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## Research article

## Looking beyond justice as universal basic needs is essential to progress towards 'safe and just operating spaces'

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## ABSTRACT

Taking point of departure in the ambitious framework for 'safe and just operating spaces' for social-ecological systems, this paper explores the applicability of this conceptual framing. Specifically, we draw attention to limitations in the conceptualisation of justice as a question of attaining a minimal level of (material) wellbeing. With an empirical case from Laos, we apply a broader notion of environmental justice based on interconnected dimensions of distribution, procedure and recognition to examine the dynamic relationship between 'safe' and 'just' at village level, and we question how 'boundaries' of social and ecological sustainability are conceptualized and determined. Our findings illustrate important considerations for the way conservation interventions are rationalized and designed, in particular for the way social and environmental sustainability are portrayed and how governance is envisaged to function locally. This paper contributes to current sustainability debates on how to explore and integrate justice dimensions in development and conservation within human-defined planetary boundaries.

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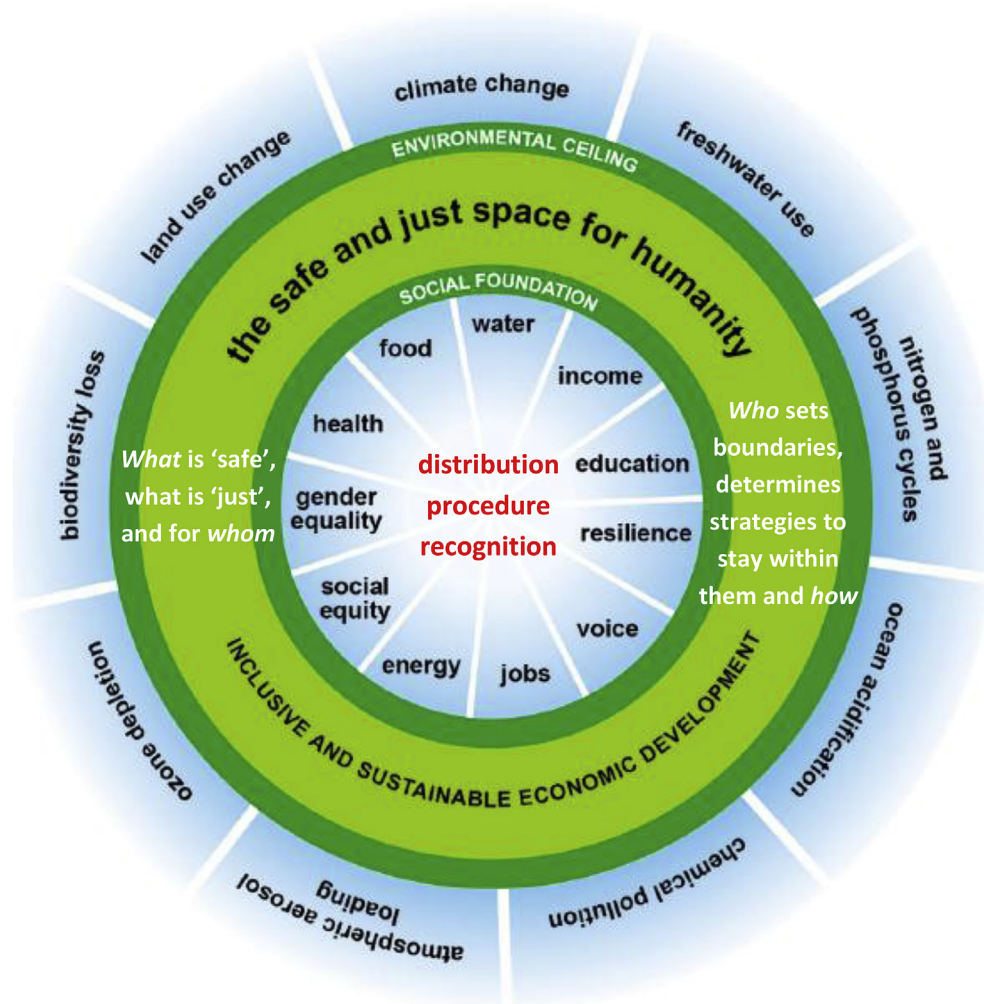
## 1. Introduction

The terms justice and equity have gained increasing, global traction in policies relating to climate change, sustainable development, biodiversity conservation and beyond (Biermann, 2018; Dawson et al., 2018a). The way in which these terms are defined, interpreted and embodied in forms of governance now has key implications for how various environment and development related policies, programs – and the global actors driving them – address social-ecological tradeoffs, and the outcomes to be realized (Agyeman et al., 2016; Dryzek and Pickering, 2018; Ehresman and Stevis, 2018; Evans and Phelan, 2016). The notion of 'safe and just' operating spaces was first introduced by Kate Raworth (2012) and has proven a "powerful metaphor and communication tool" (Dearing et al., 2014) highlighting the need to include multiple environmental and social concerns within economic development strategies. The theory references 'a safe operating space for humanity' by Rockstrom et al. (2009), who marked out nine biophysical boundaries, which should not be exceeded if resilience of the Earth system is to be maintained in a stable state for human

development. Raworth's rationale for coining 'safe' and 'just', coupling the planetary boundaries concept with considerations of social justice, was to fulfil every person's claims to life's essentials, while emphasizing the need to situate the economy within environmental limits. This resulted in a framework bounded by both human needs and environmental sustainability (see Fig. 1). According to Raworth (2012) "[t]he resulting space – the doughnut – is where inclusive and sustainable economic development takes place" (p. 5), a "space where both human well-being and planetary well-being are assured, and their interdependence is respected" (p. 7). This popular theoretical framework has inspired, and will likely inspire many more, applications to research at sub-planetary scales, whether national, regional, subnational, landscape or more local levels. In this article, we explore this theoretical framework, focusing particularly on the conceptualisation and examination of justice. Drawing from contemporary literature on social and environmental justice and equity, and illustrated through a case study in rural Laos, we use the 'safe and just operating space' framework to first assess nature conservation and development at local scale. We then assess the local status and trends in conservation through a perception-based analysis embracing the three-dimensional approach to environmental justice (cf. Schlosberg, 2004), socio-ecological trade-offs, and expertise perspectives. By comparing

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**Fig. 1.** According to [Raworth \(2012\)](#), the inner blue circle is a space of critical human deprivations (hunger, illiteracy, poverty, voicelessness, etc.), which humans should be freed from by empowerment of rights and resources needed to provide a social foundation for leading lives of dignity, opportunity, and fulfilment. At the same time, humanity's use of natural resources should remain within environmental limits to ensure sustainable development, which means recognizing the critical natural thresholds or gradients of increasing risk (climate change, biodiversity loss, land use change, etc. in the outer blue circle) that must not be crossed if the Earth is to remain in its current stable state. Elements of justice (red text in the center of the circle) and expertise (the 'what' and 'who' questions in white text) are added by the authors of this paper. Source: adapted from [Raworth \(2012\)](#). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

the two assessment approaches, we argue that the latter (although itself open to criticisms we discuss later) can be more meaningfully applied to the governance of complex social-ecological systems at finer scales, going beyond 'safe and just' operating spaces as a communication tool. The paper thereby contributes to current debates in sustainable development by nuancing considerations of how to research and pursue both environmentally sustainable and just governance of landscapes or social-ecological systems. We urge a progressive articulation of justice, attention to plurality, power and governance processes across spatial and temporal scales through this lens, and a critical perspective on the role of scientific expertise.

Extending beyond a theoretical contribution, the 'safe and just operating space for humanity' ([Raworth, 2012](#)) has been proposed as a framework for application at regional scales ([Dearing et al., 2014](#)). It is proposed that when taken to finer scales such a framework can:

1) increase *policy impact*, as most governance takes place at the regional rather than planetary scale;

- 2) contribute to the understanding and dissemination of *complexity thinking* throughout governance and policy-making; and,
- 3) act as a *powerful metaphor* and *communication tool* for regional equity and sustainability ([Dearing et al., 2014](#)).

While appealing in its worthy goals, theoretical simplicity and approach, any operationalization of the framework beyond being a communication tool has so far mainly focused on the *safe* parameter. Although the word 'just' features as one of two main desired criteria in the title of the framework, the justice dimension is not well conceptualized or developed in either Raworth's original paper or in Dearing et al.'s application of the framework, rendering conspicuous a pressing need for integration of concepts and methodologies to assess the justice issues and tradeoffs arising from governance for the environment and human development ([Hossain et al., 2017](#); [Häyhä et al., 2016](#)). Fortunately, the combination of environmental and social objectives is far from new to either research or policy. For example joint ecological and social objectives are increasingly prevalent in nature conservation (e.g. [Miller et al., 2013](#)). This has arisen due to acknowledgement, not

only that conservation and development policies may cause social and environmental harm as well as gains, but that safeguarding biodiversity and key ecological functions cannot be achieved without social and economic compatibility (e.g. Angelsen and Agrawal, 2009; Atela et al., 2015a) or without efforts to identify, understand and manage the significant trade-offs that tend to occur in the governance of ecosystems (Howe et al., 2014; Nelson et al., 2009; Visseren-Hamakers et al., 2012). For instance, multiple 'co-benefits' are often sought in ecosystem interventions such as schemes to reduce carbon emission from deforestation, typically including goals supporting inclusive decision-making, respect for Indigenous Peoples' knowledge and fair distribution of costs and benefits (e.g. Angelsen, 2008; Chhatre et al., 2012; Poudel et al., 2015). This paradigm shift in environment and development policy has brought debates about social justice and governance quality to the forefront of sustainability science (e.g. Corbera et al., 2007; McDermott et al., 2013; Pascual et al., 2010; Sikor et al., 2014). This paper contributes to these debates with a critical conceptual view and through empirical exemplification of trade-offs at local level.

The remaining parts of the paper are structured as follows. In Section 2, we unpack the 'safe and just' framework, adding conceptual perspectives and a review of empirical literature on justice as an objective and an outcome of ecosystem governance. We also discuss approaches to complement scientific expertise with wider worldviews and perspectives. We explain our empirical approach in Section 3, followed by a 'safe and just' analysis of our findings from the case study in Laos. In Section 4, we discuss our application of the framework in the light of justice and expertise, and we highlight key questions remaining to be addressed to facilitate greater application of integrated sustainability science at a site, landscape or subnational level.

## 2. Conceptual backdrop: 'safe and just' with additional emphasis on diverse conceptions of justice and governance

Theory from social and environmental justice and social-ecological systems research, supported by a rich tradition of empirical cases, emphasizes some key areas, which have been paid scant attention in work on safe and just operating spaces. Notably, a key feature highlighted by existing academic literature is the plurality of perspectives and severe limitations of universalist approaches, which overlook heterogeneity between and within communities (Agrawal and Gibson, 1999; Blaikie, 2006; Pasgaard and Nielsen, 2016). Leaning on Raworth (2012), the social foundation examined by Dearing et al. (2014) is defined by nationally or internationally agreed minimum standards for human outcomes based on a global consensus on specific social priorities, including food security, income, water and sanitation, health care and education (see Fig. 1). These priorities are used as the basis for selecting indicators within regions to define a social foundation, using data available through the Millennium Development Goals adjusted to provide national and sub-national levels for poverty and health. While some basic human needs may exhibit a degree of universality and objectivity (Nussbaum, 1992) they are neither an adequate reflection of an individual's wellbeing nor the concerns which drive their perceptions of how just a situation, policy or outcome is and their behavioural response to it (Holden et al., 2017; Reader, 2006; Sen, 2004). Different people evaluate outcomes, issues, policies, or institutions differently based on their own individual and collective identities, values (including relationships to biodiversity, places and ecosystems), subjective goals, worldviews, recent as well as historic experiences, the nature of their interactions with other people and institutions, and relative as well as absolute impacts (Honneth, 2004; Martin et al., 2016). Therefore, whilst ensuring allocation of a minimal level of resources such as

access to education or income level may be deemed just by some, justice concerns may not be perceived as satisfied for others unless their historic rights to self-determination have been granted, whether or not that leads to enhanced material wellbeing.

As a consequence of the diversity of perspectives exhibited, justice is best conceptualized not simply as a set of outcomes with a universal threshold, but as an ongoing, interactive process through which different ideas are negotiated about how things should be, how they should be decided and how they should be done (Holifield et al., 2009; Walker, 2012). This in turn has major implications for sustainability policy because it underscores the importance of the political and institutional context for any decisions with social and environmental implications, including how power is distributed and exercised and the processes through which some ideas are prioritized over others (Berbés-Blázquez et al., 2016; Boonstra, 2016; Leach et al., 2018; Schlosberg, 2004). In other words, the intricacies of governance processes and negotiations, both formal and informal, across sectors and at multiple scales, are critical determinants of justice. Indeed, three interrelated justice dimensions are increasingly discussed and applied in research into environmental justice or equity, namely the *distribution* of costs, benefits, and risks; the *procedures*, both formal and socially embedded, through which decisions are made; and *recognition* of people's varying experiences, contexts, identities, and values, in both decision-making processes as well as distributive outcomes (Friedman et al., 2018; McDermott et al., 2013; Nathan and Pasgaard, 2017; Pascual et al., 2010). This three dimensional approach, although scant as a standalone conceptual framework, draws on broad theoretical foundations from justice literature (Fraser, 1995; Young, 2011). Numerous scholars have noted its compatibility with a capabilities approach, which can provide a holistic, socially-constructed understanding of a person's values and consideration of a good life (beyond those necessary simply to survive) and appropriate governance, through which to interpret demonstrations and articulations of justice (Day, 2018; Holland, 2008; Schlosberg and Carruthers, 2010). Also complementary to this multidimensional framing of environmental justice, social-ecological systems research highlights key features of socially and environmentally effective governance to be inclusion of different social groups, integration of their different forms of knowledge, collaboration between them to design processes, set and work towards objectives and to promote social learning and adaptive capacity (Armitage et al., 2009; Folke et al., 2005; Sinclair et al., 2017; Tschakert and Dietrich, 2010). Recent contributions to environmental justice theory go further still, suggesting a need to more explicitly adopt a more critical decolonial, feminist or other appropriate lens than the three dimensional approach provides for to overcome enduring power inequalities and enable more transformative pathways and solutions to emerge (Elmhirst, 2011; Pellow, 2017; Pulido and De Lara, 2018).

With such broad definitions of justice (and equity<sup>1</sup>) and attention to governance processes, deeper and more nuanced questions relevant to sustainable development can be addressed. These include how changes in governance and land use impact different people, directly and indirectly, materially and non-materially, whether changes in structures, procedures and impacts are perceived to be fair and just by diverse interest groups, and how tradeoffs among different people and with ecosystems may be avoided, minimized, mitigated or reconciled such that governance

<sup>1</sup> While equity is often treated alongside justice in conservation research and share similar conceptual dimensions, a justice analysis often differ from equity assessments by applying wider ethical considerations and broader scales of outcomes and actors (Sikor et al., 2014).



can become more just as well as ecologically sustainable (Dawson et al., 2018a; Sikor, 2013).

These perspectives on justice and the characteristics of governance emphasize the narrow normative basis of the safe and just framework. Raworth (2012) herself also explicitly addresses the normative nature of the framework boundaries, i.e. the environmental ceiling and the social foundations, but does not provide guidance on how to move beyond a universalist approach to justice. She notes that

“[...] although science focuses on giving an objective description of the planet's biophysical reality, the question of *where* to set the boundaries of natural resource use is ultimately a normative one, based on *perceptions* of risk, and of the *desirability* of staying within the [current stable state of the] Holocene” (p. 8, emphasis added).

Regarding application of the safe and just framework, this raises questions as to how science and scientific experts determine the boundaries “guiding human development on a changing planet” (Steffen et al., 2015, p. 736) or whether and how different disciplines, actors and perspectives can be bridged through the framework's application. Together with Melissa Leach and Johan Rockström (the lead author of the Planetary Boundaries foundational paper from 2009), Raworth also notes that the process of setting these and other social boundaries also involves *judgements* about what constitute acceptable human outcomes (Leach et al., 2013). Thus, inevitably, this identification and quantification of boundaries calls into question *what* is perceived as ‘safe’ and ‘just’, and *who* sets the desirable boundaries (see also McDermott et al., 2013),<sup>2</sup> which in itself is a political process requiring bridging of and prioritization among multiple perspectives. Such questions of *what* and *who* may be assumed the remit of expert scientists, since they often attempt to assess these complex trajectories of social, technological and environmental change (Jasanoff, 2005). Importantly, scientists are often the ones who measure and decide whether an alert status should be moved from yellow to red (Berling and Bueger, 2015; Pasgaard et al., 2017), thereby defining thresholds for ‘safe operating spaces’ exemplified with the planetary boundaries framework and applications of it (Häyhä et al., 2016; Steffen et al., 2015). However, as noted earlier, different people have different ideas about what constitutes wellbeing, and tensions between expert and local views on when a need is met or unmet exist (Chaigneau et al., 2018). For the social indicators selected by experts, the thresholds of human needs are commonly limited (academically and in practice) to material wellbeing, such as production and income, or may be expanded to include objective measures of health and education such as the Human Development Index or Multidimensional Poverty Index (Hossain et al., 2017). If we conceptualize the expertise exercised as designating authoritative knowledge instead of being something you can possess (Halfon, 2015), the central question is no longer which scientific assessments are *right*, but *whose* representation of environmental quality, social status or quality of life should be accepted as credible and authoritative – especially in the face of great uncertainty (Jasanoff, 2005), which is an inherent facet of defining operating spaces (Rockstrom et al., 2009; Steffen et al., 2015). Although questions of meaningful representation and authoritative knowledge are still pertinent, ambitious co-designed programs are

emerging at various scales to provide examples of best practice for bridging different types of actors and knowledge systems in integrated sustainable development governance or natural resource management (Chaigneau et al., 2018; Clark et al., 2016; Sterling et al., 2017; Tengo et al., 2017; van Noordwijk, 2017).

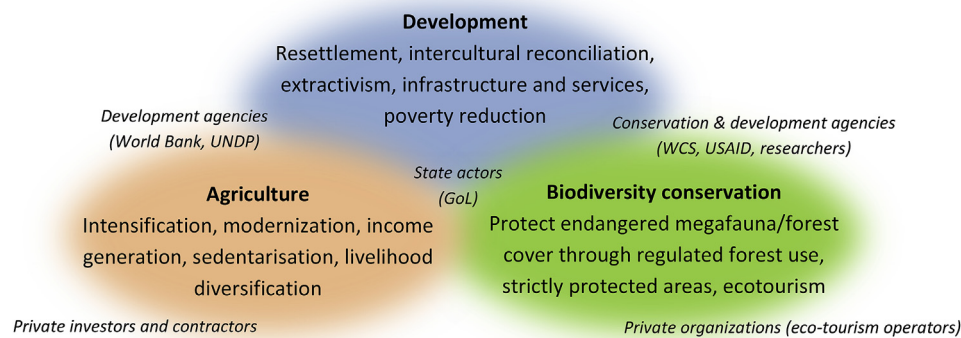
In Fig. 1, questions concerning scientific expertise and bridging of perspectives (white text, inside the green doughnut) are added to the ‘safe and just’ framework along with the three environmental justice dimensions (red text, in the center, see Schlossberg, 2004).

### 3. Empirical and contextual background

To further examine the safe and just framework, with particular attention to diverse perceptions of justice and the role scientific expertise, we provide insights from an interdisciplinary research program conducted in 2014–2015 in Northeastern Laos. Through a case study we illustrate different possible interpretations of trends in social justice and environmental integrity across the landscape and reveal some of the trade-offs and synergies between environmental and social sustainability emerging through the perspectives of local inhabitants from three villages. The study is based on approaches and findings presented in Dawson et al. (2017) supplemented with additional results and perspectives.

The case study focused on the landscape around Nam Et-Phou Louey National Protected Area (hereafter NEPL NPA), an area of tropical forest in Huaphan Province in northeastern Laos. This region presents a highly relevant context to consider the application of the safe and just operating spaces framework: the mountainous forest mosaic landscape provides a wide range of provisioning, regulating and cultural ecosystem services to local and wider populations (Dawson et al., 2017). NEPL NPA contains high, though highly threatened, biodiversity, including eighteen species of large mammals classed as globally threatened, some of them critically endangered (Johnson, 2012). The region is considered one of the least developed in Laos and local people's livelihoods, including shifting cultivation of rice and sundry crops, both for subsistence and income-generation, are strongly linked to land and natural resource use (Broegaard et al., 2017). However, rapid social, economic and environmental changes have and are increasingly taking place across this landscape, in part a result of numerous interacting development and environmental governance initiatives, each with goals to promote benefits for local as well as national or international stakeholders (Fig. 2). During the 1980s (in the aftermath of the Vietnam or ‘American War’ when communists took power in Laos) all villages in the region were relocated out of the forest to ethnically-mixed settlements along roadsides to promote peace-building and facilitate easier governance, infrastructure provision and development (Thalemann, 1997). Policies since then have continually aimed to reduce shifting cultivation and promote more permanent farming, though with little practical implementation or success (Broegaard et al., 2017). However, in more recent years the Lao government has relaxed border controls, begun to engage in greater levels of international trade and encouraged greater marketisation of the rural population. In this part of Huaphan, the emergence of new crop types linked to wider markets, predominantly maize for livestock feed in Vietnam, has since around 2010 initiated a sharp move away from subsistence rice cultivation towards cash cropping (Castella et al., 2013; Vongvisouk et al., 2016). Also since around 2010, local health centres, schools, water supplies and asphalt roads have proliferated. The protected area, NEPL NPA, was established in 1993, though boundaries and rule enforcement were not functional until around 2000 (Johnson, 2012). On the whole the protected area has restricted the local population's access to a range of forest plants, animals and resources, including many target species for hunting (Vongvisouk et al., 2016). Different

<sup>2</sup> McDermott et al. (2013) propose a framework with dimensions for examining equity, including parameters concerning *how* these dimensions are shaped by the scale and target group of concern, *how* the framing of goals with respect to equity is made, and *how* the decisions about the content, target and aims of equity are taken.



**Fig. 2.** A graphic exemplification of dominant discourses and influential actors in and around NEPL-Protected Area illustrates some of the competing interests and complex alliances at play.

management zones and regulations do exist in the landscape, however, including ecotourism schemes, controlled-use forest zones and various forest areas within village lands as well as the total protection zones where no access is permitted (Eshoo et al., 2018a). Key actors influencing local social and environmental trends therefore include: government authorities at district, province and national levels across various sectors; international development and conservation agencies; village leaders and villagers from various social, economic and ethnic groups; foreign companies and their workers involved in agricultural investments, forestry, extractives such as mining or infrastructure projects; and traders acting as middle-men between villagers and foreign buyers various valued crops or natural resources (Vongvisouk et al., 2016). Fig. 2 sketches out dominant competing discourse and objectives within development, agriculture and forest conservation; a deeper analysis of the land use transitions and political actors in Laos can be found in Lund (2011), Lestrelin et al. (2012b), Lestrelin et al. (2012a) among others.

In this particular study, we focus on the conservation and development dynamics of three villages adjacent to the NEPL Protected Area (Table 1): Phon Song adjacent to a Total Protection Zone (TPZ) in which no access is allowed; Khorn Ngua adjacent to a Controlled-Use Zone (CUZ); and Son Koua situated on a paved road adjacent to the CUZ. Son Koua has an ecotourism project operating in the village that provides employment and trade opportunities to some villagers, and the project involves a revenue sharing scheme.

The findings presented in this paper draw on qualitative and to a lesser extent quantitative data collected through semi-structured interviews, focus groups and life-history interviews. Semi-structured interviews were carried out with individuals from 100 randomly-selected households to explore views of local people in relation to governance of the landscape, including the adjacent NEPL National Protected Area, and various social and economic development policies and initiatives affecting them. A set of open questions explored the three dimensions of environmental justice, namely in terms of perceptions of the decision-making procedures, recognition of their values, needs and identities, and the outcomes they experienced in terms of the distribution of material and nonmaterial costs, risks, and benefits. These 100 interviews were supplemented with three focus groups in each village involving a random selection of mixed-gender participants exploring priorities to live a good life, valued resources and places in the surrounding landscape and key changes affecting villagers' lives over the past decade. Life history interviews were carried out with a subset of 30 members of households taking part in semi-structured interviews

to explore longer-term changes including resettlement and migration, and social and cultural values, practices and relations. This approach elicited an understanding of people's cognitive responses to political, environmental, economic, and technological, social, and demographic changes and their resulting behavior. All interviews and focus groups were conducted in Lao language, consent was recorded, and responses were coded in QSR NVIVO 10 (QSR, 2012).

#### 4. Is the landscape around Nam et-Phou Louey National Protected Area in Laos an example of a 'safe and just operating space'?

In the following, we apply the 'safe and just' framework for analysis of our empirical case study of three villages situated in the landscape around NEPL Protected Area in Laos. First, we briefly present results on the ability of people in the three selected villages to attain and exceed lower levels of wellbeing based on indicators in line with the categories put forward in the 'safe and just operating spaces' framework in Fig. 1, and briefly consider the status of the environment in the local landscape. Second, we explore the perceptions of villagers and diverse understandings between different interest groups regarding governance processes and outcomes, and we bridge 'safe' and 'just' with examples at village level. Third and last, we reflect on the "expert" process of setting boundaries for what is 'safe and just' in this particular case.

##### 4.1. Status and trends based on indicators of universal human needs

Over a ten year period, the socioeconomic status of the three villages appears through multiple indicators of wellbeing to have greatly improved. As documented in Table 1, people are able to meet their needs well, when judged by looking at commonly used indicators on income, jobs, water, education, energy, food, health, gender equality and resilience. Furthermore, all of these indicators have progressed over the decade up to 2015, and many of them have improved dramatically within that time due to enhanced local services (water supply, electricity, roads, health centres, schools) and income generating opportunities. The adoption of maize as a cash crop in the region, to be sold to locally-operating companies and supplied as livestock feed to markets in Vietnam and China, has greatly increased disposable incomes since 2010. Local perceptions of the change is characterized by the common response: "There wasn't any money before maize! We didn't make any." 91% of the 100 households surveyed grow maize for income while the other 9%

**Table 1**

Socio-economic data by village, using indicators primarily adapted from the Sustainable Development Goals (UN, 2015) and the Multidimensional Poverty index (MPI) to follow the categories presented in the safe and just operating spaces framework (Fig. 1) and commonly applied lower boundaries of wellbeing for each.

Sample information	Phon Song	Khorn Ngua	Son Khua	
Type of protection	Total protection zone	Controlled-use zone	Controlled-use zone + ecotourism	
Number of households in village	50	60	178	
Number semi-structured interviews (100 total)	30	30	40	
Ethnicity of those interviewed	Lao Loum 26 Khmu 3 Black Tai 1	Khmu 30	Lao Loum 14 Khmu 23 Red Tai 3	
Indicators for safe & just operating space framework				Comment on change over time
<b>Food</b> – households with severe food insecurity, if any member must ever go entire day without food <sup>a</sup>	0%	0%	0%	In 2014, despite shift to growing maize for livestock feed, 88 of 100 households produced rice for consumption and supplemented with extensive wild food collection, vegetable gardens, hunting & fishing.
<b>Water</b> – no equitable access to safe and affordable drinking water for all <sup>b</sup>	0%	0%	0%	Public, clean water supply introduced in each village since 2008
<b>Income</b> – average household income per adult (3.65m per annum = US\$1.25 per day) <sup>c</sup>	\$1.59 per adult per day (339.1m Kip/73 adults)	\$1.74 per adult per day (426.62m Kip/84 adults)	\$1.75 per adult per day (532.8m Kip/104 adults)	Substantial increase in incomes since maize introduced in 2010. In 2014 maize accounted for 50% of total income earned in 100 households sampled. Better infrastructure/education also enabled travel for work & remittances.
<b>Jobs</b> – Proportion of informal employment in non-agriculture <sup>d</sup>	37%	47%	40%	Work opportunities and livelihood diversification greatly enhanced through maize-based disposable income, infrastructure and education. 41% of 100 households engaged in non-farm employment in 2014, with 32% of those performed by women.
<b>Education</b> – no person in household with 5 years + schooling <sup>1</sup>	13.3%	20%	17.5%	Accessibility of education (primary schools present in each village since 2010) has greatly reduced this rate. 24% of households attained 5 years + education in just 4 years from 2010 to 2014.
<b>Energy</b> – homes without access to electricity <sup>e</sup>	43.3%	3.3%	17.5%	All three villages connected to electricity since 2010. Phon Song most recently therefore figures of those without electricity expected to fall rapidly.
<b>Health</b> Under five (years old) mortality rate <sup>f</sup>	3.3%	3.3%	0%	18% of households had suffered death of child <5 years, 13 of them since 2000 but only 2 post 2010, since when local health centres present in all 3 villages, higher incomes and better access to town health facilities
<b>Gender equality – female household head</b> Womens equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources <sup>g</sup>	1	1	3	Only 5 of the 100 households had a female household head. But they held land, performed comparable livelihoods and generated income comparable to other households. Female respondents expressed that improved technology (e.g. electricity, motorbikes, tractors), in part facilitated by the shift to maize production, had greatly reduced the time they spend performing manual tasks and had enabled them to work more alongside their husbands or take other forms of employment. 32% of the 41 instances of non-farming jobs among the 100 households were held by women.
<b>Voice</b> Responsive, inclusive, participatory and representative decision-making <sup>h</sup>	More fines and imprisonment relative to other villages			Consultative decision-making processes for land-use and conservation, but perceived disregard or lack of recognition for villagers' values, identities, practices and institutions, and minimal participation and influence. 79% of those interviewed had attended the meetings about the NPA boundary establishment and agreed with ideas presented there. But almost all respondents expressed dissatisfaction with broken promises of livelihood support (key factors in their expression of agreement) and lack of influence over PA decisions.
<b>Resilience</b> People building long-term resilience to shocks and volatilities through climate change adaptation, disaster risk reduction, and well-designed social protection schemes <sup>3</sup>				The great diversity of resources utilized in the landscape <sup>2</sup> provides resilience to detrimental change. For example, in Khorn Ngua, gold mining operations polluted the river and destroyed resources for three years (fish, shellfish, river weed for food and income). Yet sufficient other resources could instead be harvested from forests and fields. If rice harvests (staple food crop) are insufficient for a family's needs, local social protection systems, present in all three villages, enable either intra- or inter-village borrowing from communal rice stores. No person was found to have migrated or suffered hunger in those circumstances. Livelihoods are also rapidly diversifying (see 'Jobs' above)
<b>Social equity</b> Proportion of people living below 50 per cent of median income, by age, sex and persons with disabilities <sup>h,3</sup>	33%	13%	20%	Median income for the 100 households/3 villages is 12,363kip or \$1.55 per adult per day. Figures presented show % of households living on less than 50% of that or \$0.78 per adult per day

SDG indicator <sup>a</sup>2.1.2; <sup>b</sup>6.1; <sup>c</sup> 1.1.1 <sup>d</sup>8.3.1; <sup>e</sup>7.1.1;; <sup>f</sup>3.2.1; <sup>g</sup>5.A; <sup>h</sup>16.7.2; <sup>i</sup>10.2.1 (UN, 2015) <sup>1</sup> Alkire and Santos (2014) <sup>2</sup>; Rasmussen et al. (2016); <sup>3</sup>cf. Raworth (2012).

were engaged in other forms of trade, such as owning local shops, so did not grow crops commercially. Not only have people become commercial rather than subsistence farmers (not one household could be considered as surviving through subsistence or even farm labour alone in 2015), but their livelihoods have also greatly diversified within ten years. 41% of households benefitted from substantial off-farm income on top of farming or trade income and 21% could be considered to gain income from a profession such as teachers, government administrators, builders, soldiers, mechanics or drivers. This is a high proportion for a remote, mountainous rural area. Natural resources from the local landscape still provide a basis for people's livelihoods, through farming, subsistence collection for a multitude of uses and sale of forest products (Rasmussen et al., 2016), but the status of natural resource use as virtually the sole source of livelihood has diminished considerably. Data on land use changes over the same period reflect low rates of deforestation within the protected area and therefore corroborate the view that intensified use of land outside of the protected area (Dawson et al., 2017), and income generation from a variety of farm and non-farm sources may have improved forest conservation by replacing the need to convert forest for subsistence rice cultivation (Table 1). Thus, a win-win situation satisfying both 'safe' and 'just' criteria seems to be in place. To further investigate the promising changes, we take a closer look at the local perspectives on the long-term trends and the processes by which conservation and development objectives, structures and strategies are decided and formed.

#### 4.2. Status and trends based on local perceptions: values, practices, needs and quality of governance

In contrast to the picture portrayed through the positive characterization and trajectory of justice following the framework for safe and just operating spaces (Table 1 and previous section), exploration of the perceptions of local people reveal numerous injustices with strong implications for the ecological integrity within the surrounding landscape. In particular, participants pointed to the disregard or lack of recognition for their values, identities, practices and institutions, repeatedly perpetrated through environment and development and other associated policies and programs, as having harmed their wellbeing. These perceived injustices have led to protracted unresolved conflicts with potential or emerging negative impacts for the effectiveness of environmental policies.

For many generations, local livelihoods in this mountainous region have centered around shifting cultivation of upland rice, management of swiddens and collection for consumption or use of a wide range of vegetables, animals and products from the forest-mosaic landscape. These livelihoods developed in response to a harsh tropical climate with seasonal extremes and the need to produce storable staple foods from poor soils requiring frequent regeneration. Villages were generally socially cohesive units through which sharing and exchange of labour, resources and decision-making were highly communal. This regional generalization of livelihood-based identity does not deny that the many ethnic groups present also hold diverse cultural values and practices, including language, spiritual beliefs, forms of housing and so on, and that "communities" are less homogenous than often perceived (Blaikie, 2006). However, with this understanding of local context, it is unsurprising that in focus groups and interviews, local inhabitants of both genders and across all ethnic groups stated that access to land for farming and access to natural resources (from forests, farmland and rivers for food, construction materials, household items and medicines) remain the ultimate priorities enabling them to live a good life (Dawson et al., 2017).

Inhabitants of the region have also been subject to social and

political upheavals, through the international and inter-ethnic conflict which brought great insecurity from the 1960s through even to the 1990s, and their resettlement outside of the deepest forests and abandonment of homes and villages in the 1980s and early 90s as encouraged by the communist government to facilitate interethnic reconciliation and provision of services to improve living standards. It is also unsurprising, therefore, that effective local leadership and decision-making at village level, and social cohesion through good intra and inter village relations were also prioritized by study participants as necessary foundations for living a good life (Dawson et al., 2017).

The inclusion of local values and perspectives in land related policy, or of any influence, consultation or other form of participation of local communities, has been negligible (Bourgoin et al., 2012; Broegaard et al., 2017). Policies and programs aimed at conserving the forest ecosystem and associated biodiversity, including establishment of the NPA and associated land use planning initiatives, and those seeking to improve the lives of local people (both through the Lao government and international governmental and non-governmental organisations) have been dominated by the interrelated narratives that: a) shifting cultivation is a backward and ecologically damaging practice that should be eliminated through zoning the landscape and restricting land uses; b) that this should occur in favour of more sedentary land use, based on a system of property rights, and; c) that alternative, market-oriented livelihoods should be promoted to enhance incomes and reduce use of forest resources. Although local identities are dynamic and many people residing in and around the NPA express that they do not want to be shifting cultivators forever, and wish to support their children's education and diversify their livelihoods, the contrast between local identities and the objectives guiding conservation and development policies is glaring.

The suite of externally-driven conservation, social development and agricultural policies have resulted in more defined ownership and zonation of the landscape, to the clear detriment of customary access to land for short term, rotational cultivation. Formalisation of tenure and intensification of land use have effectively denied land use rights to those lacking social capital and the poorest within rural Lao communities. Seventeen percent of the households studied held less than a hectare (average 0.68ha), despite a reliance on land for income generation and no shortage of labour capacity. As a result, all of these families lived on less than US\$1.25 per adult per day, a situation they perceived as being far from just.

As a result of the gulf between externally-designed policy and local wellbeing, the formal governance system is considered so imposed and unrealistic for local people that parallel forms develop. Instead of those policies and regulations being effectively implemented, local people seek other ways to influence land access and management. Through negotiating with alternative decision-makers such as sympathetic local government authorities and expressing their claims over land, a system of informal governance takes over, whereby use of land within the protected area is increasingly sanctioned, not through conservation managers, but by local government actors. This emerging trend towards less sustainable or unsafe land use represents a local reaction to governance perceived as unjust and imposed. However, the informally negotiated, alternative system has favoured those with power and resources to insure against any punitive measures. Elite capture of land has ensued, exacerbating maldistribution and contributing to further inequality, social division and resentment among those with lesser social, economic or political status.

A clear case for injustice in distribution of costs from conservation among the villages surfaces. In particular, the residents of Phon Song suffer from having less land, lower incomes and less food security (rice sufficiency) than the other villages, though these



relations are not reflected in material indicators like the multidimensional poverty index (Dawson et al., 2017, Table 1). The poor relative situation in Phon Song can be attributed to the restrictions placed on the residents by the NEPL-NPA, as they are in the core or 'total protection zone' where all forest uses are prohibited. There is clear dissatisfaction with these outcomes in Phon Song (relative to the other two villages). Many people from this particular village clear land inside the Protected Area, they try to protest vocally and through letters to authorities, and fines and imprisonment of villagers take place every year to the extent that in a single year, 2013, a villager from Phon Song was arrested from approximately one in every five households for subverting conservation regulations (Dawson et al., 2018b). These issues reflect not only land scarcity but lack of recognition of traditional practices, because hunting and collection a diverse array of Non-Timber Forest Products (NTFPs) are also impinged by the Protected Area. In terms of compensation, Phon Song has not been specifically targeted to receive benefits to reflect the costs they suffer. In that sense they are treated like any other village, or even receive less than others. Few conservation related development programs operate in Phon Song, compared to more accessible villages along main roads such as Son Khua. Recently, loans have been supported for livestock rearing in Phon Song, particularly for women, though such a scheme could arguably be seen as counterproductive to an integrated conservation and development strategy. Thus, the anticipated and observed win-win outcomes in terms of being 'safe' and 'just' at the aggregate level seem to dissolve when a nuanced justice perspective is applied at inter-village level. In Table 2, we separate out and connect a





selection of social and environmental outcomes from our study in order to illuminate trade-offs and synergies between 'safe' and 'just'.

Justice concerns among and within villages not only reflect distributive and procedural deficiencies, but also lack of recognition and effective inclusion of poor and marginalized social groups, all of which may contribute to less effective forest protection (e.g. Angelsen and Agrawal, 2009; Sunderlin et al., 2010). In this case, the distribution of costs and benefits from conservation are heavily determined by the spatial location of villages within or around the protected area (see also Pasgaard and Nielsen, 2016). Regarding recognition of various social groups and their inclusion in formal or informal decision making, processes of village resettlement in the 1980s and early 1990s brought together people from diverse locations and ethnic backgrounds, with differences still evident in social status, cultural practices and access to resources, most notably land. The impacts of land-use and conservation decisions, perceptions as to their fairness and reactions to them are affected by these types of complex socio-political dynamics that persistently determine who gets what and who has power to decide. Universal thresholds of basic needs may therefore be poor reflections of local concerns and weak indicators of how pertinent injustices may be addressed.

In relation to recent socio-economic trends, a high dependency on contractors (agricultural merchants or middle men) leaves local income generation vulnerable to external pricing and decision-making control, which might lead to continued deforestation in pursuit of alternative options or to maintain income generation

**Table 2**

Examples of empirical findings from a 'safe and just' perspective. Arrows indicate the relationship and expected synergies between 'safe' and 'just', thereby integrating our added justice dimensions (see Fig. 1). Many of these relations are also linked vertically and connected to large scale transformation and development trends, which are not illustrated in this Table.

Main findings: village-level study in Laos	Is it <i>just</i> ? (distribution, procedure, recognition)	Is it <i>safe</i> ? (environmental sustainability)
Profound trade-offs between conservation governance and local practices/perceptions	<b>Not just</b> , due to a lack of participation and transparency (procedure); rule-breaking and corruption favouring the elite (distribution), and; changing identities, perceptions and responses to conservation exacerbating tradeoffs, while local institutions have faced long-term subjugation(recognition)	 <b>Not safe</b> with lack of inclusion and recognition-based injustice leading to resentment, cases of non-compliance and a risk of ineffective forest protection.
Informal governance replaces operative policies and regulations	<b>Not just</b> , since the informal system favors the more powerful who can afford risks of being fined and who may negotiate access with local government. This elite capture enhances inequity, social division, and resentment among poorer and the less powerful	 <b>Not safe</b> , since land within the protected area is increasingly sanctioned by the alternative decision-makers in local government. Forest clearance continues leading to biodiversity loss and greenhouse gas emissions
Distance and access to national park affect village-level allocation of costs and benefits, leading to inter-village inequity	<b>Not just</b> , as those residing closer to core protected areas suffer most (income and debt, Table 1), but are not recognized or compensated well, whilst those in accessible areas with relatively better infrastructure gain the park benefits of tourism and projects	 <b>Not safe</b> due to risk of ineffective forest protection in more remote and often most biodiverse areas, through alienation of remote villagers and rule-breaking
Increasing dependency on external traders/middle-men, and increasing loans and debt	<b>Not just</b> , since decision-making power is very low and income generation vulnerable. Signs of increased social division, increased inequality in land access	 <b>Not safe</b> , with a risk of continued deforestation to extend agriculture and take advantage of productive soils due to land use restrictions, declining income and unequal land distribution

Main sources: Dawson et al., 2017, field study



from harvests. This dynamic is rooted in the major trend for development in the region encouraging increases in cattle rearing because markets in towns, Vietnam and China are booming (Vongvisouk et al., 2016). This is a trend which conservation authorities are not actively acknowledging or engaging with. This lack of foresight may occur because conservation and development are in many respects poorly integrated in the area (Broegaard et al., 2017).

Essentially there are multiple tradeoffs in the case of the NEPL NPA that have occurred over several decades and need to be identified, openly discussed through more socially-cognizant, inclusive governance processes and where possible turned into positive synergies benefitting both safe and just dimensions. Table 2 only provides a selection of examples illustrating the complex relations between the 'safe and just spaces' of conservation at village level. These examples highlight the daunting challenges that conservation strategies face to pursue environmental and social objectives simultaneously to ensure the desired outcomes. The examples also stress the need to apply multiple methods for the preparation, implementation and evaluation of conservation strategies (Rasmussen et al., 2016). Establishing objectives and selecting methods ultimately depends on the decision-makers and implementers of conservation projects, who in this case set the boundaries of 'safe' and 'just' by defining goals and approaches. The minds behind conservation projects are often an uneven mix of donors, government agencies, national and international NGOs and external scientific consultants (Fig. 2), who bring to their individual ideas and interests to the table (Broegaard et al., 2017; Pasgaard and Mertz, 2016). Following our conceptual frame (Fig. 1, added white text), we illustrate the setting of boundaries in the case of NEPL NPA in Laos below.

#### 4.3. Who sets the boundaries of what is 'safe' and 'just', and for whom?

According to Wildlife Conservation Society (WCS) in Laos – who conducts research, provides training, and partners with authorities – the forest conservation project in NEPL integrates various environmental and social dimensions, for instance by improving sustainable harvest of wild plants and animals to provide greater local food security, or by promoting ecotourism as alternative livelihoods directly linked to ecosystem health (WCS, 2016). These aims reflect the practical 'safe and just' operating space within boundaries (environmental ceiling and social foundation) determined by the main conservation project actors. Overall, the environmental and social goal of the project resonate well with the overall 'safe' dimensions with regard to for instance land use change (avoiding agricultural encroachment and over-harvesting) and biodiversity loss (protection of endangered species, tigers in particular), as well as with the 'just' dimensions in terms of health and food, education (building awareness), income and jobs (improving livestock raising and ecotourism) (WCS, 2016). However, the conservation activities *in practice* seem to follow a "scatter gun approach" with many different organisations who follow their own individual goals and ideas, for instance about poverty and wildlife consumption (USAID-WCS, 2010), reducing hunting activity and promoting pro-conservation behavior (Saypanya et al., 2013), saving tigers (GoL, 2010; WCS, 2016), and promoting ecotourism (Bhula et al., 2009; Eshoo et al., 2018b). There does not seem to be any kind of integrated strategy for conservation and development to address these at times competing goals (see Fig. 2). Instead, the definitions and boundaries of what is 'safe' and 'just' differ among the primary conservation actors with the Government of Laos (GoL) and the Wildlife Conservation Society (WCS) being the most influential. By contrast, the environmental justice perspectives presented in the

previous sub-sections represent the socially constructed perceptions, and the values and behaviours, of the rural inhabitants, who are at the heart of the questions of 'safe and just'. Their perceptions reveal what is acceptable, desired and just *for them* (Dawson et al., 2017). For instance, they seek ways to supplement their shifting cultivation-based livelihoods and seek market support for selling their products so they can benefit, e.g. by educating their children and improve their general living standards. These desires resonate with the 'social foundation' defined by Raworth (2012) (Fig. 1). However, the environmental trade-offs and unjust distribution, procedure, and recognition result in conservation outcomes that are neither 'safe' nor 'just' (Table 2) from the perspective of those who set the boundaries at village level, in this case the conservation actors – and the authors of this paper.

## 5. Discussion and conclusion

### 5.1. Lessons from applying the 'safe and just' framework versus three-dimensional environmental justice

In this paper, we scrutinize conceptualisations of justice applied to questions of environmental and social sustainability, and propose advances to the 'safe and just operating spaces' framework with important implications for research, governance and policy-making. While the original 'safe and just' framework presents a simple and noble goal focused on meeting universal, primarily material basic needs, more nuanced analyses are commonly being applied to understand the operating space in all its dynamic complexity. Our empirical case at local level in rural Laos, based on contemporary frameworks for studying environmental justice tell a different story than "standard" spatial analyses or well-being assessments based on aggregation or externally-defined material thresholds. Such narrow and inflexible framings of justice paint a picture of positive development and conservation trends while disguising the socially-constructed perceptions of those at the heart of questions of justice, namely, in this case, rural inhabitants and particularly social minorities within them (Dawson et al., 2017). Our study reveals that conceptualising justice in terms of universal basic needs indicators provides a weak basis for decision making, particularly because it neglects recognition of valued social and cultural institutions, including long-term discrimination against practices like shifting cultivation and related customary tenure systems, and the extent to which governance is inclusive of different groups, their voices and aspirations. Indeed, approaches focused on attainment of material basic needs may risk overlooking considerable injustices, persistent power inequalities or even persecution and violation of rights that threaten sustainability in the long or short term. Embracing and analyzing this complexity is a different task than assessing justice and measuring its "space" in relation to a defined threshold. For instance, what is the ceiling for having a voice, and which minimum level of voice is acceptable to whom? We seem to encounter the same difficulties as attempts to measure livelihood capitals, in particular the social capital, which is notoriously difficult to identify and assess (Bebbington, 1999).

Considering justice solely in terms of basic needs thresholds may serve to support dominant neoliberal framings of development and conservation and suggest only minimal reform is required to governance or the strategies to pursue them to attain sustainability even in circumstances involving long-term subjugation of rural communities. Applying a more holistic lens on environmental justice that considers local values and identities in ways aligned with a capabilities approach facilitates a more nuanced comprehension of governance. In turn such analysis may emphasize areas requiring reform or transformation to orient towards sustainability and enhanced justice. For example, our study

highlights that rules and even boundaries associated with formal conservation governance actually mean little even in a core area in a frontier of conservation, in the face of economic gain and complex informal governance systems. The way people interact with ecosystems, the way their current and future wellbeing is entwined with nature often rests on ancestral and place based cultural knowledge, though social identities may also be in flux and aspirations differ greatly between and within a given location or social group. Thus people's behavior and their reactions to political, social or environmental changes cannot be predicted based simply upon their status against a standardized, material threshold. The basic interpretation of justice evident in the 'safe and just' framework risks neglecting these important facets and trade-offs between safe and just; such basic interpretation could for example be used to support externally-driven alternative livelihoods approaches that aim to disconnect people from their traditional lands leaving them vulnerable to commercial intensification or exploitation and as such are neither 'safe' nor 'just' (Table 2). "Universal" strategies and thinking about integrating conservation and development that seeks to detach people's practices from their established places and social institutions, have been evident globally for decades, but evidenced to perform poorly in terms of social and ecological impacts (Atela et al., 2015b; Blom et al., 2010).

### 5.2. Governance advances – justice gaps persist

The focus on governance in conservation, sustainable development, climate policy and even extractive industries is generally increasing (e.g. Brockhaus et al., 2014; Korhonen-Kurki et al., 2014; Sikor et al., 2014), and we effectively show why it has to. Despite years of practical experience and important lessons to harvest (Blom et al., 2010), it is still a great challenge to integrate social, environmental and economic concerns, to design suitable forms and cultures of governance, and to strengthen capacities for implementation. At the root of the implementation difficulties, lie challenges in the negotiation of diverse interests and agendas (Broegaard et al., 2017; Pasgaard and Mertz, 2016) and of the underlying competing norms among different actors, stressing the need to uncover and deal with tradeoffs rather than imposing ways of thinking on people (Li, 2007). While hegemony is becoming a thing of the past in stated development goals, we need to recognize that many approaches still carry its legacies. Our ways of envisioning justice in practice are very far removed from what would be considered just by local communities and particularly the most vulnerable among them (Nathan and Pasgaard, 2017).

So, what kinds of issues are generally overlooked and hidden by dominant governance approaches in conservation and development? Examples are the impacts on the poorest, their subsistence and other social practices (e.g. Leggett and Lovell, 2012; Milne and Adams, 2012), as well as cultural identity and place detachment (e.g. Agyeman et al., 2016; McLean and Stræde, 2003). In basic terms, if compensated relocation based on top-down policy strategies can be considered as a safe and just solution (one which endures in dominant discourse and appears supportable by the universal basic needs approach to justice put forward in the safe and just framework), then a gap in perceived justice between policymakers and local, affected communities will persist. Such justice gaps need to be narrowed before we can consider an approach a good reflection of safe and just. Unfortunately, our case study example is not very positive in this regard given the selected universal indicators and available data (Table 1).

Other studies and approaches can provide useful guidance to address the safe and just challenges, and we should turn to them for insights and advice. For instance, biocultural approaches integrates biological and cultural phenomena in a holistic way (Dufour, 2006;

Hadley and Wutich, 2009), well-being approaches at national and subnational levels can direct attention to people's perceptions of happiness, life satisfaction and aspirations, including perceptions of governance processes (O'Donnell and Oswald, 2015), and community protocols seek to establish what the local users envision with specific reference to their ideas of justice (e.g. UNEP, 2009). These approaches to reveal social complexity and other inclusive and multi-perspective views on conservation and development may inform governance innovations to enable collaborative, cross-sectoral, integrated and adaptive decision-making or even empower communities and social movements to drive change (e.g. Armitage et al., 2009; McDermott et al., 2013), which offer promising new directions towards more sustainable solutions. The three-dimensional approach is open to criticism itself as a very limited conceptual framework. When interpreted without adequate attention to the theoretical foundations, can also be used to support simplistic analyses of environmental governance. For example, interpretation of 'equity' for protected area management can support tick-box forms of participation and provision of minimal material compensation rather than questioning long-term power dynamics and promoting the transformation in governance that local social movements or rights advocates often demand in order to overcome injustice and conflict (Martin et al., 2016). For these reasons, recent environmental justice scholarship has sought to question or augment this approach, firstly with the addition of a capabilities approach to highlight the holistic and socially-constructed nature of wellbeing (Day, 2018; Holland, 2008), and secondly with methodologies that seek to center more on the perceptions of persistently marginalized groups and the various dynamics through which that marginalization is reproduced, such as decolonial studies or critical feminist geographies (Elmhirst, 2011; Pellow, 2017; Pulido and De Lara, 2018). Attention should be paid to these contemporary developments in justice theory when applying the 'safe and just' framework to inform sustainability policies and practices.

### 5.3. Scientific expertise and discursive potentials

Dearing et al. (2014) note that "the challenges of communicating concepts to describe complexity in real world situations are significant". In the safe and just framework description, the defined operating spaces are categorized as 'safe', 'cautious' and 'dangerous' based on a colour-coding. The authors argue that this "simple imagery condenses powerful complexity concepts and time-series analyses into an easily understood qualitative basis of assessment" (p. 299). In this sense, they argue that the framework is a powerful metaphor and communication tool. In other words, and as Raworth (2012) and Rockstrom et al. (2009), they use their scientific expertise to decide and compellingly disseminate the alert status of what is safe and just in their view (see Berling and Bueger, 2015; Pasgaard et al., 2017). The analytical complexity and uncertainty condense and collapse into an easily understood and persuasive image, which makes it harder to question whether the scientific assessments are right, but easier to accept policy recommendations, if only the scientists are perceived as credible and authoritative experts (cf. Jasanoff, 2005). With this condensation, scientific experts ultimately make ethical choices, but without considerations of deeper issues of justice, as argued below.

The empirical analysis by Dearing et al. (2014) shows "the extent to which each region currently meets *expected* social standards [...] for an *acceptable* social foundation (p. 233, emphasis added)". Applying our assessment approach with an emphasis on justice and expertise, these important aspects require a deeper interrogation than accounted for by Dearing et al. (2014). For instance, *who* expect these social standards, based on what normative criteria,

and why? What is an *acceptable* social foundation – from whose perspective? Moreover, with reference to Raworth's social foundation, it becomes relevant to ask who is interested in and would be willing to accept internationally agreed *minimum* standards for human outcomes or “a *minimum* of every human's claims” (2012, p. 9, emphasis added)? All these questions are rooted in the perceptions of what we (the international community) perceive as an acceptable social foundation for rural developing populations. We, who have the power and will to improve the lives of others (Li, 2007). In the above paragraph, we (as authors of this paper) air our own wish to narrow the justice gap towards better reflections of safe and just. But how narrow and what is better or good, and from whose perspective? By stating this, we also set boundaries and face the difficulties of defining them. These are highly normative questions making it important to expose and reflect upon different framings and motivations, including our own (Leach et al., 2013), but in particularly those framings aiming at short term income boosts, livelihood diversification, and overall economic growth. This is still an extremely influential policy discourse (Purdey, 2010), perhaps even the master frame surrounding national economic growth, trade and consumption that overshadows all considerations of sustainability and justice (Kerschner and O'Neill, 2015). Thus, in order to give greater emphasis to being safe and just in the NEPL NPA case, we need to also consider such discourses, policy framings and how they would actually need to change. Projecting this to the ground level, a crucial starting point is improved and regular communication among key stakeholders across conservation and development (Fig. 2), and community representatives, for ensuring a greater leveling of expectations and balancing of interests.

At the policy level, the dominant discourse surrounding the social foundation somehow legitimizes how developing poor populations are kept in an accepted “background condition” of pre-existing misery (see Ribot, 2014), i.e. minimum standards of living – or are raised with environmental degradation as being the “normal” baseline situation (Soga and Gaston, 2018). While this is the harsh reality for many who may have adapted to poor conditions that are seriously harmful (Chaigneau et al., 2018), our empirical study shows that people strive for more than a minimum threshold – they strive for livelihoods they have reason to value socially and culturally, that can be sustained and that they have influence over. Their desires are not always in sync with the ‘safe and just operating space’, and this mismatch re-connects our discussion to the justice perceptions and dimensions. We argue in favour of a conceptual and analytical approach which unfolds rather than condenses complexity, and which considers the perceptions of local people. A legitimization of minimum standards for some populations can be said to be a starting point towards greater equity in the global distribution of incomes and resource use (Raworth, 2012, p. 20) and the doughnut should focus attention on addressing deeper inequalities (Raworth, 2017). But remember, global redistribution is not visually communicated in the original ‘safe and just’ framework, nor is it emphasized by Dearing (2014) or Rockstrom et al. (2009). Likewise, Steffen et al.'s (2015) update on Planetary Boundaries explicitly refrains from taking into account and providing guidance concerning “the deeper issues of equity and causation” (p. 8). This suggests a normative paradox or even hypocrite, as many of these same scientific experts do not keep back from determining boundaries and indicating when these are transgressed, which is a highly political and normative expert practice (see however Dearing, 2017, embracing justice dimensions, participatory approaches, and co-production of knowledge; and Steffen and Stafford Smith, 2013, who re-analyse the equity–environmental sustainability relationship). We welcome signs of the earlier apolitical approaches being challenged, not least

by more than 15,000 scientists, who recently signed a call for a transition to sustainability, including a reduction of wealth inequality and *per capita* consumption (Ripple et al., 2017), thereby stepping out of their own perceived boundaries to keep humanity within theirs. Ultimately, the application of critical justice analyses that incorporate diverse values and question power relations are more likely to offer insights into governance innovations necessary to attain the transformative sustainability required, apparently with ever more urgency.

## Declaration of interests

None.

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## References

- Agrawal, A., Gibson, C.C., 1999. Enchantment and disenchantment: the role of community in natural resource conservation. *World Dev.* 27 (4), 629–649.
- Agyemang, J., Schlosberg, D., Craven, L., Matthews, C., 2016. Trends and directions in environmental justice: from inequity to everyday life, community, and just sustainabilities. *Annu. Rev. Environ. Resour.* 41 41, 321–340.
- Alkire, S., Santos, M.E., 2014. Measuring acute poverty in the developing world: robustness and scope of the multidimensional poverty index. *World Dev.* 59, 251–274.
- Angelsen, A., 2008. Moving Ahead with REDD. Center for International Forestry Research (CIFOR), Bogor, Indonesia.
- Angelsen, A., Agrawal, A., 2009. Using community forest management to achieve REDD+ goals. In: Angelsen, A. (Ed.), *Realising REDD+: National Strategy and Policy Options*. Center for International Forestry Research (CIFOR), Bogor, Indonesia.
- Armitage, D.R., Plummer, R., Berkes, F., Arthur, R.I., Charles, A.T., Davidson-Hunt, I.J., Diduck, A.P., Doubleday, N.C., Johnson, D.S., Marschke, M., McConney, P., Pinkerton, E.W., Wollenberg, E.K., 2009. Adaptive co-management for social–ecological complexity. *Front. Ecol. Environ.* 7 (2), 95–102.
- Atela, J.O., Minang, P.A., Quinn, C.H., Duguma, L.A., 2015a. Implementing REDD plus at the local level: assessing the key enablers for credible mitigation and sustainable livelihood outcomes. *J. Environ. Manag.* 157, 238–249.
- Atela, J.O., Quinn, C.H., Minang, P.A., Duguma, L.A., 2015b. Implementing REDD plus in view of integrated conservation and development projects: leveraging empirical lessons. *Land Use Policy* 48, 329–340.
- Bebbington, A., 1999. Capitals and capabilities: a framework for analyzing peasant viability, rural livelihoods and poverty. *World Dev.* 27 (12), 2021–2044.
- Berbés-Blázquez, M., González, J.A., Pascual, U., 2016. Towards an ecosystem services approach that addresses social power relations. *Current Opinion in Environmental Sustainability* 19, 134–143.
- Berling, T.V., Bueger, C., 2015. *Security Expertise: Practice, Power, Responsibility*. Routledge.
- Bhula, R., Makhani, N., Sinn, R., Stark, L., 2009. Business Plan for Ecotourism in Nam Et–Phou Louey National Protected Area, Lao PDR. Haas School of Business University of California, Berkeley.
- Biermann, F., 2018. Global governance in the “anthropocene”. In: Brown, C., Eckersley, R. (Eds.), *The Oxford Handbook of International Political Theory*.
- Blaikie, P., 2006. Is small really beautiful? Community-based natural resource management in Malawi and Botswana. *World Dev.* 34 (11), 1942–1957.
- Blom, B., Sunderland, T., Murdiyarso, D., 2010. Getting REDD to work locally: lessons learned from integrated conservation and development projects. *Environ. Sci. Policy* 13 (2), 164–172.
- Boonstra, W.J., 2016. Conceptualizing power to study social–ecological interactions. *Ecol. Soc.* 21 (1).
- Bourgoin, J., Castella, J.-C., Pullar, D., Lestrelin, G., Bouahom, B., 2012. Toward a land zoning negotiation support platform: “Tips and tricks” for participatory land use planning in Laos. *Landsc. Urban Plan.* 104 (2), 270–278.
- Brockhaus, M., Di Gregorio, M., Mardiah, S., 2014. Governing, the design of national



- REDD plus : an analysis of the power of agency. *For. Policy Econ.* 49, 23–33.
- Brogaard, R.B., Vongvisouk, T., Mertz, O., 2017. Contradictory Land Use Plans and Policies in Laos: Tenure Security and the Threat of Exclusion, vol. 89. *World Development*, pp. 170–183.
- Castella, J.C., Lestrelin, G., Hett, C., Bourgoin, J., Fitriana, Y.R., Heinimann, A., Pfund, J.L., 2013. Effects of Landscape Segregation on Livelihood Vulnerability: Moving From Extensive Shifting Cultivation to Rotational Agriculture and Natural Forests in Northern Laos. *Hum. Ecol.* 41 (1), 63–76.
- Chaigneau, T., Coulthard, S., Brown, K., Daw, T.M., Schulte-Herbrüggen, B., 2018. Incorporating basic needs to reconcile poverty and ecosystem services. *Conserv. Biol.* 33 (3), 655–664.
- Chhatre, A., Lakhanpal, S., Larson, A.M., Nelson, F., Ojha, H., Rao, J., 2012. Social safeguards and co-benefits in REDD+: a review of the adjacent possible. *Current Opinion in Environmental Sustainability* 4 (6), 654–660.
- Clark, W.C., Tomich, T.P., van Noordwijk, M., Guston, D., Catacutan, D., Dickson, N.M., Mcnie, E., 2016. Boundary work for sustainable development: natural resource management at the consultative group on international agricultural research (CGIAR). *Proc. Natl. Acad. Sci. U.S.A.* 113 (17), 4615–4622.
- Corbera, E., Kosoy, N., Tuna, M.M., 2007. Equity implications of marketing ecosystem services in protected areas and rural communities: case studies from Meso-America. *Global Environmental Change-Human and Policy Dimensions* 17 (3–4), 365–380.
- Dawson, N., Coolsaet, B., Martin, A., 2018a. Justice and equity. Emerging research and policy approaches to address ecosystem service trade-offs. In: Schreckenber, K., Mace, G., Poudyal, M. (Eds.), *Ecosystem Services and Poverty Alleviation. Trade-Offs and Governance*. Taylor & Francis.
- Dawson, N., Martin, A., Danielsen, F., 2018b. Assessing equity in protected area governance: approaches to promote just and effective conservation. *Conservation Letters* 11 (2), e12388.
- Dawson, N.M., Grogan, K., Martin, A., Mertz, O., Pasgaard, M., Rasmussen, L.V., 2017. Environmental justice research shows the importance of social feedbacks in ecosystem service trade-offs. *Ecol. Soc.* 22 (3).
- Day, R., 2018. A capabilities approach to environmental justice. In: R.H., Chakraborty J., G.W. (Eds.), *The Routledge Handbook of Environmental Justice* (Chapter 11). London.
- Dearing, J.A., 2017. Limits and Thresholds. Setting global, local and regional safe operating spaces. In: Schreckenber, K., Mace, G., Poudyal, M. (Eds.), *Ecosystem Services and Poverty Alleviation. Trade-Offs and Governance*. Routledge.
- Dearing, J.A., Wang, R., Zhang, K., Dyke, J.G., Haberl, H., Hossain, M.S., Langdon, P.G., Lenton, T.M., Raworth, K., Brown, S., Carstensen, J., Cole, M.J., Cornell, S.E., Dawson, T.P., Doncaster, C.P., Eigenbrod, F., Floerke, M., Jeffers, E., Mackay, A.W., Nykvist, B., Poppy, G.M., 2014. Safe and just operating spaces for regional social-ecological systems. *Global Environmental Change-Human and Policy Dimensions* 28, 227–238.
- Dryzek, J.S., Pickering, J., 2018. *The Politics of the Anthropocene*. Oxford University Press.
- Dufour, D.L., 2006. Biocultural approaches in human biology. *Am. J. Hum. Biol.* 18 (1), 1–9.
- Ehresman, T., Stevis, D., 2018. International environmental and ecological justice. In: Kütting, G., Herman, K. (Eds.), *Global Environmental Politics. Concepts, Theories and Case Studies*, second ed. Routledge, pp. 113–130.
- Elmhirst, R., 2011. Introducing new feminist political ecologies. *Geoforum* 42 (2), 129–132.
- Eshoo, P.F., Johnson, A., Duangdala, S., Hansel, T., 2018a. Design, monitoring and evaluation of a direct payments approach for an ecotourism strategy to reduce illegal hunting and trade of wildlife in Lao PDR. *PLoS One* 13 (2).
- Eshoo, P.F., Johnson, A., Duangdala, S., Hansel, T., 2018b. Design, monitoring and evaluation of a direct payments approach for an ecotourism strategy to reduce illegal hunting and trade of wildlife in Lao PDR. *PLoS One* 13 (2), e0186133.
- Evans, G., Phelan, L., 2016. Transition to a post-carbon society: linking environmental justice and just transition discourses. *Energy Policy* 99, 329–339.
- Folke, C., Hahn, T., Olsson, P., Norberg, J., 2005. Adaptive governance OF social-ecological systems. *Annu. Rev. Environ. Resour.* 30 (1), 441–473.
- Fraser, N., 1995. From redistribution to recognition - dilemmas of justice in a post-socialist age. *N. Left Rev.* (212), 68–93.
- Friedman, R.S., Law, E.A., Bennett, N.J., Ives, C.D., Thorn, J.P.R., Wilson, K.A., 2018. How just and just how? A systematic review of social equity in conservation research. *Environ. Res. Lett.* 13 (5), 053001.
- GoL, 2010. National Tiger Action Plan for Lao PDR 2010–2020. Government of Laos (GoL), Division of Forestry Resource Conservation, Department of Forestry, Ministry of Agriculture and Forestry.
- Hadley, C., Wutich, A., 2009. Experience-based measures of food and water security: biocultural approaches to grounded measures of insecurity. *Hum. Organ.* 68 (4), 451–460.
- Halfon, S., 2015. Contesting human security expertise: technical practices in reconfiguring international security. In: Berling, T.V., Bueger, C. (Eds.), *Security Expertise: Practice, Power, Responsibility*. Routledge.
- Holden, E., Linnerud, K., Banister, D., Schwanitz, V.J., Wierling, A., 2017. The Imperatives of Sustainable Development. Needs, Justice, Limits. Routledge.
- Holifield, R., Porter, M., Walker, G., 2009. Introduction spaces of environmental justice: frameworks for critical engagement. *Antipode* 41 (4), 591–612.
- Holland, B., 2008. Justice and the environment in Nussbaum's "Capabilities Approach" - why sustainable ecological capacity is a meta-capability. *Political Res. Q.* 61 (2), 319–332.
- Honneth, A., 2004. Recognition and justice: outline of a plural theory of justice. *Acta Sociol.* 47 (4), 351–364.
- Hossain, M.S., Dearing, J.A., Eigenbrod, F., Johnson, F.A., 2017. Operationalizing safe operating space for regional social-ecological systems. *Sci. Total Environ.* 584–585, 673–682.
- Howe, C., Suich, H., Vira, B., Mace, G.M., 2014. Creating win-wins from trade-offs? Ecosystem services for human well-being: a meta-analysis of ecosystem service trade-offs and synergies in the real world. *Glob. Environ. Chang.* 28, 263–275.
- Häyhä, T., Lucas, P.L., van Vuuren, D.P., Cornell, S.E., Hoff, H., 2016. From Planetary Boundaries to national fair shares of the global safe operating space — how can the scales be bridged? *Glob. Environ. Chang.* 40, 60–72.
- Jasanoff, S., 2005. Judgment under siege: the three-body problem of expert legitimacy. In: Maasen, S., Weingart, P. (Eds.), *Democratization of Expertise? Exploring Novel Forms of Scientific Advice in Political Decision-Making*. Springer, Dordrecht, pp. 209–224.
- Johnson, A., 2012. A landscape summary for the Nam Et-Phou Louey national protected area, Lao PDR. Evidence-based conservation: lessons from the lower Mekong. In: Sunderland, T., J.S., Minh-Ha, H. (Eds.), *Evidence-based Conservation. Lessons from the Lower Mekong*, pp. 73–90.
- Kerschner, C., O'Neill, D.W., 2015. *Economic Growth and Sustainability, Sustainability*. Routledge.
- Korhonen-Kurki, K., Sehring, J., Brockhaus, M., Di Gregorio, M., 2014. Enabling factors for establishing REDD plus in a context of weak governance. *Clim. Policy* 14 (2), 167–186.
- Leach, M., Raworth, K., Rockström, J., 2013. Between Social and Planetary Boundaries: Navigating Pathways in the Safe and Just Space for Humanity World Social Science Report 2013. *Changing Global Environments UNESCO*.
- Leach, M., Reyers, B., Bai, X., Brondizio, E.S., Cook, C., Díaz, S., Espindola, G., Scobie, M., Stafford-Smith, M., Subramanian, S.M., 2018. Equity and sustainability in the Anthropocene: a social-ecological systems perspective on their intertwined futures. *Global Sustainability* 1, e13.
- Leggett, M., Lovell, H., 2012. Community perceptions of REDD+: a case study from Papua New Guinea. *Clim. Policy* 12 (1), 115–134.
- Lestrelin, G., Castella, J.C., Bourgoin, J., 2012a. Territorialising sustainable development: the politics of land-use planning in Laos. *J. Contemp. Asia* 42 (4), 581–602.
- Lestrelin, G., Vigiak, O., Pelletreau, A., Keohavong, B., Valentin, C., 2012b. Challenging established narratives on soil erosion and shifting cultivation in Laos. *Nat. Resour. Forum* 36 (2), 63–75.
- Li, T.M., 2007. *The Will to Improve. Governmentality, Development, and the Practice of Politics*. Duke University Press - Durham & London.
- Lund, C., 2011. Fragmented sovereignty: land reform and dispossession in Laos. *J. Peasant Stud.* 38 (4), 885–905.
- Martin, A., Coolsaet, B., Corbera, E., Dawson, N.M., Fraser, J.A., Lehmann, I., Rodriguez, I., 2016. Justice and conservation: the need to incorporate recognition. *Biol. Conserv.* 197, 254–261.
- McDermott, M., Mahanty, S., Schreckenber, K., 2013. Examining equity: a multi-dimensional framework for assessing equity in payments for ecosystem services. *Environ. Sci. Policy* 33, 416–427.
- McLean, J., Stræde, S., 2003. Conservation, relocation, and the paradigms of park and people management—A case study of padampur villages and the royal chitwan national park, Nepal. *Soc. Nat. Resour.* 16 (6), 509–526.
- Miller, D.C., Agrawal, A., Roberts, J.T., 2013. Biodiversity, governance, and the allocation of international aid for conservation. *Conservation Letters* 6 (1), 12–20.
- Milne, S., Adams, W.M., 2012. Market masquerades: uncovering the politics of community-level payments for environmental services in Cambodia (vol 43, pg 133, 2012). *Dev. Change* 43 (2), 622–622.
- Nathan, I., Pasgaard, M., 2017. Is REDD+ effective, efficient, and equitable? Learning from a REDD+ project in Northern Cambodia. *Geoforum* 83, 26–38.
- Nelson, E., Mendoza, G., Regetz, J., Polasky, S., Tallis, H., Cameron, D., Chan, K.M., Daily, G.C., Goldstein, J., Kareiva, P.M., Lonsdorf, E., Naidoo, R., Ricketts, T.H., Shaw, M., 2009. Modeling multiple ecosystem services, biodiversity conservation, commodity production, and tradeoffs at landscape scales. *Front. Ecol. Environ.* 7 (1), 4–11.
- Nussbaum, M.C., 1992. Human functioning and social justice: in defense of aristotelian essentialism. *Political Theory* 20 (2), 202–246.
- O'Donnell, G., Oswald, A.J., 2015. National well-being policy and a weighted approach to human feelings. *Ecol. Econ.* 120, 59–70.
- Pascual, U., Muradian, R., Rodriguez, L.C., Duraipappah, A., 2010. Exploring the links between equity and efficiency in payments for environmental services: a conceptual approach. *Ecol. Econ.* 69 (6), 1237–1244.
- Pasgaard, M., Mertz, O., 2016. Desirable qualities of REDD+ projects not considered in decisions of project locations. *Environ. Res. Lett.* 11 (11), 114014.
- Pasgaard, M., Nielsen, T.F., 2016. A story of "communities": boundaries, geographical composition and social coherence in a forest conservation project, Northern Cambodia. *Geografisk Tidsskrift-Danish Journal of Geography* (in press).
- Pasgaard, M., Van Hecken, G., Ehammer, A., Strange, N., 2017. Unfolding scientific expertise and security in the changing governance of Ecosystem Services. *Geoforum* 84, 354–367.
- Pellow, D.N., 2017. *What Is Critical Environmental Justice?* John Wiley & Sons.
- Poudel, M., Thwaites, R., Race, D., Dahal, G.R., 2015. Social equity and livelihood implications of REDD plus in rural communities - a case study from Nepal. *Int. J. Commons* 9 (1), 177–208.
- Pulido, L., De Lara, J., 2018. Reimagining 'justice' in environmental justice: radical ecologies, decolonial thought, and the Black Radical Tradition. *Environ. Plan.:*



- Nature and Space 1 (1–2), 76–98.
- Purdey, S.J., 2010. *Economic Growth, the Environment and International Relations*. Routledge.
- QSR, 2012. NVivo Qualitative Data Analysis Software. Version 10. QSR International Pty Ltd, Doncaster, Australia.
- Rasmussen, L.V., Mertz, O., Christensen, A.E., Danielsen, F., Dawson, N., Xaydongvanh, P., 2016. A combination of methods needed to assess the actual use of provisioning ecosystem services. *Ecosystem Services* 17, 75–86.
- Raworth, K., 2012. *A Safe and Just Space for Humanity*. Oxfam Discussion Paper February 2012.
- Raworth, K., 2017. A Doughnut for the Anthropocene: humanity's compass in the 21st century. *The Lancet Planetary Health* 1 (2), e48–e49.
- Reader, S., 2006. Does a basic needs approach need capabilities? *J. Political Philos.* 14 (3), 337–350.
- Ribot, J., 2014. Cause and response: vulnerability and climate in the Anthropocene. *J. Peasant Stud.* 41 (5), 667–705.
- Ripple, W.J., Wolf, C., Newsome, T.M., Galetti, M., Alamgir, M., Crist, E., Mahmoud, M.I., Laurance, W.F., countries, s.s.f., 2017. World scientists' warning to humanity: a second notice. *Bioscience* 67 (12), 1026–1028.
- Rockstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F.S., Lambin, E., Lenton, T.M., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., de Wit, C.A., Hughes, T., van der Leeuw, S., Rodhe, H., Sorlin, S., Snyder, P.K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R.W., Fabry, V.J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., Foley, J., 2009. Planetary boundaries: exploring the safe operating space for humanity. *Ecol. Soc.* 14 (2).
- Saypanya, S., Hansel, T., Johnson, A., Bianchessi, A., Sadowsky, B., 2013. Effectiveness of a social marketing strategy, coupled with law enforcement, to conserve tigers and their prey in Nam Et Phou Louey National Protected Area, Lao People's Democratic Republic. *Conservation Evidence* 29–38.
- Schlosberg, D., 2004. Reconceiving environmental justice: global movements and political theories. *Environ. Pol.* 13 (3), 517–540.
- Schlosberg, D., Carruthers, D., 2010. Indigenous struggles, environmental justice, and community capabilities. *Glob. Environ. Politics* 10 (4), 12–+.
- Sen, A., 2004. Capabilities, lists, and public reason: continuing the conversation. *Fem. Econ.* 10 (3), 77–80.
- Sikor, T., 2013. The Justices and Injustices of Ecosystem Services, the Justices and Injustices of Ecosystem Services. Routledge, pp. 24–28.
- Sikor, T., Martin, A., Fisher, J., He, J., 2014. Toward an empirical analysis of justice in ecosystem governance. *Conservation Letters* 7 (6), 524–532.
- Sinclair, K., Rawluk, A., Kumar, S., Curtis, A., 2017. Ways forward for resilience thinking: lessons from the field for those exploring social-ecological systems in agriculture and natural resource management. *Ecol. Soc.* 22 (4).
- Soga, M., Gaston, K.J., 2018. Shifting baseline syndrome: causes, consequences, and implications. *Front. Ecol. Environ.* 16 (4), 222–230.
- Steffen, W., Richardson, K., Rockstrom, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., de Vries, W., de Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B., Sorlin, S., 2015. Planetary boundaries: guiding human development on a changing planet. *Science* 347 (6223).
- Steffen, W., Stafford Smith, M., 2013. Planetary boundaries, equity and global sustainability: why wealthy countries could benefit from more equity. *Current Opinion in Environmental Sustainability* 5 (3), 403–408.
- Sterling, E.J., Filardi, C., Toomey, A., Sigouin, A., Betley, E., Gazit, N., Newell, J., Albert, S., Alvira, D., Bergamini, N., Blair, M., Boseto, D., Burrows, K., Bynum, N., Caillon, S., Caselle, J.E., Claudet, J., Cullman, G., Dacks, R., Eyzaguirre, P.B., Gray, S., Herrera, J., Kenilorea, P., Kinney, K., Kurashima, N., Macey, S., Malone, C., Mauli, S., McCarter, J., McMillen, H., Pascua, P., Pikacha, P., Porzecanski, A.L., de Robert, P., Salpeteur, M., Sirikolo, M., Stege, M.H., Stege, K., Ticktin, T., Vave, R., Wali, A., West, P., Winter, K.B., Jupiter, S.D., 2017. Biocultural approaches to well-being and sustainability indicators across scales. *Nature Ecology & Evolution* 1 (12), 1798–1806.
- Sunderlin, W.D., Larson, A.M., Duchelle, A., Sills, E.O., Luttrell, C., Jagger, P., Pattanayak, S., Cronkleton, P., Ekaputri, A.D., 2010. Technical Guidelines for Research on REDD+ Project Sites. Center for International Forestry Research (CIFOR), Bogor, Indonesia.
- Tengo, M., Hill, R., Malmer, P., Raymond, C.M., Spierenburg, M., Danielsen, F., Elmqvist, T., Folke, C., 2017. Weaving knowledge systems in IPBES, CBD and beyond-lessons learned for sustainability. *Current Opinion in Environmental Sustainability* 26–27, 17–25.
- Thalemann, A., 1997. Laos: Between battlefield and marketplace. *Journal of Contemporary Asia* 27 (1), 85–105.
- Tschakert, P., Dietrich, K.A., 2010. Anticipatory learning for climate change adaptation and resilience. *Ecol. Soc.* 15 (2).
- UN, 2015. Sustainable development goals. <https://sustainabledevelopment.un.org>. Accessed Aug 29, 2018. United Nations (UN) 2015.
- UNEP, 2009. Bio-cultural Community Protocols. A Community Approach to Ensuring the Integrity of Environmental Law and Policy. Produced by Natural Justice for the United Nations Environmental Programme (UNEP).
- USAID-WCS, 2010. TRANSLINKS. Promoting Transformations by Linking Nature, Wealth and Power. Finding the Linkages between Wildlife Management and Household Food Consumption in the Uplands of Lao People's Democratic Republic: A Case Study from the Nam Et-Phou Louey National Protected Area. USAID and Wildlife Conservation Society - Lao PDR.
- van Noordwijk, M., 2017. Integrated natural resource management as pathway to poverty reduction: innovating practices, institutions and policies. *Agric. Syst.* 172, 60–71.
- Visseren-Hamakers, I.J., McDermott, C., Vijge, M.J., Cashore, B., 2012. Trade-offs, co-benefits and safeguards: current debates on the breadth of REDD+. *Current Opinion in Environmental Sustainability* 4 (6), 646–653.
- Vongvisouk, T., Brogaard, R.B., Mertz, O., Thongmanivong, S., 2016. Rush for cash crops and forest protection: neither land sparing nor land sharing. *Land Use Policy* 55, 182–192.
- Walker, G., 2012. *Environmental Justice: Concepts, Evidence and Politics*. Routledge.
- WCS, 2016. Nam et-phou Louey NPA. <http://programs.wcs.org/laos/Saving-Wild-Places/Nam-Et-Phou-Louey-NPA.aspx>. Wildlife Conservation Society - Lao PDR.
- Young, I.M., 2011. *Justice and the Politics of Difference*. Princeton University Press.