Gender inequality, biodiversity loss, and environmental degradation

Helping People and the Planet Thrive

Prepared by EnGen Collaborative - A. Emmett Boyer and Margaux Granat - for the CARE-WWF Alliance

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The discussions in this literature review on gender inequality, biodiversity loss, and environmental degradation directly impact the lives of Indigenous Peoples and communities around the world, who contribute immensely in defending human rights and protecting natural resources at global, national, and local levels. We want to reaffirm and underscore the importance of decolonial approaches in gender and conservation work and centering the voices, experiences, knowledge, and rights of Indigenous Peoples in these discussions and in future research and action on gender equality and environmental conservation.

Contents

Executive Summary

In collaboration with the CARE-WWF Alliance, EnGen Collaborative conducted a literature review as a critical step in responding to the question: **What is the cost of biodiversity loss and environmental degradation on gender equality?** The research unearthed several findings about the relationship between gender and the environment, but what is most noteworthy are the gaps that emerged.

The identified linkages and gaps will support the development of future CARE-WWF Alliance programming, learning and advocacy. The literature review, as well as this executive summary, also offers practical recommendations to help practitioners, donors, policy-makers and academics begin to fill these gaps, i.e., advance gender equality and conservation in their program design, implementation, research and learning, including through institutional cultural change, in stakeholder and partner engagement, etc. The full literature review and list of references is forthcoming.

This research revealed compelling evidence that underscores the importance of addressing the relationship between gender inequality, biodiversity loss, and environmental degradation:

Gender and Environmental linkages

Gender inequality and environmental degradation are correlated, as are women's empowerment and environmental wellbeing. A study analyzing environmental and social indicators for 114 countries found a statistically significant relationship between gender inequality and environmental wellbeing, where nations with higher levels of inequality tend to have lower environmental wellbeing and vice-a-versa. Another study of 70 countries found that a greater proportion of women in parliament and their years of educational attainment was correlated with a decrease in the expected carbon emissions per resident,[1] particularly in countries with lower indicators of socioeconomic development.

Women's Leadership and Participation in Conservation and Climate Decision-Making

Evidence demonstrates that participation and leadership of women in natural resource and land management leads to better governance and environmental outcomes. However, women are consistently underrepresented and face barriers to participating in conservation and climate decision-making, from global and national policy spaces to local resource management groups.

Key Gaps

Data Connecting Gender and Conservation and Its Use

The global community needs to redouble its efforts to connect gender-disaggregated environmental data, without which sustainable development analyses and progress monitoring is incomplete. Seven of the 17 SDGs do not include official indicators on gender equality, and SDG 5 (gender equality) excludes indicators on access to natural resources. As of December 2020, only 13% of UN Member States had data for at least half of the SDG gender indicators, and globally, there is still not enough available information for nearly two-thirds of SDG gender indicators.

While there are toolkits and methodologies for identifying gender indicators, limited capacity to collect and analyze sex-disaggregated data, lack of funding, and inadequate

baseline data have limited the use and usefulness of gender indicators in conservation. Limited capacity and funding to implement research methods that would expand understanding of the qualitative pathways through which socially constructed gender norms shape environmental governance and outcomes is also a barrier to implementing programming that realizes the promise of linked gender equality and conservation impacts.

Men and Masculinity

Societal expectations of men and social norms surrounding masculinity affect not only gender equality but also the effectiveness of conservation strategies. However, gender and conservation literature rarely considers how social norms affect men, how these norms are created and sustained, and their relationship to the protection or destruction of ecosystems.

Initial research has revealed linkages between patriarchal structures, societal expectations for men, and conservation attitudes. When men are unable to meet social expectations to provide for their families in the context of ecological and climatic change (e.g., natural disasters or crop failure), this can lead to self-destructive behaviors, negative coping mechanisms, and even gender-based violence. Conversely, pro-environmental behaviors and views are more associated with social constructions of femininity—such as natural resource stewardship as an extension of caretaking, a norm associated with women in many cultures. This may present opportunities that the conservation community has not fully leveraged**.**

Indigenous Women's and Men's Rights and Leadership in Conservation

Environmental degradation poses risks to the realization of the rights to territorial integrity, cultural self-determination – and even health, safety, and livelihoods – of Indigenous Peoples. Simultaneously, Indigenous-managed territories are characterized by better ecosystem health and higher levels of biodiversity. Global calls to conserve 30% of the globe's biodiversity by 2030 – coupled with the reality that over a quarter of Earth's land are Indigenous and 67% of that is classified as natural) – means that much of the land and seas targeted for conservation reside in Indigenous territories. Conservation strategies must expand beyond traditional protected areas to include other effective conservation measures, relying in large part on the construction of mutually respectful partnerships with Indigenous People and Local Communities (IPLCs).

Indigenous women are often recognized as holders of environmental knowledge, yet governance and policy decision-making spaces at multiple levels often fail to value them as equal and autonomous actors. This contributes to strategies that misrepresent the relationship between Indigenous culture and nature, restrict traditional practices and sacred spaces, enhance bias in knowledge valuation and research, and position Indigenous women as vulnerable parties in relation to environmental degradation and climate change. Aligning conservation solutions with capitalism risks over-relying on economic interventions to empower Indigenous women without recognizing how such interventions may perpetuate inequitable colonial structures and create new (or exacerbate existing) risks for Indigenous women and their lifeways.

Indigenous Language and Knowledge in Ecology and Conservation Research

Ecology and conservation literature is dominated by authors and scholarship from the Global North. Many peer-reviewed journals limit publication to written materials in English, which excludes important ecological knowledge embedded in Indigenous languages and oral traditions. Experts noted a common misperception that research gaps exist where they do not really exist, because studies have been published in local languages; this can lead to

duplication of work and dismissal of local research efforts. Indigenous communities may also experience participation fatigue if they are continually asked to share information with various research initiatives, usually without shaping the research agenda or compensation.

Recommendations for Progress on Gender Equality and Conservation

Based on the findings, the CARE-WWF Alliance refined EnGen Collaborative recommendations to make them more actionable. While far from exhaustive, here are a few concrete steps key actors can take to address these gaps and advance gender equality and environmental sustainability in research, practice, grant-making and policy-making:

Academics and practitioners should expand opportunities for IPLCs to lead the design and application of research and practice by relying on local experts and loosening language requirements. Research institutions and NGO projects should rely, whenever possible, on local researchers and those with expertise in feminist, participatory and action research methods that are rooted in local culture and/or value traditional knowledge and practices. This includes respecting and prioritizing Indigenous research practices and ethics, which is especially critical in efforts to bridge Indigenous and scientific knowledge in ways that support and learn from Indigenous land management. To this end, IPLCs should be able to submit research and programmatic proposals in their native language. BINGOs should pay for translation of such proposals – just as digital journals should expand their ability to translate articles to democratize access to peer-reviewed research.

Programmatic designers and implementers should connect the best of top-down and bottom-up approaches by prioritizing co-design, co-management, and co-production principles in ways that enable programmatic accountability to the needs and priorities of communities rather than donors. At their worst, top-down approaches can exclude the voices and leadership of IPLCs including women, undermining the sustainability and local ownership of conservation programs. In contrast, creating feedback loops between different scales of programming allows for community input and priorities to guide systems changes, such as policies and regulations, data collection and dissemination priorities or budget allocation. Structures that facilitate such feedback make learning agendas and programming activities more accountable to IPLCs.

Here are some concrete ways practitioners might use co-production and co-management principles to connect the benefits of top-down and bottom-up approaches throughout and beyond the project cycle:

- Address the under-representation of IPLCs in programmatic roles by recruiting and resourcing local ‘experts’ in programming, ensuring that the people hired speak the local language, live in the region, and are responsible not only for providing local context but for leading project activities. Also, provide training and capacity strengthening so communities have the skills and information they need to meaningfully participate in all stages of the project cycle and enable project ownership.
- Ensure that an understanding of the dynamics between environmental, sociocultural and economic systems inform projects by working with donors to prioritize and resource gender analysis and the collection of data on gender and social norms and natural resources. In addition to promoting participatory design, donors and practitioners should fund staff training on gender-transformative practices and monitoring or engage local partners with expertise in these areas.

- Address the social norms that create the limitations for women to meaningfully participate in natural resource management and other activities in their communities. Strategic approaches to understanding and challenging harmful and discriminatory social norms – with attention to intersectionality – should inform every stage of the project cycle.
- Build participatory systems for monitoring and evaluation that engage communities in locally relevant research design and data collection, while also providing mechanisms to feedback to global learning and research agendas. Ensure that communities are engaged in the synthesis of findings and how data are used to improve design and implementation. Ensure that the communities also have access to use the data as they desire for their own development as well.
- Explore ways to create and sustain partnerships with local organizations that go beyond the life of projects. Support could include providing financial capital, in-kind resources, or capacity building to social movements and civil society organizations (CSOs). Improve the responsiveness of policy and planning to local needs by creating opportunities for women and IPLCs to hold positions of power and lead decision-making and by linking government agencies and policymakers with CSOs.
- Conservation and development organizations must also examine not only their recruitment practices, but also their relationships with country offices and internal accountability processes. As with donors, funding structures should be examined to explore how to shift power to IPLCs and local organizations. relationships with country offices and internal accountability processes. As with donors, funding structures should be examined to explore how to shift power to IPLCs and local organizations.

Donors should address their role in perpetuating unequal power dynamics by shifting funding priorities and modalities to resource and empower IPLCs as primary agents of change. Donor organizations can work to improve their accountability to grantees by taking steps to assess and understand their organizational biases, such as undertaking anonymous surveys regarding staff attitudes, audits of discriminatory hiring and operating practices, and examining how these biases affect their relationships with local partner organizations. Donors that primarily work with big international NGOs (BINGOs) based in the Global North should also re-examine their funding structures to prioritize less restricted funding to local organizations, particularly those led by women and/or Indigenous Peoples; this may require shifting eligibility requirements that are more readily fulfilled by BINGOs. In the process, donors can form direct relationships with local organizations and practitioners to better understand their funding needs and priorities – as well as to connect with additional local organizations based on recommendations from their peers.

Global biodiversity and climate policymakers should ensure that their agendas mainstream women and gender in their decision-making and aspirations. The 2022 *UN Convention on Biological Diversity* Conference of Parties 15 meeting presents a momentous opportunity to agree on the Post-2020 Gender Action Plan, in particular to:

- Ensure that the Global Biodiversity Framework contains specific commitments to gender-responsive actions and indicators;
- Adopt a new stand-alone target to “ensure equitable access and benefits from conservation and sustainable use of biodiversity for women and girls, as well as their informed and effective participation in policy and decision-making related to biodiversity”; and
- Create spaces for local women-led organizations to influence the development of the global biodiversity agenda, including accountability structures that allow for the monitoring of biodiversity goals that address the needs of women and IPLCs.

Acronyms

CIWB	Carbon intensity of well-being
COP	Conference of Parties
CSOs	Civil society organizations
FPIC	Free, prior, and informed consent
GBV	Gender-based violence
ICCAs	Indigenous and Community Conserved Areas
NGOs	Non-governmental organizations
PES	Payments for ecosystem services
REDD+	Reducing emissions from deforestation and forest degradation, conservation of existing forest carbon stocks, sustainable forest management and enhancement of forest carbon stocks
SDGs	Sustainable Development Goals
SOGIESC	Sexual orientation, gender identity and/or expression, and sex characteristics
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

Rapid and widespread environmental degradation and biodiversity loss threaten all areas of life -- with significant and dire risks to ecosystem health, state fragility and security, human rights, and the very lives, livelihoods, and cultures of billions of people around the world (OECD, 2019; WEF, 2021; WWF, 2020). The acute impacts of degradation and loss on food security and nutrition, water availability, cultures and traditions, and health and safety are already being felt by people who are highly dependent on natural resources to meet their basic, daily needs (Fedele, 2021; Roe, et al., 2019). Women, girls, people living in poverty, rural communities, sexual and gender minorities, and Indigenous Peoples are among the populations disproportionately struggling and coping with these impacts (FAO & UNEP, 2020; Garnier, et al., 2020). Despite their roles in protecting nature and the critical value they would and do bring to solutions, these populations are consistently underrepresented (if represented at all) in influencing and leading ecological restoration and biodiversity conservation solutions to the threats directly altering their lives (IUCN, 2020a; Ramos, et al., 2021).

Using recent research and evidence from academia, organizations, institutions, governing bodies, and activists, as well as focus groups with key experts, this literature review is separated into three sections to explore mutually reinforcing impacts and challenges of gender inequality on biodiversity loss and environmental degradation. The first section identifies several constraining factors prevalent in the literature that hinders progress on gender equality and biodiversity conservation. The second section outlines critical gaps in the literature that need more attention in ongoing and future work, including who is included in and leads conservation efforts. The final section discusses some of the key enabling factors identified through the research that can potentially promote mutual progress on gender equality, ecological restoration, and biodiversity conservation. Throughout the review are boxes that have specific examples illustrating issues identified in the main text.

This literature review was conducted to inform the CARE-WWF Alliance as a critical step in responding to the question: What is the cost of biodiversity loss and environmental degradation on gender equality? The findings herein aim to aid the CARE-WWF Alliance in identifying areas for future initiatives, research, and learning to address the mutual drivers of these issues and close knowledge gaps.

This literature review was not focused on any specific ecosystem, sector, geography, or degradation concern. The issues, concerns, gaps, enabling conditions, and recommendations are therefore attempting to provide an overview of these discussions for global gender and conservation challenges and opportunities in general. The findings of this review can be used to frame research and analyses in specific contexts to then identify unique issues, concerns, gaps, enabling conditions, and recommendations targeted to that context.

Constraining factors to mutual progress on gender equality and biodiversity conservation

A vast majority of gender[1] and conservation research tends to describe gendered relationships with natural resources and potential contributions to biodiversity conservation along traditional

[1] Gender describes the socially defined roles, behaviors, expressions, and activities that are seen as acceptable and expected of women, men, and people who are not represented by binary gender terms.

gender roles and norms. In many low-income, rural areas, gender roles and norms reinforce men as primary income earners and decision-makers and women as household and family caretakers (Cely-Santos & Hernández-Manrique, 2021). This translates into how studies often characterize the different priorities of women and men in valuing and using ecosystem services and natural resources -- with women valuing regulating services and renewable resources, particularly for household food, water, and medicine, while men value provisioning services and consumptive resources that have higher economic value (Fortnam, et al., 2019; Morezuelas, 2021). Women's knowledge of biodiversity in particular is related to their critical responsibilities as "household managers, plant gatherers, home gardeners, seed custodians, food producers, forest managers, income generators, and plant breeders," which often means that they "engage more intensively in the protection, management, and use of agricultural and forests resources than men" (Khadka and Verma, 2012, p. 46).

Women's and men's interactions and priorities with ecosystem services and natural resources develops gendered knowledge on the use, management, and value of natural resources and biodiversity, which can inform potential responses to degradation (see Box 1) (Crona & Bodin, 2006; Orr, et al., 2017; Sithole, et al., 2021). There is overwhelming agreement across gender and conservation literature that the roles, priorities, and environmental knowledge of both women and men contribute to livelihoods, resilience, ecosystem health, and biodiversity in unique ways (Dishan, et al., 2010; Leisher, et al., 2016; Morezuelas, 2021).

Box 1: Women's contributions to agrobiodiversity, food security, nutrition, and resilience

Women hold broad knowledge of local biodiversity through their management of the interface between domestic and wild edible and medicinal plant species (Garnier, et al., 2020; Khadka and Verma, 2012). They are involved in preserving crop diversity through seed selection, storage, and use by identifying varieties based on drought resistance, taste, nutrition, and storability (Zeigler, 2021). This knowledge is highlighted in agrobiodiversity literature as an important aspect of conserving culturally and traditionally important crop species, as well as species with differing adaptive qualities to climate shocks, such as drought (Chambers & Momsen, 2007). For instance, women-managed home gardens are important sources of vast genetic diversity (Akhter, et al., 2010; Avilez-López, et al., 2020; Cely-Santos & Hernández-Manrique, 2021), with crops that hold cultural and subsistence values that are often different from species grown in large-scale monocrop agriculture (Chambers & Momsen, 2007). A recent case study of post-conflict livelihood pressures in the Colombian Caribbean found that home gardens are an important coping strategy for families as they return to the area (Cely-Santos & Hernández-Manrique, 2021). Cely-Santos and Hernández-Manrique (2021) note that the home gardens maintained by women contain more than 70 plant types, including a diverse array of staple crops and culturally important foods with various harvest times and drought resistances. This accessible source of food contributes to health and wellness for all family members and potentially allows for continuous access to nutritious foods in the event of crop failure or income loss. (For other examples, see case studies in Khadka and Verma, 2012.)

However, current literature also notes that women's roles, priorities, and environmental knowledge are often overlooked in strategies and policies for ecological restoration and biodiversity conservation (Nchanji, et al., 2021; Vázquez-García and Ortega-Ortega, 2017). Unequal power dynamics and norms associated with gender and intersecting dynamics of marginalization shape individual experiences of privilege and disadvantage, which influences who

Gender is dynamic and varies between different cultures, and it is one of many identities that shape individual experiences of privilege and disadvantage in social, political, and economic relationships and structures (IUCN, 2021).

accesses, controls, and makes decisions over natural resources (Sijapati Basnett, et al., 2017). As a result, women face challenges and barriers to participating in, influencing, and benefitting from conservation, which also undermines a broader understanding of their important contributions to conservation and sustainable use of biodiversity (Adhikari, et al., 2021; Cely-Santos & Hernández-Manrique, 2021; Jackson, et al., 2021; Tabangay & Westerman, 2016). Likewise, biodiversity loss and environmental degradation affects women's ability to collect resources they need for social, cultural, subsistence, and environmental purposes, which impacts their contributions to biodiversity conservation (Khadka & Verma, 2012).

The following sections outline the constraining factors that are prominently discussed in gender and conservation literature. These factors represent gender inequalities and unequal gender norms – from the international to local level – that impede progress on equality and conservation outcomes and affect the ability of women to meaningfully participate in, influence, and benefit from ecological restoration and biodiversity conservation.

Unequal inclusion and knowledge valuation in conservation governance and decision-making

Evidence demonstrates that participation and leadership of women in natural resource and land management leads to better governance and conservation outcomes (James, et al., 2021; Leisher, et al., 2016; Schuster, et al., 2019). For example, a recent New York Times article profiled women leading marine conservation efforts in the Philippines and noted that women played a critical role in establishing and continuing to manage the Binoongan Marine Sanctuary, which now has the highest fish biomass of any sanctuary in Siquijor (Trent, 2021). However, women are consistently underrepresented and face barriers to participating in conservation decision-making at all levels (Giakoumi, et al., 2021), from global and national policy-making spaces to local resource management groups. This limits women's contributions and hinders a broader understanding of the critical linkages between their roles, priorities, and environmental knowledge to biodiversity conservation. Moreover, the increase in recognition of gender equality principles in international decisions, organizational strategies, and investment frameworks may appear as a signal of significant progress, but Lawless, et al (2021) counter that:

> deeper examination of how gender is represented, rationalized and strategized by governance actors and within policy instruments illustrates that the nature of commitments and investments may not be fit for the complex social-ecological challenge at hand. (p. 13)

Much of the gender and conservation literature reviewed spoke to the importance of decision-making dynamics in households, particularly between women and men, in using, controlling, and managing natural resources and land to contribute to conservation outcomes (discussed more in the following section). There are also more studies that recognize barriers to equitable governance and decision making in environmental and conservation project design and implementation, policymaking, and research (see Box 2) (Gay-Antaki, 2020; Lawless, et al., 2021; Liévano-Latorre, et al., 2020; Westerman, 2021). These studies help to reveal the elements of structural discrimination and under-consideration that influence who is included and which issues are deemed important in global and institutional conservation solutions, investments, and priorities.

Box 2: Gender inequality in conservation research institutions and publishing

There is growing recognition of inequalities in internal systems and structures that hinder women's access to formulate, conduct, and publish research in conservation related journals and institutions. Women represent 11% of top-publishing authors from leading ecology, evolution, and conservation journals, and less than 25% of top-publishing authors are from the Global South (Maas, et al., 2021). A study conducted by Giakoumi, et al. (2021) found that marine conservation scientists were aware of gender bias in research institutions and perceived it as a problem to effectively support conservation solutions. The study also explains that gender-related barriers in conservation science and research institutions need to be addressed for sustainable change, including "promoting critical gender awareness … considering contextual (institutional and family-related) factors and non-contextual factors (including individuals' attitudes and beliefs)" (Giakoumi, et al., 2020, p. 5). Giakoumi, et al. (2021) and a study by Liévano-Latorre, et al. (2020) both found that editorial boards of conservation journals are male-dominated, with both stating that addressing gender bias on editorial boards is one way to contribute to innovative, inclusive research on conservation solutions.

Conservation projects

According to Larson, et al. (2021), "conservation solutions… still favor uniform, top-down models of change" (p.4) as primary approaches to curb biodiversity loss. Top-down[2] methods are based on priorities determined by international organizations, national governments, or corporate actors, which may not represent the realities of local communities (Apfelbaum, et al., 2013; Eicken, et al., 2021). These approaches make it difficult for people with minimal political power, including women and Indigenous Peoples, to significantly influence solutions and participate in governance opportunities (Apfelbaum, et al., 2013; Larson, et al., 2021). Top-down strategies, such as those grounded in "fortress" conservation,[3] that overlook or diminish traditional rights and the agency of Indigenous Peoples do not support sustained positive conservation outcomes (Armitage, et al., 2020). Ravnborg, et al. (2016) notes that top-down conservation solutions displace accountability on action to mitigate climate change and biodiversity loss to communities least responsible, seeing as easier to change the behaviors of politically marginalized communities than those of the corporate interests driving land use change. Even when principles and approaches exist to protect the rights of people and secure their inclusion in governance, such as free, prior, and informed consent (FPIC) for Indigenous and local communities, these principles and approaches are sometimes not respected or adequately carried out, leading to dispossession and abuses of power (Ramos, et al., 2021). Fontana and Grugel (2016) state that processes like FPIC do not "automatically lead to better or more democratic governance and a more equal society," and that they can exacerbate existing social, cultural, and economic tensions because the intentions are not always transparent. Approaches considered bottom-up[4] also have drawbacks, including difficulty scaling up and transferring results from individual cases, and many researchers advocate

[2] Eicken, et al. (2021) define top-down approaches as those that are "within the context of a global, international, or national framework, often with a focus on national and international assessments and scientific research; top-down approaches typically define essential variables that link to broad societal benefits and more specific agency or operational missions" (p. 468).

[3] Fortress conservation is "based on the belief that biodiversity protection is best achieved by creating protected areas where ecosystems can function in isolation from human disturbance. Fortress, or protectionist, conservation assumes that local people use natural resources in irrational and destructive ways, and as a result cause biodiversity loss and environmental degradation" (Robbins, n.d.).

[4] Eicken, et al. (2021) define bottom-up approaches as those that are designed and "undertaken at the local scale and brought forward to higher-level bodies" (p. 468).
often with a focus on supporting outcomes desired by a local community" (p. 468).

for developing hybrid approaches to enhance conservation outcomes and greater resilience of local-scale efforts (Apfelbaum, et al., 2013; Eicken, et al., 2021; Khadka & Vacik, 2012; Pereira, 2019; Vucetich, et al., 2018).

Despite organizational commitments to inclusion and articulation of plans for equitable engagement and access to opportunities, these principles and plans may not come to fruition in practice if they are not systematically accounted for throughout implementation (Davies, et al., 2018; Lawless, et al., 2021; Tabangay & Westerman, 2016). For example, stakeholder surveys are often administered to heads of households, who are predominantly men, with the assumption "that the respondent is fully knowledgeable and forthcoming about the practices of all household members" (Tabangay & Westerman, 2016, p. 89). Perry and Gillespie (2019) conducted interviews of households surrounding a protected wetland in Cambodia and found that work that was considered too hard for women to conduct would sometimes differ between households, highlighting that gendered roles and capabilities are heavily tied to cultural context. One case of Indigenous conservation management in Australia found that there was evidence of increasing employment of Indigenous women in protected areas (Davies, et al., 2018). However, the researchers could not draw conclusions of enabling factors that could have stemmed from Indigenous conservation management programs and partnerships because gender equity was not a part of planning, implementing, and evaluating frameworks, which limits the opportunities to enhance understanding of gender equality impacts on conservation outcomes (Davies, et al., 2018). Even well-intentioned, participatory methods used in conservation solutions can overlook the discriminatory barriers facing socially and politically marginalized groups within communities that may restrict their meaningful participation in solutions (see Box 3) (Jerneck, 2018; Satyal, et al., 2020). There are cases of environmental projects pushing for gender parity in activities without understanding local gender dynamics have resulted in household conflicts between women and their husbands or backlash from communities if women attend project meetings or activities (Castañeda Camey, et al., 2020). For example, in Tanzania, a natural resource project encouraging equal participation of women and men in community training did not account for social gender norms, and one woman who did participate was subject to rumors of extramarital affairs when she returned to her village (House, et al., 2014).

Box 3: Intersectional social dynamics: Sociocultural discrimination and barriers to REDD+ decision making

Several studies on REDD+[5] projects find that many implementation efforts disproportionately burden minority and historically marginalized groups by restricting access to land and resources and failing to address intersectional issues of income, ethnicity, race, indigeneity, and gender in equitable decision-making and benefit distribution (Löw, 2020; Milne, et al., 2019; Satyal, et al., 2020). A study of REDD+ projects in Nepal found that many Indigenous women in the medium wealth category participated and had an overall positive experience in REDD+ pilot projects (Satyal, et al., 2020). Conversely, Dalit women -- among the poorest, most marginalized, and lowest group in the caste hierarchy -- continued to face caste-based discrimination in decision-making and representation from community members. Dalit women who were designated to be on executive committees explained their presence was symbolic to meet diversity requirements for the committee and that their concerns were largely ignored or criticized by other committee members (Satyal, et al., 2020).

[5] Reducing emissions from deforestation and forest degradation, conservation of existing forest carbon stocks, sustainable forest management and enhancement of forest carbon stocks

International decision-making bodies

International conferences on climate change, biological diversity, and land degradation are important global convenings for scientists, researchers, governments, civil society, and other stakeholders to determine priorities, targets, and advocate promising practices for securing a sustainable future (Lawless, et al., 2021). However, these spaces can be difficult to navigate for non-state actors, small non-governmental organizations (NGOs), civil society organizations (CSOs), and advocacy groups, particularly those advocating for politically marginalized groups, such as youth, sexual and gender minorities, and Indigenous Peoples (Ferrer, et al., 2021; Gay-Antaki, 2020). Additionally, conferences without internal structures to promote safety and participation, such as non-discrimination policies, guidelines, and reporting mechanisms for harassment, among others, can discourage or even restrict people from attending (Tulloch, 2020). Barriers to entry and protocol-related knowledge expected at these conferences have meant that the voices and concerns of those most impacted by environmental degradation and with capabilities to lead and enact change are sidelined or barred from participating in these governance bodies (Ferrer, et al., 2021; Gay-Antaki, 2020; Vanguard News Nigeria, 2021). Gay-Antaki (2020) argues that these barriers to the UN Framework Convention on Climate Change (UNFCCC) Conference of Parties (COP) have contributed to some decisions that homogenize women's experiences to climate change, and while this has helped to increase the attention to issues, it means that a "wide array of worldviews and perspectives are dismissed in the process" (Gay-Antaki, 2020, p. 2).

However, increasing awareness of intersectional issues and growing contingencies of advocates around the world have challenged essentialized narratives in these arenas, with some groups abandoning the COP process altogether and organizing counter-COPs (Vanguard News Nigeria, 2021). A recent article published by graduate student researchers explained that there was a stark divide between the largely market-driven climate solutions embraced in formal COP negotiations "and the more holistic, justice-centered approaches advocated for outside of those chambers" (Ferrer, et al., 2021, Introduction section, para. 6). Scholars and activists have decried the focus on market-driven solutions to environmental degradation and climate change (Rice, et al., 2021; Vanguard News Nigeria, 2021), stating goals for sustainability cannot be reached through global economic systems that undermine local communities, Indigenous Peoples, and women in "systemic, ongoing, and violent ways" (McGregor, et al., 2020, p 36). Yet, despite increasing presence of and calls for recognition of these groups, fossil fuel industries have a major presence in international climate negotiations to monitor and influence emissions discussions. Global Witness (2021a) found that fossil fuel lobbyists outnumbered the official Indigenous Peoples' constituency by two to one at the UNFCCC COP in Glasgow in 2021.

Limited or restricted access and rights to land and natural resources

Land rights largely dictate who can do what with natural resources, including using, accessing, consuming, controlling, managing, and leveraging them for economic benefit (Kariuki & Birner, 2021; Khandker, et al., 2020). In many areas, women do not have secure rights to land, which limits their access to natural resources and makes them more susceptible to food insecurity, poverty, and gender-based violence (GBV) as a result of land loss and environmental shocks (Abubakar, 2021; Sida, n.d.). Biodiversity loss and environmental degradation also impact women's access to ownership and control of natural resources, including water, fuel, and food, which contributes to their underrepresentation in management and conservation decisions over those resources (Khadka & Verma, 2012; UN ECLAC, 2021). As stated by Jerneck (2018):

> To fulfil gendered productive and reproductive responsibilities and obligations women may have an interest in, depend on, and manage natural resources while neither having the right to nor being entitled to control these same resources. (p. 410)

Unequal land rights are also linked to social exclusion in community and institutional decision making around priorities and management of natural resources. One study found that involving women in institutional and community management groups would allow for new ideas to be included in discussions and ensure that decisions better reflect the different views and priorities of women and men, leading to outcomes that benefit communities as a whole (Khandker, et al., 2020). These groups are important for determining who has rights to access and use to land and natural resources in communities and how and to what extent conservation measures are enforced, but discriminatory norms and perceptions of women's capabilities means that their priorities are not fully considered in these decisions (Khandker, et al., 2020). Insecure rights limit women's ability and incentive to contribute to biodiversity conservation efforts (Rights and Resources Initiative, 2019; Salcedo-La Viña, 2020), as well as their access to benefits deriving from development and conservation efforts (Box 4) (Facio, 2017; Jerneck, 2018; Vázquez-García & Ortega-Ortega, 2017).

Box 4: Gendered impacts of payments for ecosystem services (PES) programs

Recent studies on PES programs as conservation and ecological restoration strategies reveal the importance of land and resource rights in accessing benefits (Kariuki & Birner, 2021; Loft, et al., 2019; McElwee, et al., 2021). A study on a PES program in Kenya found that payments from tourism revenue on the Mara North Conservancy were distributed through contracts with landowners, and due to gender-based restrictions on land ownership, only 2% of contracts were with women -- mostly widows who often delegated control of payments to male relatives (Kariuki & Birner, 2021). Payments were reportedly used for livestock, labor, food, and school fees and helped ease insecurity during droughts, but women were often unable to make decisions about how money was used or were unaware of payment amounts to determine if there was money left over and what it was used for (Kariuki & Birner, 2021).

Given the risks stemming from restricted rights and access to land, many studies and organizations include recommendations and actions to improve land tenure security through gender-sensitive land reforms (Abubakar, 2021; Ali, et al., 2014; McElwee, et al., 2021; Samandari, 2017), which are also enshrined in significant international guidance and frameworks on sustainable development and resources rights (FAO, 2012; UNDESA, n.d.). However, some advocate that land tenure reform approaches may unintentionally exacerbate power imbalances or erode local claims to land (Kelly & Peluso, 2015; Lemke & Delormier, 2018), particularly for rural and Indigenous women, if local livelihoods and governance rights are not recognized (Larson, et al., 2019; Salcedo-La Viña. 2020). For example, there is sometimes an emphasis on formal land titling as a singular approach to secure land rights, but this approach alone does not necessarily help women exercise greater control over land and secure tenure rights (Salcedo-La Viña. 2020). Women and men in rural and Indigenous communities may not be aware of state-mandated provisions for equitable land tenure (Resources and Rights Initiative, 2019), women attempting to exercise rights to land may face social backlash and violence (Izquierdo, 2017), land titles may exclude women in informal or common-law unions (Ali, et al., 2014), or women may not have required identification to participate in land titling programs (Salcedo-La Viña. 2020). Evidence is also lacking on the extent to which gender considerations in land reform are being implemented, as well as the overall effectiveness of such reforms on progressing equitable land tenure (Ravnborg, et al., 2016). In Nicaragua, for example, despite over 30 years of land reforms, equal land rights have not yet been realized in practice. According to Izquierdo (2017), men in rural areas view bequeathing land to women as a loss of male authority, and in some

cases, women are forced off the land they have rights over or face domestic violence as their husbands assert control over land. This is not the case everywhere, however, and there is some evidence that shows positive gender outcomes associated with land tenure formalization. For example, a study by Ali, et al. (2014) found that a land regularization program in Rwanda improved land access for legally married women and resulted in improved inheritance rights for women. Additionally, the program also had a positive impact on soil conservation investment and management measures (Ali, et al., 2014).

Common land and natural resources

Women's roles in securing livelihoods and their knowledge of biodiversity often rely on their interactions with common resources, such as forests and woodlots, and peripheral species or "in between" spaces that are undervalued economically but contribute to women's independent income and livelihoods (Fortnam, et al., 2019). However, their access to these resources and spaces is often tenuous as they do not have formal land rights and the lands are not highly valued. For example, tree species preferred by men are often prioritized in community forests, while species valued by women and marginalized groups as sources of food, medicine, and income may be destroyed to expand the area available for economically valuable species (Khadka and Verma, 2012). This can change the biological makeup of forests and lead to loss of socially and culturally valuable species (Khadka and Verma, 2012). Many Indigenous and local lands are also used, managed, or governed collectively by communities through customary laws and norms (Oxfam, et al., 2016). While several international human rights instruments recognize the collective rights of Indigenous Peoples to land, territories, and resources, necessary procedures are not always completed to extend recognition at the national level, which can lead to state-led land reform efforts that deny customary rights and displace Indigenous Peoples from their lands (Oxfam, et al., 2016; United Nations Permanent Forum on Indigenous Issues, 2018). This removes a vital source of food security, income, and livelihoods for women and undermines sustainable and culturally rooted land management systems (Larson, et al., 2021; Salcedo-La Viña. 2020). Restricting access to valuable livelihood resources and displacement from land can also occur through the establishment of protected and conserved areas that do not have adequate multiple-use provisions, rights-based stakeholder consultations, and community governance structures (see Box 5) (Perry & Gillespie, 2019; Ramos, et al., 2021; Tauli-Corpuz, et al., 2020). For example, a study of protected wetlands in Cambodia found that women and men in villages surrounding the protected area boundary had to travel further to conduct fishing activities, and women interviewed for the study were unable or less willing to travel far from the village due to fears of theft, harassment, and violence (Perry & Gillespie, 2019).

Box 5: Impacts of protected and conserved areas on land rights, resource access, livelihoods, health and safety

Establishing protected and conserved areas is a key approach to stop biodiversity loss and environmental degradation that is widely supported by international decision-making bodies and conservation organizations (Archibald, et al., 2020; Tauli-Corpuz, et al., 2020). Despite categories of protected and conserved areas that allow for some degree of sustainable, multiple-use of areas (Nigel, 2013), there are studies that argue protected and conserved areas of all categories directly affect land rights and livelihoods of communities, with the potential to foster conditions for increased violent crime and human rights violations that erode cultural traditions and community networks (Gonzalez-Duarte, 2021; Ma, et al., 2019; Ramos, et al., 2021; Tauli-Corpuz, et al., 2020). One case of a monarch butterfly conservation area in Mexico revealed that the reserve reconfigured social dynamics in local communities and augmented power imbalances, allowing criminal networks to thrive and resulting in "coercion and extortion, disappearance, homicide, human trafficking, and illegal logging to clear land for the avocado industry" (Gonzalez-Duarte, 2021, p. 3). Other cases are also coming to light of increased militarization tactics funded by states and organizations in protected and conserved areas that have contributed to systematic abuses and murders of community members and environmental defenders and have led to poor conservation outcomes in the long run (Duffy, et al., 2019; Massé, 2020; Ramos, et al., 2021).

Indigenous and Community Conserved Areas (ICCAs) are increasingly cited as one way to bridge conservation and livelihood goals in protected areas while recognizing the rights and immense contribution that Indigenous and local communities already make to conserving global biodiversity (Ramos, et al., 2021). Yet, there are still gaps and barriers that increase pressure on these areas and undermine the ability for Indigenous and local communities to govern areas effectively. This includes lack of rights protections in national laws and regulations for Indigenous Peoples and limited funding to these protected areas for staff and training, as well as continued and strengthened state support to international conservation strategies that effectively usurp Indigenous-led management approaches (Tauli-Corpuz, et al., 2020; Tran, et al., 2020).

Restrictions to common resources and spaces is not always the result of land formalization, and it may also be driven by internal power imbalances in households and communities. This can affect women's movement, access to natural resources, and autonomous income, particularly when resources traditionally managed by women become more economically lucrative (Gonzalez Behar & Djoudi, 2020), and limit their contributions to sustainable resource management and biodiversity conservation. For example, a study by Cely-Santos and Hernández-Manrique (2021) on post-conflict livelihoods in the Colombian Caribbean found that women experienced restrictions in their movement and limitations to their working areas, which included travel to and use of resources in open fields and forested areas prior to the conflict. Men interviewed for the study explained that they forbid women in their families from going to these areas to protect them from the forms of violence that women endured during the conflict, but the researchers also hypothesize that limiting women's access to productive spaces "could also be seen as a way to reinstall a social order in which women are dependent upon and subordinated to men" (Cely-Santos & Hernández-Manrique, 2021, p. 19). On top of reinforcing and strengthening discriminatory gender norms, the restriction to women's movement and space also contributed to biodiversity loss of wild edible plants, as women could no longer access the plants in fields and propagate them for household consumption (Cely-Santos & Hernández-Manrique, 2021).

Experiences and threats of gender-based violence related to natural resource use and conservation

Environmental shocks and changes to natural resource access increase tension and competition over resources, contributing to food insecurity, poverty, land grabbing, and displacement -- conditions where harmful gender norms can give way to an increase in gender-based violence (GBV)[6] (Boyer, et al., 2020; Castañeda Camey, et al., 2020; Doubleday, 2020; Garnier, et al., 2020; GBV AoR Helpdesk, 2021; Thurston, et al., 2021; Zaman, 2020). For example, in resource-stressed situations, women and girls are still expected to carry out daily tasks related to natural resource management and collection. Women and girls must spend more time completing these tasks face heightened risk of harassment (see Box 6) (Zaman, 2020), and there are cases where women are subject to sexual exploitation to access natural resources (Rao, et al., 2017) or experience domestic violence if they are unable to complete tasks (Castañeda Camey, et al., 2020). In areas where prolonged droughts or other disasters have impacted crop yields, water availability, and other livelihood resources, there is evidence of increased rates of domestic violence and men asserting decision making power over resources traditionally managed by women to cope with losses in income (Castañeda Camey, et al., 2020). There is also growing concern that resource scarcity is driving some families to marry off young girls to ease household resource burdens (Castañeda Camey, et al., 2020; McLeod, et al., 2019).

Box 6: Risks of GBV in daily water collection and efforts to address and minimize risks

Many studies reveal that water scarcity is an amplifier of violence in households and communities, and women take on immense risk as they travel further away from their homes along unfamiliar or unsafe routes to reach water (Castañeda Camey, et al., 2020; House, et al., 2014; Zaman, 2020). For example, a study from Bangladesh interviewed women and men about water collection and climate-driven resource scarcity and found that women faced increased pressure from families and danger to their personal safety while securing water supplies (Zaman, 2020). Men interviewed for the study explained that water collection was the responsibility of women, and if men helped their wives they would be insulted and made fun of by community members, further noting that they did not see issues of GBV in water collection. Interviews with women participants revealed the difficulties and dangers of the task and the cultural stigmas of discussing GBV, sharing stories of violence and harassment from strangers while collecting water, including stalking, verbal threats, and sexual harassment (Zaman, 2020). Research from Pakistan found that criminal networks were diverting government water supplies and selling it to communities at an inflated cost, resulting in women paying more for water and facing violence in households for the increased burden (IDRC, 2017).

As there is relatively more research and understanding of GBV risks in relation to water collection, there are some promising practices to identify, mitigate, and respond to these risks, specifically emerging in humanitarian contexts and sustainable development efforts (House, et al., 2014; Travers, et al., 2011). For example, in 2009, Women in Cities International and Jagori, a women's group in New Delhi, partnered to conduct a women's safety audit for the water and sanitation sector in resettlement areas where women and girls were facing violence and harassment in their daily water collection (Travers, et al., 2011). One of the methods used was a safety audit walk, where service providers, local government officials, and researchers joined women from communities to walk through neighborhoods to water and sanitation facilities to identify the unsafe conditions and hear from the women firsthand. This helped build trust and understanding between groups and revealed to providers and governments the previously overlooked

[6] GBV refers to any harm -- physical, emotional, sexual, verbal, among others -- perpetrated against a person's will based on their gender. Forms of GBV include sexual harassment, stalking, rape, domestic and intimate partner violence, child marriage, human trafficking, female genital mutilation, and other violent acts and threats intended to coerce and control a person (Castañeda Camey, et al., 2020)

dangers that affected the safety and accessibility of services (Travers, et al., 2011).

Political and social marginalization in decision making over natural resources and territories exposes women to forms of GBV and has a detrimental effect on their agency and ability to contribute to conservation efforts meaningfully and safely (Castañeda Camey, et al., 2020). Conservation projects and programs also risk unintentionally exacerbating GBV in communities if local gender dynamics are not thoroughly assessed and integrated (see Box 7) (Doubleday, 2020). For example, establishment of conservation areas can restrict or stop local communities from using natural resources important to maintaining their daily livelihoods and income, leading to increased rates of domestic violence and some cases where women are coerced into sex work to make up for lost income (Castañeda Camey, et al., 2020). Without necessary gender analysis and gender-responsive approaches to shift underlying social norms and gender roles, economic empowerment efforts part of biodiversity conservation can also have unintended consequences on power dynamics in communities and households and potentially increase instances of GBV (Castañeda Camey, et al., 2020; CWEEE, 2020). Some research shows potential reductions in intimate partner and domestic violence as a result of cash transfer and economic empowerment programs, but note that there are also cases of increased household violence where men attempt to reassert power as primary earners; and therefore, methods like gender analysis, gender sensitization, and GBV response strategies are critical for women's safety and meaningfully shifting social norms (Eggers del Campo & Steinert, 2020; Gilligan, et al., 2015).

Box 7: Human-wildlife conflict, gender roles and norms, and GBV

A recent study by Doubleday (2020) reveals how GBV is a hidden cost related to human-wildlife conflict in India where the ways in which patriarchal norms and gender-based discrimination shape use of environmental resources has contributed to GBV in the Sariska Tiger Reserve in Rajasthan. The study explains that nearly two-thirds of India's tiger habitat overlaps with multiple-use forests where humans live and interact with resources: tiger reintroduction is thus a key conservation strategy with numerous social consequences, including restrictions on year-round livestock grazing. Women interviewed for the study note that they continue to go into the reserve and buffer zone for resources -- including to collect fodder for their water buffalo, whose milk is an important source of income and food for families -- spending an average of four hours a day and walking 11km per trip to meet the societal expectations of being "good Indian women." Women found it necessary to risk their own lives by entering the reserve and being exposed to tigers to collect fodder for water buffalo, but they were not willing to risk the lives of water buffalo by bringing them into the reserve to eat. Women also faced risk of punishment from the forest department as their use of the reserve resources was deemed illegal; yet, if they were unable to fulfill tasks, they were subject to verbal and physical abuse within the household. These women were inadequately consulted and have not received sufficient support to address their livelihood needs and safety.

Recognition of GBV and environmental linkages has grown among international environmental and conservation organizations and donors in recent years, with more investments in research, policies, and programs (Castañeda Camey, et al., 2020; GBV AoR Helpdesk, 2021; GCF, 2021; GEF, 2018; USAID, 2020). However, it takes time to translate research into action and there is still very little information on GBV prevention and response strategies specific to biodiversity conservation. This is complicated by the fact that GBV is a highly complex issue and is considered taboo in many societies, and in some areas, gender-based discrimination and violence is normalized, permissible, or seen as a private matter (IUCN, 2020b; Zaman, 2020). This means that people experiencing GBV may not feel safe or comfortable reporting violence, there may be

limited avenues for justice and support services, and if there are not proper response mechanisms in place, projects and programs risk leaving survivors in unsafe situations or exacerbating violence (Castañeda Camey, et al., 2020).

Women environmental human rights defenders

Resource extraction, energy industries, and large-scale agroindustry are major contributors to environmental degradation and are also known drivers of violence against women, particularly women in local communities and Indigenous women (Castañeda Camey, et al., 2020; Rice, et al., 2021). Numerous environmental and human rights defense movements have formed over the decades in response to threats to nature and biodiversity from powerful state and corporate interests (Castañeda Camey, et al., 2020; Ramos, et al., 2021). These movements are often met with violence from state and non-state actors to dissuade opposition and silence dissent (Global Witness, 2021b). This threatens the very lives of those dependent on these resources and undermines the critical contributions of locally driven conservation and sustainable resource management priorities and outcomes.

Women are critical parts of environmental defense movements and face specific forms of violence and harassment that weaponize traditional gender roles and norms (Castañeda Camey, et al., 2020; Tran, 2021). In many societies, women are expected to adhere to and not challenge norms, and women who defend the environment risk violence due to their advocacy in addition to violence, discrimination, ostracization, and criminalization by defying gendered social expectations (Barcia, 2017). Many of these acts are tied to traditional roles that women hold and norms surrounding motherhood and marriage; for example, labeling them as bad mothers or threatening to take their children away (Hurtes, 2018). Other violent responses to women's defense include sexual assault, rape, physical violence, threats to their own and their family's lives, and murder (Castañeda Camey, et al., 2020).

Indigenous women environmental defenders, in particular, face intersecting forms of violence and discrimination based on ethnicity, indigeneity, and gender; and they face additional barriers to accessing justice in response to that violence (Lemke & Delormier, 2018; Ramos, et al., 2021). Violence facing Indigenous women environmental defenders can originate from or be supported (directly or indirectly) by the state and reflect "a legacy of colonization, state violence, oppression, and patriarchy" (Women's Earth Alliance & Native Youth Sexual Health Network, 2016, p. 33). For instance, in many countries, Indigenous Peoples, especially Indigenous women, are not adequately recognized in national census data or do not have access to forms of state identification to access services in response to violence, which reinforces a "nameless and faceless" treatment and dismissal of Indigenous defenders (Barcia, 2017). This contributes to Indigenous Peoples being labelled as anti-development, terrorists, criminals, and "illegal" on their own land, and fosters a culture of impunity for the violence they face (Global Witness, 2021b). Many Indigenous defenders emphasize that exploitation of land and resources also contributes to broader instances of violence in communities, particularly against women where perpetrators are rarely brought to justice. Reports from Indigenous environmental defenders in North America link the increased presence of extractive industries on Indigenous land, with heightened rates of missing and murdered Indigenous women and girls (NDN Collective, 2021). Their disappearances often go under-investigated or dismissed based on historical stereotypes and discrimination (Women's Earth Alliance & Native Youth Sexual Health Network, 2016).

Persistent gaps in discussions, research, and action on gender equality and biodiversity conservation

This section is an assessment of issues and areas that are under-considered or missing from research on gender and conservation as well as an introduction to where gaps persist between topics included in research and the actual implementation of research findings into equitable and just conservation actions. The following gaps were identified based on the literature review, the authors' experiences and knowledge, and focus group discussions with experts. These gaps are by no means exhaustive and require additional research to gain a full perspective of issues and opportunities within the gender and conservation field of work.

Quantitative data connecting gender and conservation

Studies frequently identify the challenge of persistent gaps in gender-related data collection and availability; this data gap risks masking key entry points for improving gender and conservation outcomes (Asher & Varley, 2018; Campbell, et al., 2020; McElwee, et al., 2021; UNEP & IUCN, 2019). Gender data gaps make it difficult to conduct rigorous and quality analyses on gender and conservation linkages, particularly at a global scale, which impedes evidence-driven policy and strategy development (UNEP & IUCN, 2019). This also leads to bias and discrimination in participating in or receiving benefits from projects and programs (Dwyer & Woolf, 2018), undermining the possibility of transformative change (Crawford, 2020; UNEP & IUCN, 2019). According to the 2016 Global Gender and Environment Outlook:

> One of the strongest messages emerging from the body of analyses and reports on the gender-and-environment nexus is the crucial need for gender-disaggregated data. In the absence of such data, environmental analyses remain inadequate and partial, and establishing baselines, monitoring progress and assessing outcomes is almost impossible. (UNEP, 2016, p. 4)

Data related to labor force, resource ownership and access, representation in decision-making, and other areas across various environmental sectors is not always gender-disaggregated or representative of the types of roles, responsibilities, and priorities held by both women and men. UNEP (2016) notes that sectors heavily dominated by women, such as subsistence farming, home food production, and wild food collection, are not collected or valued by national and global datasets despite the importance of these sectors to food security and conservation. Also, in sectors with more data collected and available, the activities and responsibilities of women are often overlooked in data collection efforts (UNEP, 2016). This can give a false impression of who is involved in certain sectors or potentially affected by interventions (Kleiber, et al., 2014). For example, fisheries are often considered a male-dominated sector, with data showing that women hold only 14% of harvesting roles in capture fisheries and aquaculture. However, when considering the entire value chain of fisheries from catch to sale or consumption, women's involvement matches men's involvement (FAO, 2020). By focusing on harvesting roles in data collection and reporting, the gender aspects of fisheries are under-considered in fisheries policies and research (Fröcklin, et al., 2013).

While there is some improvement in availability of data related to environmental sectors, biodiversity conservation, and climate change, "gender analyses of such data are still rare" (UNEP & IUCN, 2019, p. 21) (see Box 8). The ability to fully analyze the linkages between gender and the environment, as well as biodiversity conservation, is a challenge because "[t]he relationships between gender and environment are often manifested over a long time period; in many cases, the available evidence and data do not capture these relationships fully" (UNEP, 2016, p. 10).

Global databases and indices can be useful tools for analysis, but they are limited by the lack of gender-disaggregated data, which affects country coverage and the indicators used and limits the ability to produce representative and cross-national analyses on gender and environment linkages (UNEP, 2016). Defining indicators to act as proxies for complex social and ecological issues like gender inequality, biodiversity loss, and environmental degradation is difficult and lack of data limits the pool of potential indicators for analysis (Boyer, et al., 2020). For instance, common indicators for gender (in)equality include educational attainment, labor force participation, legal rights, and others. However, these indicators do not necessarily account for social bias and discrimination, as the Gender Social Norms Index finds that around 50% of women and men feel that men make better political leaders, 40% feel men make better business executives, and 28% think it is justified for a man to beat his wife (UNDP, 2020). Many datasets that do exist are limited in scope or rely on relatively outdated statistics because the information comes from national statistics institutions and national-level studies that may not have the capacity or resources to provide representative, quality, and timely gender-disaggregated data (Azconca & Duerto Valero, 2018). For instance, the FAO Gender and Land Rights Database collates sex-disaggregated data across five indicators: distribution of agricultural holders, by sex; distribution of agricultural landowners, by sex; incidence of female agricultural landowners; incidence of male agricultural landowners; and distribution of agricultural land area owned, by sex (FAO, n.d.). However, only six countries of the 84 country profiles included in the database have sex-disaggregated data available for all five indicators (FAO, n.d.).

Box 8: Gender and environment analyses

Analyses on gender and environment linkages that were included in the process of conducting this literature review varied widely in their methods, scale, definitions, and findings. While all these analyses attempt to draw conclusions on correlations between gender equality and various environmental issues or sustainability concerns, they are going to be somewhat limited at capturing all the factors that contribute to gender equality and empowerment. Each study makes certain assumptions and justifications about proxies for gender inequality, environment, and other concerns, and indices used in studies have unique methodologies and may weigh variables differently. Finally, none of the studies included in this review focused specifically on gender and biodiversity conservation, making it difficult to include conclusions on the best practices for methods and indicators to analyze these linkages. The following are a few examples of analyses on gender and environment issues and correlations with key details for reference.

A study by Austin and Banashek (2018) analyzed gender inequality and environmental wellbeing for 114 countries with a cross-sectional analysis, using the 2016 Yale Environmental Performance Index for environmental wellbeing; the 2016 WEF Global Gender Gap Index for gender inequality; and data on national GDP, secondary school enrollment, and percent of GDP from agriculture. The study results suggest a statistically significant relationship between gender inequality and environmental wellbeing where nations with higher levels of inequality tend to have lower environmental wellbeing (Austin & Banashek, 2018). The authors note that the study has several limitations, including restrictions on data availability and that the study was a comparison at a single point in time (Austin & Banashek, 2018).

A study by Boyer, et al. (2020), funded by USAID and IUCN, analyzed the linkages between gender inequality, state fragility, and climate vulnerability, for 122 countries. The study developed a “triple nexus” indicator framework using 27 country-level indicators across the three issue areas to determine prevalence scores for each issue area and a total triple nexus prevalence score (Boyer, et al., 2020). The study found that there is a positive, statistically significant correlation between the indicators for these three issue areas, meaning that countries with higher values in gender inequality, state fragility, or climate vulnerability tend to have higher values in other issue areas (Boyer, et al., 2020). The study has certain limitations including limited availability of indicators, use of time-bound data, and lack of data availability

for issue areas and countries (Boyer, et al, 2020).

A study by Ali, et al. (2021) considered the impact of gender equality and environmental degradation on human well-being in Pakistan with a time series analysis, using the UNDP Human Development Index as a proxy for human well-being, the UNDP Gender Inequality Index as a proxy for gender inequality, and CO_2 emissions as a proxy for environmental degradation. The study results showed that gender inequality has a negative, statistically significant impact on human wellbeing in Pakistan and that there is a positive but statistically insignificant relationship between environmental degradation and human wellbeing in Pakistan (Ali, et al., 2021). However, the study did not analyze the relationship between gender inequality and environmental degradation.

A study by Ergas, et al. (2021) considered how different aspects of gender inequality, including percentage of women in parliament, expected years of education for women, and percentage of women in the labor force, affect the carbon intensity of well-being (CIWB), which is an ecological efficiency measure defined as a ratio measuring the amount of CO_2 emitted per unit of life expectancy at birth. The study of 70 countries, including both developed and less developed countries, is unique in that it attempted to assess the relationship between the individual measures of gender inequality with CIWB to understand the types of interventions most advantageous to women and the environment (Ergas, et al., 2021). The study found that in less developed countries increases in the percentage of women in parliament and years of educational attainment reduce the CIWB ratio, meaning that enhancing empowerment in these areas also lessens harmful environmental impacts (Ergas, et al., 2021). The study found that increasing women's participation in the labor force, however, increases the CIWB ratio, particularly in less developed countries, but also notes:

> increasing labor force participation, and potentially creating more exploitative and unequal labor relations, correlates with a declining conversion of environmental exploitation into social well-being. The dimensions of gender inequality are not entirely independent of one another, however, and serve to moderate each other's associations with CIWB. Increasing women's educational attainment and seats in parliament attenuate the relationship between the percent of women in the labor force and CIWB, both across all nations but particularly in [less developed countries]. (Ergas, et al., 2021, p. 19)

Gender indicators in conservation monitoring frameworks are also important to understand gendered access to natural resources, opportunities for equitable engagement, decision-making power, and potential GBV risks (Crawford, 2020; UNEP & IUCN, 2019), as well as how gender roles and responsibilities affect the conservation outcomes of programs. While there are available toolkits and methodologies for identifying gender indicators (CI, 2019; GCF, 2017; GEF, 2018; MFF, et al., 2018; Miletto, et al., 2019), limited capacity to collect and analyze gender-disaggregated data, lack of financial resources, and inadequate baseline data limit the use and usefulness of gender indicators in conservation efforts (Murray, 2019). For example, McElwee, et al. (2021) notes that PES programs struggle to make connections between gender roles and responsibilities to conservation outcomes due to limited data availability and lack of formal guidance for programs. These barriers can also be reinforced by a lack of political and institutional will, awareness, and leadership to address gender that determine priorities for resource use and staff capacity. Additionally, indicators for ecological objectives in programs, such as species composition, do not capture the important intersections of ecological health with social equity (Shackelford, et al., 2013), and indicators proposed by researchers to elaborate on social equity objectives rarely incorporate gender (Kariuki & Birner, 2021).

Internationally agreed upon indicator frameworks related to human development, sustainability, environment, and other areas, such as the Sustainable Development Goals (SDGs) indicator framework, have helped to enhance relevant data collection among national statistics institutions and efforts (UNEP & IUCN, 2019). Yet, gender data gaps persist, and many areas lack integration of relevant gender indicators. A report by UNEP and IUCN (2019) of gender and environment statistics notes that "[t]here is insufficient research and statistical data in relation to natural resources and biodiversity ownership and access rights" (p. 22). The report also mentions that while the SDG indicator framework helped increase attention to critical linkages across sectors for sustainable development, the indicators identified in the framework are not as interlinked, specifically in terms of gender (UNEP & IUCN, 2019). The SDG indicator framework includes over 230 indicators, with 72 gender-specific indicators (Encarnacion & Maskey, 2021) and 93 related to the environment (Conceição, 2020). However, only 30% of the indicators related to the environment have an agreed upon methodology and most lack enough data for analysis on progress (Conceição, 2020). Also, seven of the 17 SDGs, including SDG 14 (life on water) and SDG 15 (life on land) that are critical for biodiversity conservation, do not include official indicators on gender equality (Francescon, 2021), and SDG 5 on gender equality does not include indicators on access to natural resources (Agarwal, 2018). According to experts in a special session at the Gender Summit 21, environmental related SDGs and SDG 5 are not well connected to other goals and suffer from a lack of data, which makes synergies for progress across multiple goals difficult to attain (Francescon, 2021). As of December 2020, only 13% of UN Member States had data for at least half of the SDG gender indicators, and globally, there is still not enough available information for nearly two-thirds of SDG gender indicators (Encarnacion & Maskey, 2021). As SDG targets and indicators are an important global framework that will likely continue to inform global conservation strategies, including the post-2020 global biodiversity framework (UN Women & UNEP-WCMC, 2021), lack of data and integration of critical issues in the indicators are significant barriers in progressing on gender and conservation goals.

However, the collection of gender-disaggregated data and identification of gender indicators is not enough to understand how gender equality and biodiversity conservation influence one another. A study by Asher and Varley (2018) found that among forestry research articles that incorporate gender discussions, many are gender-aware rather than gender-transformative; and they often narrowly define "gender" as meaning "women." They posit that while researchers incorporate or collect sex-disaggregated statistics, there is not a lot of evidence to suggest these statistics are being applied in studies to reveal gendered relations of power and "the underlying social dynamics that create sex-based differences" (Asher & Varley, 2018, p. 14). Critically, there must be available capacity to identify relevant indicators and collect and analyze data (Serrao, et al., 2019), or there is risk that gender indicators are omitted completely or that data collected cannot be applied to activities and analyzed to understand underlying gender inequalities in a meaningful way. As Orr, et al. (2017) explains:

> indicators are influenced by political values and contexts and thus must be selected, measured, collected and analysed with the intention and capacity to be integrated with other data that can be disaggregated by gender. When they are, it is possible to measure gender-related changes in society and the environment over time. (p. 74)

Characterization of gender in conservation

There is a tendency in gender and environmental conservation literature to conflate the terms 'gender' and 'women,' and view women as a singular vulnerable group with fixed roles and experiences (Löw, 2020), or focus solely on sex-disaggregated data without addressing how policies and strategies reproduce gendered power imbalances (Asher & Varley, 2018). This

presents barriers to successful conservation efforts by limiting the agency of women and all people in those efforts and perpetuating colonizer stereotypes of a romanticized “third world woman” (Gay-Antaki, 2020; Tran, 2020).

In the last few years, more published articles in the environmental conservation field have reaffirmed the long-standing arguments of intersectional feminists that gender dynamics cannot be separated from sociocultural dynamics related to race, class, ethnicity, indigeneity, sexuality, age, and (dis)ability (Elias, et al., 2020; Gay-Antaki, 2020; Lemke & Delormier, 2018; James, et al., 2021; Löw, 2020; Ramos, et al., 2021; Rice, et al., 2021). However, there is still a gap in gender and environmental conservation work between identifying these intersectional dynamics and applying gender-transformative interventions that critically address and work to dismantle inequitable and discriminatory norms to effectively engage people in conservation (see Box 9) (Gutiérrez-Zamora, 2021; James, et al., 2021).

Box 9: Defining and measuring gender transformation

In the focus group discussion on gender and conservation facilitated as part of this literature review, several participants noted that a challenge is the lack of a common idea or understanding of what gender-transformative means within conservation projects and programs. In general, gender transformation is addressing the roots of gender inequality by changing social norms, attitudes, and behaviors that allow inequality to persist. Some frameworks and studies define gender transformation within the context of a project or program by outlining approaches that can result in gender-transformative outcomes and ways to measure those outcomes (Hillenbrand, et al., 2015; Morgan, 2014; Ricardo & Verani, 2010). However, some of the experts in the focus group questioned whether gender transformation can be achieved within the relatively short timeline of a project or program, especially as many projects are focused within a community and transformation requires broader systemic change that can take a long time to manifest and cannot easily be traced to the activities of a singular project or program. Nevertheless, there was agreement that projectized funding is not conducive to embracing gender transformational approaches, as the way many projects and programs define gender indicators is focused on upward accountability to donors. A participant emphasized that conservation projects and programs need to be considered as one part of a broader movement towards gender equality by prioritizing collaboration and knowledge sharing with other projects and programs to strengthen existing networks and build on outcomes as one project is unlikely to achieve transformative change.

Sexual and gender minorities

In many societies, arrival of colonial forces and ruling powers enforced white, Christian, heteropatriarchal ideals on gender, sex, and sexual orientation and (re)structured cultural gender dynamics and relations (Biswas, 2019; Omowale, 2021). This resulted in laws and norms that subject anyone not fitting those ideals to discrimination and erasure, including through criminalization, state-sanctioned surveillance, restrictions to freedoms, social ostracization, and violence (Biswas, 2019). Many of these laws are still in place and the current prevalent understanding of gender roles and norms is rooted in this history, leading to ongoing discrimination and political marginalization of sexual and gender minorities (see Box 10) (Mendos, et al., 2020). Restricted access to essential services, healthcare, and resources limits the agency of sexual and gender minorities, contributes to precarity of their livelihoods, and reduces their resilience, particularly in response to climate and environmental shocks and stressors.

Box 10: Sexual and gender minorities - A note on terminology

Binary classifications of gender (woman and man), gender expression (feminine and masculine), sex (female and male), and sexual orientation (heterosexual and homosexual) do not capture the vast diversity of human relationships and experiences with these terms. For all human history, societies around the world have recognized, respected, and revered the existence of orientations, identities, expressions, and characteristics beyond these binaries (PBS, 2015; Urquhart, 2019). For instance, *fakaleiti, metis, hijra, quariwarmi, winkte*, and *ninauposkitzipxpe* are just a few of the many terms used to describe gender identities, expressions, and sexualities around the world, but each are rooted in a specific cultural understanding that may not translate to Euro-American terms, such as transgender, gender non-conforming, non-binary, lesbian, gay, bisexual, androgynous, masculine, and feminine, among others (UN Free & Equal, n.d.; PBS, 2015). For this reason, the acronym SOGIESC -- sexual orientation, gender identity and/or expression, and sex characteristics and its variants (SOGI and SOGIE) -- are increasingly used among international organizations and decision-makers to better represent the diversity of terms used by people in relation to these identities. As everyone has SOGIESC, it is not an acronym that can alone stand in for people who have one or more SOGIESC that lie outside of what is socially accepted. For this reason, the term “sexual and gender minorities" is also used, including in this literature review, to denote power imbalances in political and social access and mobility between those with normative SOGIESC and those with one or more SOGIESC that are considered outside the norm (Dwyer & Woolf, 2018).

Sexual and gender minorities may face challenges in obtaining formal identification and documents that match their gender identity or expression, making them more vulnerable to social discrimination and harassment in accessing housing and employment and benefitting from programs (Dwyer & Woolf, 2018; Knight & Sollom, 2012). For example, one report revealed that transgender people in Nepal faced discrimination when collecting relief in the aftermath of disasters, with reports of people “removed from the relief beneficiary list because the distributors didn’t approve of their appearance” (Brown, et al., 2019). They may also be barred or discouraged from accessing certain services, such as healthcare, that require disclosure of identity for fear of facing violence and discrimination (Littlejohn, et al., 2019). One study of violence against gender and sexual minorities in nine African countries found that 56% of participants had experienced some form of physical or sexual violence in their lifetime, but that violence prevention and support services were usually not accessible to them (Müller, et al., 2021).

Research on sexual and gender minorities related to areas of environment and climate change tends to be focused on disaster risk reduction and humanitarian response (Anschell, 2021; Dwyer & Woolf, 2018; Gaillard, et al., 2016; International Gay and Lesbian Human Rights Commission & SEROvie, n.d.). The concerns facing and opportunities for including sexual and gender minorities are often completely omitted from gender and conservation research (Lawless, et al., 2021), with some exceptions for movements and discussions specific to the United States and Canada (Bergan, 2019; Dazé & Mehindiratta, 2021; Leslie, 2019; Sbicca, 2012). However, there is an opportunity to learn from these other areas and apply frameworks for improving the knowledge base on sexual and gender minorities in conservation strategies. Discrimination and violence facing sexual and gender minorities, as well as their capacity to contribute to and lead solutions, should not be overlooked in conservation and broader environmental research and action, including toward realizing global gender equality and sustainable development (Stonewall International, n.d.).

Men and masculinity

Societal expectations of men and social norms surrounding masculinity affect conservation and gender equality, and in some cases can affect how research is conducted and the effectiveness of conservation strategies (Siegalman, 2019). Articles often focus on linkages between pervasive patriarchal structures and societal expectations of what it means to be a man (with value placed on traits associated with dominance, violence, and aggression) with ecological destruction and climate change, noting that pro-environmental behaviors and views are associated with femininity (Brough & Wilkie, 2017; Pease, 2019). For instance, some research notes that constructions of masculinity lead to men engaging in physically demanding and dangerous economic activities and enduring violence to prove their manliness, which can result in activities that exploit resources and degrade ecosystems (Paulson, 2017).

However, the gendered experiences and vulnerabilities of men and masculine behavior are not always fully explored in gender and conservation literature (Rao, et al., 2017), with "little consideration of what it means for men and how they perpetuate, accommodate to, or resist environmental destruction" (Pease, 2019, p. 118). Solely framing men as at fault reinforces their absence and limits their agency in meaningfully contributing to questioning, challenging, and addressing gender inequality (Lawless, et al., 2021), which ultimately allows discriminatory gender norms to remain unchallenged. It also overlooks other social and environmental impacts stemming from masculinity that are often under explored in literature, including how men are affected by environmental degradation and how their attempts to cope with pressures to fill socially prescribed roles for men and masculinity impact gender equality and conservation (Paulson, 2017). Additionally, this framing diminishes the gendered knowledge that men have on natural resource use and management (Colfer, 2021), which in many ways have been pushed aside by increased focus on expansion of exploitative environmental activities to meet global economic demands (Paulson, 2017).

In many societies, norms and stereotypes surrounding masculinity do not encourage men to express emotional and physical vulnerability, which suppresses their genuine reactions, concerns, grief, and fears about environmental degradation and impending ecological crisis (Pease, 2019). This can lead to denial, hopelessness, and misplaced blame, and as stated by the MenEngage Alliance (2020), "men's sense of powerlessness and pain are, paradoxically, caused by their own socially sanctioned power." Inability to meet expectations and provide for families contributes to self-destructive behaviors, negative coping mechanisms, and forms of GBV in response to socio-ecological changes, such as crop failure, climate-related disasters, and conflict (Castañeda Camey, et al., 2020; Massé, et al., 2021; Rao, et al., 2017). For instance, certain environmental crimes, such as poaching, are lucrative sources of income for young men facing pressure to provide for families; they are also extremely dangerous for their personal safety and have significant impacts on communities, ecosystems, and biodiversity (Castañeda Camey, et al., 2020). Presence of heavily militarized rangers and other poachers mean that men risk being harmed or murdered in their attempts to earn income (Ramos, et al., 2021), leaving behind wives and families with increased vulnerability to poverty and livelihood loss. Other studies show that financial pressures from environmental degradation can also contribute to increased rates of suicide among men; this is the case in India, where an average of 28 farmers die by suicide every day (Shhivji, 2021).

It is important to note that men are not a homogenous group and masculinity is not always solely a trait of men nor the same across geographies and spaces. When exploring linkages to conservation, it is necessary to consider intersecting dynamics, including those related to race, caste, class, indigeneity, sexuality, age, and (dis)ability (Colfer, 2021). Not doing so is a common mistake across gender and conservation literature in general, which tends to ignore that gender

is relational and stops at “integrating women but ignoring gender” (Jerneck, 2018, p. 409). According to Paulson (2017):

> studies and policies that lump all the world’s people into two essentializing categories -- man versus woman -- can miss important variations within those categories and perpetuate unfounded stereotypes… It also constrains efforts to describe empirical realities observed in diverse contexts and fails to resonate with people living in non-dominant identities in every cultural context. (p. 210)

Indigenous Peoples’ rights and leadership in conservation

There is significant evidence that environmental degradation risks the health, safety, livelihoods, and culture of Indigenous Peoples (Garnier, et al., 2020), and that Indigenous-managed lands are characterized by better ecosystem health and higher levels of biodiversity (Garnett, et al., 2018; Rice, et al., 2021; Schuster, et al., 2019). Artelle, et al. (2019) emphasizes that much of the land and seas that are targeted for conservation reside in Indigenous territories; and therefore, “augmenting conservation within them will increasingly not be possible, justified, nor legal without Indigenous consent and partnership” (p. 1). Indigenous women are often cited in biodiversity conservation literature as critical holders of biodiversity knowledge, including as related to techniques, uses, and conservation methods for various species critical to daily life and cultural and spiritual practices (Khadka & Verma, 2012).

Nonetheless, Indigenous women and men are often overlooked, or their roles diluted in gender and environmental conservation research and strategies, and many governance and policy-making bodies do not value Indigenous Peoples, especially Indigenous women, “as equal, autonomous, political actors within the conservation world,” which “influences how conservation decision-making at the state and international levels plays out, notably in international arenas” (Picq, 2021, p. 5). This has led to strategies that falsely reconceptualize Indigenous relationships with nature and culture (Toivanen & Fabritius, 2020), enforce outsider perspectives of sustainability and restrictions on traditional practices and sacred spaces (Fernández-Llamazares & Virtanen, 2020), bias in knowledge valuation and research (see Box 11), and position Indigenous women as vulnerable parties in relation to environmental degradation and climate change. As Löw (2020) remarks:

> The picture of vulnerable indigenous women eclipses structural causes for their disadvantaged situation such as capitalist development and modernity, based on use of fossil fuels, unsustainable production and consumption, liberal individualism, patriarchy and internal colonization within nation states. (p. 94)

Box 11: Bias against Indigenous language and knowledge in ecology and conservation research

Ecology and conservation literature is dominated by authors and scholarship from the Global North (Apostolopoulou, et al., 2021; Trisos, et al., 2021), and in many cases, peer-reviewed journals limit publication to written materials, excluding important conservation and ecological knowledge embedded in Indigenous oral teachings (Kornei, 2021). While there are efforts to increase recognition and respect for Indigenous oral teachings in academic literature (see Kornei, 2021), use of these efforts among conservation literature is very limited. English is also the primary form of knowledge communication in science publications, which, according to Trisos, et al. (2021), makes it “easy to forget that for the majority of people ecological knowledge is produced and tested in other tongues” (p. 1206). Trisos, et al. (2021) also offer this example as a way to highlight what context and knowledge is lost when translated to English:

> the separation of rational self (culture) and wild nature in English language thinking is a result of post-Enlightenment rationality as an historical process, and is sociological and cultural, not empirical. In contrast, nature is relational in many other languages. For example, the isiXhosa root word for the environment is difficult to translate into English. *Indalo* means both creation and nature. *Kwezendalo* means of or in the environment. *Umdali* is the creator. The implication is that people (*abantu*) are located within the environment. (p. 1206)

These ways of gathering and communicating research on conservation and ecology contributes to a bias against Indigenous knowledge in publications and conservation priorities, which can lead to erosion of cultural, spiritual, and ecological practices and knowledge. For instance, a study of maps used for nomination and management of UNESCO World Heritage sites found that bureaucratic heritage maps do not emphasize or have methodologies in place for presenting the significance of Indigenous toponyms, and represent names as "static, inanimate objects void of meaning" (Palmer & Korson (2020, p.183). Another key issue in conservation and ecology literature is access to research articles, where under-funded institutions cannot obtain scientific publications behind paywalls or ecological data collected in the Global South that are stored in private servers in the Global North (Trisos, et al., 2021).

The issue of bias against Indigenous knowledge and teachings was also reflected in focus group discussions on decolonization and conservation conducted as part of this literature review. Participants noted that there can be a misperception that research has not been done when it does exist but is published in local non-English languages. This can lead to duplication of work, dismissing local research efforts, and result in research fatigue among Indigenous communities if they are continually asked to share information with various research initiatives, often without compensation. Participants also spoke on the inclusion of Indigenous spiritual practices and oral teachings in conservation research and actions, sharing stories of being told that there was not time to conduct a ceremony before scientific review panels and experiences of Indigenous spiritual beliefs around connections between nature and healing being dismissed.

Conversely, more recent studies are attempting to couple vulnerability with empowerment of Indigenous women, but top-down conservation strategies risk characterizing them as "quasi natural agents of change," which increases their responsibilities and burdens to sustain the environment "without any fair increase in economic benefits, representation and rights" (Löw, 2020, p. 94). This can also result in conservation efforts that see Indigenous women and men as sources of labor, knowledge, and legitimacy for international conservation organizations, which further entrench power imbalances and commodification of Indigenous knowledge, lands, and territories (Rubis & Theriault, 2020). Even well-intentioned conservation strategies led by international organizations operate via a global discourse that determines conservation priorities for the global South, which many argue are steeped in colonialist and capitalist regimes that displace and harm Indigenous and local communities (McGregor, et al., 2020; Rubis & Theriault, 2020).

Many researchers and activists focused on Indigenous rights are critical of conservation strategies that promote the empowerment of Indigenous women through their participation in capitalist markets (Altamirano-Jiménez, 2013; Gutiérrez-Zamora, 2021; McGregor, et al., 2020). Powerful global economic interests drive rapid environmental degradation through unsustainable expansion of extractive industries and large-scale agribusiness, which promote and reinforce power asymmetries, displace local and Indigenous communities, exacerbate GBV and poverty, and degrade environments and natural resources (Castañeda Camey, et al., 2020). Aligning solutions with these same interests risks over-relying on economic interventions to "empower" and "liberate" Indigenous women without recognizing how such interventions uphold structures of inequity and create new or exacerbate existing risks (Gutiérrez-Zamora, 2021).

Decolonial approaches to conservation

Violent colonialism was and still is a major cause of environmental degradation, with settler priorities determining land and natural resource management and use based on efforts to prepare land for settlers and global economic systems that depend on natural resource extraction (Anseeuw & Baldinelli, 2020; Collins, 2019; Liboiron, 2021; Rubis, 2020; Trisos, et al., 2021). These political and market-driven priorities of colonial powers are embedded into how ecological science and conservation are understood and researched today, with conservation priorities drawing from Western scientific notions of environmental control, including by "dispossessing colonized peoples of their land and ways of life and discounting existing knowledge systems" (Trisos, et al., 2021, p. 1205). Historical effects and ongoing colonization of Indigenous land and territories through conservation efforts uphold power imbalances and halt progress on solutions rooted in solidarity (McGregor, et al., 2020; Rubis & Theriault, 2020). Nixon (2015) challenges settler environmental movements that attempt to appropriate Indigenous women's environmental knowledge while ignoring historical and ongoing colonization of Indigenous territories. Nixon (2015) states:

> Indigenous self-determination and the return of stolen Indigenous lands are essential to the reclamation of Indigenous knowledges. Separating Indigenous knowledges from their political contexts only reinforces the denial of Indigenous genocide within these territories on which the settler state legitimates itself.

Increasingly, conservation practitioners and scientists are recognizing the need to shift colonial priorities in conservation efforts, but there is misunderstanding and misappropriation of what decolonization means and what conservation organizations should or can do in terms of anti-oppressive and decolonial practices.

A seminal article by Tuck and Yang (2012) states that decolonization means bringing "about the repatriation of Indigenous land and life; it is not a metaphor for other things we want to do to improve our societies" (p. 1). By stating that decolonization is not a metaphor, Tuck and Yang (2012) challenge the tendency of movements to misappropriate the words "decolonize" and "decolonization" into existing frameworks for human rights, gender equality, and biodiversity conservation as synonyms for inclusive methodologies and approaches when these words have specific meaning. Appropriating this terminology and uncritically applying it to efforts that do not have the goal of repatriating land to Indigenous Peoples and have previously ignored or silenced Indigenous Peoples is a form of colonialism -- reinforcing oppressive structures and recentering settler ideals and priorities (Tuck & Yang, 2012). Decolonial approaches in conservation efforts must confront past and existing policies, methods, and structures that have perpetrated colonization and placed higher value on the ideals of Northern NGOs and perspectives over that of local movements builders and Indigenous Peoples (Doane, 2019; Domínguez and Luoma, 2020; Mabele, et al., 2021). For instance, practices such as REDD+ and militarized anti-poaching operations are steeped in colonial legacies that restrict and demean Indigenous knowledge and practices with natural resources (Collins, 2019; Trisos, et al., 2021). Decolonial approaches to conservation "demands a re-framing of conservation and efforts for nature prosperity in non-Western perspectives" (Mabele, et al., 2021), recognizing Indigenous knowledge as expertise (Liboiron, 2021), and embracing actions that are negotiated, participatory, and widely owned (Global Fund Community Foundations, 2019). Importantly, Menton and Gilbert (2021) state that decolonial approaches from international conservation organizations and actors requires them to:

> recognise their complicity [in colonization] and begin to build decolonial, respectful and equitable relationships with grassroots movements and communities that fight to protect lands, forests and waters from invasion by extractive industries and thereby protect the

> wildlife and ecosystems that BINGOs [big international non-governmental organizations] aim to conserve. (p. 28)

Liboiron (2021) emphasizes that investigation of scientific and research practices is necessary and offers this critical thought:

> We should accept that sometimes the anticolonial move is to stop. To not do the research if you don't have permission from Indigenous people and governing bodies. To not propose research with Indigenous groups or on Indigenous land unless you've been explicitly invited by those groups. To not use the sample extraction method that creates toxic chemicals that require land to absorb. To stop carbon-intensive research that directly impacts Arctic and other Indigenous peoples. All forms of ceasing or mitigating the entitlement to Indigenous life and land are anticolonial science, and can be practiced by anyone. (p. 876)

Enabling factors for mutual progress on gender equality and biodiversity conservation

Drawing from the literature and focus group discussions, the following enabling factors have potential to facilitate addressing the factors that constrain mutual progress on gender equality and biodiversity conservation toward closing the gaps discussed in the sections above. The focus group discussions yielded more insights than are listed below, and images from the groups' inputs can be seen in Annex 1. It is important to note that these are not exhaustive, but based on the review of literature and the identified gaps, with many areas overlapping, and/or a specific effort can catalyze additional enabling conditions. Enabling factors will also be different across societies, geographies, landscapes, and sectors, and the ones outlined here are intended to serve as entry points for further exploration into context-specific needs, particularly as the CARE-WWF Alliance continues to center work in this area.

Embed gender-responsive and -transformative approaches and metrics at every stage of conservation research policies, programs, and projects. This point was emphasized in focus groups and the literature as an important way to generate evidence of the critical linkages between gender and positive conservation outcomes (Davies, et al., 2018; James, et al., 2021). One participant in the focus groups noted that unless a conservation project is designed to be gender-transformative from the beginning, then it is extremely unlikely to produce meaningful transformative outcomes and nearly impossible to produce lessons and best practices to inform future interventions. Some considerations for furthering research and processes to enable this factor include:

- Collect, analyze, and use data on areas of natural resource use and management dominated by women that are under-considered in current data collection efforts, such as home food production and wild food collection, and the impacts on conservation and wellbeing.

- Document different processes and outcomes between gender-blind, gender-neutral, gender-sensitive, gender-responsive, and gender-transformative approaches, including what efforts worked, why, and how, and what didn't work; what would enable replication in future interventions.

- Ensure that considerations on gender in conservation do not only focus on the issues facing and considerations for empowering women but also integrate men and

masculinities, including by understanding the priorities, concerns, and views of men and boys; addressing harmful masculinities in natural resource use and management; and engaging men and boys in gender equality.

- Research topics and issues under-considered in current gender and conservation literature, including issues facing and opportunities for engaging gender and sexual minorities in natural resource use and management.

- Build knowledge base on GBV and biodiversity conservation (and degradation) linkages by developing and integrating GBV prevention and response strategies, collecting and analyzing relevant data, and conducting research on GBV drivers and considerations in conservation (e.g., implications of environmental degradation and natural resource scarcity on child marriage, unintended impacts on GBV stemming from biodiversity conservation approaches and strategies to mitigate and respond to risks, and violence affecting women environmental human rights defenders).

Prioritize conservation approaches that are inclusive, community-led, and adapted to the specific cultural context. Formulating solutions to biodiversity loss and environmental degradation requires attention to gender and social dynamics unique to every society and groups in order to develop context-specific approaches and community-centered conservation (see Box 12) (Armitage, et al., 2020; Bialostocka, 2021; Garnier, et al., 2020). Some considerations for this enabling factor include:

- Map and involve a wide range of diverse stakeholders in program and project design, implementation, and monitoring and promote engagement (with supported capacity building for stakeholders) with decision-making, governance platforms, and institutions at all levels (Fröcklin, et al., 2013; Ravnborg, et al., 2016). This can include developing a framework for inclusive stakeholder engagement (beyond one-way communication) and multi-stakeholder forums, and accountability mechanisms to ensure this approach is undertaken in projects (see Evans, et al., 2021).

- Engage local women's groups and associations and feminist organizations, such as national gender ministries, women's and gender minorities' rights organizations, women's resource management groups, human rights advocates, etc., to critically assess and address local gender inequality patterns. These groups can help engage directly with local stakeholders, community leaders, and build trust to ensure that conservation and gender equality efforts are grounded in localized context (Acosta, et al., 2021; Durán-Díaz, et al., 2020; Garnier, et al., 2020).

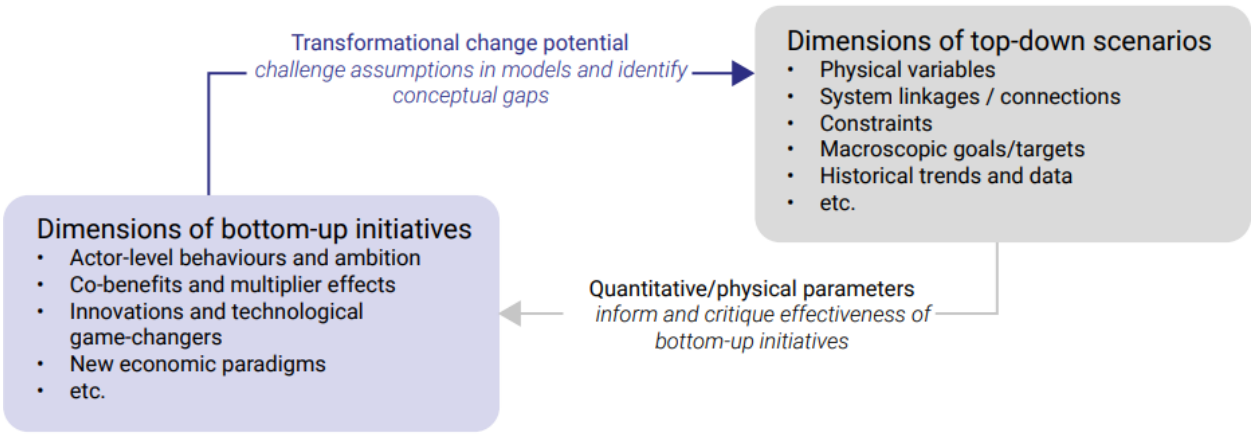
- Connect positive aspects of top-down and bottom-up approaches in conservation (see Figure 1), and prioritize co-design, co-management, and co-production principles, including "by focusing on pressing societal problems at a scale that intersects interests of both local communities in a particular region and large-scale observing efforts" (Eicken, et al., 2021, p. 480).

Box 12: Five principles of community-centered conservation governance for the post-2020 framework

An article by Armitage, et al. (2020) explains that strategies to address biodiversity loss and environmental degradation must be place-based and consider socioeconomic aspects, political circumstances, and wellbeing of communities. The authors therefore define five governance principles for community-centered conservation as necessary parts of the post-2020 global biodiversity framework (see Armitage, et al., 2020 for additional information on each principle):

1. Build multilevel networks and collaborative relationships needed to coproduce conservation solutions that provide social and ecological outcomes.
    a. This includes respecting agency and self-determination, encouraging coproduction of knowledge and solutions through relational and networked approaches to conservation, engaging with local leaders and groups to build trust, and stimulating communication among community members and between communities and external partners.
2. Promote equity and opportunity for all, recognizing specifically the role of women as agents of change in community-centered conservation.
    a. This includes understanding cultural and context-specific challenges and concerns of women, involving women in identification and analysis of conservation measures, ensuring that 'solutions' do not take away livelihood practices, engaging men in awareness raising and solutions, involving women in the bio-economy, and paying further attention to intersectionality to overcome structural barriers in conservation.
3. Reframe conservation action through the lens of reconciliation and redress (e.g., injustices from land grabs and territorial enclosures).
    a. This includes creating an enabling environment for Indigenous Peoples and local communities by addressing questions (i) What do communities expect from redress? (ii) What do different governance actors understand by restorative justice? (iii) What potential remedies could be explored to reconcile tensions? (iv) What is needed to gain the trust and co-operation of Indigenous Peoples and local communities who are crucial partners in the global conservation project?
4. Adopt a rights-based approach to conservation action in which community access and decision-making autonomy are emphasized.
    a. This includes clearly defining access and decision-making rights to improve transparency, recognize diverse stakeholder interests, foster custodianship, reduce conflicts, and drive implementation of conservation. The authors note that appropriate processes and mechanisms are context specific and emphasize a shift in the conversation from "if" processes are necessary to "how" they can be achieved.
5. Revitalize the customary and local institutions that provide legitimate adaptive strategies for the stewardship of biodiversity.
    a. This includes identifying and engaging customary institutions in projects and programs to better understand the practices and norms that dictate value and conservation of ecosystems and biodiversity.

FIGURE 1: Conceptual framework for mutually beneficial feedbacks between top-down and bottom-up approaches to generating sustainable scenarios



Source: Pereira (2019)

Advocate for the global biodiversity agenda to be more ambitious in making gender-inclusive decisions. The interconnected crises of climate change and nature loss have exacerbated gender inequality and the impact of environmental degradation on women. Despite ongoing efforts, nature is in steep decline, also undermining efforts to tackle the climate crisis. The UN Convention on Biological Diversity's (CBD) COP15, scheduled to take place in Kunming, China in 2022, presents a once-in-a-decade opportunity to secure an equitable, nature-positive, and net-zero emissions world for all, and to address biodiversity crisis and gender inequality at the global level.

Government parties negotiating the Post-2020 Global Biodiversity Framework (GBF) under the CBD are gathering in Geneva on 13-29 March 2022 for the final Open-Ended Working Group meeting. They will discuss the first draft of the Post-2020 Framework to be adopted at the CBD COP15 meeting mid-2022 in Kunming. This is a rare and momentous opportunity for governments to agree on ambitious outcomes at the CBD COP15 that will have impacts on nature and people for decades to come. Equally so, COP15 meeting presents a momentous opportunity to agree on the Post-2020 Gender Action Plan, and to ensure that gender-inclusive decisions are strongly featured in the global biodiversity agenda. Some considerations for this enabling factor include advocacy for the CBD to:

- Revise the current draft of the Global Biodiversity Framework to adequately address gender-responsive actions and relevant indicators.
- Adopt a new stand-alone target "to ensure equitable access and benefits from conservation and sustainable use of biodiversity for women and girls, as well as their informed and effective participation in policy and decision-making related to biodiversity (UN Convention on Biological Diversity, 2020)"

Confront internal and external practices that contribute to colonization and embrace decolonial approaches in conservation research, policies, programs, and projects. The leadership of Indigenous women and men and their rights to land and territories are critical for decolonial approaches in conservation. Strategies are required to redress injustices and harm against Indigenous Peoples, including forced displacement and erasure of knowledge and culture in conservation actions, to work toward embracing decolonial conservation policies, programs, projects, and research rooted in solidarity (see Box 13). Some considerations for this enabling factor include:

- Critically reflect on how current efforts perpetrate harm against Indigenous Peoples, reevaluate roles in leading conservation efforts, and revise institutional strategies and goals to embrace decolonial approaches.

- Identify internal needs and opportunities to embed decolonial approaches to research, policies, programs, and projects within conservation institutions, including through listening and learning workshops, allyship and unconscious bias training, and identification and trust building with local organizations and movements.

- Build internal capacity on decolonial literature and approaches to conservation, including systems thinking and awareness to embrace and find mutual pathways for bridging between and coexistence of Indigenous and non-Indigenous worldviews (see Goodchild, et al., 2021).

- Build mutually respectful partnerships and acknowledge, communicate, engage, and work with local leaders and movements, valuing their perspectives, needs and approaches. This includes valuing and paying for local and national expertise, designing and implementing strategies in equal partnership with communities, defining timelines and reporting with partners, asking questions about local priorities and bringing in local partners to help meet them, ensuring continuous engagement with communities throughout iterative learning processes and approaches.

- Listen to, understand, and prioritize how people envision, perceive, and think about decolonial approaches in gender and conservation work, as this may change across contexts, cultures, and communities.

- Work with local gender-focused organizations and groups to determine what issues are facing sexual and gender minorities in relation to environmental degradation.

- Engage local gender-focused organizations and human rights groups to collect data, analyse and frame gender issues and considerations within the local context, including considerations facing sexual and gender minorities in communities.

- Conduct research with feminist and Indigenous-led groups and organizations to better understand the impact of colonialism on gender identity and sexuality, identify conflicts of Western norms and approaches on gender equality with Indigenous communities, and increase awareness and action on the intersection of these identities and equity approaches with biodiversity conservation (e.g., FRIDA, ILGA, etc.).

- Collaborate with groups focused at the intersection of gender identity and sexuality to determine best practices and strategies for framing gender in a more inclusive, decolonial way (e.g., ILGA, OutRight International, Arcus Foundation).

Box 13: Five anti-oppressive shifts for more ethical ecological practice

An article by Trisos, et al. (2020) considers how ecology as a discipline has been chapped by exclusionary Western approaches and outlines five necessary shifts to address colonization in ecology. The authors emphasize that these are not a checklist, but are positive interventions to "promote ways of knowing and practicing ecology that are more creative, reflective, equitable, inclusive and effective" (Trisos, et al., 2020, p. 1207):

1. 'Decolonize your mind' to include multiple ways of knowing and communicating science;
2. 'Know your histories' to acknowledge our discipline's role in enabling colonial and ongoing violence against peoples and nature, and begin processes of restorative justice;
3. 'Decolonize access' by going beyond open access journals and data repositories to address issues of data sovereignty and the power dynamics of research ownership;
4. 'Decolonize expertise', by amplifying diverse expertise in ecologies and giving due credit and weight to that knowledge; and
5. 'Practice ethical ecology in inclusive teams', by establishing diverse and inclusive research teams that actively deconstruct biases so all team members are empowered participants in developing new knowledge.

Annex: Focus group discussions

Three focus group discussions were held with experts as part of this literature review. Two focus groups focused on decolonial approaches in conservation and one focused on gender and conservation. Each group was held via Zoom and utilized Jamboard as a way to share thoughts around guiding questions.

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