may help to galvanize public support for military actions or reinforce nationalist integrity (Gilbert 2012). Environmentalists have expressed concerns over the militarization of the climate change agenda for at least the last 20 years (see Dabelko et al. 1999). Importantly, as Gilbert (2012) emphasizes, militaries tend to have a narrow perspective on security that relates to the extent to which natural resource extraction could contribute to the fragility of states. Further, she makes the point that military approaches to climate change mitigation tend to eschew systemic causes of climate change such as fossil fuel extraction and colonialism, and increasing inequality between the rich and poor.

Militarization is often justified under the auspices of peacebuilding. Peacebuilding, conflict prevention, peacekeeping, and post-conflict stability have common origins (De Coning 2008; Matthew 2014). There are some broad characteristics across these terms (De Coning 2008: 51). Many of these perspectives are geared to situations driven by intrastate interests among external actors such as UN agencies, humanitarian organizations and foreign governments, often connected to engagements with national-level liaising actors in formal institutions. To date, there are many examples of peacebuilding efforts, which have also afforded two overarching critiques, namely around the availability of resources to achieve goals and the dependence on foreign institutions. A growing call to link peacebuilding with climate change is often framed around the risks of climate change likely to exacerbate conflicts, such as limitation of water resources, droughts, flooding, and other forms of climate-induced vulnerabilities or displacement (Conca et al. 2017; Conca 2019; Maertens 2019). Concerted efforts are linking climate change and human security, with implications for the structure of international governance regimes. This aims to bring groups together in more proactive

Box 1. Environmental peacebuilding

‘Environmental peacebuilding’ is a specific term emerging as a concept in the late 1990s in direct critique to environmental conflict and environmental security discourses (Conca 2002; Dresse et al. 2019; Ide et al. 2021). Proponents reframed environmental challenges around cooperation by examining avenues for building synergies, realizing new institutional forms, and shifting from the triggers of conflict to the “cooperative triggers of peace that shared environmental problems might make available” (Conca 2002: 5) . Peacebuilding initiatives around the environment and natural resources have been focused at a local scale and draw heavily on studies and practice on conflict resolution (Bingham 1987; Fisher and Sablan 2018; see also Herbert 2019) such as mediation (Susskind and Cruikshank 1987), multi-stakeholder processes or collaborative governance (Emerson and Nabatchi 2014), and adaptive collaborative management (Colfer et al. 2022). However, environmental peacebuilding is still emerging as a concept and has several shortcomings in implementation, sometimes leading to societal and environmental destabilization (Ide 2020).

ways between climate and peacebuilding, through programmatic and funding alignments involving climate mitigation and adaptation (See Box 1 for an explanation of environmental peacebuilding). Nevertheless, opportunities for integration are hampered by the contexts and timescales of peacebuilding relative to the imminent threats of violence versus the longer-term timescales of climate initiatives. This has resulted in scepticism towards the integration of climate and peacebuilding institutions and initiatives.

1.2. CLIMATE CHANGE MITIGATION

Climate change mitigation includes introducing technologies for energy efficiency and emissions reductions, reducing deforestation, and reducing consumption (Nielsen et al. 2020). For the purposes of this review, **we define climate change mitigation initiatives (CCMIs) as “human actions that [explicitly state an intent to] reduce greenhouse gas emissions and/or sequester carbon emissions”** (IPCC 2007; see also Millar et al. 2007). We add ‘explicitly state an intent to’ to specify that we have not focused on activities that may have some links to carbon emission reduction, but it is not a core justification for the initiative. For example, we do not focus on the EU Forest Law Enforcement, Governance and Trade (FLEGT) or logging bans since they are primarily focused on reducing the trade of illegally harvested timber or trade of logs. Similarly, although there are clear links with sustainability certification, the objectives are not always explicitly the mitigation of climate change. We focus on CCMIs as specific actions that directly affect, or are implemented in, forest areas in LMICs, since we understand this as a knowledge gap with direct and practical relevance to reversing climate change. This means that we also limit our study to initiatives applied in forest areas; initiatives such as carbon taxes and other policy instruments are not our core focus. We introduce some

of these other initiatives to recognize that proponents justify them as relating to the reduction of carbon emissions in this section, but focus on initiatives fitting our definition. We recognize that CCMI can play both productive and counterproductive roles in advancing peace/conflict (see Brock et al. 2020).

Mitigation strategies in the forest sector can be further categorized into those which (1) increase forested land area through afforestation or reforestation; (2) increase the carbon density of existing forests at both stand and landscape scales; (3) expand the use of forest products that sustainably replace fossil-fuel CO₂ emissions; and (4) reduce emissions from deforestation and degradation (Canadell and Raupach 2008). We add (5), reduce carbon emissions through non-forest strategies that compete with forest land uses (see Box 2 below). Each of these strategies involves a range of interventions. In this section, we outline some of the forms that contemporary CCMI take, starting with REDD+ and moving on to nature-based solutions, zero-deforestation commitments, standards and verification of products, and other market and policy mechanisms.

Reducing Emissions from forest Degradation and Deforestation in Developing Countries (REDD+) is “a framework created by the UNFCCC Conference of the Parties (COP) to guide activities in the forest sector that reduces emissions from deforestation and forest degradation, as well as the sustainable management of forests and the conservation and enhancement of forest carbon stocks in developing countries” (UNFCCC). It was envisioned as a ‘quick’ and ‘cheap’ way of mitigating climate change in the absence of an international agreement to address it (Angelsen et al. 2012). REDD+ evolved from predecessors such as Clean Development Mechanism and Integrated Conservation and Development Projects, which failed to reach the scale of REDD+. It offered what proponents framed as an innovative way for high-income countries to internalize some of their climate change externalities and for people in low- and middle-income countries to benefit from new markets (Corbera and Friedli 2012; Karsenty and Ongolo 2012; Lund et al. 2017). In many ways, REDD+ is an extension of Payment of Environmental Services (PES) approaches, in which people receive payment for providing an ‘environmental service’ (Mahanty et al. 2013). Although REDD+ has dominated the CCMI landscape for the past 15 years, other forms of CCMI are now emerging, discussed next.

Interest in **Nature-based Solutions (NbS)** has rapidly increased in both the private and the public sector over the past five years, with a dominant interest in forests (Seddon et al. 2019; Lang 2020 Oct 28; Cousins 2021). NbSs are defined by the IUCN as “actions to protect, sustainably manage and restore natural or modified ecosystems, which address societal challenges (e.g. climate change, food and water security or natural disasters) effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits” (Cohen-Shacham et al. 2016: xii). Broad in scope, NbSs include mainstreaming nature into governance policy and instruments; regional and international cooperation; valuing nature through governance and finance; and mitigating, adapting and building resilience to climate change (Nature-Based Solutions (NBS) Facilitation Team of the 2019 UN Climate Action Summit 2019). NbSs are

often contrasted with technical solutions that provide only one benefit as providing multiple benefits that can be sustained over time (Dasgupta 2021). NbSs are also dominated by market forces and the commodification of nature and are closely linked to PES approaches (Boyle and Kuhl 2021; Cousins 2021).

The private sector has embraced NbSs as a mechanism that both contributes to climate, biodiversity and deforestation issues and brings financial benefits through carbon farming, and the increased value from certified commodities, green bonds, forest insurance and carbon off-taker guarantees (Vivid Economics 2020a; see also Seddon et al. 2021). Both the aforementioned report and another commissioned by the UN's Principles for Responsible Investment frame natural forest restoration as an 'easy' and 'low-cost' opportunity for investors, projecting annual revenues of up to US\$190 billion by 2050. Another expected growth area in these reports is Avoided Deforestation, which is projected to generate annual revenues of up to US\$610 billion by 2050 (Vivid Economics 2020b). Its advocates argue that rewilding and reforestation are the most effective ways of restoring carbon and protecting biodiversity (Lewis et al. 2019; Perino et al. 2019).

Current trends toward nature-based solutions, within which tree planting is a dominant strategy, are critiqued in the literature as a perpetuation of notions of the commodification of nature. "Both in design and implementation, tree-planting programs have been guided by forest rent distribution practices of state forestry bureaucracies and by corporate accumulation strategies linked to increasingly globalized commodity chains" (Barr and Sayer 2012: 9). Concerns over NbSs related to reliability and cost-effectiveness have been raised as well as tendencies within the approach to reward initiatives that ignore biodiversity value through mono-culture afforestation and overlook the interests of local communities (see also Gómez-Baggethun and Ruiz-Pérez 2011 on the cost-effectiveness of PES approaches; Seddon et al. 2019; Seddon et al. 2021). Further, like other CCMI, NbSs have been critiqued as distracting policy-makers from systematic changes such as decarbonization by phasing out fossil fuels (Seddon et al. 2021). At the heart of the issue that places NbSs at risk of repeating the mistakes of the past that trigger conflict, Welden et al. (2021) suggest that the perpetuation of a dichotomy between people and nature needs to be reconsidered in the framing of NbSs toward better inclusivity and collaboration among actors with different perspectives, policy objectives and practices.

There are a host of **market and policy-oriented approaches** to mitigate against climate change on which we focus less in this review. Since the boundaries of this review are those of the forests, we recognize other initiatives such as certification, the EU Forest Law Enforcement, Governance and Trade (FLEGT), sustainability certification, and zero deforestation, and the ways in which proponents are increasingly understanding them as climate change mitigation. Other policy-oriented approaches such as carbon taxation (Metcalf and Weisbach 2009) may be equally important to mitigating against climate change; however, since they are not implemented directly in forest areas, we do not focus on them in this review. We are

also careful to avoid assumptions that all forest conservation is a CCMI. We discuss forest conservation CCMI in our findings but pay attention to the way in which the initiatives are framed, recognizing that project proponents may shift perspectives toward or away from climate change mitigation (see Abbott 2012 on forum shopping in transnational regimes for climate change).

Not all CCMI in forests are concerned with protecting them. Renewable energy CCMI also put direct and indirect pressure on forests and the people who depend on them (Daiglou et al. 2019). A recent case in India highlighted conflicts among local communities, environmentalists and implementers of a wind energy project, in which forestlands were cleared for the project (see also Searchinger et al. 2018 for the case of European forests and renewable energy initiatives related to bioenergy; Gupta 2021 Aug 7). Similar pressures on forest cover and land use are resulting from the expansion of rare earth products needed for

Box 2. Green technologies and cobalt extraction in the forests of the Democratic Republic of Congo

Conservation and carbon capture are not the only drivers of forest land-use change related to mitigation that lead to conflicts. The United Nations Environment Programme places “new technologies and renewable energies” and “making older equipment more energy efficient” at the centre of its conceptualization of climate change mitigation (UNEP 2017 Sep 14). Renewable energy technologies play a prominent role in CCMI, most of which require storage of power (Gielen et al. 2019). Currently, the leading storage solutions involve lithium-ion batteries, which use lithium and a cathode material, and most of which include cobalt (Schmidt et al. 2016; Standage 2021 Aug 3). Cobalt markets are increasingly reliant on the end-use of lithium-ion batteries (Campbell 2020). Congo (Kinshasa) supplies 70 percent of cobalt mine production in the world. As a fragile state, and having 198 Mha of natural forest comprising 85 per cent of its land area (WRI 2020), there is a direct link between renewable energy and forest areas in the country. Cobalt extraction engages international actors such as the World Bank and multinational companies. It is often violent, featuring human rights abuses, unsafe working conditions, forced labour and conflicts with forest users over land and environmental degradation (Turner 2007; Sovacool 2019). Sovacool (2019) aims to humanize the conflicts by showing how mining corporations evict artisanal miners using private security forces, followed by protests involving the destruction of company property. These conflicts are at times extremely violent, leading to killings. Corporate interests are backed by patronage and are able to eschew legal scrutiny. The background of these conflicts is often in forest areas, which Sovacool shows have been decimated by blasting and waste tailings. While on one hand DRC is an international focus for carbon sequestration in forests, on the other hand, international actors require cobalt for the production of green energy storage, the production of which contributes to instability.

green technologies (see Box 2 on cobalt). Corbera et al. (2017) analyse Lamb and Dao (2017) to emphasize how concerns that Chinese investments in large-scale hydropower plants in forest areas in Myanmar and Vietnam would mean less attention to local issues and the effects of local people than domestic or OECD-based companies would. Lamb and Dao (2017) argue that there was little evidence to support this, and that critiques tended to lack appreciation of the cultural and political histories among the countries.

Not only could CCMIIs deepen conflict, but they could also intensify existing power struggles that may result in more intense violence (Nightingale 2017; Froese and Schilling 2019; Mirumachi et al. 2020). While violent conflicts that occur against *groups* are more easily contemplated as having political drivers, violence against individuals based on race or gender is often spatially and temporally diffuse and therefore more difficult to understand within a broader context (Brison 2013). Further, actions that result in protest or conflict and that are based on policies of oppression or subjugation are also considered acts of violence even though they manifest themselves at micro levels, such as dispossession of land or other property, forced exclusions from forests, or the forced restrictions on livelihoods in contrast with customary practices (Hall et al. 2011; see also Zimmerer 2014; Myers and Muhajir 2015; Lund 2021).

1.3. FORESTS AND PEACE/CONFLICT

Forests have complex governance and are prone to conflict. Forest areas are host to many of the world's conflicts (Donovan et al. 2007; Harwell 2011; Harwell et al. 2011; Castro-Nuñez, Mertz, Buritica, et al. 2017). Forests are notoriously challenging to govern, especially in the tropics where forestlands can be vast and law enforcement remains weak and, in many cases, corrupt (Colchester 2006; Agrawal et al. 2008; Harwell 2011). Lying at the edge of agricultural frontier expansion, they have long histories of colonial intervention aiming to control forest resources (Le Billon 2002; Corbera et al. 2011; see also Peluso and Lund 2011). 'Resource curse' theory suggests that large injections of finance associated with CCMIIs can, in itself, become a source of conflict. In scenarios where financial flows associated with CCMIIs might reach significant volumes concentrated in particular areas, there is the potential for conflict and other hazards due to the potential for corruption associated with the lack of institutional capacity to absorb such revenues. The resource curse phenomenon is commonly associated with extractive industries in fragile states (Ross 1999) but lessons from this sector can be applied to the design of benefit-sharing mechanisms for successful CCMIIs (Luttrell and Betteridge 2017). Featuring complex governance structures, the state tends to be weak in forest areas, leading to disputes over land rights and high-value natural resources that can finance or exacerbate conflict (see also Auty 1995 on the resource curse; Collier and Hoeffler 2004; Rustad et al. 2008; Castro-Nuñez 2018). This renders forests vulnerable to illicit resource extraction (Harwell 2011).

Box 3. Political forests

‘Political forest’ is a term coined by Peluso and Vandergeest (2001). In later works, they link the political ecology of forests and the geographies of war (Peluso and Vandergeest 2011a). They focus on the way in which forests were reconceptualized during the Cold War period in response to insurgencies and violence. War was depicted as being staged from forested territories, thus helping to establish forests as components of the modern nation-state. The crisis rhetoric of environmental security around ‘jungles’ as ‘dangerous’ spaces near international borders led to the emergence of national security and conservation initiatives (Peluso and Vandergeest 2011b; Devine and Baca 2020). This literature highlights the processes that led to a particular location becoming a forest, whether due to interests of conservation, resource extraction, or protection of a species and, more recently, climate change policies (Peluso and Vandergeest 2011b; Devine and Baca 2020).

Box 4. Fragile states

Fragile states experience conditions of weak governance, corruption, tenuous security, factionalized elites, group grievances, poverty, inequality, weak human rights, weak legitimacy of the state, limited public services, weak rule of law, and social pressures including demographic and international displacement issues (Zoellick 2008; Fund for Peace 2017). An OECD (2007: 2) publication defines fragile states as those that “lack political will and/or capacity to provide the basic functions needed for poverty reduction, development and to safeguard the security and human rights of their populations”. While alleviating many of these issues might be included in the design of CCMI, the combination of CCMI and fragile state structures presents both opportunities for peace-building and challenges at several levels.

CCMIs in forest areas are often inserted into contexts of existing conflict and tensions (Karsenty and Ongolo 2012). Due to the need for additionality, many CCMI are located in areas with high deforestation threats. Forests with high carbon content overlap geographically with areas of higher conflict. Drivers of deforestation in these areas are often linked to tension or political complexities, which may include broader political and economic interests (Reed 2011; Naughton-Treves and Wendland 2014; Asiyanbi 2016). Nations affected by conflict hold 40 per cent of the world’s tropical forests (Donovan et al. 2007). At the level of the nation-state, forest areas that are the target of CCMI tend to be located in fragile states (see Figure 1 for a map of the main case countries). Harwell (2011) uses OECD data to conclude that more than half of the states implementing REDD+ are classified as ‘fragile’. Castro-Nuñez et al. claim that no fewer than 25 of 64 countries with REDD+ initiatives are experiencing or emerging from

armed conflict (Castro-Nuñez, Mertz, and Sosa 2017; UN-REDD 2017). Although these data cannot imply causality, forests and conflict at least correlate at the nation-state level (but Gritten et al. 2013 mention are not always at the local level) and are therefore likely to share some governance challenges and solutions.

Conflict can lead to deforestation. In times of peace, strong and well-organized institutions tend to have a favourable effect on deforestation (Obydenkova et al. 2016; Cary and Bekun 2021) and, conversely, **conflict and associated weak institutional governance can lead to deforestation.** Studies have suggested that forest loss advances more rapidly post-conflict. In the five years after the end of the conflict in Nepal, Sri Lanka, Ivory Coast and Peru, annual forest loss showed a 68 per cent increase (Grima and Singh 2019). Other studies in Colombia also found that deforestation increased during times of armed conflict (Landholm et al. 2019; Negret et al. 2019). Conflict-linked deforestation also occurs in protected areas (Darbyshire 2021 Apr 22). Forests serve as refuges both for insurgents and for those hiding from conflict (Harwell 2011; Peluso and Vandergeest 2011b; Ladan 2014; Tar and Safana 2021). For example, during the conflict period (1986–2003) in Rwanda, 96 per cent of the deforestation occurred in protected areas to which displaced communities had fled for safety (Ordway 2015). Conflict has been shown to lead to migration into forested areas in some cases (e.g. the Shining Path led to migration from the Andean highlands into lowland Amazonian forests) and away from them in others (e.g. the FARC activity in Colombia led to migration out of the forest). Baumann and Kuemmerle (2016) show that the ways in which armed conflict affects land use, especially in rural areas, are highly variable and can have a long-term effect.

Conflict can also reduce deforestation. The impact of conflict on forests can vary depending on the scale of analysis and the local context (McDermott et al. 2019). Studies show that in some areas of conflict, deforestation has decreased (Le Billon 2000; Baumann and Kuemmerle 2016). Studies in Colombia showed evidence of reduced deforestation in conflict areas due to (1) ‘gunpoint conservation’, whereby guerilla activity in forested areas curtailed deforestation (Dávalos 2001) and (2) active conservation of canopy cover as a strategy to avoid surveillance (McNeely 2003a). Another study in Colombia showed how local people conserve forests in conflict areas to ensure they are protected from aggressors (Castro-Nuñez et al. 2016).

Forests can contribute to peace. Beevers (2015; 2016) argues that forests can act as ‘peace resources’ that support economic and social development. He uses the case of Liberia, where proceeds from timber helped to finance insurgence during times of conflict, but forest governance became a cornerstone of the peace-building process. Further, **peace agreements do not necessarily lead to reduced deforestation due to historical legacies.** For example, the power vacuum left by the FARC retreat in post-conflict Colombia presented challenges for REDD+, where rates of deforestation had increased as a result of unclear institutional arrangements, land grabbing, and colonial agricultural expansion (Landholm et al. 2019; Clerici et al. 2020; Mendoza 2020; Prem et al. 2020; Van Dexter and Visseren-Hamakers 2020; Liévano-Latorre et al. 2021; Rodríguez-de-Francisco et al. 2021). Similarly, the concept of ‘peace parks’

gained popularity in the 1990s and 2000s, promising benefits to both biodiversity conservation and peace/conflict (Hanks 1997; McNeely 2003b). But some of these initiatives have tended to reproduce and amplify existing inequalities, as well as recentralize power in the hands of elites (Duffy 2001).

1.4. STRUCTURE OF THE REVIEW

In the next section, we outline the methods used in our review, noting that a full methods document provides further detail (see Myers et al. 2021). We elaborate the ways in which we conducted the literature review and introduce the main cases that resulted from the review process. Then, we introduce our analytical framework and elaborate the main variables that we explore. Next, in section 3, we present our findings. Finally, in section 4, we present recommendations drawn from both the literature reviewed and from our analysis of the literature.



2. REVIEW METHODS

The aim of the review was to explore linkages between forest-related climate change mitigation initiatives (CCMIs) and peace/conflict. This was achieved by examining a range of mitigation efforts in forest areas and different forms of security. Two guiding questions of the review are: (1) What are the ways in which CCMIs and peace/conflict influence one another? (2) How do different dynamics result in different impacts for people and forests? We also aimed to explore CGIAR's contribution to the literature on peace/conflict and climate change mitigation in forests, and what the opportunities for CGIAR might be for future research directions.

We used methods developed for integrative literature reviews (Whittemore and Knafelz 2005; see Neuman 2011) to generate new knowledge on, or conceptualization of, a topic through a process of review, critique, and synthesis of the literature. We took an inductive approach to the review. Firstly, we developed an analytical framework (Myers et al. 2021) to lay out some of the categories that we expected to find in the literature. This framework was based on types of CCMIs related to forest (Agrawal et al. 2014) and causes of peace/conflict (adapted from Patel et al. 2013), and in the review questions we defined our variables and search parameters to help identify key literature. We drew on (1) empirical evidence from specific cases studies of forest mitigation, and (2) more theoretical literature exploring the perspectives around CCMIs and peace/conflict. We collated literature using four methods (see Badampudi et al. 2015)

1. Purposive snowballing based on relevant literature to find prior and derivative works
2. Broad search using Google Scholar (because we also wanted to capture the grey literature, and its search parameters were better suited to our study than Web of Science) was conducted on publicly available documents (including those behind academic paywalls) using keywords (see Myers et al. 2021).
3. Search of publications in the CGIAR Gardian database
4. Search of publications in the CGIAR Climate Security database filtered by CGIAR drivers of conflict, country and region.

From these four methods, a total of 1,147 publications were assessed for inclusion. From them, we selected 153 items that made the link between security, conflict and/or peace and CCMI. These items were then ranked on a 1-5 scale for how closely the linkages between the concepts were made. The 42 publications with the highest ranking (5) were annotated and coded according to our analytical framework (see Figure 2 and Myers et al. 2021 for details). The core analysis focused primarily on 18 case studies and three literature reviews (see Figure 1, Table 1 and Annex 3 for details). As we progressed, we augmented this with a review of wider theoretical literature. We then categorized and constructed the four key themes regarding the interaction and dynamics between CCMI and peace/conflict.

Our research design for literature selection resulted in several limitations which have implications for the results (laid out in more detailed in Annex 1) :

- First, although the design of the study was to address security, we found that the literature on security specifically pertaining to CCMI in forests in LMICs was too limited. We therefore focused on concepts of peace and conflict from which lessons for security could be drawn. Because in the literature conflict is more easily observed than peace, our search terms included more strings related to conflict and violence than peace. Also, when looking for case studies of insecurity, we intentionally focused on visible expressions of conflict and violence. This means that while this review is useful for deriving lessons on the dynamics around the types of security found in the specific case studies, we cannot make overall judgements such as whether or not CCMI lead to security.
- Second, we analysed peace/conflict in relation to CCMI; however, counterfactuals were not possible within the scope of this review. Therefore, if a CCMI has been shown in the literature to lead to conflict, this review does not assume that another type of land-use change would not.
- Third, a significant portion of the literature focused on REDD+. Of the 42 works rated as having a level five intensity ranking, 19 explicitly concern REDD+.
- Fourth, we faced the challenge of attributing outcomes to the CCMI rather than pre-existing conflict in that forest area or other intervention of which the CCMI was part. Not all the case studies included the details or captured the complexity of local context needed to make a judgement on that attribution.

- Fifth, we relied on academic literature and grey literature that was publicly available and searchable using the online search tools. This may have resulted in a focus on local level case studies and less on policy and landscape-level mitigation initiatives, which are a more recent phenomenon and may therefore be better covered in grey or policy literature.

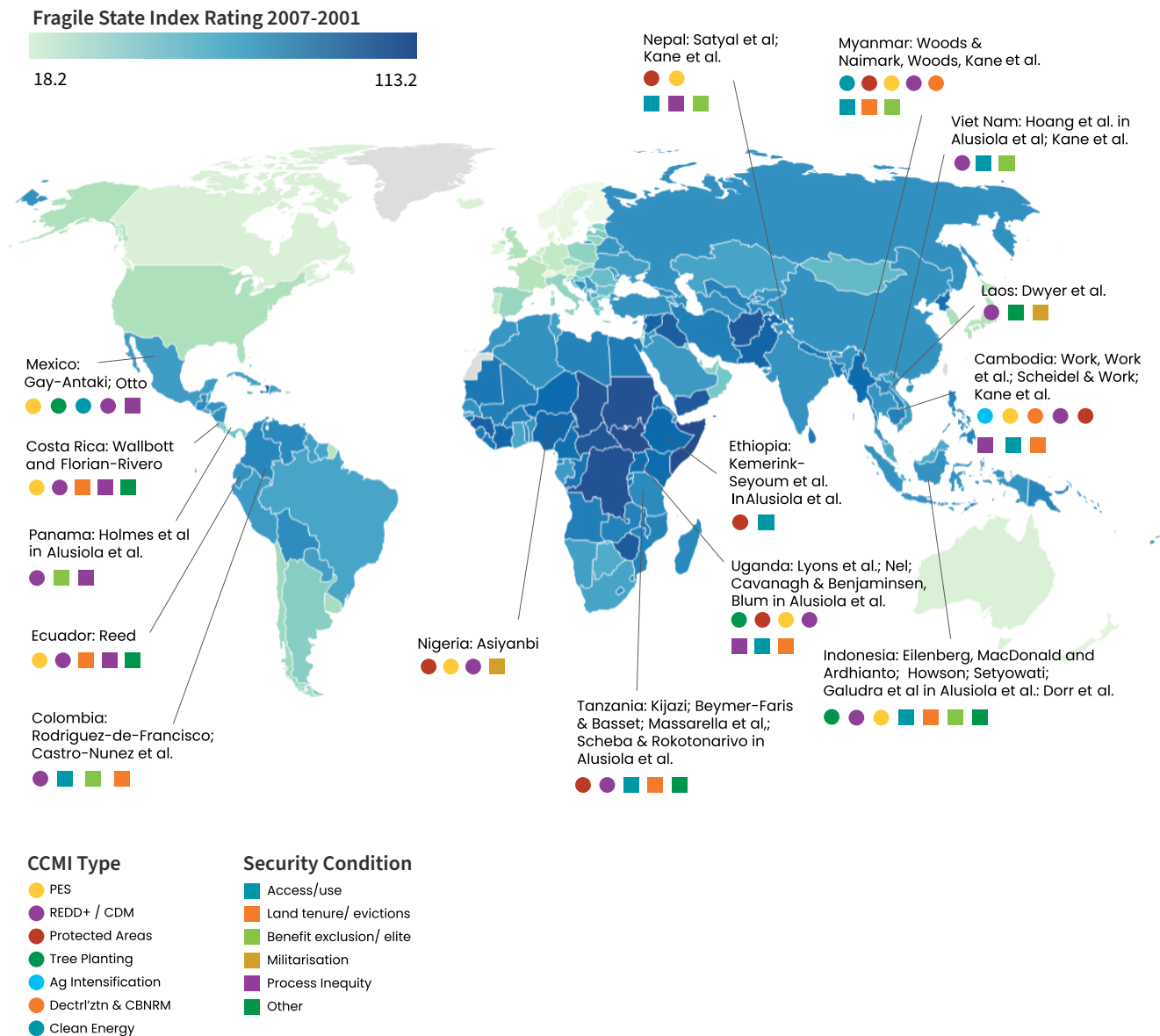


Figure 1. Main cases referred to in the literature review.

2.1. ANALYTICAL FRAMEWORK

In this section, we lay out the variables used to categorize and analyse our case studies (see Figure 2) and the results of that categorization. These variables include:

- type of CCMI
- influences on peace/conflict
- security/fragility feature
- ideological perspective taken by the case study

Below, we briefly discuss how the case studies relate to each of these variables. The next subsections elaborate Figure 2, and more details about the definitions we used for each variable can be found in Myers et al. (2021). The CCMI-security dynamic comprises our core findings, which are elaborated in Section 3.

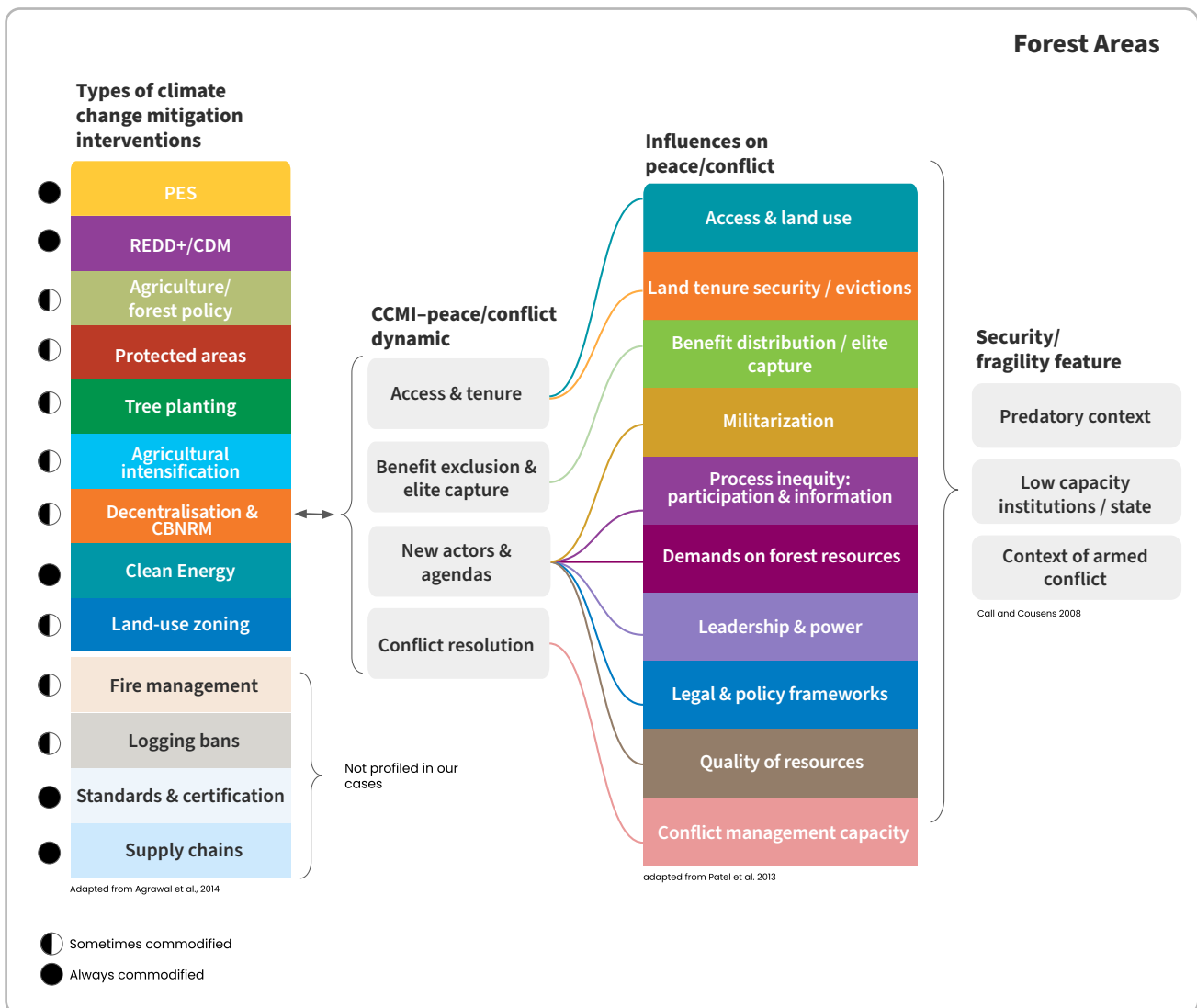


Figure 2. The variables used to analyse the case studies.

Table 1 shows a summary of the cases that we analysed in depth, showing the number of publications that can be attributed to each CCMI type and influence on peace/conflict. We included both the main case studies and the multi-case studies as shown in Annex 3.

2.2. TYPES OF CLIMATE CHANGE MITIGATION INITIATIVES

The 18 in-depth case studies covered CCMI types that include PES, tree planting, logging bans, industrial tree plantation (ITP), ‘flex crop’ production (crops that can be used for food, feed, fuel or other purposes) and clean energy. The four papers with multiple case studies discussed a range of PES under REDD+. Most of the in-depth case studies we reviewed also discuss REDD+, both the preparation stages and the possible implications of upcoming implementation. The case studies selected covered a wide range of geographical areas from Asia, Africa and the Americas, as shown in Figure 1. PES approaches to mitigation (some of which include or overlap with protected areas, tree planting and logging bans) were looked at in every region, while cases with industrial tree plantation schemes were located in Uganda and Cambodia. Flex crop production is discussed by cases in Cambodia and Myanmar, and clean energy in Cambodia and Mexico. Papers by Work (2015) in Cambodia, and Woods (2015) in Myanmar, used a landscape approach in their studies, and these covered multiple schemes. In Uganda, ITP’s mitigation objectives were identified as having significant peace/conflict issues, which resulted in research attention (Lyons et al. 2014; Nel 2015a; Blum in Alusiola et al. 2021). In Mexico, wind farms were studied as a CCMI that had implications for conflict (Gay-Antaki 2016; Dunlap and Arce 2021). Figure 2 lays out the various types of CCMI covered and, for each, lists the main conflict influences identified in that case study. We used this as the first level data collation on which to base our further thematic analysis.

Table 1. Summary of main case publications by CCMI type and peace/conflict

CCMI types	peace/conflict influences							Total
	Access/ use	Evictions	Land Tenure	Benefit exclusion/ elite capture	Militarization	Process inequity	Other	
Clean Energy	4	0	2	2	0	2	0	10
Community Forestry	3	0	2	2	0	0	0	7
Conservation	13	8	7	0	1	2	1	32
Biofuel / Flex Crops	4	0	4	0	0	0	0	8
PES	14	5	10	5	2	2	5	43
REDD+ / CDM	22	12	21	12	1	5	10	83
Tree Planting	2	2	3	1	0	3	2	13
Total	62	27	49	22	4	14	18	-

2.3. PEACE/CONFLICT

In order to examine peace/conflict features, we first used Patel et al.'s (2013) framing of 'sources of impairment' to REDD+ projects and equated them with influences on peace/conflict. As shown in Figure 2, these influences include access use and restriction, benefit distribution, competing demands on forest resources, conflict management capacity, leadership, legal and policy frameworks, participation and information, quality of resources, and land tenure security, including principles of equity toward pro-poor access to, and ownership of, land for marginalized groups, women and youth. Each variable is placed within the context(s) of peace/conflict, as shown in Table 2 below. In Figure 1, we show the main case studies reviewed on a geopolitical map that aggregates data from the Fragile State Index. Although these data are not chronologically aligned with the cases, the level of fragility can be used as a broad proxy for insecurity. Figure 1 also shows that the cases we selected (because they were the most explicit about CCMI and peace/conflict issues) were not located in the most or least fragile states. Costa Rica and Panama are examples of some of the least fragile states within which our cases are located, and Myanmar and Uganda are among the most fragile. In our findings, we also pay attention to the Democratic Republic of Congo, which is both highly fragile and a significant focus of REDD+ initiatives; however, literature items on REDD+ in DRC did not feature in our highest-ranked documents.

Table 2. A categorization of the 'fragile' security contexts in which the CCMI case studies are located

Security/fragility feature	Features of this context	Example of case studies where the 'security context' influences (in) security outcomes
Contexts of armed conflict	Weak institutions, social networks and negative loops of poverty, violence and resource degradation; low state legitimacy and high repression	Post conflict context leading to a vacuum of authority and higher deforestation (Colombia) (Rodríguez-de-Francisco et al. 2021) Forest as sites of armed conflict and finance for war (Colombia) (Castro-Nuñez 2018)
Predatory institutional contexts	Often authoritarian; elite interest in resource rents; power through patronage; low accountability of state to citizens, low state legitimacy, low rule of law; high levels of corruption	State using militaristic conservation to further statebuilding interests (Nigeria) (Asiyanbi 2016); quelling ethnic insurgency (Myanmar) (Woods and Naimark 2020); border security (Laos) (Dwyer et al. 2016)
Absent state / low capacity institutions	Weak state; unable to control some areas; absent or weak government presence; often areas far from capital or on borders, ethnic or religious polarization; can lead to rogue private and non-state actors	Private companies unregulated by the state leading to forced evictions from ITPs (Uganda) (Lyons et al. 2014; Nel 2015b)

Adapted from Call and Cousens (2008) and Harwell (2011)

2.4. IDEOLOGICAL PERSPECTIVES AROUND COMMODIFICATION

Across the range of case studies, we identified **a number of contrasting ideological perspectives**. These perspectives specifically reflect the conflictual nature of the debate around climate change mitigation in forests (see Bäckstrand and Lövbrand 2006; Sconfienza 2017).

A key overarching theme relevant to all the dynamics is the marketization or commodification of nature bolstered by the emergence of carbon markets related to demands for mitigation. We understand ‘commodification’ as the process of transforming something from a non-tradable to a tradable good or service that can be owned and controlled. With the arrival of CCMI driven by external actors that promise economic benefits, local means of production, accumulation and distribution also change. In the cases of CCMI, commodification processes include valuing carbon sequestered for sale in carbon markets and certifying land from which carbon credits can be legally bought or sold. The term ‘marketization’ refers specifically to “the expansion of the market into the lifeworld and the commodification of the natural environment and social context in order to achieve the need for growth and profit demanded by financial markets and investors” (see also Dunlap and Fairhead 2014; Tadajewski 2020: 3). Commodification and marketization of land and carbon contribute to conditions of peace/conflict in different ways, which we explore in the subsequent sections of our findings.

The first perspective **assumes that engaging in markets can help conservation to become more profitable than deforestation**. A central perspective promoting forest-related climate mitigation is that it is one of the most efficient and cost-effective ways to address carbon emissions associated with the climate problem (Repetto 2001; McDermott et al. 2011; Angelsen and McNeil 2012; Di Gregorio et al. 2017), and at the same time affords co-benefits of sustainable forest management, biodiversity protection, poverty reduction, and local socio-economic development in LMICs (Bäckstrand and Lövbrand 2006). Some perspectives view the commodification in CCMI as a ‘good thing’ as it bestows financial value on a previously financially unvalued asset. Newell and Paterson (2010) argue that carbon markets signal a transformation of capitalist models toward more environmental consciousness.

Second, we see papers based on a more ‘civic’ perspective that embrace the benefits of such initiatives but argue that CCMI benefits bring trade-offs between economic, ecological, and social dimensions (Bäckstrand and Lövbrand 2006; Dankelman 2010; 2012; Brugnach et al. 2017; Di Gregorio et al. 2017; Ramos-Castillo et al. 2017). They emphasize that market-based mechanisms may have differential effects on the rights and livelihoods of local communities, particularly on vulnerable groups such as women and Indigenous populations living in and near forests (Dankelman 2010; Brugnach et al. 2017; Ramos-Castillo et al. 2017), and have the potential to exacerbate social tensions (Peters, Dupar, et al. 2020). This raises a need for safeguards such as mechanisms for the redistribution of costs and benefits, secure property rights, and public oversight and participation to minimize negative outcomes and insecurity. Associated with this perspective are concerns about the impact that projects may have on tropical biodiversity and ecosystem protection.

Third, **many papers were based on more critical perspectives** that question the association of mitigation with the offsetting of carbon emissions in some areas, with carbon sequestration in others. Authors argue that forest-based climate change mitigation weakens the focus on reducing greenhouse gas emissions by industrialized countries and is predominantly in the interests of high-emitting countries (Dunlap and Fairhead 2014; Lyons and Westoby 2014a; Nielsen 2014; Leach and Scoones 2015; see also No REDD in Africa Network as an example of some of these perspectives). This body of work views these approaches as extensions of colonial legacy manifested in sometimes racialized exploitation and commodification of nature (Birrell et al. 2012; Cabello and Gilbertson 2012; Collins 2019; Ramcilovik-Suominen 2019). Böhm et al.(2012) suggest carbon markets exemplify ecological commodification and expropriation indicative of uneven development (see also Asiyambi and Lund 2020). Similarly, Lund et al.(2017) show that REDD+ resembles well-entrenched dynamics in the conservation and development industries that involve the commodification of nature leading to increased global inequities (see also Fairhead et al. 2012; Fletcher et al. 2016; Asiyambi and Lund 2020). **Market-based perspectives of commodification often conflict with local understandings of forests** (Reed 2011; Mickels-Kokwe and Kokwe 2015; Neimark and Wilson 2015; Work 2015; Sconfianza 2017; Müller 2020) and can, therefore, be seen as an indirect form of violence.



3. CLIMATE CHANGE MITIGATION INITIATIVES: peace/conflict dynamics

Based on the case studies laid out above and combined with wider theoretical literature, we categorize four key ‘dynamics’ by which CCMI and peace/conflict influence one another:

1. **Tenure and access rights**
2. Distribution of **costs and benefits**
3. New emerging forms of governance—**new actors, agendas and accountabilities**
4. **Conflict resolution/peacebuilding and engagement**

Table 3 synthesizes the key outcomes emerging under each of these categories on which we expand in the subsections to follow. We then examine possible trajectories of conflict resolution and peacebuilding/peacemaking. This understanding of dynamics seeks to influence programmatic approaches, design, safeguards, and overall engagement in ways more attuned to dimensions of peace/conflict. Finally, we examine the contributions of and gaps in CGIAR to this literature.

In the discussion of each dynamic, we highlight the extent to which literature identifies different experiences for women, Indigenous People, visible minorities, and other minorities. Across the entire body of works we reviewed, many publications call for increased participation of these groups in CCMI, with some referring to conflicts that emerge from exclusion. However, there is limited literature on the differential impacts and how security or insecurity on and conflict stemming from CCMI affects these groups differently.

Table 3. A categorization of the ‘fragile’ security contexts in which the CCMI case studies are located

Security/fragility feature	Climate security outcomes
Land access, management, and tenure rights	<ul style="list-style-type: none"> ● Tightening access in areas of contested rights lead to exclusion ● Technical requirements incompatible with traditions, culture and contexts ● Re-emergence of ‘fortress conservation’ approaches ● Violent evictions and enforcement of externally imposed rules ● Uncertainty that carbon rights do not automatically follow land, tree, and other forms of resource tenure
Benefit distribution	<ul style="list-style-type: none"> ● Overall benefit flow is limited and unevenly distributed ● Uncertainty and changing terms over promises and expectations create tension ● Finance is not always a key motivating factor ● Loss of livelihoods ● Costs accrue disproportionately among marginalized groups ● Elite capture of benefits ● Exclusionary effects emerge from technical requirements ● Corruption with high levels of finance influxes (resource curse)
New actors, agendas and accountabilities	<ul style="list-style-type: none"> ● New range of non-state actors involved in implementation and oversight ● Overcoming context of colonial dynamics by paying for a global good vs imposing new forms of global exploitation ● International focus can help highlight rights issues but can also lead to vulnerability for local communities ● State centralization needed for coherence and coordination, which can clash with efforts to empower local rights and authority ● Climate crisis narrative used to further political agendas; e.g. militarization and land grabbing
Conflict resolution/ peacebuilding and engagement	<ul style="list-style-type: none"> ● Lack of attention to conflict in the design of climate change mitigation initiative ● Lack of attention to root causes of conflict ● A shift from conflict resolution to peacebuilding ● The crucial need for meaningful implementation of safeguards ● Climate change mitigation initiatives can provide avenues to assist in peacebuilding ● Limited influence of women, Indigenous peoples and minorities in addressing conflicts ● Poor participation leads to conflict

3.1. LAND TENURE AND ACCESS RIGHTS

Land tenure and access rights to forest resources is a crucial theme consistently running through the CCMI case studies. The commodification of resources associated with mitigation has implications for addressing or exacerbating existing forest- and land-tenure-related insecurities depending on the perspective taken. On one hand, **well-functioning carbon markets are said to require secure tenure** (Sunderlin et al. 2018), and many projects and communities have perceived REDD+ as a chance to secure tenure rights (Dorr et al. 2013). This has been a key motivation for community involvement. In Indonesia, high-level government interest in REDD+ led to enhanced forums for establishing the regulatory environment, mechanisms, and means for securing land tenure for Indigenous peoples (Afiff 2016). On the other hand, many of the case studies reviewed show that CCMI have **increased the value of land and forest and, in many cases, led to the exclusion of local people**. In this section, we discuss the ways in which resource tenure and peace/conflict are linked. Even in cases where policies in support of establishing CCMI helped to raise the profile of rights and tenure for Indigenous peoples and local communities across Indonesia, securing such rights is by no means automatic (van der Muur et al. 2019; Fisher and van der Muur 2020). Indeed, in one case in Indonesia, land rights recognition for Indigenous peoples constituted its own process of green grabbing: some Indigenous activists aligned their land claims with ‘green economic’ state and private interests while simultaneously excluding other local actors depending on their ethnicity, class or gender (Astuti and McGregor 2016). In this discussion, we distinguish between the (1) underlying contexts of tenurial complexity in forests into which CCMI are inserted and exacerbate existing conflict; (2) new tenurial-related realities and conflicts created by CCMI; and (3) complexities emerging which are specifically related to carbon tenure (as distinct to that associated with land).

Pre-existing tenurial tensions affect the way CCMI lead to peace/conflict

As laid out in our introduction, many forest areas are sites of preexisting complexities and tenurial uncertainty with a high potential for conflict. Most countries have **unresolved disputes between the state and local community groups over tenure regimes, and it is into these contested landscapes that CCMI are inserted**. Many papers raise concerns about the planned implementation of PES/protected area initiatives due to the pre-existing insecurity of land tenure and/or the possible responses of the community towards the initiatives (see Reed 2011; Beymer-Farris and Bassett 2012; Dorr et al. 2013; Sarmiento Barletti and Larson 2019). This is of concern especially in areas where there are pre-existing significant land disputes or in (post-)conflict contexts (Castro-Nuñez, Mertz, Buritica, et al. 2017; Setyowati 2020; Galudra; Holmes in Alusiola et al. 2021; Rodríguez-de-Francisco et al. 2021), where existing governance structures may not be equipped to minimize conflicts (Gilmore and Buhaug 2021).

A common characteristic across the case studies is that the introduction of CCMI is associated with increasing restrictions of **access rights** in forest areas (see Lyons and Westoby 2014a; Woods 2015; Work 2015; Kijazi 2015; Asiyambi 2016). Many of the cases describe actors who

do not have **formal titles being excluded from both the benefits of the CCMI** and from **accessing and using land and forest resources in other ways**. Many of the cases document exclusion based on **the lack of recognition of customary land rights** and the way this loss of customary rights often outweighs other benefits associated with the CCMI. For example, Kane et al. (2018) show that REDD+ activities in Viet Nam's Lam Ha district brought benefits to local community members such as jobs and payments for ecosystem services, but, despite the benefits, the restrictions on access to land for some groups remained a significant contention. Similarly in K'ho territory in Viet Nam, the REDD+ project was built on previous PES work but enforced with tighter restrictions on land use. Customary land claims were re-interpreted as invalid, and related customary activity was considered illegal by the state. K'ho people considered the project contrary to custom and its proponents oblivious to the norms of social equity (Hoang et al. 2019; and as in Alusiola et al. 2021). In West Kalimantan, Indonesia, Eilenberg (2015) shows that historical tensions over land and pressure from conservationists was intensified by REDD+. Indigenous communities were excluded from decision-making and elites were positioned to benefit. He argues that the amplified exclusions were a result of a lack of attention to the historical and political contexts and imposition of foreign concepts that contrasted with customary understandings of nature.

In West Kalimantan, Indonesia, unclear land tenure enabled a 'grey area' in which **local elites were able to include some people and exclude others** from REDD+ benefits. This fomented conflict. Claims for certificates of land were stimulated by the opportunity to benefit from REDD+, even before benefits were distributed. The distribution of the certificates was highly disputed by local community members, with claims that the issuance was inconsistent with customary claims and in favour of local elites and along lines of patronage. The grey areas were perpetuated by conflicting land allocation policies and lobbying efforts to convert land allocated for REDD+ projects to oil palm developments (Eilenberg 2015). Work (2015) describes the dramatic changes in the Prey Lang Forest in Cambodia, where **shifting agricultural practices were made illegal** by the state, and the customary rotation of tree felling was also halted by a series of sub-decrees related to the formalization of a protected forest and biodiversity conservation area related to CCMI.

We also find a number of cases of **physical evictions were justified by the lack of land and access rights** (see also Brockington 2002; Cavanagh and Benjaminsen 2014; Kijazi 2015; Nel 2017; Wallbott and Florian-Rivero 2018; Massarella et al. 2021). Howson (2018) discusses the case of Sungai Lamandau in Central Kalimantan, Indonesia, where only landholders with formal title were allowed to enter the forestlands used for a REDD+ project. Local forest users entered their customary land in the project area by stealth at night as project proponents labelled them as illegal forest users who were undermining the conservation project. Violent conflict erupted between those with customary claimants and the proponents of the REDD+ project. Forest users without legal land rights—primarily Indigenous people—suffered more violence than farmers with land—primarily migrants.

Many of the cases of evictions associated with **CCMIs follow the traditions of protected areas before them**. For example, both Neumann (1998) in the case of Arusha National Park in Tanzania, and Li (2007) in the case of Lore Lindu National Park in Central Sulawesi, Indonesia, describe similar patterns of forced evictions under the auspices of environmental protection. These patterns are evident in the literature on CCMI implementation. In some places, the communities observed that with the arrival of CCMIs, exclusion is more severe than with any other interventions that they have experienced. In the case of Ecuador, the tensions agitated by REDD+ were based on long-standing tensions. Indigenous peoples' activities had been organizing against their exclusion from forests in a movement joined by urban leftists and landless peasants (Reed 2011). Reed (2011: 256) shows that despite REDD+ showing promise of departing from command-and-control approaches to protecting forest, it carries risks of agitating long-standing disputes: "If Indigenous communities do decide to enter into REDD+ projects, it must not be forgotten that they, once more, enter a realm of modernity where new money and institutional agreements can once again alter their natural environments and ways of life in ways never seen before."

Asiyanbi (2016) warns against the oversimplification of addressing land tenure alone. He explores how conflicts in Nigeria are linked to the way **REDD+ is positioned in technical terms and is external to the political nature of tenure** (see also Nel 2017). REDD+ proponents tried to find ways of 'solving' tenure rather than acknowledging that climate change mitigation is a power dynamic in itself. The failure to recognize these dynamics led directly to conflict, and indirectly created an environment conducive to the emergence of future conflicts through strengthening already inequitable power structures. Within communities, even well-designed CCMIs struggle to realize equity in implementation, which leads to discontent among those whose voice is not heard, or who fail to receive what they understand to be their 'fair share' of benefits. Chomba et al. (2016) explore the design and implementation of REDD+ in the cases of Kasigau in Kenya. They note that the REDD+ project designs took account of equity and reduction of elite capture, but because the programme was built on pre-existing structures stemming from colonial times, existing power dynamics were only reinforced by the project. This resulted in increased marginalization of people based on gender, class and ethnicity leading to increasingly severe social conflicts. The authors conclude that "[d]isguised as agrarian reform and formalization of tenure, these processes lead to benefits for the minority at the expense of the majority in the society, as demonstrated here in the context of REDD+" (Chomba et al. 2016: 211).

New tenurial tensions directly related to CCMIs

One issue raised in several cases is **the incompatibility of CCMI design requirements (such as the need for clear fixed boundaries) with traditional or customary uses of land**, which tend to cover larger territories and are used in different ways. Woods and Neimark (2020) highlight how the confirmation of park boundaries led to exclusions, and Asiyanbi (2016) also documents conflict caused by the mapping of boundaries.

Some literature we reviewed views **conflicts in CCMI through the lens of ‘land grabbing’** (Lyons and Westoby 2014a; Woods 2015; Work 2015; Scheidel and Work 2018). Land grabbing is defined as “the capturing of control of relatively vast tracts of land and other natural resources through a variety of mechanisms and forms that involve large-scale capital that often shifts resource use orientation into extractive character” (Borras et al. 2012: 851). Lyons and Westoby (2014a) argue that the scale of initiatives and the ways in which they attract a range of powerful actors with new interests in forest resources has led to various forms of ‘carbon violence’. Nel (2017) shows that a coalition of agribusiness companies and big banks propelled carbon investment forward in Uganda by developing large-scale industrial tree plantations. He observes that the voices of local forest users were ignored and that “[a]cknowledging the multiple actors in the emergence of the current carbon forestry dispensation, there is a clear bias towards foreign investors, NGOs and carbon developers” (page 148).

Li (2011) suggests that the **structural requirements for carbon accounting have led to a technical approach which disregards other values of a forest landscape** (Nel 2017). This is exacerbated by the need for additionality. We can see the illustration of this in Lyons et al. (2014), where an industrial tree plantation company who joined the voluntary carbon initiatives was required to tighten its borders and not allow any settlement or community farms within its concession areas to avoid leakages in their carbon accounting. **The requirement to ensure carbon sequestrations are verifiable and tradeable can lead to exclusions** (Brockington et al. 2008). We see this across a number of our cases; for example, the case of REDD+ in Sungai Lamandau, Indonesia (Howson 2017), and the CDM project in industrial tree plantation case in Uganda (Lyons et al. 2014). In the Cross River State, Nigeria, a logging ban that included NTFPs was imposed as a military task force was set up for the purpose of establishing the area as a REDD+ pilot (Asiyanbi 2016). In the Aural Landscape and Prey Lang Forest, Cambodia, evictions and loss of access were the result of various PES projects such as CDM and REDD+ (Work 2015).

CCMIs have rekindled ‘fortress conservation’, limiting access in forest areas in the name of conservation (see Brockington 2002; Lyons et al. 2014; Kijazi 2015; Nel 2015b; Howson 2018). Dunlap and Fairhead (2014) frame this activity as a form of land grabbing in the name of climate change mitigation, and as an expression of the violence and history of political forests. Dunlap and Fairhead (2014) distinguish between ‘hard counterinsurgency’ in the form of conservation practices that translate into a fortress conservation model and ‘soft’ counterinsurgency methods through participatory or community-based conservation (we return to this issue in a later section). The ‘fortress conservation’ model posits that protected areas prioritize the protection of nature above the needs or rights of local communities (Brockington 2002; Siurua 2006). Based on this assumption, this conservation model tries to eliminate any human disturbances in the ecosystem of a defined protected area. Local people dependent on the natural resources of the area are barred from accessing the area and the resources, and park rangers guarding the boundaries often enforce this (Neumann 1998; Brockington et al. 2008). In the case of Mount Kilimanjaro, Tanzania, climate change concerns prompted an expansion of the national park that took over the forest previously designated

for the community's subsistence use, leaving communities without resources (Kijazi 2015). In the case of Uganda's industrial tree plantation, a system where communities were initially allowed to grow their crops in between the company's trees was then phased out because of a carbon certification requirement (Lyons et al. 2014).

Fortress conservation is, in some ways, an **extension of colonial and neo-colonial understanding of the state's domination over natural resources and forests** (Hulme and Murphree 1999; Bluwstein 2018; Domínguez and Luoma 2020). Some of the examples of 'fortress conservation' employed military or armed protection. For example, preparations for a state-led REDD project in Cambodia were accompanied by increased military presence and the erection of concrete poles around a cardamom buffer zone to protect the forest area. The officiation of the project included heavily armed military police and other shows of power (Milne 2012).

Some CCMI's have led to changes in land-use dynamics linked to violence (Froese and Schilling 2019) and, in some cases, to killings (see Milne 2012 Apr 30 for the Pataxo carbon offset plantation case). Other case studies describe industrial tree plantation (ITPs) or flex crop production, where a company or corporation takes over the land entirely and changes the landscape and biomass into monoculture plantation (Lyons et al. 2014; Woods 2015; Work 2015; Nel 2015a; Blum in Alusiola et al. 2021). This suggests that these forms of mitigation are particularly associated with local populations being violently evicted, in what Lyons and Westoby (2014a) have termed 'carbon violence'. Dunlap and Fairhead (2014) argue that ITPs are associated with high levels of conflict (and killings) associated with land grabs, and Woods and Naimark (2020) analyze conservation as a counterinsurgency in Myanmar.

The outcome of exclusions associated with CCMI's falls disproportionately on more marginalized groups. Kane et al. (2018) show that restrictions placed on customary land included in the Forest Carbon Trust Fund projects (in Chitwa, Ghorka, and Dolaka districts in Nepal) excluded those without a formal title. This affected women more than men by restricting NTFP and firewood collection, increasing travel times and investment to meet daily needs. Higher-caste groups were also said to be affected less than lower castes, and ethnic minority groups, who had less formalized privatized land, were severely impacted. The authors showed that higher castes with privatized land actively lobbied against distribution of land to those without formal land rights, causing conflict along ethnic lines. Sarmiento Barletti and Larson (2019) argue that Indigenous communities are susceptible to greater injustice than other groups.

Local communities excluded from accessing forest resources or ancestral lands, or those suffering from the loss of livelihoods, **express discontent and show resistance** in the form of protest, strikes, road blockage, violence against the police/military, and so on. For others, the response takes the form of 'everyday forms of resistance', such as continuing customary practice covertly (despite activities being made illegal) and small acts of defiance towards

access restrictions that undermine the objectives of the CCMI (see Scott 1987; Hoang et al. 2019; and as in Alusiola et al. 2021).

We see **some overt and violent forms of protest**. For example, in the case of Cambodia, participatory maps determining village boundaries and limiting agricultural expansion near forest areas were violently protested by local elites. This delayed the process for two years and resulted in the redrafting of the maps to focus only on a 600ha block of cardamom forests (Milne 2012). In other cases, resistance rarely succeeded in bringing back their access rights or land rights. At the very most, the communities were given compensation for their loss of rights. There are also a **myriad of reasons why local communities might not resist** or might consent to their own exclusion. They may be powerless to resist, fear repercussions for resistance, believe promises of compensation or agree with arguments that exclusions will be the best thing for their communities (Scott 1987; Sunderlin et al. 2009; Myers and Muhajir 2015; Martin et al. 2018).

Carbon rights and peace/conflict

Our analysis also suggests the value of **analytically separating an understanding of commodification of carbon from the commodification of the land** and forest resources, due to the specific tenure issues that carbon markets bring. Under CCMI, carbon credits have become a new commodity with a vacuum of legal clarity over their tenure. Meanwhile, literature on community-based resource management has long made the argument—and increasingly so in recent political efforts to recognize Indigenous peoples and local communities as inherent protectors of natural resources—that much of the continued protection of carbon resources has taken place over many generations among locally rooted environmental stewards. There are increasing efforts to quantify the role that Indigenous peoples play in protecting carbon, embodied through statements like this: “Indigenous justice and climate change are closely tied together. Indeed, it is estimated that around 24% of above-ground stored carbon, or 54.5 gigatonnes of carbon, is stored in tropical forests held by communities and Indigenous peoples” (Ospina 2018: 1).

On the one hand, the commodification of carbon emission reductions has rendered certain types of land ‘investable’ once carbon credits gain value. On the other hand, this raises the potential for tension and conflict as new claims are made (Asiyanbi 2016) in a context of unclear legal frameworks and questions such as who owns the carbon, what its value is and who has the right to make money from it, questions for which there is often a legal vacuum (Martínez-Alier 2002; Kravchenko 2007; Karsenty et al. 2014; Gilmore and Buhaug 2021). Asiyanbi (2016) highlights the way in which claims, counterclaims and legal ambiguity about carbon rights can further complicate power dynamics.

Rights to benefit from carbon do not automatically follow the rights to land or forest resources (Luttrell et al. 2014). In many countries, the decision over whether carbon rights

accrue to local communities or are classed as a state asset (in the way that mineral resources usually are) has not been clarified and depends on whether carbon credits are defined as a national public good and therefore the nation should benefit accordingly. To date, much of the debate about benefit-sharing from REDD+ has assumed local people have the ‘rights’ to benefits (Loft et al. 2017). This relates to tensions in many countries over who owns the land and who owns forests, which has implications for benefit-sharing (see also Luttrell and Betteridge 2017).

Loft et al. (2015: 1033) argue that **clarity over tenure and resource rights in tandem with the carbon asset is critical to prevent disruptive conflicts** between competing actors within REDD+ countries. They continue to say that “such conflicts will propagate uncertainties and further complicate transactions between sellers (‘providers’) and buyers (‘beneficiaries’) of carbon ecosystem services (ES) provided by forests.” They highlight that investors are reluctant to commit to CCMI in contexts where lack of clarity may compromise not only the success of the CCMI but also peace/conflict more broadly.

Addressing land tenure for peacebuilding

Many authors advocate for the recognition of local land claims and/or the use of tenure solutions to address peacebuilding and for CCMI to be successful (Patel et al. 2013; Rodríguez de Francisco et al. 2013; Sarmiento Barletti and Larson 2017; Castro-Nuñez 2018; Peters, Dupar, et al. 2020). Many CCMI proponents hope that **tenure security will be a co-benefit of REDD+** (Sunderlin et al. 2018) and that by bringing attention to the issue, REDD+ would be a way to resolve land tenure issues. For example, groups in Indonesia have used climate change mitigation (especially REDD+) to bring international attention to land rights (Afiff 2016; Sunderlin et al. 2018). REDD+ has been promoted by some NGOs as a means of strengthening the rights of local communities, and this represents an example of mitigation being used to enhance security. However, Indigenous peoples’ rights groups specifically have been cautious about promoting REDD+ as a vehicle towards increased rights, using the mantra ‘No rights, no REDD’ to show that rights must come before REDD+, rather than after or in tandem (Gomez et al. 2010; Howell 2014; see also Sikor et al. 2017).

However, **conflict issues are associated with the clarification of land tenure**. In the uplands of Cambodia, the commodification of land through individual titling led to internal processes of dispossession, violent forms of exclusion of the Indigenous Bunong people and instability caused by the erosion of communal (non-tradable) land tenure (Milne 2013). Similarly, in Lao PDR, a coordinated effort among international donors, NGOs, and different levels of government aimed to strengthen land tenure security within the context of REDD+ in order to minimize conflict and maximize the chances of success of the projects. However, “plural, contradictory regulations and policies, combined with existing power inequalities result in a ‘filter mechanism’ that reduces the practical impact of legal instruments and safeguards aimed at strengthening the least powerful actors’ rights” (Broegaard et al. 2017: 170).

Addressing land tenure in (post-)conflict contexts is particularly challenging due to a lack of capacity in government institutions and civil society (Blair 2007; Unruh 2010). Dunlap and Fairhead (2014) suggest that (post-)conflict areas have a history of CCMI taking advantage of weak institutions to obtain the security of land rights. Several studies have shown that **collective tenure has a stronger effect on meeting the objectives of deforestation initiatives** and may lead to less conflict by providing conflict resolution mechanisms better suited to the context than individual titles in communities of Indigenous peoples (Larson et al. 2008; Cronkleton and Larson 2015; Saito-Jensen et al. 2015). Thus Reed (2011) suggests that confirmed Indigenous peoples' territories are likely to be the best place for CCMI as land is secure. Dabelko et al. (2013) and Sawas et al. (2018) suggested that REDD+ can go further than this by strengthening land tenure security through confirming customary lands.

3.2. BENEFIT DISTRIBUTION AND COST-SHARING

As land tenure and access to forest and carbon resources shift, questions of benefit distribution and cost-sharing emerge. The concept of 'net zero' in the design of some CCMI is based on the notion that the costs of producing carbon emission reductions will be compensated by new sources of finance (and related benefits) for forest-based people and others incurring 'costs' in reducing carbon emissions from forests (see Stark et al. 2019 as an example). As well as being solutions to climate change, global carbon markets are championed as drivers of positive development outcomes for local communities because they provide revenue to advance socio-economic development (Dabelko et al. 2013; Tänzler 2013). While there are examples of CCMI improving livelihoods and wellbeing, in some of our cases, **benefit-sharing caused conflict**.

In case studies where the **benefits flowing to local communities** were discussed as a factor related to peace/conflict, **the benefits have not been significant** (Work 2015; Howson 2018) or have been overshadowed by the costs incurred (see Mahanty et al. 2013). **Some suggest that the undelivered promises and expectations of benefits** from REDD+ have caused new tensions and conflict (Scheba 2014; Eilenberg 2015; Nel 2017; Alusiola et al. 2021) or **have accentuated existing ones** (Dorr et al. 2013). CCMI present opportunities for wrongdoing resulting from a lack of accountability around delivering the benefits. In some cases, key proponents have downplayed monetary benefits from CCMI in order to frame a CCMI as 'successful' (Lund et al. 2017; Rutt et al. 2018; Setyowati 2020). Further, **the price of carbon remains low** at around USD 5 per tonne. **This affects the viability** of CCMI. The low level of financial return can lead to conflict due to high upfront costs which may not be compensated as expected. Many CCMI remain financially dependent on ODA and public finance.

The type of benefit matters. Finance is not always the key motivating factor for local communities. The concept of PES is based on the premise that actors are incentivized by financial rewards. Overall, the heavy focus in our case studies on the importance of gaining access rights to land and forest resources (as the section above on tenure discusses) suggests that this premise may be too simplistic and that actors may be more heavily motivated by other

‘benefits’, such as tenure security and access to land. The case study from Aceh (Setyowati 2020) highlights the way in which support for REDD+ was based primarily on the assumption they would be able to derive benefits from it, both directly and indirectly, by gaining access to resources that would contribute toward personal benefits (e.g. access to forest land for cultivation).

Livelihoods are affected by changes in land use. As discussed above, **livelihoods** have been lost as the result of changes in access rights to forest areas and in changes to land use (Kijazi 2015; Asiyambi 2016; Scheidel and Work 2018). Some CCMIIs compete with agricultural land, which may put pressure on food prices (Daioglou et al. 2019; Gilmore and Buhaug 2021; Sen and Dabi 2021). Lyons and Westoby (2014b) frame these scenarios as forms of violence that are manifested in the destruction of food systems, denials of rights and livelihoods, denial of access to sites of cultural importance, and reduced availability of ecosystem services for local forest users. A case in Indonesia shows that bureaucratic delays in a national REDD+ demonstration were halting payments to community members, creating tensions among communities and the state. The state expressed commitment to the long-term support of local communities but had to work with local NGOs in the short term to overcome internal obstacles. This suggests that CCMIIs need to consider long-term commitments to the well-being and livelihoods of local communities (see also Agrawal 2005 on the role of intermediaries in land-use governance; Indriatmoko et al. 2014). Gilmore and Buhaug (2021) discuss how climate change mitigation policy can significantly affect economic growth and unequal distribution of burdens and benefits. They identify that CCMIIs may reduce overall economic performance through diversions of funds designated for other purposes in LMICs and, in so doing, create conflict. For example, policies designed to reduce emissions from transportation could lead to economic hardships.

One overall feature of CCMIIs is that **costs and benefits accrue in different temporal or geographical spaces**. In the cases we reviewed, the conflict has been caused by **inequity in the way in which benefits and costs are distributed**—whether it is between local and international levels, between countries, within a local landscape or within a community. The concerns of equity were more related to conflict than concerns over ‘wanting more benefits’. PES schemes focus primarily on economic efficiency, and this undermines attention to notions of equity (Pascual et al. 2014), which can lead to conflict. The potential for benefits to accrue differently to different groups can cause complex power relations and create the potential for conflict. Conflict is caused by seeing misallocation of costs and costs being incurred on the ground, and the way in which many of the people who bear the costs are not the people who receive the benefits (see Poudyal et al. 2016).

Many of the studies we reviewed show that these **costs are accruing disproportionately in marginalized parts of society, and this is leading to insecurities** (see Mahanty et al. 2013 as an example). Case studies from carbon forestry reforestation projects in Mexico show the labour burden which has fallen primarily on women, where those involved are not receiving

financial compensation on a par with the labour expended (Gay-Antaki 2016) or are working under disenfranchising labour arrangements (Otto 2014). This issue is also tightly connected to the issue of access to forest and land tenure. Eilenberg (2015) shows how local elite actors make land claims (legal and illegal) to ensure they are included in the benefits and that this creates tension in the community as well as further marginalization of the community's poorest members. **In some cases, CCMI have exacerbated gender inequalities and the exclusion of women;** for example, where engagement (and potential benefits) were routed through farmer associations and co-operatives—groups comprised mostly or exclusively of men (see also Elmhirst 2011 in the context of a political forest in Indonesia; Howson 2018).

Many authors raise the elite capture of benefits as a significant issue (Dorr et al. 2013; Kijazi 2015; Nel 2017; Sovacool 2019; Alusiola et al. 2021). This is particularly the case in (post-) conflict contexts (see Box 5 on Aceh). Elite members of the community who are less dependent on forests are able to be included in the benefit distribution system, while more marginalized ones who are more dependent on forests are not. People who have the resources and ability to claim benefits are not the ones who suffer the most from the loss of access to forest land. The people whose livelihoods are dependent on forest land are sometimes the ones who are unable to claim benefits from PES (Eilenberg 2015; Howson 2017).

The technicalities of CCMI, combined with the uncertain nature of the markets and unstable market relations, present significant risks for CCMI proponents (Nel 2017). In addition to the technical requirements, smaller players are further excluded by not having **access to market information** on which to base informed decisions. The resulting need for **intermediaries** to navigate the complexity further increases potential points of tension (Nel 2017), such as the uncertainty and short time scales associated with many NGO engagements (as shown in Indriatmoko et al. (2014). On the other hand, in their analysis of the Katingan Project in Central Kalimantan, Indriatmoko et al. (2014), show how the flexibility of working through NGO networks can help overcome the often onerous implementation arrangements around CCMI that lead to confusion over the laborious bureaucratic processes that impeded the engagement of surrounding villages in local livelihood initiatives.

Many of the debates around REDD+ benefit-sharing assumes that a significant proportion of any revenue raised would accrue to the locality or community reducing emissions. However, **experience from the extractive resource sectors suggests that if financial flows become significant, this distributive rationale may be problematic and can lead to conflict.** If the emission reduction is classified as a national good (or incurring a national cost), benefits should arguably accrue to the nation for wider development purposes. Decisions on this depend clarifying who the 'rightful beneficiaries' are (see section above on carbon rights), and are also related to the benefits of ensuring some subsidiarity (the principle that matters ought to be handled, and decisions taken, by the smallest, lowest or least centralized competent authority) (Le Billon 2001; Ross 2003), as well as the need to minimize rewards for poor performers (Mejía Acosta 2015). Although rewarding regional efforts to generate their own

Box 5. The challenges of inserting mitigation initiatives into the complexity of (post-)conflict contexts

In post-conflict Aceh, Indonesia, Setyowati (2020) shows how 2,300 forest rangers were hired by REDD+ project proponents to protect Ulu Masen forestlands. Community members were recruited as community rangers to collaborate with state agents for policing forest areas. Most forest and community rangers were former GAM (*Gerakan Aceh Merdeka* – Free Aceh Movement) combatants, illegal loggers, and poachers. The project proponents assumed that involving the former combatants in REDD+ would reduce the likelihood of their return to the conflict and would prevent them from turning to illegal logging activities, hence fostering successful reconciliation processes in the region. Support for REDD+ was based on the assumption they would be able to derive benefits from it, both directly and indirectly, by gaining access to resources that would contribute toward personal benefits (e.g. access to forest land for cultivation).

However, many GAM ex-combatants proved to have intricate network ties with logging business actors who often supplied logistical support to GAM, creating inequalities in access to the forest depending on how strong linkages were with GAM actors. Rampant illegal logging agitated relations between project proponents and communities, which was deeply entrenched in networks involving various actors such as military officers, the police, GAM combatants, and local communities. This resulted in an uneven distribution of benefits from the REDD+ projects.

revenues is logical, there is a (re)distributive logic of investment in areas where needs are higher (Acosta and Yanguas 2014).

3.3. NEW ACTORS, NEW AGENDAS, NEW ACCOUNTABILITIES

As opportunities for new benefits arise, new actors develop interests in forests, lured by the prospect of accessing emerging markets or gaining control over forest areas. These new actors have their own agendas and accountability structures that may conflict with actors engaged in forest landscapes. CCMI involves new forms of governance and actor relations due to the introduction of (1) international and national objectives to the local levels, and (2) the involvement of new (public, private and civil society sector) actors (see Sikor et al. 2017). **The imposition of new actors and agendas and emerging forms of governance affect peace/conflict in a number of ways.**

International oversight versus carbon colonialism

Demand for climate mitigation is dominated by international voices and results in new interactions and power dynamics between sub/national and the international (Dwyer et

al. 2016; McEwan 2017; Mirumachi et al. 2020). On one hand, we see contestations between the global public good objectives of carbon emission reductions and local objectives related to livelihoods (Reed 2011; Dunlap and Fairhead 2014; Lyons and Westoby 2014a; Eilenberg 2015; Work 2015; Asiyani 2016; Borrás et al. 2018; Castro-Nuñez 2018; Scheidel and Work 2018; Franco and Borrás 2019). On the other hand, **the public sector is increasingly involved in financing and providing technical inputs** to mitigation activities, and increased numbers of civil society and non-state actors are involved in oversight, accountability and conflict resolution. This range of new hybrid assemblages (involving both public and private) can help bypass the state to further agendas on which nation-states might be lagging; for example, Indigenous peoples' rights and wider human rights issues such as gender and diversity issues. Local interest groups are increasingly using international attention to further their own interests. Keck and Sikkink (1998) have used the term 'boomerang effect' to refer to this phenomenon of local advocacy groups channelling information about human rights violations to transnational actors to generate international support.

International attention can **support local agendas, but it can also bring increased vulnerability and risk exposure for actors** who raise international attention to challenge powerful interest groups. In some cases, this can lead to reprisals in the form of killings, criminalization, smear campaigns and threats against those who challenge powerful actors (Menton and Le Billon 2021; see also Box 6). Many international NGOs and UN initiatives argue for increasing the visibility of the threats against human rights defenders (Forst 2014). However, the Global North tendency towards individualization of 'environmental heroes' can undermine the safety of those 'heroes' and disarticulate collective movements (Verweijen et al. 2021). Some question the role of international NGOs in exacerbating local conflicts that leave their local allies at risk of reprisals (Grant and Le Billon 2021) or, in other cases, in engaging in partnerships with companies that enact violence upon local communities (Menton and Gilbert 2021). **There is also a scaled dimension around activist groups succeeding in securing regulatory victories in land tenure recognition through REDD+** (Afiff 2016) that refract in the distribution of benefits for certain actors (van der Muur et al. 2019) and can lead to exclusions by certain individuals benefiting certain subjects in a community over others (Agrawal 2005; Astuti and McGregor 2016).

It has been argued that, by using a market-based mechanism, the **concept of REDD+ has attempted to overcome neo-colonial dynamics** inherent in preexisting internationally driven conservation initiatives by compensating those incurring costs of conservation. On the other hand, many argue that **the mechanism failed to overcome these colonial power dynamics and, in many cases, has reinforced them**. For example, the conditionalities of performance-based payments has led to these dynamics being termed 'carbon colonialism' and accusations of elite polluters finding new ways to 'colonise' (see also Bachram 2004; Bumpus and Liverman 2010; Lyons and Westoby 2014a). CCMI is perceived to be following the same violent patterns as colonial logics, characterized by lack of recognition, inattention to history, and the development of systems that favour elites, all of which leads to instability

Box 6. Environmental defenders and CCMI

In 2020, 227 environmental and land defenders were killed worldwide in retaliation for their efforts to protect land, forests, waters and other ecosystems (Global Witness 2021). This represents the worst year on record since monitoring began in 2012. For the second year in a row, Colombia saw the highest rates of killings (65 in 2020; 64 in 2019). The Global Witness report focuses on the links between the attacks on environmental defenders and the climate crisis—that defenders are “agents of climate conservation”, such that progress towards mitigating climate change requires prevention of violence against defenders (Global Witness 2021, page 16). Indeed, 70 percent of those killed in 2020 defended forests from deforestation and expansion of industrial development into forested areas. In this recent shift in the framing of climate activism and climate justice to include Indigenous peoples’ rights and land rights more broadly, more attention is being drawn to the role of Indigenous peoples and local communities as climate protectors. However, it is not so straightforward. As mentioned elsewhere in the report, contestations against REDD+ projects are one of the most ubiquitous of conflicts linked directly to CCMI. Although very few killings can be linked directly to CCMI, they are intricately linked to land conflicts and the fight against deforestation and the industries responsible for GHG emissions at a broader level. Weak recognition of tenure rights; failure to respect the principle of free, prior and informed consent; and growing demand for land have led to an increase in land conflicts and growing dangers for communities defending their land rights, including increased violence against forest defenders (NYDF Assessment Partners 2018; Streck 2020).

Some CCMI have led to changes in land-use dynamics linked to killings (e.g. Milne 2012 Apr 30). Others have been linked to the intensification of land conflicts and the criminalization of Indigenous leaders. For example, in northeast Brazil, eucalyptus plantations encroached on lands located within Indigenous peoples’ territories and are linked to threats against local leaders.

Actions aimed at combating deforestation and environmental crimes, be they NGO campaigns and investigations or government-sponsored enforcement of environmental laws, can increase conflict for environmental defenders as those responsible for those crimes seek retribution or to silence defenders. Many of the defenders who are killed are local leaders, grassroots activists and defenders of Indigenous peoples’ land rights. However, some are also NGO employees, government officials, and lawyers. In some countries, opposition parties face attacks for pro-environment stances. For example, in the Philippines, politicians, NGOs and community leaders face red-tagging (i.e. being labelled as communists) for speaking out against development projects that cause environmental damage (IUCN 2020 Dec 15). Yet, at the same time, the high-level visibility of these conflicts can sometimes serve as leverage to draw international attention to particular conflicts.

and fragile governance structures. The commodification of nature is a specific imposition of Global North logics on forests on which the hopes of climate change mitigation have been pinned. In reality, forests are not vacuous ungoverned chunks of land but managed commons that have long histories of conflict and peace. There is a neo-colonial logic to placing the hopes of climate change mitigation on forests in the tropics. The burdens (e.g. loss of access, shifting governance toward elite preferences, and the introduction of new markets and actors) are shouldered by poor countries, while rich countries hope to purchase carbon credits that allow them to conduct business as usual. In addition, the perceived imposition of an international agenda at national and subnational levels can also have implications for democratic processes, ownership and sovereignty. This can lead to lack of national ownership or government buy-in to the climate change objective and disinterest in resolving emerging conflicts.

State centralization related to CCMI: implications for peace/conflict

At the same time as **international actors are using mitigation to gain more influence over national and subnational forest-related activities, we also see some strengthening of the central state and of their function** associated with CCMI. Effective mitigation suggests the need for the centralization of some state functions to ensure coherence and coordination. This is particularly related to the need for legitimacy in the eyes of international markets and civil society, to bring coherence and coordination to MRV systems and to ensure that leakage does not occur. There is a need to address structural issues such as land tenure and institutional capacity which the project level is not able to address. This has led to the emergence of 'jurisdictional approaches' which aim to move beyond the project level, increase the volume of financing and thus hope to tackle these structural issues (Sticker et al. 2018; Arts et al. 2019).

An increase in the level of state centralization and involvement can bring the benefits of subsidization and increased input of capacity but can also lead to conflict due to the undermining of local autonomy and community institutions. The scaling up and centralising of CCMI can lead to a disconnection from local realities (Reed 2011; Kijazi 2015; Nel 2015a; Work et al. 2019; Sarmiento Barletti and Larson 2019) and increased complexity of vertical power dynamics. The following literature suggests that the need for centralization can also be used as rationale and a means to strengthen state control and/or to impose other agendas. This is noted to be a source of conflict. In Indonesia, we see how the REDD+ process becomes embroiled in national-subnational government power play and creates tensions between national and sub-national governments. A case in Kapuas Hulu, Indonesia, highlights the issue of different interests over land between different levels of the state leading to conflict. Forest and Fauna International applied for an Ecosystem Restoration Concession permit in a conversion forest area, which meant that the land use was eligible to be converted from forest to agricultural or plantation use. The proposal was supported by the district government for the purpose of implementing a REDD+ project. However, the provincial government then designated the area protected forest, rendering void any deforestation arguments for the project. Local forest users and the district government were upset that the potential benefits of REDD+ would no

longer be available to them, and transnational grievance systems specifically for REDD+ had not been established or considered a priority due to the effective relationships established between the local communities, project proponents and district government (MacDonald and Ardianto 2016).

In some of the cases, particularly with those in (post-)conflict contexts (such as DRC, Nigeria, and Myanmar), ‘militarization’ emerges as a theme. In Laos, Dwyer et al. (2016) showed that the **military had considered the forest frontiers as insecure areas since the Cold War, which motivated the state’s interest in controlling forestlands** (see also Peluso and Vandergeest 2011b). The authors show how contestations over forestlands are therefore manifested locally but are entrenched in national and international peace/conflict dynamics. Nagel (2015) raises the concern that as CCMI are **increasingly militarized, the already strong domination of men in policy-making and decision-making roles will be further entrenched**. Asiyambi (2016) highlights the ways in which **the state used REDD+ as a mechanism to reinforce its military presence** around the Bakassi region and the Niger Delta in Cross River, Nigeria, as part of the counter-insurgency drives that resulted in intense conflict in these areas. Local communities were shown to be highly dependent on forest resources over which the state assumed de jure rights. The state identified the forest area as a base of the insurgents. The Anti-deforestation Task Force was therefore mobilized and was active in seizing equipment and timber. The REDD+ projects stimulated a state-wide ban on logging, the offence of which resulted in seizures of timber harvests and fines. This generated income for the state exceeding its REDD+ budgets, and this supported military actions in the area under the guise of REDD+ but also served to resource military action against insurgents. The recentralization of state powers has, in some cases, been shown to simultaneously empower corporate and elite interests (Barr and Sayer 2012; Asiyambi 2016) resulting in contestations between larger scale players and communities (Böhm et al. 2012; Lyons and Westoby 2014a; Kane et al. 2018).

Climate objectives legitimising wider political agendas

Financing for CCMI attracts actors with their own agendas. Across the case studies, we see the stated objective of climate change mitigation used to further certain non-environmental agendas that legitimize the negative impacts on some (usually marginalized or Indigenous) groups (Work 2015). This phenomenon has been termed the ‘legitimization framework’ (Scheidel and Work 2018) and plays on the way in which the moral economy of CCMI brings legitimacy to actions (Franco and Borrás 2019). Related to this, some observers suggest that certain actors use crisis language and perspectives. (Kijazi 2015) argues that the term ‘climate security’ has created sensationalism and a dramatization which has created a ‘market’ for mitigation (Dunlap and Fairhead 2014), which in itself has created more conflict by its association with military-type responses.

Kijazi (2015) used the term “**climate emergency sensationalism**”, which he considers paved the way for the fortress conservation approach in Mount Kilimanjaro, where previously there

had been efforts to devolve management to local people. He shows the way climate emergency is being used to justify such actions by attributing the dramatic melting of Mt. Kilimanjaro glaciers directly to local forest users who cause degradation in the forest in the area. Scheidel and Work (2018) describe how **actions in the name of climate change mitigation are being used by political actors** in Cambodia to gain power over large swathes of forest land. In the case of the Think Biotech reforestation project in Cambodia, where an industrial tree plantation was awarded a concession three times larger for a clean development mechanism project than it was allowed for economic concession, despite its development having a huge impact on livelihoods, land use and forest carbon.

A dominant theme in some of our cases is the way in which increased costs (and/or negative outcomes) occurring more in some areas or groups than others is **legitimized by the noble greening** aim of addressing the climate change crisis and deforestation. Green grabbing, which can be understood as a form of land grabbing, is defined as “appropriation of land and resources for environmental ends” (Fairhead et al. 2012). The literature around **‘green grabbing’ highlights the way in which this dispossesses local people and those benefits are captured by elite interests** and agendas other than those of carbon emission reductions (Montefrio 2013; Dunlap and Fairhead 2014; Eilenberg 2015; Borrás et al. 2018; Scheidel and Work 2018; Franco and Borrás 2019).

In some cases, a framing of the drivers of deforestation is used to target marginalized and local actors and fails to identify the role of larger, more powerful players (see Rodríguez-de-Francisco et al. 2021). Examples of this include blaming shifting cultivation (Dunlap and Fairhead 2014) or village-level illegal logging (Kijazi 2015) for deforestation. This then allows responses in the name of mitigation to further agendas such as state territorialization, land grabbing and other forms of ‘violence’. In Cambodia, at the same time as customary forest users were being sanctioned for ‘illegal logging’, illicit logging activities were being conducted by companies connected with government officials on Indigenous peoples’ territory (Work 2015).

3.4. CLIMATE CHANGE MITIGATION INITIATIVES AND PROSPECTS FOR CONFLICT RESOLUTION AND PEACEBUILDING

Shifts in land tenure, access, benefit distribution, and powers of actors in governance structures in forests inevitably result in tensions and conflicts, which we argue are sometimes constructive. These processes present opportunities for peacebuilding, and often require conflict resolution processes to become constructive. Several studies make specific reference to the **lack of attention to conflict and effective conflict resolution mechanisms in CCMI**s **leading to greater conflict** (Patel et al. 2013; Milne and Mahanty 2019). Brugnach et al. (2017) show how the inability to manage conflict exacerbates further conflict within CCMI. Efforts to address conflict in CCMI at the international, national and local levels can draw on lessons from the fields of conflict prevention, peacekeeping, and peacebuilding. These approaches range from attention to human rights and the rule of law to politics, governance and socio-

economic interventions. However, there are some valuable distinctions (De Coning 2008; Matthew 2014) between these different approaches which have operational implications. Galtung (1976) distinguishes between (1) peacekeeping and peacemaking as a short-term action to reduce violence, and (2) peacebuilding as longer-term action to address the structural causes or drivers of conflict (also discussed in Goldwyn and Chigas 2013).

Approaches to peace have shifted from understanding **the conditions that lead to conflict to focusing on the root causes** of conflict and different responses to it (Castro-Nuñez 2018). Various conflict analysis and sensitivity tools have been developed for understanding these structural causes (Harwell 2011; Gustafsson 2016; see also Peters, Mayhew, et al. 2020). Examples of this include conflict-sensitive Environmental and Social Impact Assessment (Sawas et al. 2018) and the Peace and Conflict Impact Assessment (Bush and Opp 1999), which can be used to assess the impact of development projects on peace and conflict. A shift from managing conflict to preventing it (Lund 2008) focuses more on the building of institutions and capacities to manage conflict (Galtung 1985), and delivering services, and enhancing social trust and legitimacy of governments. There has been increasing attention on designing climate-resilient peace-building and conflict-sensitive climate programming that not only reduces conflict potential but also plays a constructive role in peacebuilding (Dabelko et al. 2013; Gustafsson 2016; Peters, Dupar, et al. 2020). Recent peacebuilding literature suggests new frameworks and opportunities for thinking about conflict and security around CCMI, which focus less on repairing and more on delivering capacity (Matthew 2014).

This framing of peacebuilding can also see conflict as an opportunity to transition into collaboration through conflict resolution mechanisms. **Approaches to conflict resolution were increasingly critiqued as focussing on the endpoint rather than on addressing the elements that create conflict.** In Indonesia, for example, the Ministry of Environment and Forestry has established a conflict resolution body to address land tenure conflict (see Firdaus and Widawati 2014). This has sought to identify locations of conflict and to introduce dispute resolution to those sites. However, in doing so, the key role of prevention is not addressed. Matthew (2014) makes the explicit case for **integrating conceptualizations of peacebuilding into climate change mitigation and adaptation initiatives through programmatic and funding alignments.** On the other hand, where there are imminent threats of violence, there has been scepticism over longer-term peacebuilding approaches and the viability of integrating climate and peacebuilding initiatives.

Some authors suggest that peacebuilding efforts have helped to create conditions favourable to the implementation of CCMI in conflict-affected areas (Castro-Nuñez et al. 2016). However, the peacebuilding literature linked to CCMI suggests that the range of activities classified as ‘peacebuilding’ refer to what would otherwise be termed as rural development programs (Galtung 1985; Castro-Nuñez, Mertz, and Sosa 2017), including support to the provision of livelihoods; strengthening governance institutions to ensure rights

and access to land (Blom et al. 2010); conditional payments for the production of alternative crops and forest conservation; development and conservation programs; policy reforms and governance (Brockhaus et al. 2013); and forest conservation strategies (Brottem and Unruh 2009). In so doing, ‘a peacebuilding’ approach is not specific enough to add much analytical value.

Attention on mitigating conflict has been operationalized through the development and implementation of ‘safeguards’. They are designed, implemented and enforced by different actors but particularly by major funders such as the World Bank and UN organizations, and part of other multi- and bilateral assistance programs. Box 8, below, shows the range of REDD+ safeguards, which have been applied to varying extents and with varying success (Jagger et al. 2014). Reflecting the distinction between conflict resolution and peacebuilding discussed above, safeguards can be categorized into those which aimed to (1) prevent harm, (2) mitigate harm, (3) ‘do good’, (4) enhance opportunities, and (5) transform perspectives, ideas, practices, and policies (Arhin 2014). Brockhaus et al. (2021) argue that the latter is required in order to bring lasting and equitable outcomes, and, by extension, greater security (see also Castro-Nuñez 2016). Safeguards have been a challenge to implement and monitor for REDD+ (Duchelle et al. 2017), and there have been calls for stricter accountability mechanisms to be put in place (Work 2015). These authors used household data collected from Brazil, Cameroon, Indonesia, Peru, Tanzania and Vietnam to examine the efficacy of social and environmental safeguards in REDD+ initiatives. They found that the implementation of ‘on paper’ safeguards was insufficient to avoid negative impacts on overall perceptions of well-being.

Box 7. Conflict as a catalyst for transformation

Conflict is often equated negatively with conditions of violence and conflict in which systems have broken down. However, some literature emphasises how conflict can be a catalyst for constructive transformation and social change in mitigation (Kane et al. 2018). Conflict is not always counterproductive as, conversely, cooperation is not always conducive to REDD+ effectiveness. For example, Yasmi et al. (2009) show that when rights that were previously taken away become challenged, actors can become empowered to challenge past injustices, and therefore conflict can be an indicator of empowerment (Sarmiento Barletti and Larson 2019; and as in Alusiola et al. 2021). This act of challenge can create pathways to participation for communities that previously did not exist. This is also discussed by Brockhaus et al. (2021), which shows that conflict highlights new constellations of access and contestations at play.

Aside from considering how CCMI can be designed in more conflict-sensitive ways using safeguards, some literature highlights how climate change mitigation can be used as a response to conflict or for peacebuilding. Castro-Nuñez (2018) and Conca (2002) suggest that the **environment and natural resources can help to resolve conflicts and build sustainable peace**. In a case in post-conflict Colombia, CCMI that address transitions from cattle to low-carbon land uses such as agri-silviculture and ecotourism are shown to contribute to peace (Graser et al. 2020).

Some authors suggest that **CCMI could be used as a means to mobilize new financing and generate funds for peacebuilding and more generally for insecure areas** (Tänzler 2013; Matthew 2014). Tänzler (2013) suggests that REDD+ can act as an impetus to address structural constraints such as institutional capacity (readiness) and provides incentives to governments to improve forest governance capacities to qualify for REDD+ project support. The two main peacebuilding outcomes we see in our review are tenure security associated with CCMI, and the inclusion of a wider range of voices.

Related to the themes of collaboration and multi-stakeholder processes discussed above, **stakeholder engagement, dialogue and increasing diversity of voices is put forward as a means of conflict resolution and important as a peacebuilding approach** in the design of CCMI (Yasmi et al. 2012; Dabelko et al. 2013; Patel et al. 2013; Work et al. 2019). MSPs developed around CCMI can in themselves act as peacebuilding processes by including a multitude of voices. Policy analysts suggest that REDD+ had contributed to peacebuilding by fostering cooperation, learning and dialogue amongst a range of actors (Tänzler 2013; United

Box 8. Social and environmental safeguards

Perhaps the most widely applied, agreed-upon safeguard principles that were established at the UNFCCC COP 16 are summarized by Jagger et al. (Jagger et al. 2014: 2139) as follows:

1. Complement national forest programs and international conventions and agreements
2. Maintain transparent governance
3. Respect the knowledge and rights of Indigenous peoples and local communities
4. Obtain effective participation of Indigenous peoples and local communities in the design and implementation of REDD+
5. Avoid the conversion of natural forests and ensure that activities conserve forests, biodiversity, ecosystem services, and enhance other social benefits
6. Address risks of reversals (i.e., seek to achieve permanence)
7. Reduce leakage

Nations and World Bank 2018). At a community level, Nepal's use of forest-user groups as agents of peacebuilding shows some signs of success. In Indonesia, the large influx of civil society voices in REDD+ policy designs also led the way to state reforms and regulatory developments in the recognition of land tenure regimes (Afiff 2016). Chapagain and Sanio (2012) show that new forest management groups started after the conflict have some capacity to advance peacekeeping and CCMI objectives simultaneously, but caution that groups that existed during times of conflict were often perceived as partisan.

Experience from wider environmental conflicts shows the **efficacy of facilitated processes around adaptive collaborative management, or approaches such as multi-stakeholder fora, participatory action research and other forms of engaged scholarship, policymaking, and monitoring**. Effective conflict management requires recognition of shared struggles and setting of clear goals for resolution (Colfer 2010). This process, therefore, requires broad stakeholder engagement and attention to inclusive processes to enable a broader range of voices to be heard in decision making, and also to ensure the initiative is better targeted and fosters and ensures accountability, all of which are linked to peace/conflict.

Several case studies documented engagement with communities in the implementation of CCMIss; cases from Nepal (Satyal et al. 2019) and Costa Rica (Wallbott and Florian-Rivero 2018) at the national level, and in Indonesia (MacDonald and Ardianto 2016; Setyowati 2020) and Mexico (Otto 2014; Gay-Antaki 2016) at the local level. The use of **multi-stakeholder processes is particularly recognized in the literature as opening access to a wider range of non-state actors** (Dorr et al. 2013; Satyal et al. 2019).

Although stakeholder engagement is framed as a crucial social safeguard for CCMI, the **substance of the engagement, and thus the safeguarding outcomes, can vary considerably**. Stakeholder engagement is frequently put forward as a mechanism for avoiding conflict resolution, but some of our cases suggest that it can lead to conflict or can further entrench inequality (Yasmi et al. 2012) if done in a way that is not considered legitimate, **disingenuous or badly implemented**. This is a longstanding theme in studies of public participation and citizen engagement (Arnstein 1969; Lowry et al. 1997). Several of our case studies highlight a lack of public participation in the CCMI as leading to conflict and insecurity (Nel 2017; Satyal et al. 2019).

Indeed, many of the cases we reviewed involved **poor quality, short-term, tokenistic, or manipulative participation as a key factor leading to conflict**. The literature suggests degrees of inequity in participation at the national and local levels in which marginalized groups struggle to be included, and the opinions reflected by stakeholders are those of elites (Redpath et al. 2013; Otto 2014; Gay-Antaki 2016; MacDonald and Ardianto 2016; Nel 2017; Wallbott and Florian-Rivero 2018; Satyal et al. 2019; Setyowati 2020).

A lack of meaningful engagement added to the burden of bureaucratic processes can also serve as its own form of violence by excluding marginalized groups (Lowry et al. 1997; Dorr et al. 2013) and can undermine the legitimacy of CCMI between state, private, and civil society actors (Indriatmoko et al. 2014). For example, several studies show an attempt by CCMI proponents to engage in FPIC processes in which local stakeholders consider the state or project implementer retained control of the process, and in which inputs from the communities did not affect implementation, or the information provided was incomplete, including lack of viable alternatives to the CCMI (Yasmi et al. 2012; Asiyambi 2016; Myers et al. 2016; Sarmiento Barletti and Larson 2017; Kane et al. 2018; Satyal et al. 2019). In these contexts, ‘participation’ was often treated as an auditing or checkbox exercise that failed to reflect the local contexts (Nel 2015b). Another study showed that the focus of multi-stakeholder fora was on the outputs of decisions and plans rather than the processes of governance (Sarmiento Barletti and Larson 2019). These technocratic processes stem from patriarchal understandings of nature and the climate and reinforce patriarchal power dynamics (Boyd 2002; Nagel 2015).

The technicality of CCMI excludes marginalized groups from meaningful participation. The technicality of the details involved in carbon accounting, MRV (De Sy et al. 2012; Gupta 2012; Di Gregorio et al. 2017) and the complexities of the market and financing leads to the exclusion of small and marginalized actors from involvement in and gaining benefits from CCMI. It has also created challenges in providing actors with full understanding and involving them in decision-making and oversight mechanics, and comes at the expense of considering greater power dynamics and politics in CCMI design and implementation (Myers et al. 2018). Several authors have highlighted that REDD+ proponents’ preoccupation with measurement, verification, and tokenistic participation creates an ‘audit culture’ that weakens local and customary logic and excludes some (especially marginalized) actors (see also Arnstein 1969; Corbera and Schroeder 2011; McElwee 2015; Asiyambi 2016; Milne and Mahanty 2019).

Other literature goes further to suggest that rather than just being implemented badly, **participation itself is a ‘violent’ act intended as a way of imposing control** and exploitative agendas. Some authors have framed participation as a ‘soft counterinsurgency’ technique to impose Fortress Conservation (see also Dunlap and Fairhead 2014; Tadajewski 2020: 3). For example, Sarmiento Barletti and Larson (2019) showed that the implementation of social safeguards used as part of ‘project law’ in CCMI in the Amazon were both punitive and reinforced social inequalities.

Implementing CCMI in fragile states and (post-)conflict environments

One theme emerging from the cases located in fragile or (post-)conflict contexts is how the **design of CCMI is, in many cases, inappropriate for (post-)conflict contexts**. Brown’s (2017) review of four REDD+ projects in the Democratic Republic of Congo found that implementers made few provisions for the ways in which political instability might affect project outcomes. Implementation in these (post-)conflict contexts faces extra challenges and risks. Without acknowledging and addressing these in CCMI design, ‘additionality’ is unlikely to be achieved.

Box 9. Technocratic aspects of CCMI conflict with local notions of fair process

Technocratic approaches based on Western logics can conflict with local notions and processes. The technical approaches for CCMI, which are used to ensure the accountability of implementers to other stakeholders, cause friction at local levels among those who perceive forests differently (Myers et al. 2020). Since, by definition, CCMI embody a ‘global dimension’, CCMI are susceptible to control by the state and/or global actors and therefore transitions the logics of participants toward global citizenship (Arora-Jonsson et al. 2016). Social learning between stakeholders may not always be compatible with more target-oriented goals in CCMI; e.g. around the distinct calculus for sequestering carbon. A case in Indonesia demonstrates how Indigenous peoples’ groups attempt to translate ‘global’ technical requirements of REDD+. The authors show the struggle that the Indigenous peoples’ groups had in preparing local communities for international investors. They detail the ‘intimate exclusions’ based on ethnicity and class that resulted from this process (Astuti and McGregor 2016). Some case studies show how CCMI have used these technicalities as a means of wielding power and control (Nel 2017). Technical approaches to mitigation ignore “the local web of power relations in which it will need to be embedded, and which it will also certainly reshape” (Eilenberg 2015: 50). This reflects Li’s (2007) work on development practice and the phenomenon of ‘rendering technical’, where technical interventions are used to disregard the social history of the forest. Three dimensions of rendering technical can also be applied to CCMI: (1) confirming who the trustees are (the people who understand carbon) and who the subjects are (the people who do not), (2) questions that are rendered technical are also rendered non-political, and (3) the programs are designed to avoid a challenge to the status quo (in this case, emission-rich countries). For example, **efforts to enhance participation in CCMI highlight the complexity of describing a resource (like carbon) that is intangible and difficult to conceptualize.** Indeed, certain sites found the emergence of local terms such as ‘charcoal air’ (Kijazi 2015) or ‘selling the wind’ in Indonesia (Setyowati 2020). Miles (2021) shows a respondent saying that ghosts are more real than the fantasy of a carbon market. Local communities, and even local governments, find much of the language and vocabulary of concepts intimidating (Wallbott and Florian-Rivero 2018). While the articulation of carbon as a commodity underpinning CCMI, for example, has been compelling to private sector actors, in particular, the complex regulatory environment and the slowness by which local communities and other stakeholders have received benefits results in a distrust that undermines participation. All of these conditions are fertile ground for conflict and insecurity.

As discussed in the introduction, **different forms of fragile states result in different security issues and require different responses** (see Table 4). On one hand, there are strong but predatory states (with high levels of corruption), and, on the other hand, there are those where state control is minimal and rogue private and non-state actors are likely to take advantage of the situation (Harwell 2011). Both present different challenges for market-based approaches associated with CCMI. As an example of the latter context, Kengoum et al. (2020) show the **challenges of introducing ‘rule of law’ based initiatives in contexts where implementation of the law is weak**. This raises the hazards of assuming law will be implemented in a fragile state context. They point out that the Democratic Republic of Congo may be in a position to sign international agreements and pass new national laws pertaining to CCMI, but implementation of the laws will prove challenging in practice. Khan (2010) highlights that many developing countries have economies that are predominantly informally based and in which the significant sources of power are not based on formal institutions. Thus, institutions and policies tend to serve the interests of a core coalition of actors, and there are high levels of elite predation (Parks and Cole 2010). Early theories around New Institutional Economics (NIE) explained informality in developing countries (and blockages to reforms that were seen) as being due to low capabilities for enforcing formal institutions, or due to cultural values that increase the costs of enforcement. This led to interventions to enhance capacity to better enforce the rule of law based on the flawed assumption that agencies responsible for the enforcement of formal institutions have the power to enforce compliance. In contrast to NIE, it is argued that informal institutions likely to remain important as power-holders are not affected by changes in formal institutions (Khan 2010; Mohan and Asante 2015). Thus a technocratic focus on improving ‘good governance’ to enforce the rule of law or improve accountability and transparency may not be effective as it is unlikely to alter the underlying distribution of power (Khan 2010; Mohan and Asante 2015).

Table 4. Implications for responses by security/fragility feature

Security context	Implications for responses
Armed conflict	The importance of “do no harm” safeguards; the value of international oversight; hazards associated with large inflows of international finance; the need for non-state accountability systems
Predatory institutional contexts	Focus on accountability systems and safeguards to address elite capture; political settlement approaches; some value in engaging international pressure and campaigns coupled with safeguard for defender; hazards around high levels of financial in-flows
Absent/weak state and institutional contexts	Strengthen existing systems and capacity building; recognition of informal rights value in international finance; establish systems for absorbing finance (to avoid resource curse)

REDD+ is based on the role of incentives and conditionalities. Much focus of the REDD+ debate is on the formal institutional design, operating on the assumption that national and subnational bureaucracies conform to a Weberian ideal (Purdon 2015). This reflects the normative ‘good governance’ agenda in development (Mohan and Asante 2015), whereby elites should be encouraged to move from deals-based systems (Pritchett and Werker 2012) to rules-based systems. But some commentators in the ‘fragile states’ literature suggest that such **traditional ideas of development influence do not necessarily match real political contexts** (Whaites 2015).

Kashwan (2015), in his review of REDD+ benefit-sharing mechanisms for REDD+ across Mexico, Tanzania, and India, shows it is more helpful to look at the checks and balances between different parts of the government and the history of the state and that the assumptions behind formal institutional analysis can be misleading around the rule of law and other aspects fundamental to the working of a REDD+ safeguards system. Designing safeguards for non-Weberian systems requires different recommendations. Similarly, a common recommendation within peacebuilding approaches is the need to develop the capacity to mobilize a broad range of stakeholders (Castro-Nuñez 2018). However, in predatory governance contexts, **deliberation and engagement of actors and interest groups around an objective such as mitigation is especially challenging**. Levy and Walton (2013) suggest that technocratic initiatives and improving stakeholder involvement is less likely to work in predatory political settlements unless there is a focus on a reform in which leadership has an interest. In these contexts, they suggest progress is best made through external stakeholder mobilization.

3.5. CGIAR CONTRIBUTIONS AND GAPS

In this section, we analyse CGIAR’s contribution to the literature we reviewed, and identify some gaps, or ways in which CGIAR could orient its work to contribute more to the body of literature addressing CCMI and peace/conflict in forests. We have depended on the wide range of literature produced by CGIAR on conflicts in forest areas to frame this study and elucidate the main issues pertaining to conflicts and forests. Commensurate with the broader literature, however, only a few works have been published by CGIAR or its affiliates that relate directly to issues of peace/conflict and CCMI in forest areas.

A body of work produced by Sarmiento Barletti and Larson of CIFOR focuses on the Amazon, investigating issues of conflict, peace, and multi-stakeholder fora (Sarmiento Barletti and Larson 2017; Sarmiento Barletti and Larson 2019). This work follows Larson’s (2011) earlier work and shows that although land rights are important, there are many obstacles for local communities after rights have been won. These challenges comprise a gap between statutory rights and the ability to benefit from land and forest resources. In their most recent paper (2020), the authors show that successful multi-stakeholder fora are part of a “wider process that seeks to transform practices at multiple levels” (p.1). They suggest that CCMI must be based on history and context in order to be effective and that obstacles and risks should be

identified in the early stages. They follow up to say that to mobilize political will and adaptive learning, consensus and commitment must come from multiple levels and a wide range of actors.

Castro-Nuñez (Bioversity CIAT Alliance) provides insights into the convergence of CCMI and peacebuilding. He demonstrated that rural communities in and near forests tended to conserve forests during times of conflict (Castro-Nuñez et al. 2016). He then published an investigation of the correlation of priority areas for forest carbon storage and peacebuilding programs, in which he demonstrated the geographic overlaps of these two imperatives (Castro-Nuñez, Mertz, and Sosa 2017). A related paper shows associations between armed conflicts and land-related grievances, and shows that forest commons provided dual objectives of sequestering carbon and meeting basic needs of communities during conflict (Castro-Nuñez, Mertz, Buritica, et al. 2017). Subsequent work focuses on post-conflict Colombia, showing that peacebuilding and CCMI can function together effectively to benefit from climate finance for conserving forests and peacebuilding, but need to be carefully planned with local contexts in mind (Castro-Nuñez 2018).

Much of the work from CGIAR on CCMI and peace/conflict is related to large-scale land acquisitions, land rights and REDD+. Carter et al. (2017) (including Carter and Verchot from CIFOR and Verchot from the Bioversity CIAT Alliance) conducted a synthesis of conflicts and opportunities. In their quantitative study, they found that countries with high levels of political instability were targeted for large-scale land acquisitions and cautioned that countries with high levels of agricultural-driven deforestation should develop REDD+ strategies that prevent direct and indirect forest loss from green grabbing. Corbera et al. (2011) (including Pacheco from CIFOR) demonstrate the complexity of rights in forest areas and their implications for REDD+ design and implementation. They show how REDD+ initiatives share procedural challenges to address land-use conflicts and carbon rights. Larson et al. (2013) (featuring a CIFOR team) show that while REDD+ has presented some opportunities for improving land tenure, but that project-level attempts to address tenure fail to address land-tenure security in the broader context and have proven ineffective. Ngendakumana et al. (2013) (World Agroforestry Centre) studied REDD+ conflicts in Cameroon and concluded that successful implementation of REDD+ would be unlikely without recognition and enforcement of customary tenure, which was identified by respondents as a leading cause of conflict in villages.

Dwyer et al. (2016) (CIFOR) studies forest governance dynamics in Lao PDR. They identify the 'security exception' that serves to justify state enforcement of forest protection as a matter of state sovereignty. However, the authors find that to understand the nature of the conflict, it must be understood in the context of economic insecurity and inequity. This analysis is helpful to understand that although global dynamics affect local security, they are embedded within long-standing historical struggles. Andersson et al. (2018) (a CIFOR team) used survey data from REDD+ sites in six countries to find that higher wealth inequality correlated with lower tenure security and uneven opportunities for forest income. They also identified elite

capture of benefits from forests leading to tensions among community members. The authors emphasize the importance of addressing inequality in REDD+ projects in order to minimize conflict and maximize opportunities for success. Le et al. (2016) examined a Payment for Ecosystem Services project in forest areas in Viet Nam. They highlighted conflicts that arose from a lack of transparency and accountability around the benefit-sharing mechanisms. The authors conclude that, for local communities, benefit sharing is often a foreign concept, the terms and conditions of which are not always well understood. A CIFOR team, Sunderlin et al. (2014), conducted interviews with local community members in REDD+ sites in five countries. They found that one of the major barriers for the initiatives to address land tenure security adequately was the lack of capacity to develop effective mechanisms for conflict resolution.

CGIAR has therefore contributed significantly to the climate security CCMI nexus, although not always intentionally in the frame of 'climate security'. As with the broader literature, there is very little that explicitly investigates 'climate security' and 'CCMIs'. However, there are considerable works that identify conflicts, tensions and grievances, especially stemming from CIFOR's Global Comparative Study on REDD+. Some of the works discussed above from CGIAR are leading-edge for understanding multi-stakeholder fora, Indigenous peoples' rights and CCMIs, and (post-)conflict opportunities for peacebuilding and climate change mitigation. However, this research is conducted by only a small number of researchers in a small number of organizations within the CGIAR. Because this review focused on CCMIs in forests, it is hardly surprising that CIFOR was the most cited CGIAR organization, and that the Bioversity CIAT Alliance and World Agroforestry Center were also identified as making contributions to the literature. An expanded review that includes low-emissions development in agricultural initiatives or marine and coastal areas would likely identify a greater range of contributions.

Future directions to enhance CGIAR's contribution to the climate security-CCMI nexus could focus on some of the under-represented CCMIs in this study that are of increasing interest to policy-makers and implementers. Zero Deforestation Commitments was one area that we found underrepresented in the CCMI-security nexus. As the interest in REDD+ starts to shift towards other forms of CCMIs, especially under the banner of NbS, there are significant opportunities to learn from REDD+ and security. One of the dominant themes of our findings and analysis is the range of ways in which CCMIs fail to address some of the underlying sources of conflict. CGIAR is well placed to explore and present some genuine alternatives to market-based solutions to climate change to help overcome neo-colonial relationships. Addressing some of the fundamental security issues related to climate change mitigation could help elucidate more conflict-sensitive approaches to climate change for policy-makers and implementers.



4. RECOMMENDATIONS

In this concluding section we discuss recommendations for enhancing security in the arena of forest-related climate change mitigation in LMICs. We approach this by synthesizing the recommendations made in the literature to address peace/conflict and security in CCMI for policymakers, funders, investors, implementers. Then we analyse those recommendations against our findings. Finally, we provide recommendations to researchers in general, and then specifically show how CGIAR has contributed to the literature so far and where the opportunities might be for continued research to inform policy.

We positioned this study as learning about climate security through conflict and peace. While many of our findings were directly related to peace and conflict, we suggest that they have implications for conflict and address them specifically as such in this section.

4.1. A SYNTHESIS OF RECOMMENDATIONS FOUND IN THE LITERATURE FOR ENHANCING SECURITY IN CLIMATE CHANGE MITIGATION INITIATIVES

The following recommendations are synthesized from the literature we reviewed. All of these recommendations could apply to different stages of CCMI development and for actors at different levels. Ideally, they would be considered in design stages, but could also be used to modify implementation and evaluation of CCMI toward addressing issues of security. Security practitioners, policy-makers and scholars could also consider them in relation to climate change. These recommendations apply to a range of actors, including funders, investors, implementers, and policy-makers. The main recommendations are listed here and elaborated in Annex 4. We synthesize them in the rest of this section.

1. Integrate a conflict-sensitive approach into CCMI
2. Design CCMI for the local context
3. Design CCMI to be pro-poor, inclusive and promote the key role of Indigenous peoples
4. Integrate land tenure, access and management rights for marginalized and Indigenous peoples into CCMI
5. Strengthen existing effective, legitimate, and accountable institutions to better address conflict and build peace
6. Enhance governance systems and benefit-sharing schemata toward greater equity, and strengthen transparency and accountability of CCMI
7. Explicitly integrate gender equity into CCMI to reduce inequality gaps leading to instability through differential power relations
8. Propose alternatives to neoliberal climate change mitigation solutions

There are several recommendations to integrate peace and conflict concerns, and CCMI, especially in fragile states, recognizing that all interventions have the potential to exacerbate or alleviate existing tensions. Design climate-resilient peace-building and conflict-sensitive climate programming that not only reduces conflict potential but also plays a constructive role in peacebuilding (Dabelko et al. 2013; Gustafsson 2016; Peters, Dupar, et al. 2020). Authors recommend integrating social, economic, environmental, governance, political, security, and truth and reconciliation into CCMI (Matthew 2014) and to provide more intentional processes of understanding the contexts and histories of peace/conflict in CCMI (Harwell 2011; Patel et al. 2013; Gustafsson 2016; Sawas et al. 2018; see also Peters, Mayhew, et al. 2020). There are also several recommendations to ensure timely engagement by external parties in the early stages of conflict to mitigate risks or more serious future conflicts and re-build cooperation over actors with an influence of natural resources (Koning et al. 2007; see also Herbert 2019). Authors argue that these processes must be inclusive and deliberative about including different views, interests and politics (Leach and Scoones 2015) and bring governance and participation issues at a more centre stage to make interventions to help achieve wider benefits for rural livelihoods (Dabelko et al. 2013; Tänzler 2013; Leach and Scoones 2015). This might involve following procedural approaches such as ensuring the consistent participation of Indigenous men and women throughout REDD+, following FPIC guidelines and capacity building effort (Sarmiento Barletti and Larson 2017), as well as addressing supply-side and enhancing the capacity for FPIC amongst national and sub-national government staff, as well as staff of companies and NGOs (Kane et al. 2018). These authors stress the need to engage in robust and meaningful participatory processes with a diverse range of actors from local communities on investments and actions affecting forests (Stevens et al. 2014; Wallbott and Florian-Rivero 2018) allowing the forming of collaborative and equal relationships among them (Patel et al. 2013). To do this CCMI need to better address power structures, broaden inclusion, accountability and transparency (Peters, Dupar, et al. 2020).

Other approaches stress the need to **include policies that address the intersectionality and structural constraints that limit access by women** (and other excluded groups) to access

control and ownership over resources (Gay-Antaki 2016). This might include mainstreaming the UN Voluntary Guidelines on the Governance of Tenure in forest landscape policies and CCMIIs (Kane et al. 2018). A key issue within the resource rights debate is the need to reframe CCMIIs and safeguards to recognize the rights and key roles of Indigenous peoples in climate change initiatives and protecting forests (Sarmiento Barletti and Larson 2017). Some recommend formal approaches such as connecting CCMIIs with formal legal frameworks for the implementation of principles in the UN Declaration of the Rights of Indigenous peoples (UNDRIP) (Reed 2011).

As part of this many authors place an emphasis on the need to **address the under-recognition of women as resource managers and core actors in climate mitigation** and pay attention to gender equity into CCMIIs to reduce inequity gaps leading to instability through differential power relations (Gay-Antaki 2016; Lau et al. 2021). Specific recommendations include the use of robust measures of gender equity in policy and practice (Lau et al. 2021). There is also a need to question and ‘disrupt’ the deeper, intangible barriers to gender equity that reinforce assumptions in funding structures, projects and institutions (Lau et al. 2021). Edmunds and Wollenberg (2001: 232) suggest (based on feminist structuralist approaches) to “build alliances, gather information, and test ideas strategically, with the explicit goals of increasing the decision making power of disadvantaged groups. They continue to suggest that “the emphasis should be on building strategic, self-avowedly contingent and reflexive alliances among disadvantaged groups and those sympathetic to their claims in order to achieve justice for those groups” (2001: 237).

A fundamental factor leading to conflict is related to unclear and insecure land and access rights, especially for marginalized groups, Indigenous peoples, and women. Recommendations on this issue highlight the need to **integrate land tenure security into CCMIIs in order to avoid agitating existing conflicts**. Mechanisms to do so include ensuring the clarity of resource tenure - the systems of rights, rules, institutions and processes regulating the ownership, access and use-in legal and policy frameworks as well as in implementation (Harwell 2011; Dabelko et al. 2013; Patel et al. 2013). A range of authors stress the importance of addressing inequities in the legal recognition of customary and women's land rights through land reforms (Harwell 2011) and accounting for traditional land tenure arrangement and recognize rights of resource users without legal titles (Tänzler 2013; Stevens et al. 2014). This might include providing legal protection towards the community's forest rights by for example mapping boundaries, protecting against illegal loggers and not granting commercial concessions in community forests (Stevens et al. 2014).

A key part of developing inclusive processes is **strengthening existing effective, legitimate, and accountable institutions** (Peters, Dupar, et al. 2020). This entails identifying the obstacles and possible incentives for cross-sectoral coordination to improve integration and coordination across actors and agencies (Harwell 2011) and improving inter-institutional coordination between national bureaucracies to ensure the practice covers the issue of Indigenous People's

rights (Wallbott and Florian-Rivero 2018). Authors suggest establishing reliable, transparent, and efficient governance structures for CCMI projects (Dabelko et al. 2013) and using donor's influence to support forest sector reform by encouraging the appointment of reform-minded forestry officials, implement training programmes on good governance and sanctioning corrupt officials (Koning et al. 2007). This strengthening will require improving the capability of local institutions in identifying and dealing with drivers of deforestation effectively (Dabelko et al. 2013; Tänzler 2013) and providing information flow from the national level to the local and vice versa (Wallbott and Florian-Rivero 2018). Much emphasis is put on the importance of supporting communities with technical assistance and training (Stevens et al. 2014) and prioritizing local participation (Dabelko et al. 2013).

Another stream of recommendations focuses on **greater openness and transparency in forest resource management to reduce corruption, and reduce the potential for conflict** (Harwell 2011; Dabelko et al. 2013; Tänzler 2013; Sawas et al. 2018). These range from improving auditing processes within CCMI, to ensuring they evaluate social claims and consider livelihood impacts for communities as well as the access and use rights of local people (Lyons et al. 2014). Specific measures could include anti-corruption mechanisms to ensure transparency and accountability in bidding, chain-of-custody and revenue tracking (Harwell 2011) as well as independent monitoring and reporting of compliance by media, civil society organizations and local communities (Koning et al. 2007). This could also involve connecting Indigenous communities with outside allies through new social media to empower them (Herbert 2019). There is also a need for information sharing activities especially to poor forest-dependent and marginalized communities (Patel et al. 2013) and vice versa (Wallbott and Florian-Rivero 2018).

Finally, there are calls to seriously **explore alternatives to neoliberal climate change mitigation solutions**. Although there are proposals to address climate change through mechanisms other than market relations by, for example, dispelling the notions that economic growth can be decoupled from natural resources and moving toward degrowth especially in high-income countries (Hickel and Kallis 2019; Krause 2020; Hickel 2021), contemporary CCMI are almost exclusively market-based and neo-colonial (Fletcher 2012; Cipler and Roberts 2017; Howson 2020). Rights-based alternatives are proposed by environmental justice and Indigenous scholars among others, but have failed to influence policy and practice significantly. These recommendations suggest reducing the reliance on offset initiatives in reducing global greenhouse gas emission by expanding options in renewable energy (Lyons et al. 2014) and addressing climate change mitigation in places other than forests (Leach and Scoones 2015).

4.2. ANALYSIS OF RECOMMENDATIONS: acknowledging the divergent perspectives

Our analysis suggests a range of types of recommendations – those pitched different scales of intervention and those emanating from different perspectives and ideological positions.

Some recommendations are specifically targeted at those working at the project level and address the technicalities and implications of implementing safeguards with the assumption that wider institutional capacity is in place. However, there is an increasing recognition that **very few of the more fundamental causes of conflict can be addressed at the project scale.** Debates about REDD+ are increasingly emphasizing the need to address structural issues such as land tenure and institutional capacity. This has led to the emergence of recommendations for structural reforms such as attention to land reform and institution building at jurisdictional levels.

Across the evidence we have presented, we make a distinction between the **perspectives used (a) to capture the way in which some analysis views CCMI as providing a transformative solution for forest communities and the Global South, and (b) as a ‘greenwashing’ process that gives elites control over forest and excludes forest communities from their rights to forests** (Sarmiento Barletti and Larson 2019). The different perspectives lead to very different practical recommendations for policy design and practical implementation. Several authors working within the most critical perspectives suggest that mitigation might be better focused on other sectors as CCMI in forest areas due to the inherent contradiction around the concept of mitigation, the associated motivations to engage in green grabbing and the exploitative outcomes to which CCMI lead (Dunlap and Fairhead 2014; Lyons and Westoby 2014a; Nielsen 2014; Leach and Scoones 2015; see No REDD in Africa Network as an example of some of these perspectives). Some literature tends to view problems associated with CCMI as solvable with attention to safeguards. Those taking a more critical approach suggest that technical solutions do not work in the politicized context of forest governance, and stress how power dynamics need to be addressed.

Many of the structural reforms (particularly around issues such as land reform or inclusive processes) require significant transformation, and to achieve this involves significant attention to political settlement (see discussion on a political settlement in the previous section). More critical perspectives also frame conflict responses and safeguards, such as trying to address resource rights and enhancing stakeholder engagement for marginalized groups with the intention of ensuring access to the process for the dominant political elite and their neo-colonial or political agendas and suggest that safeguards such as participation are themselves ‘weapons’ of exploitation. Leach and Scoones (2013) suggest that carbon forestry will not be able to overcome its obstacles and that climate change mitigation would be better focussed on areas with less fragile governance structures, citing that all of the solutions involving forests and carbon are too complex and political to operationalize within the timeframe that climate change targets must be met. They suggest **using the momentum of interest in climate change mitigation to explore non-forest areas for implementation, and to apply climate change mitigation funds to improving the governance of forest areas, and improving the quality of participation in governance processes.**

Lessons that can be gleaned from this approach include the need to **address head-on the politics of marketization and financialization allowing a more nuanced exploration of the complexities of market-based solutions** (Dunlap and Fairhead 2014; Lyons and Westoby 2014a; Nielsen 2014; Leach and Scoones 2015; Whyte 2017; see also No REDD in Africa Network as an example of some of these perspectives). Taking a political ecology approach to CCMI means recognizing the historical and power contexts in which they are set (Ribot 2014; Borrás et al. 2018) and a need to address the divergent agendas and interest groups. Framing conflicts as technical rather than political also suggest the need to move away from technical solutions (McCulloch and Piron 2019) to embrace more solutions that embrace systemic inequalities and imbalances of power (Fleischman et al. 2021). There is a distinction between some of the more political, complex, and messy (see Myers et al. 2018) issues related to the nexus of climate security and CCMI and the technical recommendations often found in the policy-orientated literature. Approaches to address this may include (a) understanding the context and the political dynamics, which in the case of fragile states are even more important, and (b) exploring overt techniques to deal with inequality and power imbalances rather than politically agnostic technical recommendations.

Understanding more about the complexity of the interest groups involved can lead to a questioning of the theory of change behind PES and other market-based CCMI. There is the tendency within CCMI (and international policy in general) to assume that financial incentives can fully compensate communities and other stakeholders for what are often non-financial ‘costs’ and/or to ‘throw money at the problem. Indeed, some authors have argued that finance is the most important ‘missing piece’ for REDD+ success (e.g. Seymour and Busch 2016) an approach that can act to downplay the entrenched power differentials that influence outcomes’ (McDermott 2017). Khan (2010) suggests it is naïve to assume that political opponents to reform can be compensated for the costs they will suffer as a result of a change by suggesting “the transfer of significant benefits from those who directly benefit from an institution to those who are losing out may itself be costly in terms of incentives and a promise to make these transfers. [...] More significantly, compensations may not be arithmetically feasible if there are multiple unconnected claimants who believe they deserve a share of the net value added by an institution” (Khan 2010: 23). This complexity lies at the crux of many benefit-sharing dilemmas in CCMI such as REDD+. Our review suggests that the complexity of the relationship between financial rewards and technical solutions which, in many cases, do not directly address the underlying drivers and power dynamics that create conflict and drive many of the conflicts analysed in this report.

4.3. RECOMMENDATIONS FOR A FUTURE RESEARCH AGENDA

Researchers play an important role in identifying what works and what does not and for providing ideas for alternative ways of addressing climate change mitigation and peace/conflict concerns. Here, we make recommendations both directly derived from the literature and based on our findings.

1. **Further exploration of the relationships between CCMI and peace.** The literature on CCMI and peace relate to (post-)conflict contexts for the most part, and much of it is normative rather than empirical. There are many questions left to be answered in terms of how CCMI could contribute to peace more effectively. In our review, we can see that CCMI have both contributed to, worked against peacebuilding efforts. Our review did not reveal any literature that empirically linked the extent to which different types of peace or conflict led to different results for CCMI. We saw evidence of contexts of conflicts leading to poor outcomes for CCMI, CCMI creating or agitating conflict, and CCMI contributing to peacebuilding. However, we could not see, perhaps due to the design of our study, how the results were different from a similar implementation in a context of peace/conflict. There is very little literature on CCMI maintaining peace or the specific ways in which CCMI avoided conflict in their implementation. Similarly, there is little on the ways in which CCMI achieve positive results for the climate and communities in conditions of conflict.
2. **Identify what works.** Most of the literature on CCMI and conflict is about how CCMI accentuate conflict in some way. In other words, it is about what does not work. We have noted exceptions in our findings, but see that there is more room to highlight what the dynamics are to favourable results.
3. **Broaden research on security risks to regions that are under-studied**, including not only conflict and (post-)conflict countries, but also those that are fragile and in which tensions have not manifested in armed conflict (Sawas et al. 2018).
4. **Use comparative case studies** to generate contextual understanding and design effective interventions of CCMI in different kinds of conflicts. These studies would involve similar data sets and methods applied in different contexts to better understand the links between security and CCMI. Similarly studies could include retrospective assessments to better evaluate the effectiveness of policies and projects over time (Gilmore et al. 2018).
5. **Use mixed-method quantitative and qualitative studies** to investigate the CCMI-security relationship (see Gilmore et al. 2018).
6. **Develop more frameworks and innovative methods to transform conflicts into more cooperative scenarios** (Work 2015) and to assist designers and implementers to position CCMI to act as accountability mechanisms and safeguards (Work et al. 2019).
7. **Demonstrate how to conduct conflict-sensitive low carbon development and research.** These frameworks need to explore ways to understand contexts, vulnerabilities, risks, and context-specific ways to engage local actors (Gustafsson 2016; Sawas et al. 2018).
8. **Conduct, critique and communicate gender- and sex-disaggregated research** (Lau et al. 2021).

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ANNEX 1:

Methodological challenges and limitations

1. Although the design of the study was to address security, we found that the literature on security specifically pertaining to CCMI in forests in LMICs was too limited. We therefore focused on concepts of peace and conflict from which lessons for security could be drawn. Because in the literature conflict is more easily observed than peace, our search terms included more strings related to conflict and violence than peace. Also, when looking for case studies of insecurity, we intentionally focused on visible expressions of conflict and violence. This means that while this review is useful for deriving lessons on the dynamics around the types of security found in the specific case studies, we cannot make overall judgements such as whether or not CCMI lead to security.
2. We relied on academic literature and grey literature that was publicly available and searchable using the online search tools. While some project promotional documents were available online, many evaluations of projects were not available. Those that were often did not discuss conditions of conflict or peace.
3. We did not assume that all conservation efforts were CCMI. We observe that conservation initiatives, for example, could have been undertaken for different reasons than climate change mitigation such as biodiversity conservation, and may or may not have shifted their justifications toward climate change mitigation over time. Further, protected areas created prior to the development of the concept of carbon capture lack the additionality that is required of a CCMI even though the existence of a standing forest contributes to carbon sequestration. The extent to which an initiative could be considered climate change mitigation was not always explicit in the literature and may have changed over time. To address this distinction, we rely on the extent to which an initiative has been explicitly aligned with climate change mitigation in the literature.
4. We faced the challenge of attributing outcomes to CCMI rather than pre-existing conflict in that forest area or other intervention of which the CCMI was part. We were strict in requiring there to be a direct reference to a CCMI rather than another type of intervention. Although we have taken a targeted and integrative review of the literature, much of the complexity of the case studies present mere snapshots rooted in particular local contexts. Many of the cases we examined involved interventions other than for climate change mitigation such as conservation, which may have transformed into a CCMI later. In these cases, the historical conflict may have been about the ways in which conservation was executed, but were not necessarily about the CCMI itself. We found the descriptions for conflict in CCMI often failed to clarify the origins of the land-use change and conflict and had to use our interpretation in order to relate the security context to the CCMI.
5. The exact nature of insecurity, conflict or violence was not always clear in the literature we reviewed. While cases studied tended to elaborate more on what the sources of conflicts were and who the actors were, some of the theoretical and/or synthesis publications were less explicit.

6. A significant portion of the literature reviewed focused on REDD+. Of the 42 works rated as having five-star intensity, 19 explicitly concern REDD+. The text searches were limited to the last 10 years and therefore there is a high representation of REDD+ as a dominant mode of climate change mitigation. While the authors expected that REDD+ would likely dominate the literature, this could have as much to do with the funding and academic attractiveness of studying REDD+ rather than being representative of all of the cases in the world.
7. We analysed security and insecurity in relation to CCMI. However, counterfactuals are outside the scope of this review. Therefore, if a CCMI has been shown in the literature to lead to conflict, this review does not assume that another type of land-use change would have led to more or less conflict. By design, CCMI in forest areas occur in forests that are at a high risk of deforestation or degradation, in order to capture the additionality of the initiative (Naughton-Treves and Wendland 2014). We therefore can only say in this review that in the case of CCMI, there are certain patterns of results but we cannot claim that CCMI are better or worse than other approaches and/or land-use changes. For example, policy mechanisms are underrepresented in our review, and may or may not be a more effective approach than CCMI.
8. Although the original intent of our study was to include literature published in English, French, Spanish, and Indonesian, the complexity of our design and volume of literature within the resource constraints we had, meant that the structured text searches were only in English and other publications in other languages were only reviewed through snowballing.
9. CCMI are relatively new phenomena, for which we have also relied on the authors' collective experiences in forest, environment, and development themes, as well as the literature in the forest sector and conservation initiatives, particularly their impacts on local populations (see Brechin and West 1990). In this light, we see the potential for understanding pathways and influencing trajectories in the way CCMI and climate security take shape.

ANNEX 2: Summary of structured text results

Table A. Summary of literature selections by method

Source	n	%
Google Scholar	684	59.63
Gardian	131	11.42
CGIAR Climate Security Explorer	63	5.49
Snowball less duplicates	269	23.45
Total	1147	≈100.00

Table B. Summary of include/exclude assessment

Source	n	%
Include	153	13.34
Exclude	973	84.83
Cannot access	21	2.83
Total	1147	≈100.00

Table C. Summary of intensity ratings for included items

Intensity	n	%
1	10	6.54
2	18	11.76
3	28	18.30
4	56	36.60
5	42	27.45
Total	153	≈100.00

Data sorting

A total of 1147 publications were imported into a custom database from all matched literature items from snowballing and structured text searches. They were then assessed for inclusion using the basic criteria that each publication made one or more links between peace/conflict and CCMI. Included items (n=153).

Data coding

An intensity rating was applied to the included literature items from a scale low to high and assigned values 1–5 (see Myers et al. 2021 for full descriptions of each rating).

Data analysis

Granular codes were used for in-depth analysis of the included papers that were ranked 5 in the database (n=42). The granular coding used the variables from the framework (see Tables 1 and 2) as codes in Dedoose, a qualitative data analysis software package (see Myers et al. 2021 for details). Annotations were made in Dedoose both to excerpts of text and on the overall document in which reviewers will document overall impressions and key aspects of each literature item.

ANNEX 3: Summary of main cases

Main case studies			
Reference	Cases	Type of mitigation initiative	Peace/conflict Issues
Africa			
Lyons et al. 2014	Bukaleba Forest Reserve, Mayuge District, Kachung Forest Reserve, Dokolo District, Uganda	PES in industrial tree plantation (ITP)	Forced relocation of homes, agriculture, grazing, and other livelihood activities for the establishment and expansion of forestry plantations. ITP planted on top of the community's crops, or chemicals were sprayed, causing plants and animals to die. Animals grazing on company land is confiscated. Company continue to expand their plantation despite villagers experience acute land shortage to grow food
Nel 2015	Nawmasa Central Forest Reserve, Mubende District, Kikonda Central Forest Reserve, Kiboga District, Uganda	PES in industrial tree plantation (ITP)	Evictions and tightening of access to forest use for cattle grazing and watering holes. Evictions involved violence.
Kijazi 2015	Mt. Kilimanjaro, Tanzania	Protected area, logging ban	Fortress conservation approach that restricts access of forest use for local people and criminalization of the activities. There's brutal hostilities and coercion by park rangers, including cases of bribery and physical and sexual violence.
Beymer-Farris and Basset 2012	Rufiji Delta, Tanzania	PES intended	Local resource users are depicted negatively as forest destroyers. Meanwhile the local people have a history of strong agency of resisting injustice. Therefore there is a huge conflict potential in the implementation of the project.
Asiyanbi 2016	Mbe-Afi River Forest Reserve, Ekuri-Iko Esai cluster, Mangrove cluster, Cross River State, Nigeria	Protected area, PES, logging ban	Militarized protection of forest in the Cross River State. Logging ban expanded to include NTFP which are the community's livelihood source. Community resisted by defying the ban and continued to access NTFP despite being arrested and persecuted.

Americas

Gay-Antaki 2016	Oaxaca, Mexico	PES, tree planting, clean energy	Reforestation work was done by women and therefore women's labor is subsidizing the carbon project. The monetary compensation is not on par with the labor and it adds burden to their already heavy daily burden but the women cannot reject the opportunity for extra income. Women are also excluded in decision making.
Otto 2014	Scolec' Te, Mexico	PES	Social relations were undermined by pushing risk on participant labor and encouraging the establishment of disenfranchising labor arrangements. The participatory methods in carbon forestry undermine the social relations of production between farmers and project managers
Wallbott and Florian-Rivero 2018	Costa Rica	PES intended, national preparation with focus on Talamanca Region	The vocabulary and concepts that are dominant at the national and global levels are a challenge for the local level actors and therefore the role of mediator is crucial. Local actor's belief in regards to human relationship with nature is not suitable with the concept of PES as nature needs to be taken care of without any monetary reward.
Reed 2011	Ecuador	PES intended	Indigenous peoples' opposition to REDD+ represents a considerable obstacle in the creation of a national strategy since more than 60% of the country's remaining forest cover is on Indigenous peoples' land or under Indigenous peoples' occupation. Many Indigenous groups view REDD+, with its possible emphasis on international markets and neoliberal mechanisms, as a continuation of the type of policies that have impeded their quest for sovereignty and self determination.
Rodriguez-de-Francisco 2021	Guaviare, Colombia	PES intended	In a post-conflict state there's a power vacuum leading to higher rate of deforestation. The carbon project design focuses on farmers and Indigenous peoples' communities and not the main drivers of deforestation which are large state owners/ powerful cattle ranchers and other land grabbers.
Castro-Nunez et al. 2017, Castro-Nunez 2018	Colombia	PES intended	Risks of deforestation are lower in areas with armed conflict as forests act as venues for battles, hideouts and natural resources to finance war. Peacebuilding can be linked with carbon financing initiatives.

Asia			
Eilenberg 2015, MacDonald and Ardhiyanto 2016	Kapuas Hulu potential REDD+ program, West Kalimantan, Indonesia	Potential PES via REDD+ benefits	Inclusion/exclusion to the potential benefit causes tension in the community because of the history of exclusion in the area. There are new and sometimes illegitimate land claims made by the community as they struggle to be included in the benefit.
Howson 2017, 2018	Sungai Lamandau REDD+ social forestry, Central Kalimantan, Indonesia	PES, protected area, tree planting	Inclusion/exclusion to benefit causes tension in the community and heightened social differentiation. Restriction of access to forest caused community members to lose their livelihood. Continued illegal access to forest by the excluded members of the community.
Setyowati 2020	REDD+ Ulu Masen, Aceh, Indonesia	PES, protected area	Community engagement process tends to exclude most marginalized members. There's a history of land dispossession with previous projects that creates distrust and complexity during participatory mapping. Community learns about carbon projects from various sources not only from project proponents.
Work 2015, Work et al 2019, Scheidel and Work 2018	Aural Landscape and Prey Lang Forest, Cambodia	Various projects of protected area, logging ban, potential PES, clean energy, flex crops production and ITP in the landscape	Villagers are evicted from their homes, rice fields, orchards, grazing land and community forest with small compensation by ITP and biofuel companies. Military forces are used to intimidate villagers. There is resistance in the form of road blockage and lawsuits. In the protected forest there is a tightening of access to forest. Villagers cannot do shifting agriculture and are banned from cutting trees. They are also asked to patrol the forest from illegal logging done by elites.
Woods 2015, Woods and Naimark 2020	Thanintaryi Region, Myanmar	PES intended, flex crop, clean energy	Land grabbing from the privatization of land, agriculture and natural resource extraction. Exclusion of community from access and use rights of forest reserves. Post-war landscape targeted for REDD+ area. Militarization for protecting forest areas. Displacement of ethnic rebel groups via conservation as a soft counterinsurgency method.
Dwyer et al 2015	Xe Pian PA and Nam Phuoy, Xayaboury Province, Laos	PES intended, protected area	Government invoke national security exception that shuts down bilateral effort to implement REDD+
Satyral et al 2019	Nepal	PES intended, national level preparation	Participation has been dominated by government actors and prominent civil society organizations, while marginalized groups even though present are not able to influence the process.

Main multi-case studies

Reference	Cases	Issues of Peace/conflict
Alusiola et al. 2021	Ethiopia: Central Ethiopia (Kemerink-Seyoum et al 2018) Uganda: Mount Elgon National Park (Cavanagh and Benjaminsen 2014), Western Uganda (Blum 2020) Tanzania: Kilosa and Rungwe (Massarella et al., 2018), Southeastern Tanzania (Scheba and Rakotonarivo 2016) Vietnam: Central Highlands (Hoang et al 2018) Indonesia: Tanjung Jabung Barat, Jambi (Galudra et al 2013) Panama: Embera, Eastern Panama (Holmes et al 2017)	(1) injustices and restrictions over (full) access and control of forest resources; (2) creation of new forest governance structures that change relationships between stakeholders and the forest; (3) exclusion of community members from comprehensive project participation; (4) high project expectations that are not met; (5) changes in land tenure policy due to migrants, and (6) the aggravation of historic land tenure conflicts.
Barletti and Larson 2019	The Amazons (Ecuador, Peru, Brazil)	Most Indigenous people do not have legal ownership of land. Their territories also overlap with extraction concessions and protected natural areas. Land titling and formalization process does not address the issue of conflict with private interests. Titling also does not automatically provide use rights and carbon rights. Women have fewer chances to participate and have different preferences in benefits. They are also given less information and access to decision making. Free prior informed consent process has not been implemented effectively.
Dorr et al. 2013	Indonesia: KFCP Kapuas District, Ulu Masen, Aceh Province, Harapan Rainforest, Jambi District Uganda: Nawmasa Central Forest Reserve Brazil: Juma Sustainable Development Reserve	Pre-existing land tenure conflicts are a major challenge in implementing REDD+. There is a potential for negative impact on livelihood from displacement and increased restrictions resulting from its implementation.
Kane et al. 2018	Cambodia: Kao Seima Protection Forest Myanmar: Hkamti District, Pyapon District, Taungoo District Nepal: Chitwan District, Gorkha District, Dolakha District Vietnam: Di Linh District, Lam Ha District	In some sites, the REDD+ projects were sources of impairment for forest communities by restricting access to forest resources. However, the research also identified REDD+ projects that enabled the participation of traditionally marginalized groups and built local forest management capacities, leading to strengthened tenure for some forest communities. Similarly, in some countries REDD+ has served as a mechanism to pilot Free, Prior and Informed Consent (FPIC), which will likely have significant impacts in mitigating conflicts by addressing the sources at local to national levels.

ANNEX 4:

Detailed recommendations from literature

1 Integrate a conflict-sensitive approach into CCMIs, especially in fragile states, recognizing that all interventions have the potential to exacerbate or alleviate existing tensions. Design climate-resilient peace-building and conflict-sensitive climate programming that not only reduces conflict potential but also plays a constructive role in peacebuilding (Dabelko et al. 2013; Gustafsson 2016; Peters, Dupar, et al. 2020).

1a Integrate social, economic, environmental, governance, political, security, and truth and reconciliation into CCMI

s (Matthew 2014).

1b Integrate the following into CCMI

s:

- Conflict analysis and sensitivity
- Monitoring of conflict dynamics and how program might affect security dynamics
- Conflict resolution and mitigation planning
- Specialized institutional mechanisms to mediate conflicts
- Analytical tools and activities for disaster risk reduction, climate change adaptation and mitigation and development and conflict.

(Harwell 2011; Gustafsson 2016; see also Peters, Mayhew, et al. 2020).

1c Identify pre-existing sources of impairment to determine the types of actions that can minimize negative impacts of conflict and enhance the positive ones (Patel et al. 2013). Conduct conflict-sensitive Environmental and Social Impact Assessments (Sawas et al. 2018).

1d Ensure timely engagement by external parties in the early stages of conflict to mitigate risks or more serious future conflicts (Koning et al. 2007).

1e Use frameworks to critically assess forest and REDD+ policies and regulations that might lead to conflict and clarify and detail safeguards for the rights of Indigenous and local communities (Patel et al. 2013).

1f Focus on rebuilding and restoring cooperation over natural resources and environment (Herbert 2019).

2 Design CCMIs for the local context

2a Customize CCMI

s within a broader reconstruction framework that is unique to each peacebuilding country (Matthew 2014). Present different environmental peacebuilding opportunities for engagement according to the local context in ways that could have a transformative effect on conflict and community relationships (Herbert 2019).

2b Make compensation context-specific and agreed upon using robust participatory processes that explicitly ensure that no community members are increasingly marginalized by the form of compensation.

- 2c Identify the context of specific changes required for strengthening peaceful and inclusive development, risks to development cooperation, and project impact in design and implementation stages (Gustafsson 2016).
- 2d Improve translation and implementation of social safeguards for REDD+ to local contexts (Wallbott and Florian-Rivero 2018; Sarmiento Barletti and Larson 2019)
- 3 Design CCMI to be pro-poor, inclusive, and promote the key role of Indigenous peoples** (Dabelko et al. 2013; Tänzler 2013; Sarmiento Barletti and Larson 2017). Be inclusive and deliberative about including different views, interest and politics (Leach and Scoones 2015). Bring governance and participation issues at a more centre stage to make interventions resulting in wider benefits for rural livelihoods (Leach and Scoones 2015). CCMI need to better address power structures, broaden inclusion, accountability and transparency (Peters, Dupar, et al. 2020).
- 3a Engage in robust and meaningful participatory processes with a diverse range of actors from local communities on investments and actions affecting forest (Stevens et al. 2014; Wallbott and Florian-Rivero 2018).
- 3b Use CCMI revenues to advance socio-economic development (Dabelko et al. 2013; Tänzler 2013).
Formalize informal sector livelihoods, and if not, provide an alternative (Harwell 2011).
- 3c Pursue CCMI within Indigenous peoples' territories where existing local institutions can govern the use and distribution of forest resources, ensure security of tenure and provide mechanisms of enforcement and conflict resolution through cultural sanctions (Reed 2011; see also Peters, Mayhew, et al. 2020).
- 3d Reframe CCMI and safeguards to recognize the rights and key roles of Indigenous peoples in climate change initiatives and protecting forest (Sarmiento Barletti and Larson 2017).
- 3e Critically evaluate the additionality requirement in REDD+ to ensure equality in practice (Reed 2011).
- 3f Critical evaluation of the effectiveness of the carbon market audit mechanism to evaluate its environmental and social claims (Lyons et al. 2014).
- 3g Connect Indigenous communities with outside allies through new social media to empower them (Herbert 2019).
- 3h Connect CCMI with formal legal frameworks for the implementation of principles in the UN Declaration of the Rights of Indigenous peoples (UNDRIP) (Reed 2011).
- 3i Ensure consistent participation of Indigenous men and women throughout REDD+, following FPIC guidelines and capacity building effort (Sarmiento Barletti and Larson 2017).
- 3j Widen the scope of auditing in carbon certification beyond carbon calculation to consider livelihood impacts for communities as well as access and use rights of local people (Lyons et al. 2014).

- 3k Adaptive and collaborative management to provide conducive environment to address different interests and values of actors, allowing the forming of collaborative and equal relationships among them (Patel et al. 2013).
- 3l Improve communication and collaboration across communities and disciplines (Dabelko et al. 2013).
- 3m Co-production of knowledge and capacity with local actors (Hunsberger et al. 2017)
Conduct collaborative research between academics and local land users to co-produce knowledge that are socially relevant and locally grounded (Patel et al. 2013).
- 3n Apply a security lens to evaluations of CCMIs. The evaluations of CCMIs we reviewed were mostly technical and did not address issues of conflict or insecurity associated with the project. Evaluations based on the OECD DAC evaluation criteria— relevance, effectiveness, efficiency, impact and sustainability, and coherence (OECD 2019), for example, do not automatically consider conflict or political dynamics unless they are explicitly included in the project’s design.
- 4 Integrate land tenure security into CCMIs** in order to avoid agitating existing conflicts and to alleviate conflict through participatory processes of assessing claims.
 - 4a Address inequities in legal recognition of customary and women's land rights through land reforms (Harwell 2011).
 - 4b Integrate land recovery plans and conflict resolution mechanisms to resolve land disputes (Wallbott and Florian-Rivero 2018).
 - 4c Ensure the clarity of resource tenure—the systems of rights, rules, institutions and processes regulating ownership, access and use—in legal and policy frameworks as well as in implementation (Harwell 2011; Dabelko et al. 2013; Patel et al. 2013).
 - 4d Secure land tenure and conduct FPIC (Patel et al. 2013). Mainstream the UN Voluntary Guidelines on the Governance of Tenure in forest landscape policies and CCMIs (Kane et al. 2018).
 - 4e Account for traditional land tenure arrangement and recognize rights of resource users without legal titles even though it's complicated (Tänzler 2013; Stevens et al. 2014).
 - 4f Provide legal protection towards community's forest rights by for example mapping boundaries, protection against illegal loggers and not granting commercial concessions in community forest (Stevens et al. 2014).
 - 4g Analysis of land-cover changes that include tenure rights, citizenship and human rights (Bebbington et al. 2018).
 - 4h Create peace parks to improve forest management through cooperation, compromise to diffuse competing land claims (Harwell 2011).
- 5 Strengthen existing effective, legitimate, and accountable institutions to better address conflict and contribute to peace** (Peters, Dupar, et al. 2020).
 - 5a Identify the obstacles and possible incentives for cross sectoral coordination to improve integration and coordination across actors and agencies (Harwell 2011).

- 5b Improve inter-institutional coordination between national bureaucracies to ensure the practice covers the issue of indigenous people's rights (Wallbott and Florian-Rivero 2018).
 - 5c Establish reliable transparent and efficient governance structures for REDD+ projects (Dabelko et al. 2013).
 - 5d Use donor's leverage to support forest sector reform by encouraging the appointment of reform-minded forestry officials, implement training programmes on good governance and sanctioning corrupt officials (Koning et al. 2007).
 - 5e Improve the capability of local institutions in identifying and dealing with drivers or deforestation effectively (Dabelko et al. 2013; Tänzler 2013). Provide information flow from the national level to the local and vice versa (Wallbott and Florian-Rivero 2018). Support communities with technical assistance and training (Stevens et al. 2014). Support capacity building and prioritize local participation (Dabelko et al. 2013).
 - 5f Capacity building through multilateral process for the government on the relationship between climate and security (Sawas et al. 2018)
 - 5g Create an inventory of practical tools for the reconstruction and capacity building on peacebuilding (Matthew 2014).
 - 5h Further improvement of capacity building and information sharing activities especially to poor forest dependent and marginalized communities (Patel et al. 2013) Create capacity development program in FPIC for national and sub-national government staff, as well as staff of companies and NGOs (Kane et al. 2018) Capacity building for local population to enhance participation (Tänzler 2013). Empowerment of community forest management institutions through capacity building and protections (Harwell 2011).
- 6 Enhance governance systems and benefit-sharing schemata toward greater equity, and strengthen transparency and accountability of CCMI**
- 6a Strengthened forest governance monitoring systems, allowing it to be accessible to local communities and harmonized data (Kane et al. 2018).
 - 6b Concentrating forest law enforcement on the largest violators (Koning et al. 2007).
 - 6c Transparency initiatives to support citizen's access to legislative measures (Sawas et al. 2018).
 - 6d Plan out benefit-sharing such that it has widespread benefits and reduces illicit economies (Peters, Dupar, et al. 2020).
 - 6e Greater openness and transparency in forest resource management to increase legitimacy of REDD Programming, reduce corruption, avoid conflicts of interest, secure equitable benefits for local populations, and reduce conflict potentials (Harwell 2011; Dabelko et al. 2013; Tänzler 2013).
 - 6f Prepare an anti corruption mechanism to ensure transparency and accountability in bidding, chain-of-custody and revenue tracking (Harwell 2011).
 - 6g Independent monitoring and reporting of compliance by media, civil society organizations and local communities (Koning et al. 2007).

- 6h Investigate abuse allegations, enable access to justice, and develop grievance mechanisms within REDD+ processes (Sarmiento Barletti and Larson 2017).
- 6i Include broader actor perspective and actors such as financial and regulatory institutions in the fight against illegal logging and associated corruption (Koning et al. 2007).
- 6j Call upon investor accountability to ensure there are no forced evictions and ensure the ongoing protection of local communities (Lyons et al. 2014).
- 7 Explicitly integrate gender equality into CCMI to reduce inequality gaps leading to instability through differential power relations** (Gay-Antaki 2016; Lau et al. 2021).
 - 7a Question and disrupt the deeper, intangible barriers to gender equality that reinforce assumptions in funding structures, projects and institutions (Lau et al. 2021). Answer questions around how more gender equitable CCMI would lead to increased security. While there are direct links between exclusion and violence at household levels, we did not find any studies that linked gender based inclusion or exclusion to (in)stability or security. Understand and use robust measures of gender equality in policy and practice (Lau et al. 2021).
 - 7b Improve the under-recognition of women as resource managers and core actors in climate mitigation and adaptation (Gay-Antaki 2016).
 - 7c Include policies that address the intersectionality and structural constraints that limit women's access to control and ownership over resources (Gay-Antaki 2016).
 - 7d Improve tracking and measurement of differential security impacts of CCMI on women and men (Lau et al. 2021).
- 8. Propose alternatives to neoliberal climate change mitigation solutions.** Although there are proposals to address climate change through mechanisms other than markets relations by, for example, dispelling the notions that economic growth can be decoupled from natural resources and moving toward degrowth especially in high-income countries (Hickel and Kallis 2019; Krause 2020; Hickel 2021), contemporary CCMI are almost exclusively market based and neo-colonial (Fletcher 2012; Cipler and Roberts 2017; Howson 2020), which come bundles with tensions, conflict, violence and insecurity. Alternatives are coming from Indigenous scholars, but have failed to influence policy and practice.
 - 8a Reduce the reliance towards offset initiatives in reducing global greenhouse gas emission by expanding options in renewable energy (Lyons et al. 2014)
 - 8b Address climate change mitigation in places other than forest (Leach and Scoones 2015)

