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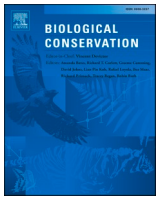

Connected Conservation: Rethinking conservation for a telecoupled world

Rachel Carmenta [a,b,*], Jos Barlow [c], Mairon G. Bastos Lima [d], Erika Berenguer [e], Shofwan Choiruzzad [f], Natalia Estrada-Carmona [g], Filipe França [h], Giorgos Kallis [i], Evan Killick [j], Alexander Lees [k], Adrian Martin [l], Unai Pascual [m], Nathalie Pettorelli [n], James Reed [o], Iokine Rodriguez [l], Angela M. Steward [p], Terry Sunderland [q,r], Bhaskar Vira [s,t], Julie G. Zaehringer [u], Christina Hicks [c]

[a] Tyndall Centre for Climate Change Research, University of East Anglia, Norwich Research Park, Norwich NR4 7TU, UK
[b] University of Cambridge Conservation Research Institute, Department of Geography, University of Cambridge, Pembroke Street, Cambridge CB2 3QZ, UK
[c] Lancaster Environment Centre, Lancaster University, LA1 4YW, UK
[d] Stockholm Environment Institute, Linnégatan 87D, 115 23 Stockholm, Sweden
[e] Ecosystems Lab, University of Oxford, South Parks Road, Oxford OX1 3QY, UK
[f] School of International Relations, University of Indonesia, Pondok Cina, Beji, Depok City, West Java 16424, Indonesia
[g] Bioversity International, Parc scientifique Agropolis II, 1990 Bd de la Lironde, 34397 Montpellier, France
[h] School of Environmental Science, University of Bristol, 24 Tyndall Ave, Bristol BS8 1TQ, UK
[i] Institute of Environmental Science and Technology, Autonomous University of Barcelona, Carrer de les Columnes s/n, Campus de la UAB, 08193 Cerdanyola del Vallès, Spain
[j] School of Global Studies, University of Sussex, Brighton BN1 9RH, UK
[k] Division of Biology & Conservation Ecology, School of Science & the Environment, Manchester Metropolitan University, Manchester M15 6BH, UK
[l] School of International Development, University of East Anglia, Norwich NR4 7TU, UK
[m] Basque Centre for Climate Change Research, Scientific Campus of the University of the Basque Country, 48940, Spain
[n] Environmental Monitoring and Conservation Modelling, Institute of Zoology, Zoological Society of London, Regent's Park NW1 4RY, UK
[o] Forests and landscape governance, Center for International Forestry Research, P.O. Box 0113 BOCBD, Bogor 16000, Indonesia
[p] Agricultural Sciences and Rural Development, Federal University of Pará, Belém 66.075.110, Brazil
[q] Forest and Conservation Sciences, University of British Columbia, Forest Sciences Centre 4623, 2424 Main Mall, Vancouver, BC V6T 1Z4, Canada
[r] Center for International Forestry Research, P.O. Box 0113 BOCBD, Bogor 16000, Indonesia
[s] Department of Geography, University of Cambridge Conservation Research Institute, UK
[t] Department of Geography, University of Cambridge, Pembroke Street, Cambridge CB2 3QZ, UK
[u] Centre for Development and Environment (CDE), University of Bern, Mittelstrasse 43, CH-3012 Bern, Switzerland

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ABSTRACT

The convergence of the biodiversity and climate crises, widening of wealth inequality, and most recently the COVID-19 pandemic underscore the urgent need to mobilize change to secure sustainable futures. Centres of tropical biodiversity are a major focus of conservation efforts, delivered in predominantly site-level interventions often incorporating alternative-livelihood provision or poverty-alleviation components. Yet, a focus on site-level intervention is ill-equipped to address the disproportionate role of (often distant) wealth in biodiversity collapse. Further these approaches often attempt to 'resolve' local economic poverty in order to safeguard biodiversity in a seemingly virtuous act, potentially overlooking local communities as the living locus of solutions to the biodiversity crisis. We offer Connected Conservation: a dual-branched conservation model that commands novel actions to tackle distant wealth-related drivers of biodiversity decline, while enhancing site-level conservation to empower biodiversity stewards. We synthesize diverse literatures to outline the need for this shift in conservation practice. We identify three dominant negative flows arising in centres of wealth that disproportionately undermine biodiversity, and highlight the three key positive, though marginalized, flows that enhance biodiversity and exist within biocultural centres. Connected Conservation works to amplify the positive flows, and diminish the negative flows, and thereby orientates towards desired states with justice at the centre. We identify connected conservation actions that can be applied and replicated to address the telecoupled, wealth-related reality of

* Corresponding author at: Tyndall Centre for Climate Change Research, University of East Anglia, Norwich Research Park, Norwich NR4 7TU, UK.
E-mail address: r.carmenta@uea.ac.uk (R. Carmenta).

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biodiversity collapse while empowering contemporary biodiversity stewards. The approach calls for conservation to extend its collaborations across sectors in order to deliver to transformative change.

1. Conservation at a crossroads

The convergence of the biodiversity and climate crises, widening of wealth inequality, and most recently the COVID-19 pandemic underscore the urgent need to mobilize change to secure sustainable futures (Brondizio et al., 2019; Daszak et al., 2020; Pörtner et al., 2021). In contrast to conventional conservation that tends to focus on site-based intervention often in combination with local poverty alleviation goals, or incorporates market-based fixes that further commoditise nature, we call for a 'Connected Conservation'. This new conservation approach challenges conservation to target wealth accumulation as the key factor driving environmental degradation, albeit in 'distant' geographies. Further, it enhances conventional site-level conservation by working to amplify the contributions of indigenous and local communities to conservation – not just locally - in the management of their immediate environments, but also through enhancing the potential for feedbacks that serve to redefine common visions of prosperity, and cultivate positive human-to-human and human-to-nature values in society at large. Such a dual-armed approach is now essential to addressing the "global interconnectivity" that threatens biodiversity (Lenzen et al., 2012; Liu et al., 2013) and achieving the "urgent policy action […] required to transform economic, social and financial models" (CBD, 2021) in socially just, equitable and decolonial ways. This policy analysis synthesizes across broad literatures, to offer the conservation, policy and practice communities a concise account of some of the challenges facing contemporary conservation, and how Connected Conservation can overcome them.

Despite increasing recognition of a new age of telecoupling, in which rising urban living and consumption-heavy lifestyles are disproportionately driving biodiversity decline in tropical forest landscapes (Brondizio et al., 2019; Almond et al., 2020; Dasgupta, 2020), the largely western 'conservation movement' (Pascual et al., 2021) remains dominated by local interventions and site-level protection or restoration, rather than actions focused on wealthy centres. For example, contemporary protection-centred interventions—e.g. Half Earth, '30 by 30' – advocate for extensive protected areas within hyperdiverse regions, rather than actions targeting distant drivers (Wilson, 2016; Waldron et al., 2020). Contemporary conservation thereby unduly exonerates those actors in centres of wealth and consumption who are most responsible for the biodiversity crisis, propagates the white-saviour colonial conservation style (Rudd et al., 2021), forfeits the opportunity of learning from contemporary biodiversity stewards, and ultimately fails conservation and its justice dimensions (Gordon et al., 2010; Díaz et al., 2019).

Here we outline Connected Conservation - based around two foci: (1) a new, challenging, and disruptive branch of *telecoupled conservation* that uses novel tools to make visible, and new actions to tackle, systemic and often 'off-stage' (mostly distant and diffuse) (Pascual et al., 2017b) causes of biodiversity loss and (2) *collaborative conservation* - an enhanced form of existing site-level intervention that amplifies the long-standing contribution of local populations to conservation (Garnett et al., 2018). We then identify concrete actions towards this new, transformative and expanded Connected Conservation agenda.

2. Why addressing distant wealth accumulation matters for conservation

The failure to address the 'distant' drivers of biodiversity decline can undermine conservation in two important ways: by shirking the centrality of financial wealth and by passing-up on the opportunity of collaborating with, championing and learning from, biodiversity stewards.

2.1. A focus on site-level poverty evades the negative impacts of distant wealth

Narratives that uncritically blame or implicitly associate poor people at the site-level with biodiversity loss evade the predominant role of wealth as a key driver of biodiversity decline (Fig. 1) (Otero et al., 2020). Yet distant wealth, not site-level cash poverty, is the dominant driver behind many of the major threats to biodiversity acting through three main flows: (i) trade, (ii) climate change and (iii) a dominant 'one-world development model' (Fig. 2). Each is expanded below.

An immense amount of resource draining takes place from North to South in unequal exchange under the guise of trade (Hickel et al., 2022). Globalized commodity trade is often financed by destination countries and involves intentional cost-shifting to lower income regions (Pascual et al., 2017b), driving environmental and cultural harms in countries with abundant resources (Lenzen et al., 2012) (Fig. 1). Some examples include agricultural expansion (Ceddia, 2020; Rajão et al., 2020), deforestation (Pendrill et al., 2019; Hoang and Kanemoto, 2021), overfishing (Tickler et al., 2018; Sumaila et al., 2019) and illegal wildlife trade (Duffy, 2016; Dang Vu, 2021), all of which result in species extinctions, either directly (e.g. with threatened bird species (Marshall et al., 2020)) or, indirectly (e.g. via bycatch associated with illegal fishing gear (Jaramillo-Legorreta et al., 2019)). Pollution is driving biodiversity decline and change through fertilizer and pesticide run-off from intensive commodity production, largely for export (Clark et al., 2018). Demand for illegal drugs is also key; conservation interventions and local communities are undermined by weakened territorial control within source and transit countries (Wrathall et al., 2020).

Tackling climate change is central to averting global biodiversity loss (Manes et al., 2021; Pörtner et al., 2021). Extreme climatic events such as flooding, droughts, heatwaves and fires are jeopardizing biodiversity in terrestrial, fresh-water, and marine systems (Barlow et al., 2018; França et al., 2020; Manes et al., 2021). Climate change impacts from greenhouse gas emissions have been primarily and historically produced in centres of wealth; though some tropical countries such as Brazil and Indonesia have a high historical contribution through land use change, much of this can be attributed to global trade and commodity demand, rather than domestic consumption (Evans, 2021).

Nearly all countries define societal progress as dependent on continuous and limitless economic growth within capitalist economies. This ubiquitous 'One World' model of development (Escobar, 2015) underpins global trade and climate change impacts, thus making it a powerful underlying (indirect) driver of global declines in biological (Otero et al., 2020) and cultural diversity (biocultural diversity) (Maffi and Woodley, 2012). The One World development model propagates cultural norms and mental structures that protect and legitimize the associated interests of the wealthy, compel affluence through material and energy growth, commodification and individualization, and seek "modernity as unending progress" (Feola et al., 2021). Furthermore, financial wealth accumulation drives alienation, rootlessness and inequality, that further undermine conservation (Pickett and Wilkinson, 2010; Martin, 2020). This development paradigm is grounded on an extractive and rent-seeking economic model that places humans as dominators of an ever-extractable nature (Muradian and Pascual, 2018). As such, it legitimizes prevailing governance patterns based on competition rather than cooperation, which are supported by current global institutions determining national economic policies and regulations (Kothari et al., 2019). This in turn fuels an accelerated global material and energy metabolism that directly degrades ecosystems, homogenises

cultural diversities, and contributes to climate change.

All three negative flows from centres of wealth dominate, and extend beyond jurisdictional borders – or across markedly different socio-cultural contexts within countries – in a process known as telecoupling (Liu et al., 2013). Conventional, largely site-level conservation, is inadequate for tackling these transboundary flows associated with global wealth drivers (Gordon et al., 2010; Friess et al., 2015; Díaz et al., 2019).

2.2. A focus on 'resolving' local livelihoods obscures locally-driven solutions

In addition to circumventing the dominant role of distant drivers, the disproportionate focus on site-level conservation places the onus for change on socially and economically marginalized communities (Adams et al., 2004; Skutsch and Turnhout, 2020). These approaches often attempt to 'resolve' local economic poverty in order to safeguard biodiversity (Roe et al., 2015; Woodhouse et al., 2021), in a seemingly virtuous act delivered by the too-often white saviour, rather than question what constitutes 'poverty' and what enhances well-being in rural place-based communities (though methods exist for doing so, e.g. Llopis et al., 2019; Carmenta et al., 2022). Further introducing economic rewards, payments and incentives can perversely nudge local actors in to the supply chains that already drive deforestation and biodiversity loss, or overwrite values related to stewardship of nature (Ezzine-de-Blas et al., 2019; Otero et al., 2020). Crucially, such site-level conservation may overlook local communities as the living locus of solutions to the biodiversity crisis - evidence shows how low intensity anthromes overlap with land held and managed by Indigenous and traditional communities (Garnett et al., 2018). It thereby misses the opportunity of empowering those local biodiversity stewards and fails to engage, champion and learn from the local knowledge and cultural norms that have proven consonant with care for nature (Büscher and Fletcher, 2019). Meanwhile, wealth-related drivers, and sometimes conservation intervention itself, are debasing centres where biocultural diversity flourishes and undermining the capacity of local people to defend biodiversity (Temper et al., 2015; Duffy et al., 2019; MacGregor, 2020). In many places, cultural diversity has persistently been attenuated, subjugated and stigmatized by the dominant flows of trade, climate change and one-world development that arise from centres of financial wealth (Maffi and Woodley, 2012). Yet, these communities contribute to biological conservation through three central, albeit increasingly marginalized, flows: (i) local models of biocultural governance, (ii) diverse knowledge and (iii) plural values (Fig. 2). Each is elaborated below.

In many places, local models of biocultural governance systems (including territorial governance) enable and allow local communities to survive and flourish (Stavenhagen, 2006). Even while being eroded, local governance is a counter-force to globalisation and stands in direct contrast to one world development – underpinned by the philosophy of community and commons (over individualism and private accumulation), attachment to place and territory, and small environmental footprints (Feola et al., 2021). For instance, community-based agroecological production is associated with resilience, provision of multiple ecosystem services and agro-biodiversity (Padoch and Pinedo-Vasquez, 2010; Tscharntke et al., 2012; Tamburini et al., 2020). Despite constant threat, indigenous people and local communities retain sufficient autonomy to hold roughly 67 % of the world's remotest land under customary systems of tenure and governance (Garnett et al., 2018). Further, much of this land represents "intact forest" landscapes that are often effectively conserved and are contemporary strongholds of biological and cultural diversity (Fa et al., 2020; Dawson et al., 2021).

Diverse knowledge systems and understanding of people-nature relations support, and are maintained by, different ways of knowing and experiencing the world (Ingold, 2002; Maffi and Woodley, 2012). Traditional and local ecological knowledge plays an important role in structuring species composition, agro-biodiversity, sustainable resource use and land management and thus is highly relevant for conservation (Reyes-García and Benyei, 2019). Furthermore, there are strong associations between cultural and biological diversity leading to the

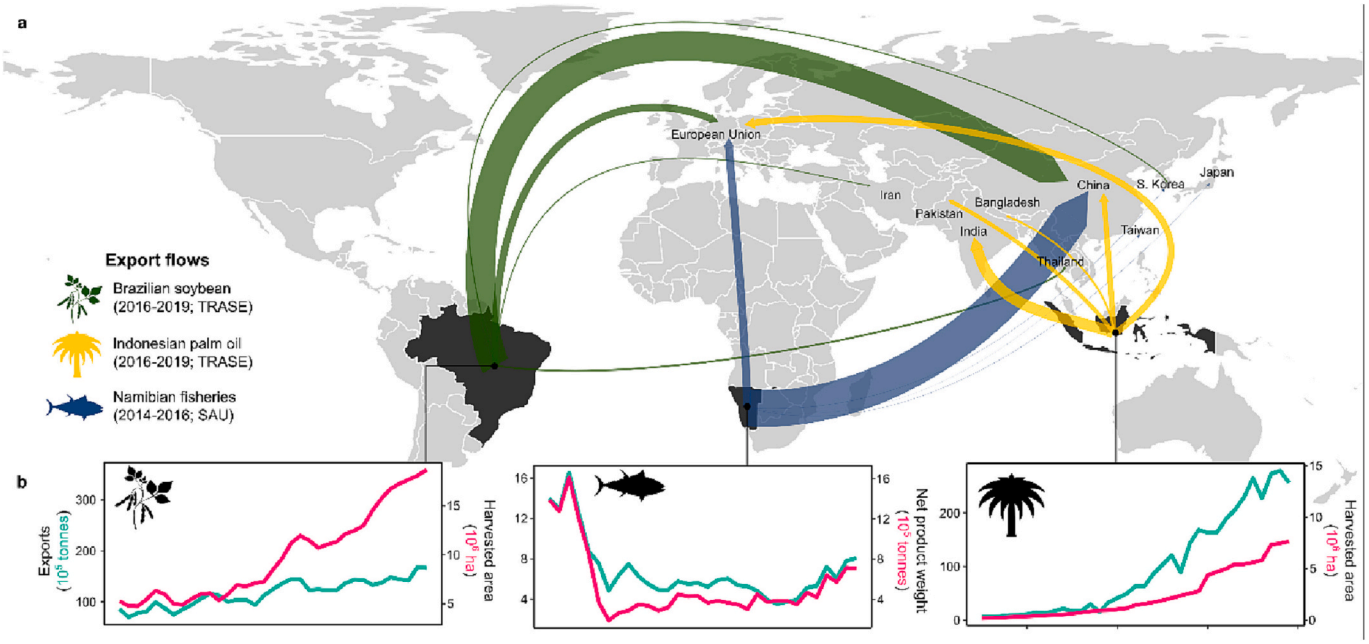

Fig. 1. Global portrait of biodiversity loss driven by the role of distant wealth and consumption. Three examples within the IUCN 'agriculture and aquaculture' anthropogenic driver of species threat, in key biodiverse regions and in relation to leading commodities: Brazilian soy, Namibian fisheries and Indonesian palm oil. a, Export flow of soy, oil palm and fish produced in biodiverse countries and distributed between the top five importing countries (i.e. centres of financial wealth). Line width indicates the average yearly proportion of total exports using the last 3 years reported. b, Trend data illustrates the total volume of each commodity and potential environmental damage associated with biodiversity loss, land use change (i.e. soy and palm oil harvested area as proxy for deforestation) and total fish catch (i.e. net product weight as a proxy for biodiversity damages in fisheries). Data sources: TRASE, FAOSTATS, SEA AROUND US, FishStatJ.

observation that landscape homogenization (e.g. via monoculture expansion) leads to lost ways of knowing, or the 'homogenization of the mind' (Maffi and Woodley, 2012; Cámara-Leret and Bascompte, 2021).

A large diversity of values about nature exist within and across societies (IPBES, 2022). Within such diversity, positive 'relational values' (Chan et al. 2016) that express integration with and stewardship of nature tend to be more prevalent in the rural and small-scale communities that conservation so often engages with (Agarwala et al., 2014). Moral, gift and solidarity economies have enabled the resilience and persistence of local communities, even while they negotiate their marginalized positions within dominant models of development and market exchange in order to maintain their own ways of living (*from*, *with*, *in*, and *as*) nature (Henrich et al., 2005; Adams et al., 2008; Hill et al., 2021). Further, diverse conceptions of living a good life likely also enhance our capacity to identify new, viable solutions and alternative developments not centred on affluence and wealth accumulation (Gómez-Baggethun et al., 2013; Leyva-Solano, 2019).

3. Connected conservation: moving beyond conservation's site-level emphasis

Addressing biodiversity loss in an economically interconnected world challenges us to develop a revised model of conservation based on greater awareness of connections among actors, locations and disciplines. Our 'Connected Conservation' model (Fig. 2) targets the role of wealth in environmental health collapse and biodiversity loss, interrogates common views of what constitutes poverty and well-being, and disrupts the dominant flows marginalizing nature. Yet is also recognizes and supports and contributes to positive, local biocultural governance, practices and values. This process of deconstructing accepted norms and models, combined with articulating efficient alternatives, is deemed necessary for the emergence of new sustainable futures (Feola et al., 2021).

Connected Conservation therefore requires two broad, ideally interconnected, sets of actions (Fig. 2): (1) *telecoupled conservation actions* that reduce and filter the dominant systemic flows of one-world development, climate change and trade from centres of wealth, and (2) *collaborative conservation actions* that enhance and amplify the positive yet marginalized forms of local governance, diverse knowledge systems and plural values of nature from bioculturally diverse regions. Connected Conservation thus recognizes and mobilises justice and diversity, making space for transformative conservation actions in a movement that pushes for change at different levels, unconstrained by colonial ideas and models of site-level conservation.

In essence, Connected Conservation pursues desired states within which both biodiversity and humanity can flourish. As illustrated in Fig. 2, within centres of wealth the desired states uphold (i) accountable and regulated trade supported by (ii) gratification not growth, thereby leading to a reduced desire and demand for socio-environmentally harmful consumption. Within biocultural centres, Connected Conservation actions pursues (iii) local governance, rights and self-determination, and (iv) respect and learning from diverse knowledge and plural values.

The actions Connected Conservation needs to progress towards these desired states are available within four interlinked and overarching levers (Independent group of Scientists, 2019): (i) Governance and Accountability (e.g. accessible, transparent, effective, fair and systemic); (ii) Economy and Finance (e.g. private and development aid flows, fiscal, monetary, trade and subsidies policy); (iii) Individual and Collective action (e.g. empowerment, knowledge, participation, mobilisation, reconfiguration of social norms); and (iv) Science and Technology (e.g. public and private, technology transfer, to anticipate, model and assess) (Fig. 2). Notably, Connected Conservation operates through dual processes of diminishing and disrupting the negative flows from centres of financial accumulation in 'telecoupled conservation' and enabling and amplifying the positive flows in 'collaborative conservation'. What it

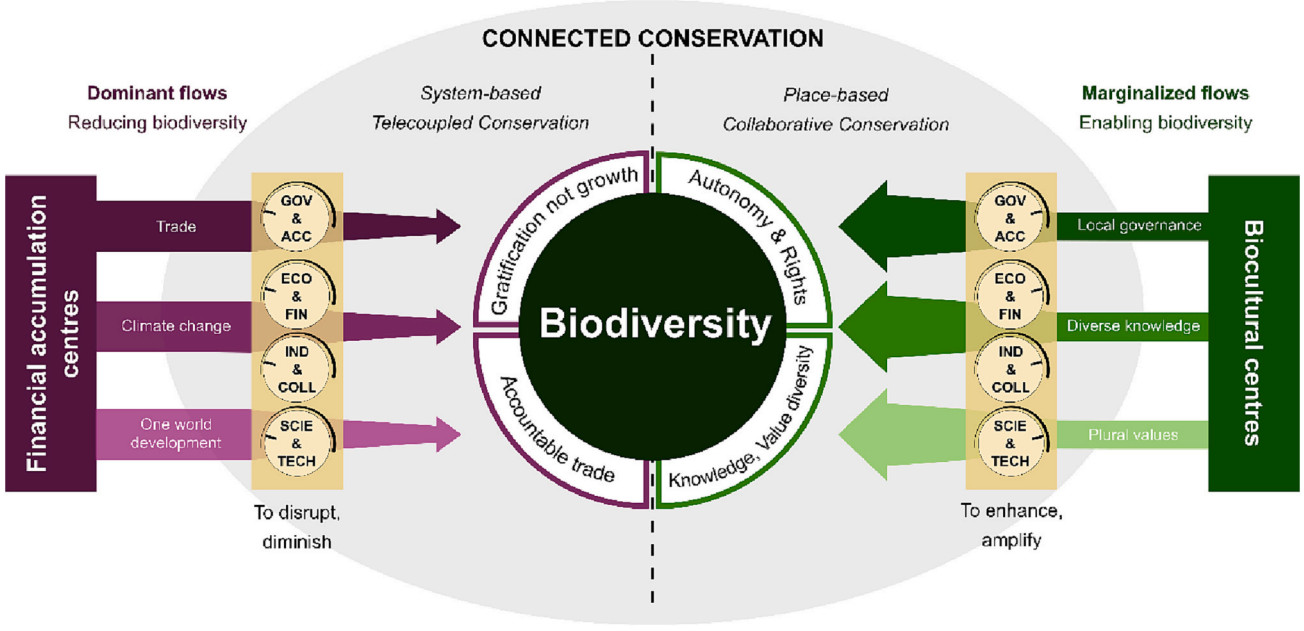

Fig. 2. Conceptual overview of Connected Conservation. Three dominant negative flows stem from centres of wealth and reduce biodiversity: one world development model, climate change and trade (legal and illegal). Meanwhile three positive, yet presently marginalized flows, stem from biocultural centres and enhance biodiversity: local models of biocultural governance, diverse knowledge, and plural values and conceptions of a good life. Connected Conservation operates through dual processes of diminishing and disrupting the negative flows from centres of financial accumulation in 'telecoupled conservation' and enabling and amplifying the positive flows in 'collaborative conservation'. Connected Conservation actions are operated through a fourfold set of levers: Governance and Accountability (GOV & ACC; e.g. environmental law, meaningful participatory decision making; transparent value chains and trade flows; embedding multi-dimensional wellbeing in national development indicators); Economy and Finance (ECO & FIN; e.g. fading out perverse subsidies, true pricing of assets); Individual and Collective action (IND & COLL; e.g. education raising social awareness of the impact of conventional wealth; social movements, protest and mobilisation for policy change; experimenting, recognizing and legitimising alternatives) and Science and technology (SCIE & TECH; e.g. research to inform evidence-based actions, monitor and evaluate impacts).

offers is conservation with justice at the centre, albeit while representing a great challenge to the networks and norms of contemporary conservation, pushing the conservation effort to connect across sectors to deliver.

3.1. Accountable and regulated trade

Novel conservation actions adequate for a telecoupled world will be the most transformative for the conservation agenda. A set of these must focus on reducing the negative flows from commodity and wildlife trade requiring regulations that allow for (a) internalising trade-related externalities and cost shifting to distant places– e.g. via commodity prices, (b) equitably safeguarding the value chain by ensuring actors (and thus their actions) and finance are traceable, (c) tightening regulations and compliance mechanisms to avoid the cost-shifting inherent in trade and (d) improving the transparency of trade agreements, fishing licensing and large-scale land acquisitions. Achieving these shifts involves actions across all levers. Although changes are ultimately delivered through trade policy (i.e. economy and finance and governance levers), these will only become available by progress and demand generated through the science and research and collective action levers. This is because existing trade institutions are designed to protect rather than challenge the dominant influence of financial wealth (Visseren-Hamakers et al., 2021; Hickel et al., 2022). Powerful vested interests in centres of wealth hold great political influence, while small-scale land or resource users with less political or economic visibility become scapegoats (Hickel et al., 2022).

The short-term, pro-growth and siloed decision-making tendencies of global trade must ultimately be resolved through actions within the economy and finance lever. This will require addressing the dominant corporate culture that continuously aspires to influence rule-making and monopolise resources (Hickel, 2017). Curbing corporations' lobbying influence might be partly achieved by expanding impact evaluation processes of proposed mergers, specifically through assessing impacts on prices, market structures, human well-being and the environment more broadly (Cafaggi and Pistor, 2015; Clapp, 2021). Lobbying for trade policy shifts such as blocs against 'imported deforestation' (Bager et al., 2021), or moratoria for suppliers or regions linked to environmental harm can have considerable impacts. Identifying, communicating and lobbying for policy reforms, such as curbing fisheries subsidies through the World Trade Organisation (Cisneros-Montemayor et al., 2020), is crucial for Connected Conservation.

Science and technology are fundamental, as they can gather evidence and develop the tools required to enable needed reforms. For instance TRASE (an open-access platform on supply chain flows) has enabled transparent monitoring of trade and finance linked to externalities (or cost-shifting) of deforestation (Gardner et al., 2019), while Global Fishing Watch is improving traceability via tracking global fishing activity in near real time. Evidence-based information can strengthen lawsuits focused on delivering liability for environmental and social externalities of extraction. For example, 'counter-forensics' (Digital Architecture group) generated evidence fundamental to the ultimate expulsion of a giant palm oil company from FSC certification in old growth Papuan forest (BBC, 2021).

3.2. Gratification rather than growth

One key way to diminish all three negative flows – one world development, climate change and global trade (Brondizio et al., 2019; Pörtner et al., 2021) – involves reducing the demand for commodity consumption in centres of wealth. This requires actions across all levers, many of which are not within the conventional remit of site-level conservation and challenge conservation to work towards transforming deeply entrenched ideologies of success and progress (Cinner and Kittinger, 2015; Balmford et al., 2021).

Redefining common visions of prosperity is considered fundamental to reducing excessive consumer demand for commodities from extractive sectors and the 'breaking of capitalist habits' (Feola et al., 2021). Citizen action and mobilisation is vital. While government action is necessary, mainstreaming norms of living that reduce consumerism is unlikely to manifest without strong, bottom-up, demand from an informed population. Thus, through the interplay between collective action, and science and technology levers – Connected Conservation seeks actions that inform and mobilize publics to demand system change. Lack of concern or emotional disconnection has shown to be a main obstacle to more effective collective action, and it is particularly pervasive with long-distance environmental problems such as deforestation overseas (Bastos Lima et al., 2021). Conversely, the strength of humanitarian, emotive story-telling has been central in the climate change movement (Raymond et al., 2013) and may offer promise for conservation (Caldwell and Henry, 2020). Research shows that revealing the humanitarian dimension of environmental harm may help mobilize actors, and can engage even diverse stakeholders with powerful interests in the status quo (Carmenta et al., 2017). Research on the narrative shifts that would help recalibrate the understanding of conservation as a form of aid, to conservation as a collective responsibility underscored by principles of stewardship is crucial (Trisos et al., 2021). Conservation-orientated gaming, citizen science platforms and citizens assemblies have all been used to help reach a broader public with messaging about the importance and intricacy of our collective relationship with the natural world (Dorward et al., 2017; Fletcher, 2017), or enhancing empathy for 'distant' citizens through innovative methods (e.g. virtual reality)(Nelson et al., 2020).

Broadening access to the knowledge and science that explains sustainability problems and the role of actors within them is also important (Blasiak et al., 2021). Connected Conservation must work more closely with the education and advertising sectors within centres of wealth to ensure that concepts such as climate change, justice, natural history, planetary boundaries, political ecology, sustainability and telecoupling are sufficiently embedded within formal educational curricula, because people may care more for what they know (Heimlich and Ardoin, 2008). Once inspired, citizens can be a powerful source of pressure on governments to demand effective and just policies supporting Connected Conservation (Raymond et al., 2013; Amel et al., 2017).

Connected Conservation must identify and lobby for policies that convey broad ideological shifts towards the "subordinat[ion of] economic objectives to ecological criteria" (Raymond et al., 2013; Escobar, 2015; Hughes et al., 2017). These policies may enable, or require, citizens and companies to make sustainable decisions regardless of their own environmental values. Recent research and action shows how behavioral science and environmental law can be used across scales to foster positive changes (Balmford et al., 2021). For instance, environmental law can assist transformational change through enforcement, correctives and compensation for victims, which ultimately signal to society that over-consumption and associated damages are no longer acceptable (e.g. illegal wildlife trade (Phelps et al., 2021)).

Connected Conservation requires bringing together a wide range of stakeholders and sectors to demystify and popularize contemporary 'alternative' living models that respect planetary boundaries (Rockström et al., 2009; Raworth, 2017). Examples of such models include social housing ventures that aspire to reduce overconsumption (Angel, 2021; Martínez, 2021), and the movement of cities geared around reclaiming and protecting the commons to satisfy social wellbeing without the need of expansion (Comú et al., 2019; Russell, 2019; Thompson, 2021). Additional examples, already being put into action, include community economies, transition towns, and ecovillages – and are geared towards enhanced resilience through, potentially replicable and scalable, decarbonized and care-focused communities (Hopkins et al., 2008; Litfin, 2012; Gibson-Graham et al., 2013; Kallis and March, 2015). Connected Conservation can support a research agenda focused on identifying the impacts of these alternative models, and how to raise their profile to promote large-scale change (Balmford et al., 2021). Lobbying for

supportive policies could help ensure that increased demand for new aspirational futures is coupled with government investments to normalize and make available the alternative models needed, which in turn can shift cultural norms and consumer preferences (Scott, 2008), particularly, when accompanied by better advertising regulation.

Proximity between research and activism has proven a fertile ground for transformation (Fletcher et al., 2020). For example, the fusion of post-growth and degrowth academic and activist movements have started to define alternative aspirational futures that replace and recast notions of wealth and understandings of progress, and also identify policy options that may support them (Kallis, 2018). These 'radical' partners (e.g. activists, climate action youth, eco-feminists, political ecologists) have, however, hitherto remained peripheral to conventional conservation but hold great promise for Connected Conservation (Massarella et al., 2021).

3.3. Embracing diverse knowledge systems and values

An enhanced model of site-level conservation (i.e. collaborative conservation) must be supported by empowering alternative knowledge systems, visions of a good life and the plurality of values about nature (IPBES, 2022). It can do so by amplifying the presently marginalized flows that contribute to transformative sustainability values (Visseren-Hamakers et al., 2021). Establishing meaningful recognition and broad validation for the diverse lifeways, notions of a good life and knowledge systems requires profound change in conservation practice in centres of wealth (see Sections 3.1 and 3.2), as well as in site-level conservation action. Decolonial conservation approaches that engage with trans-disciplinary co-production of knowledge and impact evaluations are opening new horizons (Rodríguez and Inturias, 2018). For instance, the shift enables Connected Conservation to be more aligned with local conceptions of well-being and the full suite of values that influence and motivate behaviours; it also helps reveal the true extent of injustices created by environmental harms, or indeed sometimes conservation intervention itself (Carmenta et al., n.d.; Cundill et al., 2017; Zafra-Calvo et al., 2020). New relational frameworks are enriching our understanding of the ways in which the environment mediates and contributes to multi-dimensional human well-being (Chan et al. 2016; Sterling et al., 2017).

An example of progress in this direction is a site-level approach to assess and enhance governance of area-based conservation developed by an international consortium of NGOs and scientists. SAGE (Site-level Assessment of Governance and Equity) is a toolkit for multi-stakeholder assessment of conservation governance designed around three dimensions of equity: recognition, procedure and distribution (Schreckenberg et al., 2016). This and other related initiatives such as the IUCN Green List are important because they change the basis upon which we evaluate the performance of area-based conservation, from singular attention on biodiversity gains (and/or financial poverty alleviation) to measures more attuned with biocultural approaches, including recognition of local values and knowledge. By documenting and duly recognizing diverse people-nature relationships, IPBES is also helping to counter dominant worldviews and build momentum towards broader recognition of the contribution of biodiversity to human well-being and the diverse relationships between people and nature (Pascual et al., 2017a; Díaz et al., 2018).

The capability to reclaim, rebuild and revive cultural ties is a resistance option that defends marginalized peoples and their cultures from homogenization (Rodríguez and Inturias, 2018; Yuliani et al., 2018; Leyva-Solano, 2019). Connected Conservation requires strong collaboration with place-based voices that defy dominant development in defence of diverse values, norms, knowledges and socio-ecological practices (Pilgrim and Pretty, 2010; Fletcher et al., 2020; Pascual et al., 2021). Working with humility across stakeholders and sectors can enable governance responses – such as educational curricula that reproduce and recognize local traditional and Indigenous perspectives (Garcia and Shirley, 2013). For example, place-based curricula have been a formidable tool in the political agency and resistance of the marginalized, from the Zapatistas of Mexico and the peasant agro-food territories (TCAs) of Colombia, to the Eskola Rimba (Rimba School) of Indonesia (Leyva-Solano, 2019; Manurung, 2019; Feola et al., 2021). At their most powerful, place-based educational material will reach beyond local curriculums and be delivered to wider social groups (Guilherme and Hüttner, 2015).

Crucially, Connected Conservation must move beyond simplified assumptions of values and incentives. For example, from a focus on shifting human behavior through individual motives and values (Balmford et al., 2021), towards focussing on larger-scale systemic shifts, or questioning structural socio-economic conditions driving exclusion, disempowerment and associated aspects of poverty. Further, the concept of biodiversity stewards remains branded as a 'romantic' vision that stands against the 'better evidence' and pragmatic realism of frameworks centred on utility-maximising 'man' (Bregman, 2020). These colonial tendencies of conventional conservation are now being called out (Armenteras, 2021; Gram-Hanssen et al., 2021; Trisos et al., 2021). New research could help identify what enables the resilience and persistence of local communities (rather than their collapse) (Smith et al., 2021) and, in so doing, identify how best to support communities over the long term. For example, in Indonesia's oil palm frontiers strong social connections, integral customary traditions and embedded people-nature relationships are central to the rejection of oil palm development (Yuliani et al., 2020).

Increasingly, local communities and networks are mobilising to share their knowledge and build alternative futures. Though still marginal and as yet unable to make significant macro-level transformations, such initiatives reflect a visible counter-trend to one-world development. These alternatives can be a re-assertion of ancient cultures, or be very new, but all have a core of ethical values that put justice and nature (including humans) at the centre. Bringing together these ideas and practices to create a critical mass is seen as crucial, and learnings from initiatives such as the Global Tapestry of Alternatives and the Vikalp Sangam (Alternatives Confluence) represent promising opportunities for Connected Conservation partnerships (Kothari, 2020).

3.4. Respecting local biocultural governance, self-determination and rights

The collaborative branch of Connected Conservation sees empowered, autonomous and self-determined local communities being supported by established, recognized and defended rights. The positive flows of local biocultural governance, diverse values and diverse knowledge can be enhanced and safeguarded by governance changes that move away from the traditional approach of 'resolving' frugal lifestyles, and instead champion the authority, rights and capabilities of contemporary biodiversity stewards to exercise diverse visions of prosperity (Stavenhagen, 2006; Garnett et al., 2018), and living well with nature.

Forms of governance that enable place-based stewardship of nature in the context of local culture and knowledge, provide effective, equitable and cost-efficient models for conservation and restoration of biodiverse landscapes (Schleicher et al., 2017; Reyes-García et al., 2019). This major contribution to conservation – and its diversity of local and alternative models of conservation – is now beginning to be recognized in international conservation. For example through the adoption of new terminology (e.g. Other Effective area based Conservation Measures (OECMs) or Indigenous and Community Conserved areas (ICCAs)) to recognize areas of land and sea that are effectively conserved locally even where the primary management objective focuses on culture, autonomy or wellbeing, rather than biodiversity conservation per se (Alves-Pinto et al., 2021; Gurney et al., 2021; Shaw, 2021). Biosphere Reserves (BRs) sponsored by UNESCO offer an example of a site-based biocultural model of conservation supported through formal global

conservation governance. They promote a model for learning about diverse ways of living with nature that incorporates a biocultural basis for conservation. This principle was established with the first example in Cape Horn (Berghoefer et al., 2010) and their benefits over more segregationist models of conservation have since been documented in many locations, along with the possibilities for strengthening the BR approach through greater commitment to biocultural diversity (Karez et al., 2015). The BR model links with larger scale 'telecoupled' conservation as it is influenced by global efforts to counter hegemonic one-world development, through global legal interventions such as the United Nations Declaration on the Rights of Indigenous Peoples, and global scientific initiatives such as the knowledge and value pluralism.

Broader innovations within state legal systems can enhance biodiversity conservation locally, providing a pathway for self-determined management strategies informed by plural values. Legal governance, and specifically environmental law, holds unrealized potential to uphold environmental protection and support place-based conservation and associated localized cultural practices (Phelps et al., 2021). For instance, in 2017, the government of New Zealand/Aotearoa granted personhood to the Whanganui River (Te Awa Tupua) as a result of nation-to-nation negotiations with the Māori of the Whanganui Iwi (Macpherson, 2019). Ecuador has incorporated Indigenous law into its constitution by giving rights to 'Pachamama' (Mother Earth) as well as recognizing "buen vivir" ("living well") as a holistic measure to protect marginalized members of society, and support Indigenous principles of responsibility, reciprocity and interconnectedness (Sajeva, 2017).

Important instances of resistance and self-determination have been catalysed through the collective action lever in multiple biocultural centres which Connected Conservation can support. For example, peasant and Indigenous movements and networks such as the Zapatistas, La Via Campesina, TCAs and ICCAs all orientate around principles of localized aspirational futures, and are grounded on principles such as autonomy, food sovereignty, solidarity, sufficiency, participation and the collective (Kothari et al., 2019; Feola et al., 2021). Through diverse partnerships with stakeholders that are embedded in place, locally salient welfare needs and hardships can be identified. Sound health is a prerequisite for the freedom to choose and self-define futures, and some conservation initiatives are now working in collaboration with the health sector to provide these services that inadvertently strengthen community capability to remain and to flourish (Miller, 2020).

4. Conclusion

Conservation science and practice is constantly evolving, from its original biological focus (Soulé, 1985), to its more recent consideration of people and societies (Mace, 2014) and a phase featuring investments in nature (Kareiva and Marvier, 2012). It is evident another step change is unfolding (Büscher and Fletcher, 2019). Connected Conservation builds on this momentum to take us beyond site-level emphasis, or simplistic narratives about poverty and local biodiversity threats. It instead highlights the role of wealth-related drivers in precipitating biodiversity and cultural loss. Bringing about the four desired states in which biological and cultural diversity can flourish will not be easy or straightforward– there are strongly embedded power structures that encourage incremental innovation (Feola et al., 2021), rather than more fundamental changes to challenge the status quo. We do not contend that the conservation sector has either the expertise or capacity to deliver the four desired states alone, but highlight the necessary transformation to contemporary conservation, and the imperative to pursue new actions and alliances. Conservation must challenge itself to meet this need, working in diverse partnerships and with different sectors and disciplines to bring about fundamental changes with justice at the centre. A key task will be to improve our understanding of the impact of Connected Conservation actions across scales (Editorial, 2021), and how best to apply these actions so that we can live well without destroying the biological and cultural diversity that defines the living world and our well-being as part of it.

CRediT authorship contribution statement

RC, JB, CH and BV conceived the idea for the study; FF and NEC curated the data and ran the analysis; RC, JB, AM, NEP, FF prepared and developed the Figures and Visualizations; RC, JB, CH led the writing of the original draft. RC, JB, MBL, EB, SC, NEC, FF, EK, AL, AM, UP, NP, JR, IR, AS, TS, BV, JGZ and CH developed sub-section parts and made critical contributions to the review & editing phases of subsequent drafts, and gave final approval for publication.

Declaration of competing interest

There is no conflict of interest.

Data availability

Data will be made available on request.

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