



Perspective

When solutions to the climate and biodiversity crises ignore gender, they harm society and the planet

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ABSTRACT

Global warming and biodiversity loss continue to increase, and the environment is being degraded faster than at any time in history. At the same time, it will take generations, if ever, to reach gender parity. These issues are all connected. Women and girls, particularly in low-income countries, are disproportionately harmed, yet remain underrepresented or entirely absent from the spaces that shape the global climate and biodiversity agenda. We argue that this is a failure of leadership and science and delivers serious injustice and harm to women and the environment. In this paper we explore the case of gender inequity within market-based responses to these crises, including carbon-offsetting and biodiversity conservation. We present evidence that reveals how market-based solutions primarily benefit men, especially rich and powerful men in high income countries, whilst ignoring and minimising rights, interests, and lives of women, primarily those in low-income countries. We highlight that to have any chance of being equitable, market-based climate and biodiversity solutions must also consider gender at their core. It must be intentional. We make recommendations to address gender-based injustice through both reform and radical change.

1. Overview

Global warming and biodiversity loss continue to increase, and the environment is being degraded faster than at any time in history (CBD, 2022). In this perspective article we argue that although the biodiversity and climate crises are universal, solutions and impacts are highly gendered. We further argue that failure to share power with women in shaping the global climate and biodiversity conservation agenda is not only a failure in governance and science, but also perpetuates injustice and harm, as well as ensuring these crises continue at alarming rates.

At the local level, many women's lives, livelihoods, and aspirations are disrupted and/or harmed by climate and biodiversity agendas that continue to ignore this (James et al., 2021). We use the term “women” to include cisgender women, transgender women, femme/feminine-identifying, genderqueer and nonbinary individuals. Women – and girls – in low-income countries make up to 80 % of those directly forced to migrate due to environmental degradation and climate change

impacts (Habetzion, 2016). In stark contrast, wealth, science, and global leadership are dominated by men from high-income countries. For example, over 85 % of environment ministers are men and in 2022, at COP27 (United Nations Climate Change Conference of the Parties), just seven of the 110 world leaders present were women (United Nations, 2022). This is a justice issue. When women remain underrepresented – or entirely absent – they are unable to directly influence decision making, design, and deployment of solutions to the biodiversity and climate crises that directly impact them.

To demonstrate this injustice, we explore the case of market-based responses to these crises, including offsetting both carbon and biodiversity. While such initiatives have now come to dominate as a solution, there is little acknowledgement of how they may perpetuate gender inequity (Arora-Jonsson and Gurung, 2023). The results of this, we argue, is that initiatives which rely on markets – now widely championed by nation states, the private sector, international non-government organizations and the United Nations Framework Convention on

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Climate Change (UNFCCC) – still primarily benefit men, and especially wealthy white men in high-income countries. Meanwhile, the rights and interests of women, and primarily women of colour in low-income countries - whose lives and livelihoods are most directly implicated by market-based carbon and biodiversity initiatives – are secondary or absent.

As scholars and practitioners – especially those of us in high-income countries – we must actively challenge the current systems of gender and power inequity that dominate research and decision-making, and that result in inequitable market-based responses to these crises. In attending to this responsibility, we recommend actions to address gender-based injustice around market-based climate and biodiversity initiatives. This includes widening the space to include women in meaningful ways in current market-based systems, as well as supporting more radical steps that dismantle the patriarchal and colonial systems that these solutions are based within. In so doing, we ask what success might look like if women, and most importantly women in low-income countries, have true agency in developing solutions to our biodiversity and climate crises.

2. Powerful men are largely setting the climate and conservation agenda

The evidence is clear. Despite the benefits of achieving gender equity, progress is slow, with some metrics even slipping backwards (World Economic Forum, 2022). At current rates, it will take over 130 years, if ever, to fully address equity for women (Holman et al., 2018; World Economic Forum, 2022). Although we refer to gender in binary terms (women/men), we acknowledge that this is not the lived experience of many. Our use of the term “women” includes cisgender women, transgender women, femme/feminine-identifying, genderqueer and nonbinary individuals, who are all at greater risk of gender-based inequity and discrimination (Thorne et al., 2019). We further recognize that non-binary individuals face even greater challenges than cisgender women in societies and systems structured around binary gender identities (Matsuno and Budge, 2017).

Across civil society, the corporate sector, and government, the failure to achieve gender parity persists. At the start of 2023, only 17 countries in the world had a woman Head of State, and the world's ten richest people were all men (United Nations, 2022; Visual Capitalist, 2023). As well as having outsized impacts on climate emissions, the superrich have extreme political and corporate influence in how we prioritize or address these issues (Barros and Wilk, 2021; Dabi et al., 2022).

Men's dominance in leadership is especially pronounced in some of the most ecologically and climate damaging industries, including fossil fuels, aviation, agriculture, and the military (Nagel and Lies, 2022). Our web research of company leadership showed that in 2023, not one of the top ten carbon emitting companies identified by The Climate Accountability Institute had a woman CEO or Board Chair (Climate Accountability Institute, 2019). Furthermore, our investigation revealed that of thirteen companies identified as responsible for some of the highest rates of global deforestation by Earth.org not one had a woman CEO (Earth.org, 2020).

As well as being absent from leadership of the most damaging sectors, women are also under-represented and, at times, actively excluded, from leading solutions to these very problems of resource loss and climate change (James et al., 2023). In 2020, just 15 % of environmental ministerial portfolios worldwide were held by women (United Nations, 2022). Similarly, the United Nation's (UN) two main climate change organizations – United Nations Framework Convention on Climate Change (UNFCCC), and the Intergovernmental Panel on Climate Change (IPCC) – also fall well short. Women have never comprised more than 25 % of authors on global IPCC assessment reports and remain underrepresented on governing bodies and committees (Gay-Antaki and Liverman, 2018). Women from low-income countries are even more underrepresented (Gay-Antaki and Liverman, 2018).

Men, overwhelmingly from high-income countries, continue to disproportionately influence the conservation and climate research agenda and action (Gay-Antaki and Liverman, 2018; James et al., 2022; Maas et al., 2021). For example, fewer than 23 % of the most cited climate science papers were authored by women and only 122 women were included on a recent list of the “1,000 most influential climate scientists” (Tandon, 2021). Similarly, an article published in Nature of “100 articles every ecologist should read,” included just three authored by women (Courchamp and Bradshaw, 2018). Women located in low-income countries, where gender inequality, land degradation, and climate impacts are most felt, remain largely absent, representing fewer than 3 % of authors in a recent review of conservation and science publishing (James et al., 2022). Other studies have shown that systemic inequity and gender bias mean that men have an outsized influence on conservation and science outcomes within conservation organizations themselves (James et al., 2023; Jones and Solomon, 2019). A recent global analysis of gender bias in ecological restoration revealed that men dominated in leadership, with less than 30 % of project leaders being women (Cruz-Alonso et al., 2023).

The exclusion of women across the private and public sector, as well as in scientific research, has significant consequences. In the corporate sector, it results in men having a disproportionate role in shaping both consumption and production, which in turn drives the market and economic models based on continuous growth (Dabi et al., 2022). This benefits them while continuing to perpetuate a paradigm that harms the environment, climate, and women (Dabi et al., 2022; Thøgersen, 2021). In policy and science, when women are absent the evidence shows that the interests and perspectives of men from high-income countries shape the agenda (Gay-Antaki and Liverman, 2018). This can largely result in more colonial or extractive agendas and can also result in science and policies that rely on simplistic assumptions, rather than in-depth understanding of the complex human dimensions of climate change and biodiversity loss (Arora-Jonsson, 2017; Masood, 2021). Disproportionate investments are then made to advance technical solutions and climate and biodiversity modelling, or top-down solutions. By comparison, investment in understanding climate change and biodiversity loss through the lens of social inequalities, gender, or justice is often limited (James et al., 2022).

In some ways this is not surprising, as the approach and methods of the natural sciences are assumed to be objective and value free, and thereby sitting ‘outside’ the complex political and social ecologies in which their work sits (Foale, 2021). This reductive approach is greatly aided by the dominance of western (masculine) science and its ‘metric fixation’, which focuses on numbers of people impacted or who may benefit, without a clear understanding of the quality, or gendered distribution of such impacts (Adame, 2021; Foale, 2021). This is evidenced when goals or benefits to people are secondary to the goals of biodiversity conservation and carbon abatement or only measured within general economic frameworks (Foale, 2021). This can lead to devastating impacts for local people including extreme poverty and social disadvantage when conservation leads to exclusion from ancestral lands and livelihoods (see for example the intergenerational impact of lowland gorilla protection on the Batwa people of Democratic Republic of Congo (Domínguez and Luoma, 2020).

Biodiversity conservation and climate goals are frequently framed on large scales that include diverse cultural and socio-political contexts, and where the status of women is different in each context (Clark et al., 2015). A common reductionist approach can result in the disregard of socioeconomic, cultural, and gendered differences and complexity (Foale, 2021). This can lead to an oversimplification of research studies, particularly for projects that are developed and funded externally, from high-income countries where there is limited understanding or attention given to the social complexities, or the local context. For example, although there are some commonalities with the work of the authors in Indonesia and Papua New Guinea, the various issues around women's lives including religion, land tenure, access to education and services,

and national politics mean that our approaches are necessarily different in each context. We have found that the only way to know and understand that is by focusing less on technical methods and more on understanding social issues through qualitative and collaborative approaches. But in our experience, the pressure to scale quickly and ensure carbon and biodiversity standards are ‘market ready’ means such complexities are not always adequately considered.

When women are missing there is less of a perceived need to include them. Male dominated spaces often don't see or acknowledge that women are missing or have less power and influence (James et al., 2023). As authors we face ongoing resistance to our efforts to increase women's representation. It is often framed as unachievable due to the urgency of the situation, or that there is a lack of expertise or resources to consider gender, or that women themselves are not interested (James, 2023). Although there has been increasing requirements for gender to be considered by global funding mechanisms and institutions, such as the Green Climate Fund, in our experience it is still often considered a ‘tick box’ or optional, and largely not important to the climate and biodiversity emergencies. Our collective experience, along with a review of those sites where women are involved in conservation and climate science, revealed women's participation remains highly constrained by the male-dominated systems within which women operate (James et al., 2021). Simply increasing the number of women, without challenging the prevailing social norms that exclude deep engagement and learning with women, is unlikely to deliver significant positive outcomes. Indeed, doing so may inadvertently compound gender inequity, thus failing both women and climate/conservation outcomes (Westholm and Arora-Jonsson, 2015; Westholm and Arora-Jonsson, 2018).

3. The gender injustice of market-based mechanisms

Carbon and biodiversity offsets are now widely promoted as a significant opportunity for addressing the challenges of climate change and biodiversity loss. Carbon markets work on the principle that heavy polluting industries in one place can be offset – or compensated for – by activities that sequester – or store – carbon dioxide and other greenhouse gases, somewhere else (Lyons et al., 2017). Plantation forestry, ‘climate smart agriculture’, biodiversity conservation and ecosystem restoration, are amongst the growing range of land-use activities recognised in carbon offset markets. Carbon offset projects are often tied to conservation and biodiversity outcomes, thereby aligning with the ‘30 by 30’ global agenda that aims for 30 % of the world's land and waters to be ‘protected areas’ by 2030 (CBD, 2022). Similarly, biodiversity offset programs are gaining momentum as a mechanism to help prevent accelerating global biodiversity loss (OECD, 2016). Like carbon, biodiversity offsets are designed so that development can go ahead if equivalent biodiversity can be protected, improved, or restored in another location (OECD Environment Directorate, 2016).

Although there is significant and growing support across the sector, critics also highlight the ways in which the promotion of carbon and biodiversity offset markets allows existing modes of pollution and extraction to continue and delays the urgent imperative to limit “extractivist”, often outsourced, capitalist production and consumption (Devillers and Lyons, 2023; Wright and Nyberg, 2015). Outsourcing creates a spatial mismatch between the source of emissions/environmental damage, the recipient of the profits and the location of the offset project. It can be seen as colonial in approach where resources in biodiversity or carbon rich low-income countries are commodified to offset ongoing consumption in high-income countries (Domínguez and Luoma, 2020). This means that the highest emitters are least likely to bear the cost of either the emissions or any negative impacts these projects themselves may have in low-income countries. It is important to understand this when we further consider how these market-based approaches then negatively impact women and girls, and alongside non-binary people, who also face further disadvantage and discrimination (Matsuno and Budge, 2017).

Participation in carbon and biodiversity markets requires compliance with often complex and multiple sets of standards, such as the Clean Development Mechanism, Forest Stewardship Council, REDD+, and the Voluntary Carbon Standard (Lyons et al., 2017; Arora-Jonsson and Gurung, 2023). However, auditing requirements that ensure compliance are often weak, and it is commonly reported that local women are excluded from standard setting, with ‘experts’ and ‘representatives’ from communities frequently shaping carbon and biodiversity market standards – many of whom may never visit communities themselves or project sites, and are therefore disconnected from the lived realities of those most affected (Arora-Jonsson and Gurung, 2023; Bumpus, 2010; Devillers and Lyons, 2023). In our experience, in many cases women are not even informed that there is a project over the land they depend on. Cultural norms often position men as the decision makers within households, and men are more likely to hold legal title to land and therefore rights to any income derived from sale of carbon or biodiversity offsets (Gay-Antaki, 2016; Lee et al., 2015).

The inequities when marketized and technical solutions fail to address complex social, cultural, and political problems are exemplified in many projects worldwide. One carbon offset project in Northern Uganda provides an exemplar case study into such failings. Here, a Norwegian plantation forestry and carbon offset operator, Green Resources, owned by New Forests, has faced sustained criticism for driving adverse local level impacts (Lyons, 2018). Concerns about the operator were so significant that their sole carbon credit purchaser, the Swedish Energy Agency, cancelled their long-term carbon offset purchase arrangement (Devillers and Lyons, 2023; Lyons et al., 2017). In grappling with reports directed towards its conduct, including the adverse impacts of its project – especially a lack of benefits for women – the operator responded with several technical solutions. For example, in response to criticisms about land shortages, and restricted access for women to reliable firewood supplies, the operator offered an agricultural training program and fuel-efficient cook stoves. While these interventions may have served some use, they sidestepped the main social problem. Plantation forestry for carbon offset excluded women from land they once relied upon to grow food and access firewood. These are problems that women, first and foremost, must contend with (Devillers and Lyons, 2023). While Green Resources' interventions may have provided stoves and training, they failed to attend to the challenge women faced in having no land to grow their food, the outcome of which was driving increasing hunger for themselves and their children (see Devillers and Lyons, 2023; Lyons and Ssemwogerere, 2017). Meanwhile, the financial beneficiaries of Green Resources' carbon offset project include their owners and investors, comprising the white men located in high-income countries holding both CEO and board chair positions (Devillers and Lyons, 2023).

Similarly, work by several authors on this paper with women in Papua New Guinea (see Konia et al., 2019) showed that external project and scientific advisors often focused on rapid, technological solutions, such as large-scale carbon projects and clean cookstove technology, but had limited understanding of, or investment in, addressing the social and gendered aspects of how this would work. Hence, there was extensive external expertise invested in the technology and climate/biological research of replacing mangrove wood for burning on open fires that avoided deforestation and release of carbon. Conversely, there was limited and insufficient investment in how women would buy, maintain, and fuel this technology. Who would distribute the stoves, how much would they pay, who would receive them and who wouldn't? None of this was thought through and caused uncertainty and confusion with local women. The women subsequently put a halt to clean cookstoves as a technological solution before those questions were thoroughly answered. Furthermore, women in these areas are also being increasingly excluded from mangrove resources they have traditionally depended on for food and livelihoods. With the onset of large-scale blue carbon markets, we see women completely excluded from carbon project negotiations as well as denied access to their mangrove forests, as

men from high-income countries see a new value for them as carbon offsets and negotiate directly with men in local governments and communities. These changes in resource use and valuing have put women at risk as they try to continue to access their resources.

As we demonstrated with pushing large scale carbon projects and clean cookstoves in Papua New Guinea, and agricultural training and fuel-efficient stoves in Uganda, technological solutions that are developed without women fail to attend to the actual problems and issues that offset initiatives may bring about. Importantly too, and of key concern for us, is the way they also perpetuate harm, including upon those already most vulnerable in the face of a changing climate. While the paucity of global studies that attends to these gendered power relations remains, these interventions will continue to create new forms of inequalities and harms (Larson et al., 2015; Peach Brown et al., 2011).

4. What can we do?

Progress to gender equity needs intentional action. It does not happen without this. We propose solutions that will help us work to reform existing systems that govern climate and conservation agendas to make them gender equitable. We also propose more radical ideas that involve restructuring the current market-based, heteronormative and patriarchal systems that are narrowly defining decision making, design, and deployment of the climate and biodiversity crises.

Reform existing systems:

- We recommend principles for science and conservation organizations that ensure and/or mandate gender diversity on leadership, editorial, research, and authorship teams. This will assist to render visible the gendered dimensions of science organizations, science communities and so on, including the notable absence of women, as well as non-binary people. We should as a sector, consider performance metrics where a minimum of 33 % women, and women from low-income countries must be included on leadership and research teams (James et al., 2022).
- Gender quotas, checklists, and minimum requirements have raised awareness of gender as an issue, but we believe more can be done. All standards and audit processes should take a gender sensitive approach. This may involve developing new metrics that reflect social impact/most significant change, not just quantitative metrics.
- Encourage and ideally mandate implementation of existing gender policies and commitments across climate and conservation funding, in alignment with UNFCCC guidelines.
- Mandate detailed gender analysis to better understand the social context and potential impacts of any climate or biodiversity market-based 'solution'. A comprehensive gender and social analysis will identify existing power dynamics, cultural and socioeconomic drivers of natural resource use. This information can then be used to work with women to design strategies that ensure safe, equitable benefits for the whole community and whole person (Rees, 2002).
- Critically scrutinise carbon and biodiversity market governance and enforce regulations. Offset schemes tied to markets tend to focus on cash economy, yet women often spend a significant proportion of their time in the informal and diverse economy, including outside markets. It is crucial that robust and equitable market-based initiatives for climate and biodiversity are tied to local livelihood projects that are shaped by local communities, especially women.
- Mandate project standards such as the W+ Standard that was developed with, not just for, rural women. Developed in 2014 by WOCAN (Women Organizing for Change in Agriculture and Natural Resource Management) the W+ Standard is a women-specific standard that can be used for carbon and other market-based projects (Arora-Jonsson and Gurung, 2023). It can measure women's empowerment in a transparent and quantifiable manner and provide a channel to direct money to women and their organizations at the local level (Arora-Jonsson and Gurung, 2023). This standard

considers often neglected priorities of women, including their time, income and assets, knowledge and education, health, food security, and leadership-issues that are often completely neglected in conservation and climate programs (Arora-Jonsson and Gurung, 2023).

- Compensate local women. Women should no longer work for free and bear the cost of the climate and biodiversity crises that have been largely caused by men in high-income countries including the men who lead the world's most polluting industries. Any market-based mechanisms must financially compensate women and provide women with the resources they need to manage any benefits safely.
- Gender needs to be built into budgets intentionally at the outset. This builds on detailed gender analysis which highlights where spending disproportionately impacts or where specific investment is needed to enable all genders to engage equitably (Galizzi et al., 2021).

Radicalise the system:

- Imagine a world where it was mandated that a minimum of 50 % women were in leadership and decision-making positions. From governments to the private sector, including the most polluting industries, what would the world look like if women were the majority rather than in the margins or always the minority? Our conservation and climate solutions could look very different if every public and private organisation influencing the biodiversity and climate crises were required to have at least 50 % of women from low-income countries in leadership positions.
- Imagine a world where the financial flows were transparent, and those most impacted by biodiversity loss and climate impacts by the world's richest and highest emitters had to be compensated.
- Imagine a world where not only climate and natural resource externalities were considered, but where the unpaid labour of women that keeps these systems, functioning was fully accounted for. Globally women do on average 3.5 times the unpaid work of men (United Nations, 2022). Women would fully decide what this compensation would look like and decide how to align that compensation with the profits of men in high-income countries.
- Imagine a world that gives full agency to women who are continually and systemically marginalized from conservation and climate agenda setting, including women of colour, those identifying as LGBTQIA+, women in low-income countries, women living with a disability, and women with caring responsibilities. This will require an entirely different way of understanding and measuring success. Instead of complying with externally constructed and technical metrics, women would determine measures of success and how and when they would be measured (James et al., 2022).

Addressing gender inequity requires the conservation and climate sector to be committed and intentional. We have the evidence, from carbon to conservation markets, the results will be better if we consider gender. This means addressing well-documented systemic barriers women face, so that women across all countries can have the space, confidence, and support to work in conservation and science and develop and lead solutions. We hope that reform for the sector progresses until we reach a future where radical changes are realised.

CRedit authorship contribution statement

RJ developed the concept for the paper with guidance from KL. RJ led the development and writing of the manuscript with guidance from KL and inputs from all co-authors.

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References

- Adame, F., 2021. Meaningful collaborations can end 'helicopter research'. *Nature* (London). <https://doi.org/10.1038/d41586-021-01795-1>.
- Arora-Jonsson, S., 2017. Blind spots in environmental policy-making: How beliefs about science and development may jeopardize environmental solutions. *World Dev. Perspect.* 5, 27–29. <https://doi.org/10.1016/j.wdp.2017.02.004>.
- Arora-Jonsson, S., Gurung, J., 2023. Changing business as usual in global climate and development action: making space for social justice in carbon markets. *World Dev. Perspect.* 29, 100474. <https://doi.org/10.1016/j.wdp.2022.100474>.
- Barros, B., Wilk, R., 2021. The outsized carbon footprints of the super-rich. *Sustainability: Science, Practice, & Policy* 17 (1), 316–322. <https://doi.org/10.1080/15487733.2021.1949847>.
- Bumpus, 2010. Carbon colonialism? Offsets, greenhouse gas reductions, and sustainable development. *Glob. Polit. Ecol.* 217–238.
- CBD, 2022. Convention on Biological Diversity Action Agenda. Retrieved 11 April 2023 from. <https://www.cbd.int/portals/action-agenda/>.
- Clark, S.G., Hohl, A.M., Picard, C.H., Thomas, E., 2015. *Large-Scale Conservation in the Common Interest*, 1st ed. Springer International Publishing.
- Climate Accountability Institute, 2019. Update 8 October 2019: Accounting for carbon and methane emissions, Top Twenty investor-owned and state-owned oil, gas, and coal companies 1965-2017. Retrieved 4th June 2023 from. <https://climateaccountability.org/carbonmajors.html>.
- Courchamp, F., Bradshaw, C.J.A., 2018. 100 articles every ecologist should read. *Nat. Ecol. Evol.* 2 (2), 395–401. <https://doi.org/10.1038/s41559-017-0370-9>.
- Cruz-Alonso, V., Martínez-Baroja, L., Marques, L., Rodríguez-Uña, A., Rohrer, Z., Monteagudo, N., Velado-Alonso, E., 2023. Gender bias in ecosystem restoration: from science to practice. *Restor. Ecol.* 31 (4), e13815.
- Dabi, N., Khalfan, A., Lawson, M., Maitland, A., Poidatz, A., & Stroot, H. (2022). Carbon billionaires: the investment emissions of the world's richest people. *Oxfam Int.*, 32. [DOI:10.21201/2022.9684](https://doi.org/10.21201/2022.9684).
- Devillers, E., Lyons, K., 2023. Green Colonialism 2.0: tree plantations and carbon offset in Africa. *Oakland Institute, California*. <https://www.oaklandinstitute.org/green-colonialism-two-carbon-offsets-africa>.
- Domínguez, L., Luoma, C., 2020. Decolonising conservation policy: how colonial land and conservation ideologies persist and perpetuate indigenous injustices at the expense of the environment. *Land* 9 (3), 65. <https://www.mdpi.com/2073-445X/9/3/65>.
- Earth.org, 2020. 10 Major Companies Responsible for Deforestation. Retrieved 4th June 2023 from. <https://impakter.com/10-major-companies-responsible-deforestation/>.
- Foale, S., 2021. The unequal place of anthropology in cross-disciplinary research on environmental management in the Pacific and what to do about it. In: Alexeyeff, K., Bainton, N.A., Cox, J., McDougall, D. (Eds.), *Unequal Lives: Gender, Race and Class in the Western Pacific*. ANU Press.
- Galizzi, G., Meliou, E., Steccolini, I., 2021. Theme: Experiences and challenges with gender budgeting and accounting. Moving towards gender-responsive forms of accountability?: Editorial: Institutionalizing gender budgeting-contemporary experiences and future challenges. *Public Money Manag.* 41 (7), 499–501. <https://doi.org/10.1080/09540962.2021.1971862>.
- Gay-Antaki, M., 2016. "Now we have equality": a feminist political ecology analysis of carbon markets in Oaxaca, Mexico. *J. Latin Am. Geogr.* 15 (3), 49–66.
- Gay-Antaki, M., Liverman, D., 2018. Climate for women in climate science: women scientists and the intergovernmental panel on climate change. *Proc. Natl. Acad. Sci. U. S. A.* 115 (9), 2060–2065. <https://doi.org/10.1073/pnas.1710271115>.
- Habetzion, S., 2016. Overview of linkages between gender and climate change. <https://reliefweb.int/report/world/gender-and-climate-change-overview-linkage-between-gender-and-climate-change>.
- Holman, L., Stuart-Fox, D., Hauser, C.E., 2018. The gender gap in science: how long until women are equally represented? *PLoS Biol.* 16 (4), e2004956 <https://doi.org/10.1371/journal.pbio.2004956>.
- James, R., 2023. Breaking the bias: how to deliver gender equity in conservation. *Nature*. <https://doi.org/10.1038/d41586-023-00779-7>.
- James, R., Gibbs, B., Whitford, L., Leisher, C., Konia, R., Butt, N., 2021. Conservation and natural resource management: where are all the women? *Oryx* 1–8. <https://doi.org/10.1017/S0030605320001349>.
- James, R., Ariunbaatar, J., Bresnahan, M., Carlos-Grotjahn, C., Fisher, J.R.B., Gibbs, B., Hausheer, J.E., Nakozeete, C., Nomura, S.-K., Possingham, H., Lyons, K., 2022. Gender and conservation science: men continue to out-publish women at the world's largest environmental conservation non-profit organization. *Conservation Sci. Pract.* e12748. <https://doi.org/10.1111/csp2.12748> n/a(n/a).
- James, R., Fisher, J.R.B., Carlos-Grotjahn, C., Boylan, M.S., Dembereldash, B., Demissie, M.Z., Diaz De Villegas, C., Gibbs, B., Konia, R., Lyons, K., Possingham, H., Robinson, C.J., Tang, T., Butt, N., 2023. Gender bias and inequity holds women back in their conservation careers. *Front. Environ. Sci.* 10 <https://doi.org/10.3389/fenvs.2022.1056751>.
- Jones, M.S., Solomon, J., 2019. Challenges and supports for women conservation leaders. *Conserv. Sci. Pract.* 1 (6) <https://doi.org/10.1111/csp2.36> (n/a-n/a).
- Konia, R., Masike, B., James, R., 2019. Mangoro Market Meri: women working together to protect their mangroves and build secure futures for their communities. *Women Fish. Inf. Bull.* 30, 30–34.
- Larson, A., Dokken, T., Duchelle, A., Atmadja, S., Resosudarmo, I., Cronkleton, P., Cromberg, M., Sunderlin, W., Awongo, A., Selaya, G., 2015. The role of women in early REDD+ implementation: lessons for future engagement. *Int. For. Rev.* 17 (1), 43–65.
- Lee, J., Martin, A., Kristjansson, P., Wollenberg, E., 2015. Implications on equity in agricultural carbon market projects: a gender analysis of access, decision making, and outcomes. *Environ Plan A* 47, 2080–2096.
- Lyons, K., 2018. *Plantation Forestry and Carbon Trading: Carbon Violence and Uncertain Futures for a Global Forestry Empire*, Neoliberalism and Uganda. Zed Books, London.
- Lyons, K., Ssemwogerere, D., 2017. Carbon colonialism. Failure of Green Resources' carbon offset project in Uganda. The Oakland Institute, California. https://www.oaklandinstitute.org/sites/oaklandinstitute.org/files/uganda_carbon_colonialism.pdf.
- Lyons, K., Westoby, P., Nel, A., 2017. Reforming global carbon markets or re-imagining alternative climate solutions and sustainabilities? An analysis of selected NGO strategies in Uganda. *J. Polit. Ecol.* 24 (1), 324–341. <https://doi.org/10.2458/v24i1.20812>.
- Maas, B., Pakeman, R.J., Godet, L., Smith, L., Devitor, V., Primack, R., 2021. Women and Global South strikingly underrepresented among top-publishing ecologists. *Conserv. Lett.* <https://doi.org/10.1111/conl.12797>.
- Masood, E., 2021. *GDP: The Worlds Most Powerful Formula and Why it Must Change Now*. Icon Books, London.
- Matsumo, E., Budge, S.L., 2017. Non-binary/genderqueer identities: a critical review of the literature. *Curr. Sex. Health Rep.* 9 (3), 116–120. <https://doi.org/10.1007/s11930-017-0111-8>.
- Nagel, J., Lies, T.S., 2022. Re-gendering climate change: men and masculinity in climate research, policy, and practice. *Front. Clim.* 4 <https://doi.org/10.3389/fclim.2022.856869>.
- OECD Environment Directorate, 2016. *Biodiversity Offsets: Effective design and implementation* (OECD POLICY HIGHLIGHTS Issue).
- Peach Brown, H., Smit, B., Nkem, J., 2011. Institutional perceptions of opportunities and challenges of REDD+ in the Congo Basin. *J. Environ. Dev.* 20 (4).
- Rees, T., 2002. Gender mainstreaming: misappropriated and misunderstood?. In: Paper presented to the department of Sociology, University of Sweden, 1st February 2002.
- Tandon, A., 2021. Analysis: The lack of diversity in climate-science research. In: *Science*. <https://www.carbonbrief.org/analysis-the-lack-of-diversity-in-climate-science-research>.
- Thøgersen, J., 2021. Consumer behavior and climate change: consumers need considerable assistance. *Curr. Opin. Behav. Sci.* 42, 9–14. <https://doi.org/10.1016/j.cobeha.2021.02.008>.
- Thorne, N., Yip, A.K.-T., Bouman, W.P., Marshall, E., Arcelus, J., 2019. The terminology of identities between, outside and beyond the gender binary - a systematic review. *Int. J. Transgenderism* 20 (2–3), 138–154. <https://doi.org/10.1080/15532739.2019.1640654>.
- United Nations, 2022. *The Sustainable Development Goals Report 2022*.
- Visual Capitalist. The Richest People in the World in 2023. Retrieved 11 April 2023 from. <https://www.visualcapitalist.com/the-richest-people-in-the-world-in-2023/>.
- Westholm, L., Arora-Jonsson, S., 2015. Defining solutions, finding problems: deforestation, gender, and REDD plus in Burkina Faso. *Conserv. Soc.* 13 (2), 189–199. <https://doi.org/10.4103/0972-4923.164203>.
- Westholm, L., Arora-Jonsson, S., 2018. What room for politics and change in global climate governance? Addressing gender in co-benefits and safeguards. *Environ. Polit.* 27 (5), 917–938. <https://doi.org/10.1080/09644016.2018.1479115>.
- World Economic Forum, 2022. *Global Gender Gap Report 2022*.
- Wright, C., Nyberg, D., 2015. *Climate Change, Capitalism and Corporations. Processes of Creative Self Destruction*. Cambridge University Press, London.