Equity in environmental governance: perceived fairness of distributional justice principles in marine co-management

Authors: Georgina G. Gurney[1*], Sangeeta Mangubhai[2], Margaret Fox[2], Milena K. Kim[3], Arun Agrawal[4]

[*1] Australian Research Council Centre of Excellence for Coral Reef Studies, James Cook University, Townsville, Queensland, 4811, Australia, georgina.gurney@gmail.com

[2] Wildlife Conservation Society, Fiji Country Program, 11 Ma'afu Street, Suva, Fiji

[3] School of Agriculture and Environment, The University of Western Australia, 35 Stirling Highway, Crawley, Western Australia, 6009, Australia

[4] School for Environment and Sustainability, University of Michigan, 440 Church Street, Ann Arbor, Michigan, 48109, United States

ACCEPTED AUTHOR MANUSCRIPT (Accepted final version of manuscript post peer review but prior to publisher contributions such as copy-editing, formatting etc).

Gurney, G., Mangubhai, S., Fox, M., Kaitkoski Kim, M., Agrawal, A. 2021. Equity in environmental governance: perceived fairness of distributional justice principles in marine co-management. Environmental Science & Policy 124(23-32).

Equity in environmental governance: perceived fairness of distributional justice principles in marine co-management

Abstract

Concerns with distributional justice invariably arise in environmental governance, especially in the conservation and management of common-pool resources. These initiatives generate an array of costs and benefits that are typically heterogeneously distributed. Distributing these impacts in a way that is considered fair by local stakeholders is not only a moral imperative, but instrumental to achieving social and ecological success given perceived unfairness fosters conflict and undermines cooperation. However, understandings of local stakeholders' conceptions of distributional fairness are rare because research often assesses distributional outcomes based on tacit assumptions about what constitutes fairness (e.g. equality). We examine what local stakeholders consider distributional fairness with respect to monetary benefits arising from a collective payment for ecosystem services scheme in a co-managed marine protected area in Fiji. In six villages associated with the marine protected area, we elicited individuals' fairness judgements of five distributional justice principles: equality, need, and three forms of proportionality based on customary rights, fisheries opportunity-costs, and involvement in co-management. We examine how fairness judgements are associated with socio-demographic characteristics indicative of key identities, thereby building on socially-aggregated approaches typical of the nascent literature on perceived fairness. We find the rights-based principle was considered the 'most fair' and the opportunity-costs principle the 'least fair'. Our findings challenge prevailing understandings of distributional justice in conservation and commons management, which favour the principles of equality or opportunity-cost. We also find that education was significantly positively related to fairness judgements of all principles, whilst wealth was significantly related to the equality and the opportunity-based principles. These results provide insights into how fairness judgements could be influenced by key elements of current social change in the Global South (e.g. increasing formal education, market engagement and wealth accumulation). Overall, our results suggest that fair environmental governance requires explicit identification of distributional fairness conceptions of those most affected by such initiatives, especially in a context of increasing globalisation of conservation knowledge and practice.

Keywords: environmental justice, distributional fairness, social equity, marine protected area, payments for ecosystem services, conservation

Highlights:

- Few studies examine perceived distributional fairness in environmental governance
- We study stakeholders' perceptions of five justice principles with respect to a MPA
- The customary rights-based principle was considered the 'most fair' principle
- The fisheries opportunity-costs principle was considered the 'least fair' principle
- Only a few sociodemographic factors (wealth, education) relate to fairness judgements

1. Introduction

Issues of distributional justice abound in environmental governance, especially in relation to the conservation and management of common-pool natural resources (Bavinck et al. 2018, Fabinyi et al. 2013). Governance of commons and other natural resources generates a multitude of benefits and costs (e.g. Ban et al. 2019, Gurney et al. 2014, Oldekop et al. 2015), which tend to be distributed heterogeneously among often diverse local stakeholders (e.g. Gurney et al. 2015, Gill et al. 2019). Whether stakeholders consider the distribution of these impacts to be fair[1] substantially affects the pursuit of sustainability, in terms of both its social and environmental dimensions (Bavinck et al. 2018, Leach et al. 2018).

[1]Use of the terms 'equity', 'justice' and 'fairness' differs by discipline (Lukasiewicz et al. 2017). For example, the latter two terms tend to be used differentially in philosophy, whilst in the social sciences, the three terms are often used interchangeably (Finkel et al. 2001). Here, we follow studies in environmental governance focused on stakeholders' perceptions (e.g. Adger et al. 2016, Graham et al. 2015), which use 'fairness' to describe individuals' perceptions arising from judgements of situations related to dimensions of justice (e.g. distribution, procedure), and consider 'justice principles' (e.g. equality) as existing independently of any process of judgement. Our analysis focuses on perceptions of fairness with regards to the justice dimension of distribution; specifically, we examine fairness perceptions of alternative distributional justice principles.

The pursuit of fairness in environmental governance matters from both a moral and instrumental standpoint. First and foremost, fair governance is a moral imperative. Justice is essential for a flourishing society, and is thought to be one of five fundamental foundations upon which cultures construct their moral systems (Haidt 2012). From an instrumental perspective, fair environmental governance underlies the production of positive social outcomes, and can be a critical determinant of positive ecological outcomes (Brockington 2004, Bavinck et al. 2018). Numerous studies document instances of perceived unfairness undermining stakeholders' support and cooperation with management initiatives, fostering conflicts resulting in non-compliance, sabotage and protest, and ultimately, hindering success (e.g. Brockington and Igoe 2006, Fabinyi et al. 2013, Gurney et al. 2014). Indeed, the psychology literature suggests that because commitment to fairness is a universal and unlearned human characteristic (e.g. Haidt 2012, Pinker 2003), perceived (un)fairness may elicit strong emotional, attitudinal and behavioural responses with important implications for human wellbeing (Prilleltensky 2012) and social engagement. Importantly, (un)fairness is also thought to be an important heuristic guiding behaviour in group settings – for example, co-management and other forms of collaborative governance – with shared norms of justice being an important mechanism via which collective action is maintained (Tyler 2015, Wilke 1991).

Given the centrality of distributive justice to environmental governance and its moral and instrumental importance, distributional fairness now features prominently in an array of global environment policies and agreements (see Dawson et al. 2018). For example, distributional fairness is highlighted in key agreements relating to protected areas, such as those provided by the International Union for Conservation of Nature (IUCN 2016) and the Convention on Biological Diversity. Aichi Target 11 stipulates that protected areas should be 'equitably managed' (CBD 2010), with guidance relating to its implementation suggesting that 'communities… should equitably share in the benefits arising from protected areas and should not bear inequitable costs' (CBD 2011). Likewise, the United Nations' Sustainable Development Goals relating to life below water (Goal 14) and on land (Goal 15) point to the importance of fair access and benefit sharing. However, the lack of conceptual clarity around distributive justice and fairness in these mandates hinders the realisation of aims for fair commons conservation and management.

Ambiguity regarding distributive justice in environmental policy arises in part due to a dearth of explicit consideration of justice in a number of environmental governance literatures, including that on sustainability (Leach et al. 2018), commons (Agrawal 2014), ecosystem services (Lehmann et al. 2019) and conservation (Zafra-Calvo et al. 2017, Friedman et al. 2018)[2]. Indeed, Fabinyi et al. (2013) suggest that some of the most influential frameworks or approaches employed in the environment-related literatures – including those focusing on social-ecological systems, resilience, common-property regimes, and sustainable livelihoods – are relatively inattentive to justice issues. Other scholars (e.g. Cochran and Ray 2009, Friedman et al. 2018) suggest that the relatively few studies that claim to examine fairness, justice or equity in environmental governance tend to focus on the distribution of costs and benefits among different societal groups based on the tacit assumption that unequal outcomes (i.e. inequality) constitutes unfairness (e.g. Halpern et al. 2013). This observation has also been made of the environmental justice literature (Schyppert and Wallimann-Helmer 2014, Walker 2014). Since its emergence in the early 1980s, the field has focused mostly on distributional justice, attending to the unequal distribution of environmental 'bads' or hazards in the Global North, in particular, the USA (Mohai et al. 2009). Walker (2014, p222) notes the 'tendency in much of the body of social science work on environmental justice to fail to engage with how particular revealed patterns of pollution, risk, participation or involvement may or not be considered 'unjust'; or alternatively to take the nature of injustice for granted, unproblematically equating an observed inequality with injustice.'

Although equality is often equated with justice and fairness, a fair distribution of benefits or burdens can follow other principles. Social justice theory identifies three major distributional justice principles: need, equality and proportionality (Deutsch 1975). The 'need' principle focuses on the scale of individuals' needs, and suggests that individuals who are most dependent on the benefits under consideration should receive the largest share, or alternatively, those who have difficulty in dealing with costs, should bear the least. The 'equality' principle relates to a uniform distribution of cost and benefits based on the notion that everybody should be treated alike.

[2]Note that the use of the terms 'equity', 'justice' and 'fairness' has been observed to differ across these literatures (Lukasiewicz et al. 2017, Lehmann et al. 2019), with Friedman et al. (2018) finding that these terms are often used interchangeably in conservation.

Lastly, the 'proportionality' (also known as 'desert') principle focuses on the balance between input and output, whereby the benefits an individual receives should be proportional to the costs they bear. The inputs and outputs considered in regards to the latter principle depends on the context. In conservation, opportunity costs related to forgone extractive opportunities arising from management are typically considered (Álvarez-Romero et al. 2018). In particular, conservation interventions that involve payments (e.g. payments for ecosystem services) are underpinned by a proportionality principle focused on economic efficiency, whereby those who reduce service provision (e.g. resource users) or who actively increase provision (e.g. resource stewards) receive payments (Wunder 2007).

The array of distributional justice principles raises the question: 'which of these distributional justice principles represents fairness?' The social and environmental justice literatures approach this question from both a normative and an empirical standpoint. A normative approach offers prescriptions of what 'ought' to constitute fairness, with philosophers from Aristotle (e.g. *Nicomachean Ethics)* to Rawls (1971), attempting to identify universal justice principles. In contrast, a more recent approach deals with what 'is' fairness through examining what individuals perceive as fair ('fairness judgement'; Liebig 2001). Termed an 'empirical approach', this line of investigation may engage with normative theories by examining which distributional justice principles are considered fair in a given situation (e.g. Gatskova 2013). Empirical approaches emphasise that justice is plural and situated, with judgements of fairness being shaped by individuals' experiences and their socio-cultural context. This idea that justice is plural was famously illustrated by Sen (2009) through his fable about three children claiming a flute. Each child gives a different reason why they should have the flute: (1) expertise, with one child being able to play the flue; (2) need, with one child having no other toys; and (3) merit, with one child having made the flute. Sen suggests that the claim seen as legitimate will differ from individual to individual. In the environmental governance literature, local stakeholders' fairness perceptions have received relatively little attention (Lehmann et al. 2019). However, the empirical approach is increasingly advocated (e.g. Sikor et al. 2014), and the omission is gradually being addressed, for example, with respect to environmental activism (Scholsberg 2007), payments for forest ecosystem services (e.g. Loft et al. 2017, Martin et al. 2014), environmental conflicts (e.g. Kals et al. 2004, Lecuyer et al. 2018), sea level rise (e.g. Graham et al. 2015), and protected areas (managers' perceptions; Zafra-Calvo et al. 2017, 2019).

Perceived fairness of alternative justice principles is understood to vary according to socio-demographic characteristics indicative of key social structures to which identities are tied (Clayton and Opotow 2003). Individuals' fairness judgements are thought to be shaped by the socio-cultural context in which they are embedded and their subjective experience of that context as determined by relevant aspects of their identity (Fisher et al. 2018). Taking a socially-disaggregated approach to fairness judgements thus provides insights into how judgements are shaped. It may also elucidate the role that self-interest plays in fairness judgements, a source of ongoing debate in the literature (Kals et al. 2004, Leibig 2001, Tyler 2015). Examining whether fairness judgements are related to socio-demographic characteristics that would determine whether an individual benefits under the distributional justice principle in question can provide insights into whether people develop justice rules without privileging their own situation. This line of inquiry is critical because the capacity of distributive justice principles to facilitate stable social interaction and cooperation is diminished when self-interest motivates fairness judgements (Tyler 2015). From a practical perspective, taking a socially-disaggregated approach can also provide insights into the benefit- and cost-sharing mechanisms that are likely to be considered fair by different social subgroups. This understanding is imperative to avoiding further marginalisation of groups with less decision-making power. It is also important for achieving successful social and ecological outcomes given that disparities in what is considered fair are a common source of conflict in commons conservation and management (e.g. Gurney et al. 2014). However, the emerging literature on stakeholders' perceptions of environment-related distributional justice principles tends to take a socially-aggregated approach, with very few studies examining how fairness judgements are related to people's identity and position in society (but see, for example, Martin et al. (2014) in relation to wealth and gender).

Our study adopts an empirical justice approach to examining the perceived fairness of alternative distributional justice principles with respect to the distribution of monetary benefits from a co-managed marine protected area (MPA). Specifically, these monetary benefits would arise from a proposed collective payment for ecosystem services (PES) scheme associated with the MPA. Material, including monetary, benefits arising from conservation incentive approaches (e.g. PES, integrated conservation and development, ecotourism) are an increasingly important collective outcome of protected areas and other forms of commons management in the Global South (Cetas and and Yasué 2017, Mangubhai et al. 2020). For example, see Hayes et al. (2019) review of collective PES schemes, including those related to protected areas (e.g. Martin et al. 2014). Collective PES protected area schemes are often associated with fees for entering the protected area (e.g. Clifton et al. 2013). However, analyses of what local stakeholders consider is fair in the distribution of collective benefits remain

limited (Hayes et al. 2019). Addressing this knowledge gap in the context of commons co-management in the Global South is particularly critical because such initiatives typically involve external actors, for example conservation non-government organisations (NGOs), who hold their own notions of justice often informed by global environmental policy and practice developed in the Global North (Álvarez-Romero et al. 2018, Martin et al. 2014). Using data from six villages in Nakorotubu District, Fiji, we examine: (1) local stakeholders' perceptions of fairness for alternative distributional justice principles; and (2) whether those perceptions differ according to socio-demographic characteristics indicative of key social structures to which identities are tied.

2. Methods

2.1 Background and study site

Our study site, the Vatu-i-Ra Conservation Park, is located in the Nakorotubu District, Ra Province, on the northern coast of the island of Viti Levu, Fiji. The conservation park comprises a 110.5 km^2 MPA that includes a small island. At the time the surveys were conducted, a PES scheme was being considered whereby tourists would pay FJ$15 to dive or snorkel within the MPA. The MPA is significantly larger than the original *tabu* (traditional periodically harvested closure) which it replaced. With the exception of a small catch-and-release zone for sport fishing, the majority of the MPA is completely closed to all forms of fishing.

The MPA is located within the Nakorotubu District's customary fishing ground (*qoliqoli* Cokovata Nakorotubu). In Fiji, Indigenous Fijians (*iTaukei*) have customary tenure rights that are recognised in formal law. Access rights to the 411 customary fishing in Fiji have been legally demarcated by the *iTaukei* Land and Fisheries Commission (Sloan and Chand 2016). While the clan is the legal proprietary unit for land, Fiji's inshore waters (foreshore to the outer edge of the reef) are subject to a dual system of management under both customary and statutory laws (Ward 1995). Clans have access rights to marine resources, but the State retains the power to legislate or regulate resource use (especially for commercial purposes), and retains the rights to the seabed. In the Nakorotubu District, customary fishing rights are held by the District's 47 clans. Decisions relating to the fishing ground are made by the *Bose Vanua,* a committee of the District's high chiefs.

The Vatu-i-Ra Conservation Park was established under a co-management governance arrangement primarily involving members of the *Bose Vanua* and tourism industry, as well as government organisations (the Ra Provincial Office) and NGOs (Wildlife Conservation Society, BirdLife International, NatureFiji-MareqetiViti, Fiji Environmental Law Association; Sykes et al. 2018). At the time the surveys were administered, options for distributing the monetary benefits arising from the PES within the District were being considered. The options included, for example, in the form of funds to pay the provincial government levy, loans for livelihood activities, and secondary- and tertiary-level educational scholarships.

2.2 Sampling

We collected data from 97 individuals in six villages in Nakorotubu District using household surveys undertaken as part of a broader social-ecological systems monitoring program, the Marine and Coastal Monitoring (MACMON) framework (Gurney et al. 2019). Within each village, households were systematically sampled, whereby a sampling fraction of every *i*th household (e.g. 2nd, 3rd, 4th household) was determined by dividing the total village population by the desired sample size (De Vaus 1991). The number of surveys conducted per village ranged from 11–20. The sample size was determined based on the population of the village and the time available at each site. This sampling strategy ensured that the sample was both random and geographically representative. We drew on a stratified sampling approach to select who to interview in a selected household to ensure key social subgroups (in particular, both genders) were represented in our sample (Table A1). All survey surveys were conducted in the local *iTaukei* language by trained interviewers.

2.3 Distributional justice principles and socio-demographic characteristics

We elicited fairness judgements for five alternative means of distributing monetary benefits from the PES associated with the co-managed MPA (Table 1). Respondents rated each distributional justice principle on a five-point Likert-type fairness scale (i.e. 'very unfair', 'unfair', 'neutral', 'fair', 'very fair'). These five principles represent the three distributional justice principles described earlier: need, equality, and proportionality (Deutsch 1975). We examined three principles of proportionality: (1) merit-based, whereby those who are involved in co-management of the MPA (putting effort into delivering the service) receive more benefits; (2) rights-based, whereby those with customary rights to the area where the MPA is located receive more benefits; and (3) opportunity-costs, whereby fishers who are displaced by the reserve receive more

277 **Table 1**. Descriptions of socio-demographic characteristics and distributional justice principles relating to the
278 distribution of material benefits arising from the co-managed MPA.
279
280

Variable	Description
Distributional justice principles	*All justice principles were rated in terms of fairness based on a Likert-type scale with five points (very unfair, unfair, neutral, fair, very fair)*
Equality	'Funds are distributed equally so that everybody living in the District gets the same amount'
Needs	**'**The poorest people in the District receive more funds'
Rights	**'**People who have customary rights to the place where the conservation park is receive more funds'
Merit	'People who participate in management of the conservation park receive more funds'
Opportunity costs	**'**People who fish most often in the conservation park and have to give up fishing there, receive more funds'
Socio-demographic characteristics	
Management participation	Whether the respondent is involved in co-management
Dependency ratio	Ratio of number of children to adults in the respondents' household
Material wealth	Material assets index based on a principal component analysis of the presence of absence of household assets (Table A2)
Fisheries dependence	The level of importance of fishing for the respondent's household
Migrant	Whether the respondent comes from the Nakorotubu District
Education	Primary, secondary or tertiary level of education
Age	Age in years
Gender	Female or male

281
282 benefits. The five principles reflect the benefit-sharing mechanisms being considered by the governing actors of
283 the conservation park at the time of the survey. The principles also represent notions of fairness common in the
284 literature and practice of conservation and management of commons. For example, Ostrom (1990) identified
285 proportionality of costs and benefits as one of her eight institutional design principle. A proportionality principle
286 based on opportunity costs related to forgone extractive opportunities not only underpins the PES approach
287 (Wunder 2007), but also much of conservation practice, in particular, systematic conservation planning
288 (Margules and Pressey 2001). The needs-based principle reflects a 'pro-poor' approach common in PES and
289 conservation practice more broadly, which favours provision of benefits to poorer and more marginalised groups
290 (Maharjan et al. 2009, Pascual et al. 2010).
291
292 We examined whether fairness judgements of the five distributional justice principles differed according to eight
293 socio-demographic characteristics (Table 1). We chose these characteristics because: (1) we hypothesised they
294 might be related to fairness judgements because they are indicative of key social structures to which identities
295 are tied in the study area (as identified through the authors' detailed knowledge of Fiji); and (2) many of these
296 characteristics would determine whether an individual benefits under a particular distributional justice principle.
297 For example, the benefits that an individual would receive under the needs-based distributional justice principle
298 would depend on their level of material wealth.
299
300 *2.4 Analysis*
301
302 To assess how fairness judgements of distributional justice principles were related to socio-demographic
303 characteristics, we used hierarchical ordinal regression models. The response variables were fairness judgements
304 of the five justice principles, whereby the 5-point Likert scale was coded from 1 to 5 (e.g. 'very fair' was given
305 a score of 5). Following Zuur and Leno (2016), we *a priori* set village as a random factor to account for non-
306 independence of data arising from repeated sampling within each village; this essentially models the

dependency structure among respondents living in the same village. Models were checked for (multi)collinearity by calculation of pair-wise correlation coefficients and variance inflation factors. We compared all models to their respective null model, which contains the model structure (i.e. random effect) but no explanatory variables. The full models performed better than their respective null models in all cases except for the rights-based distributional justice principle. We used the clmm2 package in R (3.5.1) for all analyses.

3. Results

Local stakeholders' fairness judgements of the distributional justice principles show pluralism in what is considered fair in the distribution of the monetary benefits arising from the PES associated with the co-managed MPA (Figure 1). The rights-based distributional justice principle, however, was most likely to be considered fair, with the vast majority (>79%) of respondents rating this principle as 'fair' or 'very fair'. The merit-based and equality principles showed similar fairness judgements, with more than 65% of respondents considering these distribution mechanisms as fair or very fair. Fewer people considered the needs-based principle fair, with approximately 59% considering it fair or very fair and 25% as unfair or very unfair. The opportunity cost principle was clearly considered the least fair, with only 27% of respondents considering distribution according lost fishing opportunity as fair or very fair and 61% considering unfair or very unfair.

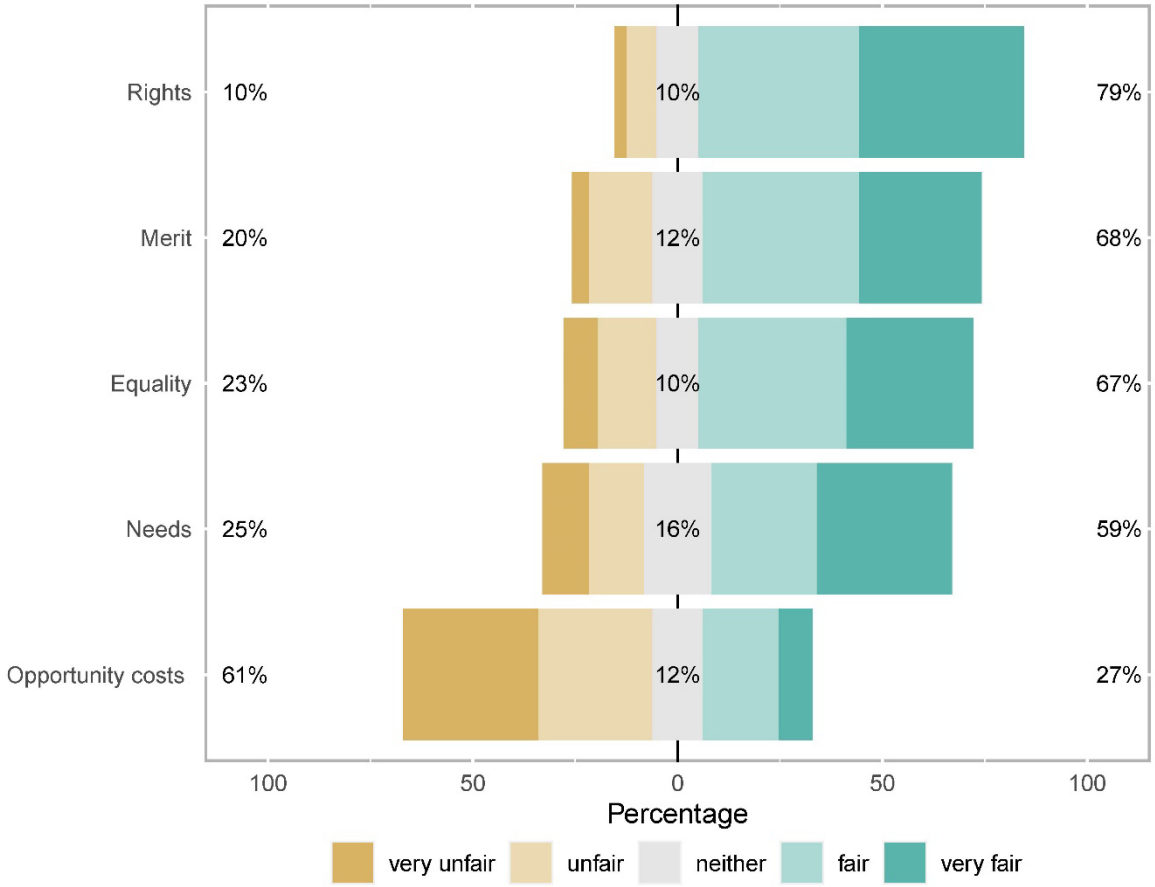

Figure 1. Fairness judgements for five distributional justice principles including equality, needs and three forms of proportionality based on customary rights, merit, and fisheries opportunity costs. Note, due to rounding the percentages for the rights principle add to 99% in figure; the exact proportions are 10.31% (very unfair or unfair), 10.31% (neither), 79.38 (fair or very fair).

We found few significant relationships between fairness judgements of the justice principles and socio-demographic characteristics (Figure 2). In particular, the variation in fairness judgements was least-well explained by socio-demographic characteristics for the rights-based principle, with the full model not performing significantly better than the null model. We therefore did not consider the results of the full model

for the rights-based principle. For all other distributional justice principles, there was a significant positive relationship between level of formal education and fairness judgements; respondents with higher levels of education were more likely to consider the merit, equality, needs and opportunity costs as fair. Wealth was significantly related to the equality and the opportunity-based principles, with stakeholders possessing more material assets showing a greater likelihood of considering equal distribution of benefits as unfair and distribution according to opportunity costs as fair. Lastly, fairness judgements of the merit and equality principles were significantly related to gender. Given we specified 'women' as the reference category for gender in Figure 2, the results show that men are more likely than women to consider merit and equality principles as fair.

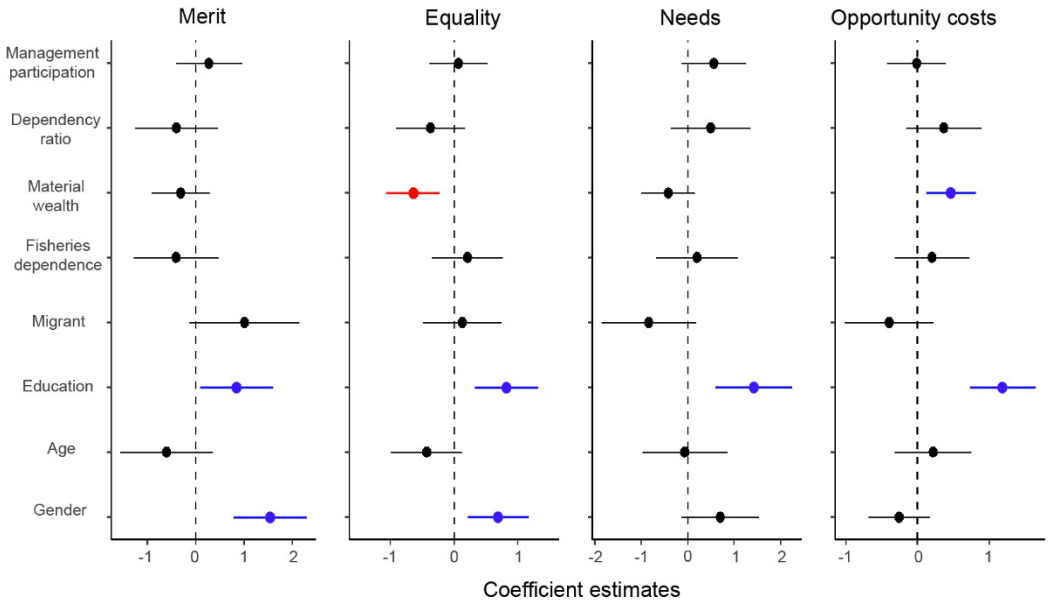

Figure 2. Relationships between socio-demographic characteristics and fairness appriaisals of distributional justice principles, including merit, equality, needs and opportunity costs. Results for the rights-based distributional justice principle are not shown because the model did not perform significantly better than its correspondening null model. Relationships are displayed as coefficient estimates from ordinal regression models, with error bars showing 95% confidence intervals. Intersection of the confidence intervals with the '0' line indicates a non-significant relationship. Red indicates a negative relationship, and blue indicates a positive relationship. Note that the reference category for gender is 'female'

4. Discussion

Our examination of stakeholders' fairness judgements of alternate distributional justice principles with regards to monetary benefits associated with an MPA has three main findings: (1) the rights-based principle is considered the most fair of the five distributional justice principles we examined; (2) the opportunity-costs principle is considered the least fair; and (3) of the eight socio-demographic characteristics we examined, few are related to fairness perceptions apart from wealth and education, two key facets of global social change.

4.1 Fairness judgements of alternate distributional justice principles

The preference of our respondents for the rights-based principle reflects the strong customary land and sea tenure systems in Fiji. These systems emerged historically to regulate access to, and use and distribution of, natural resources for the purposes of maintaining custom, identity and stability (Jupiter 2017, Ruddle et al. 1992). We suggest the rights-based principle is supported not only because it has governed the distribution of benefits derived from nature for centuries, but also because it provides a means to reinforce customary rights and power over the District's customary fishing ground in the context of increasing use by non-traditional users (e.g. fishers from other districts and foreign tourism operators and tourists). Indeed, during informal conversations held after the survey, some of our respondents expressed concern over the tourism industry operating in the Cokovata Nakorotubu customary fishing ground, pointing to how tourism precipitated the Fijian

Government's passing of the 'Surfing Decree', in 2010. The Decree eased internationals tourists' access to surf breaks by weakening customary rights over those areas. As Myers et al. (2018) suggest with respect to PES schemes in Indonesia and Mexico, a preference for rights-based distributional justice can reflect traditional fairness norms, but may also serve as a political tool to reinforce rights. As environmental governance increasingly involves actors operating at multiple levels (i.e. local to global) and from different sectors (e.g. tourism, resource use), further insight into distributional justice principle preferences could be gained by explicit analysis of power relations across governance levels and sectors (e.g. the 'power in polycentric governance' approach; Epstein et al. 2020).

Assessments of the merit-based, egalitarian and needs-based principles were roughly similar, with the majority of respondents finding these principles fair. The merit-based principle was considered fair by the majority of respondents, likely because of its similarity to the rights-based principle in this particular context where those involved in managing the customary fishing ground, members of the *Bose Vanua* Cokovata Nakorotubu, are the traditional leaders of rights-holders. Likewise, the egalitarian principle reflects the rights-based principle in practice in our case because the vast majority of people living in the District have customary rights to the fishing ground. This aligns with social justice research from psychology that suggests that collectivist societies tend to perceive equality as fair when distributing resources to in-group members, but when the pool of potential recipients includes out-group members (in our case, people who were born outside the District and had not married someone from within the District), a proportionality distributional principle tends to be considered fairer (Mahler et al. 1981). While the needs-based principle was considered fair, during informal conversations after the surveys a number of respondents voiced their concerns that it would be difficult to determine who is particularly in need given the general homogeneity of material wealth in the District; a finding in line with studies of terrestrial co-managed PES in Vietnam (Loft et al. 2015) and Rwanda (Martin et al. 2014).

The resource extraction opportunity-costs principle (as based on pre-conservation use) – a distributional justice principle dominant in policy on commons conservation and management (**Álvarez-Romero et al. 2018, Wunder 2007)** – was considered unfair by the majority of respondents. Many repeatedly expressed the concern that not all fishers in the Cokovata Nakorotubu customary fishing ground had rights to the area; for example, holders of commercial fishing licenses from adjacent districts or from another ethnic group (i.e. Fijians of Indian decent). Similarly, Martin et al. (2014) found people tended to reject an opportunity-costs principle because it translated into compensation of illegal hunting. A further key concern expressed by the respondents was that the *tabu* area had value beyond its material worth to fisheries. The opportunity cost principle privileges material values and understandings of justice, and thus downplays relational values with nature (e.g. Zafra-Calvo et al. 2020), such as place attachment (e.g. Gurney et al. 2017). Indeed, Mangubhai et al. (2020) explain that 'the concept of value in an indigenous community in Fiji is complex and places emphasis on relationships, reciprocity, stewardship of environmental and cultural resources and knowledge, communal working, and church, in addition to economic wealth and transactions.'

Thus, our results question the underlying basis of PES schemes given that proponents of this approach assert that the benefit of PES (over other incentive-based initiatives such as integrated conservation and development) lies in its economic efficiency, which requires payments based on opportunity costs related to forgone resource extraction (based on pre-conservation use; Wunder 2007). Our results also challenge prevailing understandings of distributional justice in conservation and commons management given that much of the theory and practice in these fields is underpinned by an opportunity-costs justice principle (e.g. Margules and Pressey 2001). Indeed, our results highlight that what is commonly considered fair in theory and policy on commons conservation and management may not align with local perceptions and practices of fairness.

Taken together, the fairness judgements of alternate distributional justice principles suggest that despite pluralism in what is considered fair in the distribution of monetary benefits, there is some consensus that the rights-based principle is a fair approach in our study area. The notion that fairness cannot refer to one unifying principle is widely recognised (e.g. Sen 2009), with empirical studies showing that people may draw on different justice principles simultaneously (Movik 2014). However, as the social justice literature from psychology emphasises (e.g. Tyler 2015), the utility of justice principles in facilitating cooperation and stable social interaction within groups is based on consensus (at least to some degree) of what is fair. In our case study, distribution based on customary rights was considered fair by a large majority, and indeed this approach to distribution is now adopted in the management plan and related trust deed.

4.2 Relationships between fairness judgements and socio-demographic characteristics

Our findings show that few socio-demographic characteristics were significantly related to fairness perceptions apart from material wealth and level of formal education, providing two key contributions. First, the lack of significant relationships between fairness judgments and socio-demographic characteristics that would determine whether an individual benefits under the principle in question suggests that self-interest is not a primary motivator of what individuals consider fair. For example, materially poorer respondents did not favour the needs-based principle. Similarly, Martin et al. (2014) found individuals' wealth was not significantly related to preferences for alternative distributional justice principles associated with PES payments. Further, Kals et al. (2004) contrasted motives of self-interest and fairness in regards to environmental conflict and found that affected (i.e. beneficiaries) and non-affected people do not make different fairness judgements. In contrast, an analysis of environmental policy relating to traffic emissions (Dietz and Atkinson 2005) suggested that respondents showed self-interest by arguing for distribution principles in terms of fairness for a wider group or 'community of justice' of which they were a part of and whose interests reflected their own. Likewise, given that most of our respondents were members of the 'community of justice' who benefited under the rights-based distributional principle, it could be argued that self-interest cannot be entirely discounted as a motivation of fairness judgements (although migrant status and thus ability to benefit was not significantly related to judgements of the rights-based principle). Indeed, studies typically show that fairness motivations are never absolute (Tyler 2015), with people typically balancing self-interest and fairness when making allocation decisions (Lerner and Clayton 2011). The degree to which the motivations of self-interest or fairness is salient is thought to depend on the social conditions present (Walster et al. 1978), for example, whether societies are generally individualistic or collectivist (Kahn et al. 1982). Given communal ownership of natural resources in Fiji and the collectivist nature of indigenous Fijian society, it is likely that fairness judgements are not motivated primarily by self-interest but by cultural practice, norms and relationships over shared history.

The second key result of our analysis of the relationship between socio-demographic characteristics and fairness judgements is the significant effect of wealth and education, which provides novel insights into how fairness judgements may be shaped by key elements of identity. Education was significantly positively related to fairness judgements of all distributional principles apart from the rights-based principle, suggesting that formal education results in exposure and acceptance of alternative norms of justice. Wealth was related positively to perceived fairness of the opportunity-costs principle and negatively to the equality-based principle. These results align with research on distributional justice from experimental economics that has found that wealth, market interaction and exposure to economics thinking influences preferences for fairness (e.g. Henrich et al. 2010), including what people view as a fair transaction (Bowles 1998). For example, Fisman et al. (2015) found that the distributional preferences of the United States' economic elite were more focused on efficiency than equality compared with the average citizen, while studying economics has been linked to considering egalitarianism is less fair than efficiency-promoting distribution principles (Faravelli 2007).

Given increasingly levels of formal education, market integration and wealth accumulation are important elements of social change in Fiji and many other Global South countries, the significant effects of wealth and education that we found provide insights into how social change may affect people's perceptions of fairness. The potential ramifications of this social change are considerable if they are unevenly felt, lead to increased heterogeneity in what is considered fair and therefore, a reduction in the social utility of justice principles in stabilising social interactions and cooperation. Given that PES are market-based interactions, our results contribute to concerns voiced in relation to crowding-out of pro-environmental beliefs and behaviours (e.g. Gurney et al. 2016, Agrawal et al. 2015). These interventions and other market-based instruments that are on the rise in conservation should be applied with caution lest they undermine the very behaviour they are designed to promote.

4.3 Future research

Central to an empirical approach to justice is the notion that fairness judgements are plural and situated (Sikor et al. 2014), thus suggesting fruitful directions for further research on distributional justice in the context of conservation and management of commons. Given that fairness judgements of distributional justice principles can vary depending on what is being distributed (Lecuyer et al. 2018), an important area for future research is examining how perceived fairness of alternate distributional justice principles differ across the diversity of costs and benefits in co-management (Ban et al. 2019, Gurney et al. 2014). These differences are especially important to investigate with respect to material *vs.* non-material elements. Further, future research could examine how perceived fairness of alternate distributional justice principles differs according to the characteristics of the intervention concerned; for example, protected areas that do not involves payment schemes or conventional PES schemes that operate at the individual scale. Research is also needed to extend our analysis of the relationship between fairness judgements and key elements of identity by examining how these relationships vary in

different sociocultural contexts and according to values and worldviews (e.g. political orientation). Indeed, fairness norms have been shown to systematically vary across societies (e.g. Henrich et al. 2010) according to characteristics such as degree of individualism versus collectivism (Lueng 2005).

The other two key dimensions of justice, procedure and recognition, provide fertile ground to extend our work on fairness in co-management. Following social justice theory (e.g. Fraser 2009), the literature on environmental justice emphasises two dimensions of justice in addition to distribution: 'procedure', relating to how decisions are made and by whom; and 'recognition', relating to status afforded to the identities and values associated with different social and cultural groups (Schlosberg 2007). Tri-dimensional justice assessments are increasingly common in the conservation literature, but tend to focus on the perceptions of managers or outside experts rather than those directly affected by conservation (e.g. Zafra-Calvo's et al. (2017) justice indicator framework for protected areas and an application of this framework to telecoupling, Boillat et al. 2018). Justice as recognition is particularly pertinent to co-management in the Global South because of the involvement of external actors with their own worldviews, often informed by global environmental agreements and practices developed in the Global North (Álvarez-Romero et al. 2018, Martin et al. 2014). We examined aspects of potential malrecognition by considering whether local stakeholders' justice principles differ to those dominant in global environmental policy and by taking a socially disaggregated approach to examine whether certain social subgroups' preferential justice principle are gaining traction in management.

Other potential sources of malrecognition worthy of further investigation relate to how human-nature interactions are constructed through PES and other governance arrangements that involve material compensation from external actors (e.g. integrated conservation and development, see Gurney et al. 2014). These approaches promote human-nature dualism (Lee 2016, West et al. 2006) and preference material values over the broad array of relational values that people may hold for nature (Zafra-Calvo et al. 2020), such as stewardship (e.g. Lau et al. 2019) and place attachment (e.g. Gurney et al. 2017). In our case, there is potential for this form of malrecognition. In Melanesia, maintenance of many cultural values involves resource extraction (Foale et al. 2016), and more generally, Melanesian ontologies of human-nature relations place humans as *part* of nature (Jupiter 2017, West 2006), whereby humans are inextricable from their environment and perceive their surroundings as kin. This worldview, which anthropologists have found is common to many indigenous cultures (e.g. Strathern 1980, Descola 2005), is at odds with the Western ontology of humans as *apart* from nature (i.e. human-nature dualism) underpinning conservation approaches such as PES and some forms of protected areas (Lee 2016). Assessing the potential for malrecognition with respect to how human-nature interactions are constructed by local people versus in conservation would benefit from a qualitative inductive approach that involves examining justice notions inherent to those local communities (e.g. see Lau et al. 2020). Further, the material framing entailed in PES may have a range of behavioural impacts (Cinner et al. 2020), including crowding out of the very pro-environmental and pro-social behaviours that these benefits are intended to encourage (e.g. Agrawal et al. 2015, Gurney et al. 2016). Other potential sources of misrecognition relate to who is recognised as a subject of justice in co-management institutions located in the Global South but supported materially by Global North actors. An example of discursive power influencing the problems and solutions that are rendered visible (Escobar 1998), local people are considered the primary subjects of justice, disregarding the role of the Global North in environmental degradation through, for example, carbon emissions and global resource trade (Fisher et al. 2018).

5. Conclusion

Distributional fairness in environmental governance is not only a moral imperative, but critical to the social and ecological outcomes of such initiatives, with Bavnick et al. (2018) concluding that 'addressing distributional justice concerns [in fisheries governance] may be a precondition of sustainable human-nature relations.' To this end, remedying the current paucity of research on local stakeholders' perceptions of distributional fairness, recognised in a number of environmental governance literatures is of crucial importance. We contribute to this endeavour by providing the first examination of local stakeholders' perceptions of alternative distributional justice principles in the context of conservation and management of marine commons. We find that the resource extraction opportunity-costs principle (as based on pre-conservation use) was considered the least fair and the customary rights-based principle the most fair in regards to sharing benefits associated with a co-managed MPA. Thus, our results raise questions about dominant understandings of distributional justice in conservation and management of commons, which centre on resource extraction opportunity-costs or equality principles. Taking a socially-disaggregated approach to examining how fairness judgements are shaped, we find that levels of formal education and wealth have a strong association with how local stakeholders assess distributional fairness. Our analysis provide new insights into how fairness conceptions are shaped and how they may shift in

553 response to key aspects of social change in the Global South, namely increasing formal education, market
554 integration and wealth accumulation.

555 Overall, our study highlights the critical importance of moving beyond understanding distributional justice
556 based on tacit assumptions about what constitutes fairness, typical of much of the scholarship and practice of
557 environmental governance. To improve the clarity of goals for fairness in global environmental policies and
558 agreements, we suggest they be accompanied by supporting text outlining the need for explicit identification of
559 fairness perceptions of those most affected by such initiatives (including how these preferences may vary for
560 different groups) in both planning and evaluation processes (e.g. see Gurney et al. 2019). Doing so is
561 particularly pertinent in the Global South given that environmental policy and practice – especially co-
562 management and other governance approaches involving external actors – is often shaped by that developed in
563 the Global North. For example, conservation plans designed for Fiji are often led by organisations based in
564 Australia (Álvarez-Romero et al. 2018). Further, the need for advancing understanding of distributive justice
565 with regards to protected areas, in particular, is of pressing importance. This is because the coverage of
566 protected areas is set to rapidly increase, with the 196 parties to the Convention on Biological Diversity poised
567 to commit to expanding coverage to 30% of the world's surface by 2030 (CBD 2020).

568 **Acknowledgements**
569
570 Foremost we thank the communities and leaders from Nakorotubu and Rakiraki districts for their time and their
571 willingness to participate in this research, and the Ra Provincial Office for their support, especially M. Nakoroi
572 and M. Qiri. We are grateful to L. Teneva and staff and interns at the Wildlife Conservation Society for assisting
573 with the surveys – M. Naleba, W. Naisilisili, S. Dulunaqio, T. Vasu, M. Seruvatu, and K. Navuta. This work
574 was funded by the John D. and Catherine T. MacArthur Foundation (17-1706-152078-CSD), and the
575 RESCCUE Project (funded by the French Development Agency and the French Global Environment facility)
576 implemented by the Pacific Community.
577
578 **References**
579
580 Adger, W.N., Quinn, T., Lorenzoni, I., Murphy, C., 2016. Sharing the pain: Perceptions of fairness affect private
581 and public response to hazards. Ann. Am. Assoc. Geogr. 106, 1079–1096.
582 https://doi.org/10.1080/24694452.2016.1182005
583 Agrawal, A., 2014. Studying the commons, governing common-pool resource outcomes: Some concluding
584 thoughts. Environ. Sci. Policy 36, 86–91. https://doi.org/10.1016/j.envsci.2013.08.012
585 Agrawal, A., Chhatre, A., Gerber, E.R., 2015. Motivational crowding in sustainable development interventions.
586 Am. Polit. Sci. Rev. 109, 470–487.
587 Álvarez-Romero, J.G., Mills, M., Adams, V.M., Gurney, G.G., Pressey, R.L., Weeks, R., Ban, N.C., Cheok, J.,
588 Davies, T.E., Day, J.C., Hamel, M.A., Leslie, H.M., Magris, R.A., Storlie, C.J., 2018. Research advances
589 and gaps in marine planning: towards a global database in systematic conservation planning. Biol.
590 Conserv. 227, 369–382. https://doi.org/10.1016/j.biocon.2018.06.027
591 Ban, N.C., Gurney, G.G., Marshall, N.A., Whitney, C.K., Mills, M., Gelcich, S., Bennett, N.J., Meehan, M.C.,
592 Butler, C., Ban, S., Tran, T.C., Cox, M.E., Breslow, S.J., 2019. Well-being outcomes of marine protected
593 areas. Nat. Sustain. 2, 524–532. https://doi.org/10.1038/s41893-019-0306-2
594 Bavinck, M., Jentoft, S., Scholtens, J., 2018. Fisheries as social struggle: A reinvigorated social science research
595 agenda. Mar. Policy 94, 46–52. https://doi.org/10.1016/j.marpol.2018.04.026
596 Boillat, S., Gerber, J.-D., Oberlack, C., Zaehringer, J.G., Ifejika Speranza, C., Rist, S., 2018. Distant
597 interactions, power, and environmental justice in protected area governance: A telecoupling perspective.
598 Sustainability 10, 3954. https://doi.org/10.3390/su10113954
599 Borrini-Feyerabend, Dudley, N., Jaeger, T., Lassen, B., Pathak Broome, N., Phillips, A., Sandwith, T., 2013.
600 Governance of Protected Areas: From Understanding to Action. Best Practice Protected Area Guidelines
601 Series No. 20. IUCN, Gland, Switzerland.
602 Bowles, S., 1998. Endogenous preferences: the cultural consequences of markets and other economic
603 institutions. J. Econ. Lit. 36, 75–111.
604 Brockington, D. 2004. Community conservation, inequality and injustice: myths of power in protected area
605 management. Conserv. and Soc. 2(2), 411-432.
606 Brockington, D., Igoe, J., 2006. Eviction for conservation: a global overview. Conserv. Soc. 4, 424–470.
607 Cetas, E.R., Yasué, M., 2017. A systematic review of motivational values and conservation success in and
608 around protected areas. Conserv. Biol. 31, 203–212. https://doi.org/10.1111/cobi.12770
609 Cinner, J.E., Barnes, M.L., Gurney, G.G., Lockie, S., Rojas, C., 2020. Markets and the crowding out of
610 conservation-relevant behavior. Conserv. Biol. n/a. https://doi.org/10.1111/cobi.13606
611 Clayton, S., Opotow, S., 2003. Justice and identity: Changing perspectives on what is fair. Personal. Soc.

612 Psychol. Rev. 7, 298–310. https://doi.org/10.1207/S15327957PSPR0704_03
613 Clifton, J., 2013. Compensation, conservation and communities: An analysis of direct payments initiatives
614 within an Indonesian marine protected area. Environ. Conserv. 40, 287–295.
615 Cochran, J., Ray, I., 2009. Equity re-examined: a study of community-based rainwater harvesting in Rajasthan,
616 India. World Dev. 37, 435–444. https://doi.org/10.1016/j.worlddev.2008.03.002
617 Convention on Biological Diversity, 2020. Zero draft of the post-2020 global biodiversity framework.
618 Convention on Biological Diversity, Kunming, China.
619 Convention on Biological Diversity, 2010. Convention on Biological Diversity (CBD) decision X/2. The
620 Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets. Convention on Biological
621 Diversity, Nagoya, Japan.
622 Convention on Biological Diversity, 2011. Strategic Plan for Biodiversity 2011–2020. Further information
623 related to the technical rationale for the Aichi Biodiversity Targets, including potential indicators and
624 milestones. Convention on Biological Diversity, Nagoya, Japan.
625 https://www.cbd.int/doc/meetings/cop/cop-10/information/cop-10-inf-12-rev1-en.pdf
626 Dawson, N., Coolsaet, B., Martin, A., 2018. Justice and equity: Emerging Research and Policy Approaches to
627 Address Ecosystem Service Trade-offs, in: Schreckenberg, K., Mace, G.M., Poudyal, M. (Eds.),
628 Ecosystem Services and Poverty Alleviation: Trade-Offs and Governance, Routledge Studies in
629 Ecosystem Services. Routledge, Taylor & Francis Group, London, United Kingdom., p. 352.
630 Descola, P., 2005. Par-delà Nature et Culture. Gallimard, Paris, France.
631 Deutsch, M., 1975. Equity, equality, and need: what determines which value will be used as the basis of
632 distributive justice? J. Soc. Issues 31, 137–149. https://doi.org/10.1111/j.1540-4560.1975.tb01000.x
633 Dietz, S., Atkinson, G., 2005. Public perceptions of equity in environmental policy: Traffic emissions policy in
634 an English urban area. Local Environ. 10, 445–459. https://doi.org/10.1080/13549830500160982
635 Epstein, G., Morrison, T.H., Lien, A., Gurney, G.G., Cole, D.H., Delaroche, M., Villamayor Tomas, S., Ban, N.,
636 Cox, M., 2020. Advances in understanding the evolution of institutions in complex social-ecological
637 systems. Curr. Opin. Environ. Sustain., Resilience and complexity: Frameworks and models to capture
638 social-ecological interactions 44, 58–66. https://doi.org/10.1016/j.cosust.2020.06.002
639 Escobar, A., 1998. Whose knowledge, whose nature? Biodiversity, conservation, and the political ecology of
640 social movements. J. Polit. Ecol. 5, 53–82. https://doi.org/10.2458/v5i1.21397
641 Fabinyi, M., Foale, S., Macintyre, M., 2015. Managing inequality or managing stocks? An ethnographic
642 perspective on the governance of small-scale fisheries. Fish Fish. 16, 471–485.
643 https://doi.org/10.1111/faf.12069
644 Faravelli, M., 2007. How context matters: A survey based experiment on distributive justice. J. Public Econ. 91,
645 1399–1422. https://doi.org/10.1016/j.jpubeco.2007.01.004
646 Finkel, N.J., Harré, R., Lopez, J.-L.R., 2001. Commonsense morality across cultures: Notions of fairness,
647 justice, honor and equity. Discourse Stud. 3, 5–27. https://doi.org/10.1177/1461445601003001001
648 Fisher, J.A., Cavanagh, C.J., Sikor, T., Mwayafu, D.M., 2018. Linking notions of justice and project outcomes
649 in carbon offset forestry projects: Insights from a comparative study in Uganda. Land Use Policy 73, 259–
650 268. https://doi.org/10.1016/j.landusepol.2017.12.055
651 Fisman, R., Jakiela, P., Kariv, S., Markovits, D., 2015. The distributional preferences of an elite. Science 349.
652 https://doi.org/10.1126/science.aab0096
653 Foale, S., Dyer, M., Kinch, J., 2016. The value of tropical biodiversity in rural Melanesia. Valuat. Stud. 4, 11–
654 39. https://doi.org/10.3384/VS.2001-5992.164111
655 Fraser, N., 2009. Scales of Justice: Reimagining Political Space in a Globalizing World. Columbia University
656 Press, New York.
657 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?
658 A systematic review of social equity in conservation research. Environ. Res. Lett. 13, 053001.
659 https://doi.org/10.1088/1748-9326/aabcde
660 Gatskova, K., 2013. Distributive justice attitudes in Ukraine: Need, desert or social minimum? Communist Post-
661 Communist Stud. 46, 227–241. https://doi.org/10.1016/j.postcomstud.2013.03.007
662 Gill, D., Cheng, S., Glew, L., Aigner, E., Bennett, N., Mascia, M. 2019. Social synergies, tradeoffs, and equity
663 in marine conservation impacts. Annu. Rev. Environ. Resour. 44,347-372.
664 Graham, S., Barnett, J., Fincher, R., Mortreux, C., Hurlimann, A., 2015. Towards fair local outcomes in
665 adaptation to sea-level rise. Clim. Change 130, 411–424. https://doi.org/10.1007/s10584-014-1171-7
666 Gurney, G.G., Blythe, J., Adams, H., Adger, W.N., Curnock, M., Faulkner, L., James, T., Marshall, N.A., 2017.
667 Redefining community based on place attachment in a connected world. Proc. Natl. Acad. Sci. 114,
668 10077–10082. https://doi.org/10.1073/pnas.1712125114
669 Gurney, G.G., Cinner, J., Ban, N.C., Pressey, R.L., Pollnac, R., Campbell, S.J., Tasidjawa, S., Setiawan, F.,
670 2014. Poverty and protected areas: An evaluation of a marine integrated conservation and development
671 project in Indonesia. Glob. Environ. Change 26, 98–107. https://doi.org/10.1016/j.gloenvcha.2014.04.003

672 Gurney, G.G., Cinner, J.E., Sartin, J., Pressey, R.L., Ban, N.C., Marshall, N.A., Prabuning, D., 2016.
673 Participation in devolved commons management: Multiscale socioeconomic factors related to individuals'
674 participation in community-based management of marine protected areas in Indonesia. Environ. Sci.
675 Policy 61, 212–220. https://doi.org/10.1016/j.envsci.2016.04.015
676 Gurney, G.G., Darling, E.S., Jupiter, S.D., Mangubhai, S., McClanahan, T.R., Lestari, P., Pardede, S.,
677 Campbell, S.J., Fox, M., Naisilisili, W., Muthiga, N.A., D'agata, S., Holmes, K.E., Rossi, N.A., 2019.
678 Implementing a social-ecological systems framework for conservation monitoring: lessons from a multi-
679 country coral reef program. Biol. Conserv. 240, 108298. https://doi.org/10.1016/j.biocon.2019.108298
680 **Gurney, G.**, Pressey, R., Cinner, J.C., Pollnac, R., Campbell, S. 2015. Integrated conservation and development:
681 Evaluating a community-based marine protected area project for equality of socioeconomic impacts. *Phil. Trans.*
682 *Royal Soc B: Bio. Sci.* 370(1681): 20140277.
683 Haidt, J., 2012. The Righteous Mind: Why Good People are Divided by Politics and Religion.Pantheon/Random
684 House, New York, NY, US.
685 Halpern, B.S., Klein, C.J., Brown, C.J., Beger, M., Grantham, H.S., Mangubhai, S., Ruckelshaus, M., Tulloch,
686 V.J., Watts, M., White, C., Possingham, H.P., 2013. Achieving the triple bottom line in the face of
687 inherent trade-offs among social equity, economic return, and conservation. Proc. Natl. Acad. Sci. 110,
688 6229–6234. https://doi.org/10.1073/pnas.1217689110
689 Hayes, T., Grillos, T., Bremer, L.L., Murtinho, F., Shapiro, E., 2019. Collective PES: More than the sum of
690 individual incentives. Environ. Sci. Policy 102, 1–8. https://doi.org/10.1016/j.envsci.2019.09.010
691 Henrich, J., Ensminger, J., McElreath, R., Barr, A., Barrett, C., Bolyanatz, A., Cardenas, J.C., Gurven, M.,
692 Gwako, E., Henrich, N., Lesorogol, C., Marlowe, F., Tracer, D., Ziker, J., 2010. Markets, religion,
693 community size, and the evolution of fairness and punishment. Science 327, 1480–1484.
694 https://doi.org/10.1126/science.1182238
695 Jupiter, S., 2017. Culture, kastom and conservation in Melanesia: What happens when worldviews collide? Pac.
696 Conserv. Biol. 23, 139–145. https://doi.org/10.1071/PC16031
697 Kahn, A., Nelson, R.E., Gaeddert, W.P., Hearn, J.L., 1982. The justice process: Deciding upon equity or
698 equality. Soc. Psychol. Q. 45, 3–8. https://doi.org/10.2307/3033668
699 Kals, E., Syme, G.J., Kärcher, J.D., Müller, M.M., Nancarrow, B.E., 2004. Community views of fairness in
700 environmental conflicts: Evidence from Germany and Australia. J. Environ. Syst. 31, 117–140.
701 https://doi.org/10.2190/ES.31.2.a
702 Lau, J.D., Hicks, C.C., Gurney, G.G., Cinner, J.E., 2019. What matters to whom and why? Understanding the
703 importance of coastal ecosystem services in developing coastal communities. Ecosyst. Serv. 35, 219–230.
704 https://doi.org/10.1016/j.ecoser.2018.12.012
705 Leach, M., Reyers, B., Bai, X., Brondizio, E.S., Cook, C., Díaz, S., Espindola, G., Scobie, M., Stafford-Smith,
706 M., Subramanian, S.M., 2018. Equity and sustainability in the Anthropocene: A social–ecological systems
707 perspective on their intertwined futures. Glob. Sustain. 1. https://doi.org/10.1017/sus.2018.12
708 Lecuyer, L., White, R.M., Schmook, B., Lemay, V., Calmé, S., 2018. The construction of feelings of justice in
709 environmental management: An empirical study of multiple biodiversity conflicts in Calakmul, Mexico. J.
710 Environ. Manage. 213, 363–373. https://doi.org/10.1016/j.jenvman.2018.02.050
711 Lee, E., 2016. Protected areas, country and value: the nature–culture tyranny of the IUCN's protected area
712 guidelines for Indigenous Australians. Antipode 48, 355–374. https://doi.org/10.1111/anti.12180
713 Lehmann, I., Martin, A., Fisher, J.A., 2018. Why should ecosystem services be governed to support poverty
714 alleviation? Philosophical perspectives on positions in the empirical literature. Ecol. Econ. 149, 265–273.
715 https://doi.org/10.1016/j.ecolecon.2018.03.003
716 Lerner, M.J., Clayton, S., 2011. Justice and Self-Interest: Two Fundamental Motives. Cambridge University
717 Press.
718 Leung, K., 2005. How Generalizable are Justice Effects across Cultures?, in: J. Greenberg, J. Colquitt (Eds.),
719 Handbook of Organizational Justice. Lawrence Erlbaum Associates Publishers, Mahwah, NJ, US, pp.
720 555–586.
721 Liebig, S., 2001. Lessons from philosophy? Interdisciplinary justice research and two classes of justice
722 judgments. Soc. Justice Res. 14, 265–287. https://doi.org/10.1023/A:1014367907348
723 Loft, L., Le, D.N., Pham, T.T., Yang, A.L., Tjajadi, J.S., Wong, G.Y., 2017. Whose equity matters? National to
724 local equity perceptions in Vietnam's payments for forest ecosystem services scheme. Ecol. Econ. 135,
725 164–175. https://doi.org/10.1016/j.ecolecon.2017.01.016
726 Lukasiewicz, A., Dovers, S., Robin, L., McKay, J., Schilizzi, S., Graham, S. (Eds.), 2017. Natural Resources
727 and Environmental Justice. CSIRO Publishing.
728 Mahler, I., Greenberg, L., Hayashi, H., 1981. A comparative study of rules of justice: Japanese versus
729 American. Psychol. Int. J. Psychol. Orient 24, 1–8.
730 Mangubhai, S., Sykes, H., Manley, M., Vukikomoala, K., Beattie, M., 2020. Contributions of tourism-based
731 Marine Conservation Agreements to natural resource management in Fiji. Ecol. Econ. 171, 106607.

https://doi.org/10.1016/j.ecolecon.2020.106607
Margules, C.R., Pressey, R.L., 2000. Systematic conservation planning. Nature 405, 243–253. https://doi.org/10.1038/35012251
Martin, A., Gross-Camp, N., Kebede, B., McGuire, S., 2014. Measuring effectiveness, efficiency and equity in an experimental Payments for Ecosystem Services trial. Glob. Environ. Change 28, 216–226. https://doi.org/10.1016/j.gloenvcha.2014.07.003
Mohai, P., Pellow, D., Roberts, J.T., 2009. Environmental justice. Annu. Rev. Environ. Resour. 34, 405–430. https://doi.org/10.1146/annurev-environ-082508-094348
Movik, S., 2014. A fair share? Perceptions of justice in South Africa's water allocation reform policy. Geoforum 54, 187–195. https://doi.org/10.1016/j.geoforum.2013.03.003
Myers, R., Larson, A.M., Ravikumar, A., Kowler, L.F., Yang, A., Trench, T., 2018. Messiness of forest governance: How technical approaches suppress politics in REDD+ and conservation projects. Glob. Environ. Change 50, 314–324. https://doi.org/10.1016/j.gloenvcha.2018.02.015
Oldekop, J.A., Holmes, G., Harris, W.E., Evans, K.L., 2016. A global assessment of the social and conservation outcomes of protected areas. Conserv. Biol. 30, 133–141. https://doi.org/10.1111/cobi.12568
Pinker, S., 2002. The Blank Slate: The Modern Denial of Human Nature. Penguin, New York.
Prilleltensky, I., 2012. Wellness as fairness. Am. J. Community Psychol. 49, 1–21. https://doi.org/10.1007/s10464-011-9448-8
Rawls, J., 1971. A Theory of Justice. Harvard University Press.
Ruddle, K., Hviding, E., Johannes, R.E., 1992. Marine resources management in the context of customary tenure. Mar. Resour. Econ. 7, 249–273. https://doi.org/10.1086/mre.7.4.42629038
Schlosberg, D., 2009. Defining Environmental Justice: Theories, Movements, and Nature. Oxford University Press.
Schuppert, F., Wallimann-Helmer, I., 2014. Environmental inequalities and democratic citizenship: Linking normative theory with empirical research. Anal. Krit. 36, 345–366. https://doi.org/10.1515/auk-2014-0208
Sen, A.K., 2009. The Idea of Justice. Harvard University Press.
Sikor, T., Martin, A., Fisher, J., He, J., 2014. Toward an empirical analysis of justice in ecosystem governance. Conserv. Lett. 7, 524–532. https://doi.org/10.1111/conl.12142
Sloan, J., Chand, K., 2016. An analysis of property rights in the Fijian qoliqoli. Mar. Policy 72, 76–81. https://doi.org/10.1016/j.marpol.2016.06.019
Strathern, M., 1980. No Nature, No Culture: The Hagen Case, in: MacCormack, C. (Ed.), Nature, Culture and Gender. Cambridge University Press, UK, pp. 174–222.
Tyler, T.R., 2015. Social Justice, in: APA Handbook of Personality and Social Psychology, Volume 2: Group Processes, APA Handbooks in Psychology®. American Psychological Association, Washington, DC, US, pp. 95–122. https://doi.org/10.1037/14342-004
Walker, G., 2014. Editorial: Environmental justice as empirical and normative. Anal. Krit. 36, 221–228. https://doi.org/10.1515/auk-2014-0202
Walster, E., Walster, G.W., Berscheid, E., 1978. Equity: Theory and Research. Allyn and Bacon, Boston.
Ward, R.G., 1995. Land, law and custom: diverging realities in Fiji. Land Cust. Pract. S. Pac. 198–249.
West, P., 2006. Conservation is Our Government Now: The Politics of Ecology in Papua New Guinea. Duke University Press.
West, P., Igoe, J., Brockington, D., 2006. Parks and peoples: The social impact of protected areas. Annu. Rev. Anthropol. 35, 251–277. https://doi.org/10.1146/annurev.anthro.35.081705.123308
Wilke, H.A.M., 1991. Greed, efficiency and fairness in resource management situations. Eur. Rev. Soc. Psychol. 2, 165–187. https://doi.org/10.1080/14792779143000051
Wunder, S., 2007. The efficiency of payments for environmental services in tropical conservation. Conserv. Biol. 21, 48–58. https://doi.org/10.1111/j.1523-1739.2006.00559.x
Zafra-Calvo, N., Balvanera, P., Pascual, U., Merçon, J., Martín-López, B., van Noordwijk, M., Mwampamba, T.H., Lele, S., Ifejika Speranza, C., Arias-Arévalo, P., Cabrol, D., Cáceres, D.M., O'Farrell, P., Subramanian, S.M., Devy, S., Krishnan, S., Carmenta, R., Guibrunet, L., Kraus-Elsin, Y., Moersberger, H., Cariño, J., Díaz, S., 2020. Plural valuation of nature for equity and sustainability: Insights from the Global South. Glob. Environ. Change 63, 102115. https://doi.org/10.1016/j.gloenvcha.2020.102115
Zafra-Calvo, N., Garmendia, E., Pascual, U., Palomo, I., Gross-Camp, N., Brockington, D., Cortes-Vazquez, J.-A., Coolsaet, B., Burgess, N.D., 2019. Progress toward equitably managed protected areas in Aichi Target 11: A global survey. BioScience 69, 191–197. https://doi.org/10.1093/biosci/biy143
Zafra-Calvo, N., Pascual, U., Brockington, D., Coolsaet, B., Cortes-Vazquez, J.A., Gross-Camp, N., Palomo, I., Burgess, N.D., 2017. Towards an indicator system to assess equitable management in protected areas. Biol. Conserv. 211, 134–141. https://doi.org/10.1016/j.biocon.2017.05.014
Zuur, A.F., Ieno, E.N., 2016. A protocol for conducting and presenting results of regression-type analyses. Methods Ecol. Evol. 7, 636–645. https://doi.org/10.1111/2041-210X.12577

Vitae

Dr Gurney is a Senior Research Fellow in Environmental Social Science at James Cook University. Her research focuses on environmental governance, in particular, governance of conservation and natural resource management initiatives. Gurney's current research program has two key themes: 1) understanding the **sociocultural and institutional drivers of opportunities for collaborative conservation and resource management; and 2) identifying** the multiple socioeconomic and environmental outcomes of such initiatives. She takes an interdisciplinary approach to her research, drawing from a range of disciplines including social psychology, human geography and political science. Much of Gurney's research is transdisciplinary, involving collaborations with practitioners and policymakers.

Dr Mangubhai is the Director of the Wildlife Conservation Society Fiji. She has worked on marine science and conservation in Australia, East Africa, Indonesia and the South Pacific. Mangubhai chairs the Marine Working Group for Fiji's Protected Areas Committee. Her research interests include gender, small-scale fisheries, value chains, community-based management, and payment for ecosystem services. She is currently an editor for the journal Pacific Conservation Biology and the Pacific Community's Women in Fisheries Information Bulletin. In 2018, Mangubhai was awarded a Pew Fellowship in Marine Conservation to work on mainstreaming human rights-based approaches into coastal fisheries management in Melanesia.

Ms Fox is a Gender and Social Inclusion Advisor for Fisheries at the Pacific Community (SPC). She has over a decade of experience working on community-based resource management and adaptation, linking information on traditional ecological knowledge to Western science, and creating awareness of natural resource management through various mediums. She holds a Bachelor of Science and a Masters of Conservation Biology. In 2017 - 2018, Fox co-led a national survey to quantify the contribution of women fishers to Fiji's coastal fisheries sector, and currently collaborates with Pacific governments in strengthening their institutional capacity to mainstream gender for fisheries dependent communities.

Dr Milena Kim is a Research Fellow in Environmental Social Science at the University of Western Australia. She has extensive experience working closely with Indigenous Peoples, environmental managers, community leaders and industry representatives, including through transdisciplinary knowledge co-production approaches. Her recent work focuses on evaluating the social outcomes of environmental initiatives (e.g., protected areas and conservation planning), including the impacts of collaborative (environmental) research.

Professor Arun Agrawal is a Professor in the School for Environment and Sustainability at the University of Michigan. His research emphasizes the politics of international development, institutional change, and environmental conservation. He coordinates the Sustainability and Development Initiative at the University of Michigan, and was elected in 2018 to the US National Academy of Sciences.