



RESEARCH ARTICLE

# Governance of forest resource use in western Nepal: Current state and community preferences

Manoj Bhatta, Kerstin K. Zander , Stephen T. Garnett

Received: 11 March 2021 / Revised: 17 October 2021 / Accepted: 14 December 2021 / Published online: 15 January 2022

**Abstract** Improved governance of natural resource use is critical to the sustainability and maintenance of environmental quality. In western Nepal, unsustainable resource extraction is seen by the local community as a major threat to forest sustainability. While most respondents to a survey of 243 households inside and outside a protected area (PA) thought the laws for managing resource use were adequate and appropriate, a far smaller proportion thought they were achieving their objectives. Disenchantment with the existing governance regime was strongest outside the PA, probably because there was greater investment in community engagement within the PA. The most likely reason for this failure is the deeply embedded corruption within the forest governance system. Devolution of power to local communities by increasing governance participation is one of the most likely means of containing corruption. It was therefore not surprising that *governance participation* was rated as the most important governance principle by respondents in a best–worst scaling experiment. Respondents also regarded *effectiveness*, *accountability* and *transparency* as important governance principle to improve management of forest resource extraction from red panda habitat.

**Keywords** Best–worst scaling · Community participation · Corruption · Protected areas · Red panda

## INTRODUCTION

Globally, mountain ecosystems are at high risk from the effects of climate change (Palomo 2017; Albrich et al. 2020). They are also being degraded and over-exploited (Price 2015). Responding to climate change and large-scale deforestation requires global collaboration. Over-exploitation, however, could be contained by local efforts were it not for failures in resource use governance (Arun and Ritu 2017). Governance, generally understood to be a system of rules, norms or strategies for guiding or regulating the actions of the governed (Robichau 2011), has long been appreciated as critical to society (Pomeranz and Stedman 2020) and biodiversity conservation (Baynham-Herd et al. 2018). Improving governance is one of the keys to improving natural resource management.

An example of resource governance inadequacy is a forest biodiversity hotspot in the mountains in western Nepal, which contains 84% of the country's protected areas (PA) and half of the country's global priority eco-regions. Although forests in the region provide numerous ecosystem services for the local community (see Bhatta et al. 2020), as well as supporting substantial biodiversity, such as the endangered red panda (*Ailurus fulgens fulgens*), weak enforcement of the law and inadequate regulatory mechanisms are undermining biodiversity conservation (GoN 2014).

The problem is not new – Nepal has tried various means of improving the governance of its rich biological heritage in the high-altitude parts of the country. Although the state has asserted ownership of all land in Nepal since 1768, *kipat* and *birta* land tenure systems allowed some level of communal ownership, and village heads acted as decision-makers responsible for managing forest and highland rangelands. In the latter half of the twentieth century, land

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s13280-021-01694-9>.

tenure systems were formalised, and land was categorised into state land, private land and land owned by religious groups. Some control was returned to forest user groups in the *Forest Act*, 1993 and *Forest Regulation*, 1995 following forest degradation (DFRS 2015) and some communities managed to maintain community connections to management throughout (Chaudhary et al. 2017), acting as stewards of mountain ecosystems (Acharya and Baral 2017).

Currently, governance of forest resources in Nepal combines three different forms of governance (*fragmented*, *monocentric* and *polycentric*), which differ in the way decision-making power is distributed and coordinated (Kim 2020). For most of its history, forest governance in Nepal was *fragmented*, with individualised systems of governance applying to specific sectors or groups (Zelli and van Asselt 2013). A *monocentric* approach was adopted when forests were nationalised in 1957 and PAs established with power emanating from a central government (Termeer et al. 2010; Kim 2020). However, with the advent of community forestry, from 1978 on (Gronow and Shrestha 1991), some governance has become *polycentric*, with different overlapping units of authority each having individual approaches to a given problem but taking each other into account where necessary (Marshall 2009; Pokharel and Tiwari 2013). However, although participatory conservation governance paradigms are widespread across the country (DNPWC 2015), *fragmented* governance remains common and gaps remain between rhetoric and the reality of implementing procedures and participatory conservation approaches (Paudel et al. 2010).

In western Nepal, monocentric approaches are particularly challenging given the remoteness and comparative inaccessibility of the mountain terrain, the socio-economic status of local communities and traditional and cultural beliefs (Arun and Ritu 2017). As a result of the loss of traditional regulation of resource use and a failure to enforce national policy and legislation (Bhatta et al. 2014), forest resources such as medicinal plants, highland pastures and the main food of panda, bamboo, are being over-used and are becoming less available (Bhatta et al. 2021). While local communities are willing to accept compensation for using fewer forest resources, they want conditions placed on the provision of such compensation to be strongly enforced (Bhatta et al. 2021). However, any attempt to introduce incentive-based governance approaches (Kjaer 2004), will mean that existing governance regimes must be substantially strengthened (Ferraro and Pattanayak 2006), while taking account of local culture and the ecological context (Ojha et al. 2019). The first step in achieving such an aim is to determine the views on governance of those whose resource use is being governed, particularly given their enthusiasm for strongly enforced compliance.

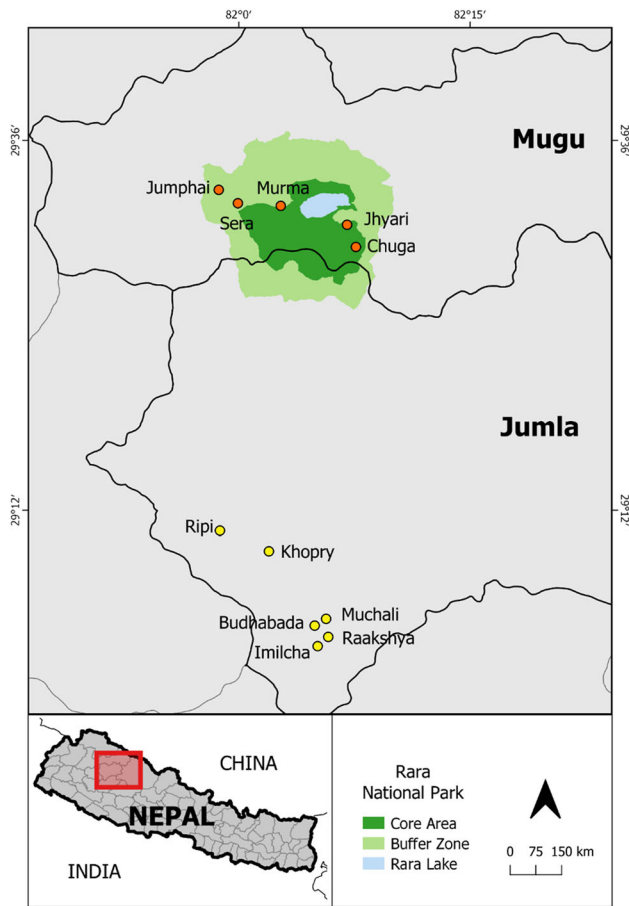
This study aims first to assess the views of people in six communities across two districts inside and outside a PA in north-western Nepal about threats to the forest which are most in need of improved governance. Secondly, we sought community members' views on the current state of governance related to forest resource use. Finally, we assessed their preferences for good governance principles that might be adopted in the development of governance arrangements in the future using a stated preference method, Best–Worst scaling (BWS). The BWS allows the evaluation of hypothetical policy settings to identify which features of any improved governance system the community thought most important, and which not so important. To the best of the authors' knowledge, there are no other studies that have analysed the status, effectiveness and potential improvements to conservation governance at the community level.

## MATERIALS AND METHODS

### Study area

The study area was located in 11 localities in three administrative wards (a ward, which is comprised of multiple villages, is the smallest administrative unit in the federal structure of the Government of Nepal) in the buffer zone of Rara National Park (RNP) in Mugu district and three wards outside the park in Jumla district. Rara National Park (RNP), Nepal's smallest PA (106 km<sup>2</sup>) and the surrounding buffer zone (198 km<sup>2</sup>) are situated in the high-altitude region of north-west of Nepal about 365 km from the country's capital (Fig. 1). The region is bio-culturally diverse (Bhujju et al. 2007; RNP 2019) but is the most impoverished, geographically isolated and least developed region of the country. Most people in the research area depend on agricultural activities for their livelihoods but often face food shortages because the little arable land available is not very productive. Traditionally the economic activities in the villages are limited to a combination of agriculture (mostly millet, barley, maize, potato cultivation), the collection of medicinal herbs and high-value forest products, home trade industries, seasonal outmigration for employment and animal farming (large herds of sheep and mountain goats) including seasonal transhumance to high-altitude grasslands (Bhatta 2021).

These sites were selected because they are the nearest villages to the known red panda habitats in and around the PA. The second reason is that these locations have two distinct forms of forest governance. Forests inside the PA are managed by the RNP authority, which is part of the Department of National Parks and Wildlife Conservation, and buffer zone management committees; community and leasehold forests outside the PA are managed by the



**Fig. 1** Location of study area in western Nepal

division forest office of the Department of Forests and Soil Conservation. The third reason for site selection is the high dependency of these communities on red panda habitats to support their livelihoods.

### Data collection and sampling

Data were collected through household surveys using structured questionnaires (see Appendix S1 in the Supplementary Information). To inform the questionnaire design, including the BWS, exploratory research was conducted from November 2017 to January 2018, including key informant interviews with the members of the RNP buffer zone management committee, community forest user group, the customary village chief (*Mukhiya*) of each of the study villages, representatives from the mother's group (*Ama Samuha*), school teachers, senior citizens and herders. The questionnaire subsequently developed consisted of three parts: (1) questions about the socio-economic background of respondents, (2) questions about the main threats to red panda habitats and the current state of governance and (3) the BWS used for ranking good governance principles. Respondents were also presented with a

short introduction to the project explaining the aims and prospects of the current study. Questions in the second part were aligned to the BWS designs and classified into the governance principles (see Table 1).

The questionnaire, including the BWS, was tested in the Mugu district during August 2019 to review and refine the chosen good governance attributes and to ensure that the concepts of indicator questions made sense. This exploratory process involved twelve face-to-face interviews and two Focus Group Discussions (FGDs) with 16 participants.

The final household survey was conducted between September and October 2019 with 243 households (145 inside and 98 outside the PA) in the six wards (3 each inside and outside the PA) consisting of 11 villages in and around the red panda habitat. We applied purposive sampling (Cresswell and Plano Clark 2011), a non-random sampling technique composed of a single-visit household questionnaire survey. The study area consisted of 334 households (220 inside and 114 outside the PA) and we sampled roughly 86% of people inside and 66% outside the PA. Elder members of the family, or, in absence of such members, other senior members of the family were selected for the survey.

Five experienced enumerators (research assistants) were recruited for the survey. These were university students, the majority of them belonging to the same region and familiar with the local language, culture, conservation practices and livelihood conditions. The enumerators were trained in the use of the questionnaire and the BWS approach. The survey language was the local language, *Khas bhasa*. The enumerators explained in detail the good governance principles and indicator questions used in the BWS exercise and other related questions, and how to read the BWS blocks. The enumerators informed the survey respondents that participation in the scheme was entirely voluntary. All necessary research permissions were obtained from the Department of Forest, Jumla Division Forest Office, Department of National Parks and Wildlife Conservation and RNP authority in Nepal. Human research ethics approval was also obtained from the Human Research Ethics Committee of Charles Darwin University (H17030).

### Best–worst scaling design and analysis

Best–Worst scaling, developed in the late 1980s (Finn and Louviere 1992; Louviere et al. 2015), is increasingly being used to rank preferences, including in the field of natural resource conservation and management (e.g. Kreye et al. 2016; Soto et al. 2018; Tyner and Boyer 2020). The BWS model provides respondents with an opportunity to choose both best and worst items (or most and least important attributes) in the subset of all the items (Louviere et al.

**Table 1** Description of good governance principles based on PROFOR and FAO (2011), and indicators used in survey to describe [principles to respondents

Good governance principles	Indicator used in Best–Worst scaling design
<i>Accountability</i> : People and institutions should be accountable for their actions	How rule-breaking and corruption is reported and investigated
<i>Effectiveness</i> : The mechanisms of governance should achieve the ends they are intended to achieve	How effectively regulations are enforced
<i>Efficiency</i> : Governance should work with a minimum of waste	Reasonable costs of governance
<i>Fairness</i> : The benefits and burdens of the forest resource should fall in a way generally viewed as just	Fair compensation for damage from wild animals
<i>Participation</i> : All interested people should have an opportunity to be heard or to influence government decisions that affect the forest	Who makes decisions
<i>Transparency</i> : Information about the forest and how it is governed should be reasonably available to all	Training and education around regulations and governance

2015). In our case, the items represented the good governance principles (“Data collection and sampling”). Although BWS requires the inclusion of multiples choice sets, which respondents may consider repetitive and confusing (Jaeger and Cardello 2009, Mueller-Loose and Lockshin 2013), it is less cognitively challenging for respondents to complete than the direct ranking of multiple items because respondents only have to select two items in any choice set, the best and the worst (Flynn et al. 2007).

The items consisted of six principles of good governance of forest resources from the PROFOR governance framework (PROFOR and FAO 2011; Kishor and Rosenbaum 2012) which consider *Accountability*, *Effectiveness*, *Efficiency*, *Fairness*, *Participation* and *Transparency* (Table 1). For each principle, selected from substantial literature on measurement criteria, indicators, methodologies and operational tools to assess the quality of governance (van Doeveren 2011; Secco et al. 2014), PROFOR provides a definition of good governance that we used to design questions relating to forest governance in our study area. Alternative tools developed for assessing national performance, such as the Framework for Assessing and Monitoring Forest Governance (Kishor et al. 2009) and the Assessing Forest Governance Toolkit (Davis et al. 2013), are not necessarily at an appropriate scale to be applied at the local level (see Secco et al. 2014 for a detailed review).

We used the object-case design of a BWS (Louviere et al. 2015) and a balanced incomplete block design (BIBD) to create the different combinations of the principles (items). To do so, we used the library *crossdes* in R (Sailer 2015) to create ten blocks of questions. We decided to present three principles in all cases from which respondents chose the most (best) and least important (worst) (see example in Fig. 2). To minimise potential confusion and fatigue from answering too many BWS tasks, we split the ten generated sets into two blocks with

each respondent being presented with one block, i.e. five BWS tasks. The two blocks were randomly allocated to respondents, ensuring that each block was used approximately the same number of times. When presenting the BWS, the enumerators first explained the principles in a general way, then provided an example to make each principle easier to understand.

### Data analysis

Data obtained from the BWS were analysed using the counting approach, following Louviere et al. (2015). First, we obtained the best–worst (BW) score for each governance principle by subtracting the total number of times a principle was chosen as ‘least preferred’ (here least important) from the number of times it was chosen as ‘most preferred’ (most important) across all respondents (i.e. at an aggregated level). Thus, a positive BW score indicates that the conservation strategy was regarded more often as ‘most important’ than as ‘least important’. We also calculated the relative preferences for the governance principles by normalising the natural logs of the square root of the number of times it was chosen as ‘most important’ divided by the total number of times it was chosen as ‘least important’. This relative preference ranges from 0 (least preferred/important) to 1 (most preferred/important) and allows the interpretation of percentage differences in preferences. Following the approach by Zander et al. (2021), and to verify the BWS results, we also calculated Elo scores (see Elo 1973) for the six governance principles. Elo scores are an alternative measurement to the BW scores and they do not require assumptions about the BWS design (Hollis 2018).

At the respondent level, we calculated the individual BW scores for each governance principle by calculating the number of times a respondent chose it as ‘most important’



What do you think are the most and least important attribute when governing the red panda habitat? (Tick one on the left-hand side as the most important and one on the right-hand side for the least important)		
MOST important		LEAST important
	Who makes decisions (participation)	
	How rule breaking and corruption is reported and investigated (accountability)	
	Fair compensation for damage from wild animals (fairness)	

**Fig. 2** Example of the best–worst scaling task used in our study, including the corresponding question

minus as ‘least important’ and dividing the result by the number of times the respondent saw the item in the BWS tasks presented to them. We then used individual BW scores to test for preference heterogeneity among respondents. We used the non-parametric Wilcoxon (W) test and Spearman’s rank correlations to assess the effect of socio-economic variables on the mean BW scores of each governance principle. As socio-economic variables of interest, we chose age, gender, education, whether respondents were practising transhumance (see Table 2) or collecting bamboo and/or medicinal plants.

Chi-square tests were used to compare the frequency of answers from respondents inside and outside the PA. The additional questions relating to the six governance of the

forests in and around RNP were classified into the six governance principles (see Table 1).

## RESULTS

### Perceived threats and current state of governance

Respondents considered that the greatest threat to red panda habitat, and therefore the activity where governance needed to be strongest, is coming from population growth and an associated higher demand for forest resources with some concern about people from outside harvesting excessive quantities of medicinal plants. Growth in tourist numbers, a shift from transhumance to agriculture and changing environmental and climatic conditions were not considered major problems (Fig. 3). There was no difference between inside and outside the PA (Chi-square = 20.7, d.f. = 14, *p*-value = 0.295).

To communicate the findings, questions asked to respondents were rephrased to emphasise the results. In terms of *Accountability*, nearly all respondents, inside or outside the park, believed that the governance of forests was either corrupt or very corrupt (Table 3). However, most respondents, particularly inside the park, were aware that punishment of some form is investigated and meted out for forest-related infringements punishment, though fewer than half knew personally anyone who had been punished for inappropriate forest use.

In terms of *effectiveness*, there was a strong contrast between inside and outside the PA. Although over 80% of respondents in both areas considered that the rules and regulations should help conserve the forest, and a substantial majority thought the resources available for management likely to be adequate, the high confidence that the rules and regulations had a positive impact on forest resource inside the park was not matched by those outside, with over half of respondents feeling that the regulations

**Table 2** Socio-economic characteristics of participants who completed the choice experiment in a survey among local people in and around red panda habitats in western Nepal (n = 243: inside protected area = 145, outside protected area = 98)

Characteristics	Values
Respondents inside the PA (%)	60
Average age (SD; median)	42.6 (11.9; 40)
Male (%)	62
Engaged in transhumance (%)	23
Engaged in collecting bamboo (%)	84
Engaged in collecting medicinal plants (%)	79
Level of education (%):	
Not completed any formal education	57
Completed primary/elementary school	21
Attended secondary school (Years 8,9,10)	12
Attended or completed high school (Years 10,11,12)	7
Attended or completed university	3

PA protected area, SD standard deviation

either had no impact or that the resources are managed worse because the other regulations. In neither place did a majority feel that money they paid was likely to make much difference to forest use sustainability, or that their livelihoods were secure into the future.

When *efficiency* is equated with monetary licensing of forest access, people inside the park not only paid for access but thought it appropriate. Even outside the park, over 60% approved payment for access to the forest, although less than half did so. Overall, over a quarter of households were being paid to manage resources sustainably, with over a third of the respondents in the park receiving benefits.

*Fairness* in access was greatest inside the park, both for households and specifically for women, with over half the respondents outside the PA not feeling they had the same access to resources as others in the village. Very few people received any compensation for losses to wild animals, particularly outside the PA, but the scale of the problem has not been assessed in this study.

With respect to *participation*, nearly three-fifths of respondents said they were consulted by the government about decisions, particularly inside the park, but few people felt empowered to report corruption, particularly outside the park, and very little training was being delivered to people about how to participate, although about a third were either on committees or would like to have been.

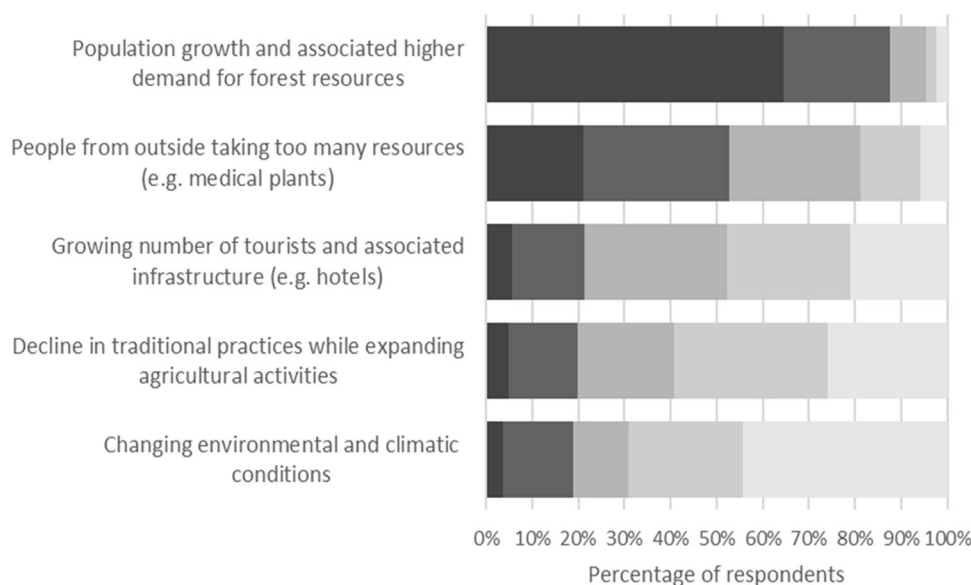
About half the respondents felt they knew those responsible for enforcing laws reasonably well, reflecting the level of *transparency*, with a lower proportion outside the park. The contrast inside and outside the park was much stronger for the provision of information from either

government of conservation NGOs, but few in either place knew they could gain access to information on the forests or had done so.

### Preferences for governance responsibility and good governance principles

Over 80% of 243 respondents, both inside and outside the park, felt that it was the responsibility of everyone in the village to ensure there was no over-use of resources, less than a quarter felt it was the responsibility of elders (Fig. 4). Those inside the park, however, were far more likely to consider that forest committee members (Chi-square = 26.82,  $p$ -value < 0.01) and national parks officers (Chi-square = 39.32,  $p$  = < 0.01) should be responsible as well as the individual respondents (Chi-square = 33.11,  $p$ -value < 0.01). More people outside the park favoured village appointees (Chi-square = 5.5,  $p$ -value = 0.020) but the proportion was < 20%. Of those interviewed, 10% were already involved in forest committees with another 28% having an interest in becoming more involved. Proportions were similar both inside and outside the national park.

Overall, respondents regarded four out of the six governance principles as important with only two principles (*Fairness* and *Efficiency*) regarded as rather unimportant, having been chosen more often as least important in the BWS tasks than most important. These two principles exhibit negative BWS scores as well as negative Elo scores (Table S1 in the Supplementary Information). *Participation* and *Transparency* were considered the two most important principles, both in terms of Elo and BW scores.



**Fig. 3** Perceptions of threats to the future of forests in mountainous western Nepal among local residents (darker shading indicates depth of concern)

**Table 3** Responses to questions, sorted by governance principle and percentage of positive responses, relating to the use and governance of resources within the buffer zone and protected area of Rara National Park (inside protected area; PA) in western Nepal, and outside. Significant probability differences ( $p < 0.05$ ) between inside and outside are in bold ( $n = 243$ : inside protected area = 145, outside protected area = 98)

Question	% positive respondents			$\chi^2$	$p$
	Entire study area	Inside PA	Outside PA		
<b>Accountability</b>					
Is the governance of forest resources corrupt or very corrupt?	95.1	95.2	94.9	0.01	0.923
Are you aware of any forest-related punishment?	73.7	84.8	57.1	23.10	< <b>0.001</b>
Are forest-related crimes and illegal activities are routinely investigated?	72.0	84.8	53.1	29.28	< <b>0.001</b>
Do you think complaints about inappropriate use of forest resources lead to investigation and appropriate sanctions?	67.9	75.2	57.1	8.72	<b>0.003</b>
Do you know anybody who has ever been punished for inappropriate forest use?	40.3	45.5	32.7	4.02	<b>0.045</b>
<b>Effectiveness</b>					
Do you think the current regulations and governance helps to conserve the forest?	88.5	93.8	80.6	9.97	<b>0.002</b>
Do you think there are enough resources to monitor the forest and enforce regulations?	79.4	89.0	65.3	20.03	< <b>0.001</b>
Do you think that the conservation rules and regulations are having a positive impact on the management of forest resources?	70.8	95.9	33.7	109.35	< <b>0.001</b>
Are the forest rules and regulation effectively implemented?	65.8	84.1	38.8	53.51	< <b>0.001</b>
Do you think payment for use of the common pastures will help regulate their use?	46.5	47.6	44.9	0.17	0.680
Do you think payment for forest use helps conserve the forest resources?	42.0	40.0	44.9	0.58	0.448
Do you feel that access to forest resources you depend on for your livelihood is secure?	39.1	31.7	50.0	8.20	<b>0.004</b>
<b>Efficiency</b>					
Do you think your payment for access to the forest is appropriate?	75.7	84.8	62.2	16.22	< <b>0.001</b>
Do you pay for access to the forest?	74.5	93.1	46.9	65.58	< <b>0.001</b>
Do you get any economic incentives to promote your livelihoods and incomes while ensuring sustainable utilisation of timber and non-timber forest products?	25.9	33.8	14.3	11.59	<b>0.001</b>
<b>Fairness</b>					
Do you think men and women have the same right to forest resources access and use?	96.7	97.9	94.9	1.69	0.194
Do you think men and women are equally able to participate in decision-making?	85.2	88.3	80.6	2.72	0.099
Do you have the same access to forest resources as everybody else in your village?	74.5	93.1	46.9	65.58	< <b>0.001</b>
Do you get fair compensation for damage from wild animals?	14.4	22.8	2.0	20.36	< <b>0.001</b>
<b>Participation</b>					
Are stakeholders allowed to seek review or reconsideration of the decisions of the forest/conservation agency?	52.3	56.6	45.9	2.65	0.104
Do the government forests office or national park and buffer zone consult with stakeholders as part of the decision-making process?	49.0	60.7	31.6	19.76	< <b>0.001</b>
Does the government engage with, create space for and support the participation of forest-dependent communities in forest-related planning and decision-making?	45.7	49.7	39.8	2.29	0.130
Are you, or would you like to be more, involved in decision-making about the forest?	37.9	39.3	35.7	0.32	0.571
Do you have an opportunity to report corruption practices to an appropriate authority?	35.4	47.6	17.3	23.39	< <b>0.001</b>
Do you get training and services from government agencies and, if so, are they appropriate for you?	11.5	12.4	10.2	0.28	0.597
<b>Transparency</b>					
How would you rate your knowledge about the people who are currently responsible for managing the forest?	54.7	59.3	48.0	3.04	0.081
How would you rate your access to information about how the resources of your forest are used and about forestry planning?	52.7	62.1	38.8	12.73	< <b>0.001</b>
Do you get any information from the government forest/conservation organisations?	52.7	69.0	28.6	38.28	< <b>0.001</b>
Do you get public notice of proposed forest/conservation policies, programmes, laws and projects?	46.9	60.0	27.6	24.72	< <b>0.001</b>
Are you aware of any activities in the forest that aim to conserve threatened species such as the red panda?	36.6	35.9	37.8	0.09	0.764

**Table 3** continued

Question	% positive respondents			$\chi^2$	<i>p</i>
	Entire study area	Inside PA	Outside PA		
Are you aware that you could access inventory data, management plans, laws and budgets for government-owned forests and protected areas?	17.7	22.8	10.2	6.33	<b>0.012</b>
Have you ever accessed inventory data, management plans, laws and budgets for government-owned forests and protected areas?	7.8	11.0	3.1	5.16	<b>0.023</b>

There were minor differences between BWS and Elo in the rankings of *Effectiveness* (ranked 3rd with BW scores and 4th with Elo scores) and *Accountability* (ranked 4th with BW scores and 3rd with Elo scores).

Using the BW standardised scores, normalised between 0 and 1, *Transparency*, *Effectiveness* and *Accountability* were all valued about 33–37% less than *Participation* (Fig. 5) but about the same as each other. *Fairness* was considered 84% and *Efficiency* 77% less important than *Participation*.

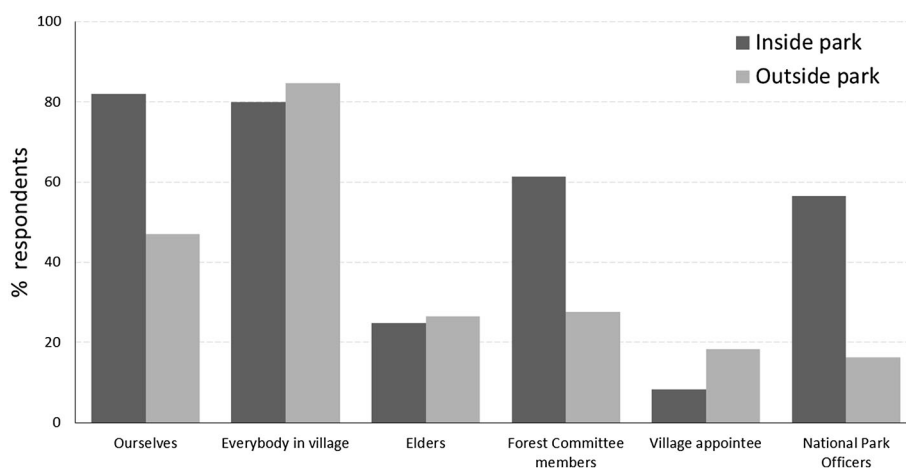
The location (inside or outside PA) and whether people collected bamboo resources had the greatest influence on preferences for governance principles (Table 4). Respondents living outside the PA had lower preferences for *Accountability* ( $W = 8414$ ,  $p$ -value = 0.0120) and higher preference for *Fairness* ( $W = 5906$ ,  $p$ -value = 0.0207) than those living inside the PA. Respondents who collected bamboo resources had a lower preference for *Participation* ( $W = 4695$ ,  $p$ -value = 0.0675) and a higher preference for *Efficiency* ( $W = 3097$ ,  $p$ -value = 0.0242) than those not extracting bamboo from the forest. Those who practised transhumance had a lower preference for *Efficiency*, on a 10% level of significance ( $W = 5935$ ,  $p$ -value = 0.0861), than those not practising it. There was no gender effect on

the preference on any of the principles, and whether respondents collected medicinal plants also had no influence on their preferences for governance principles (Table 4).

## DISCUSSION

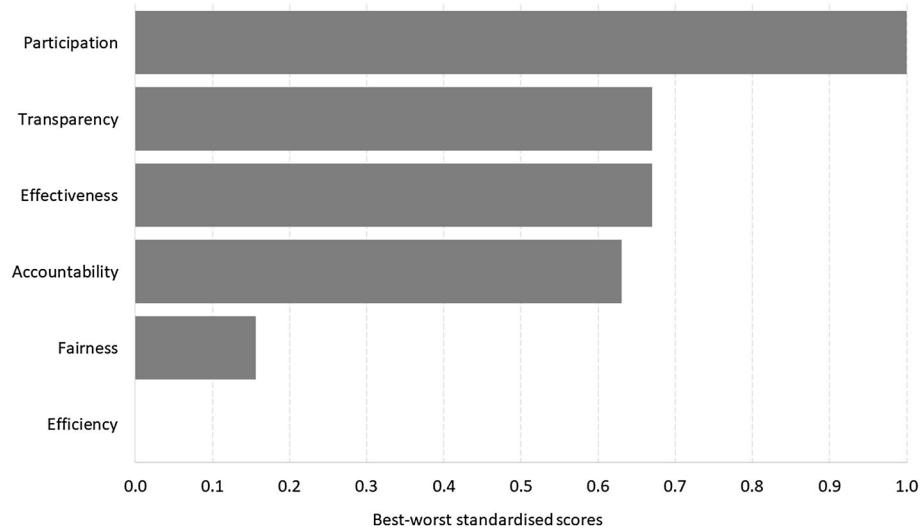
### Reasons to improve environmental governance

There are many threats to forest resources in western Nepal so understanding local perceptions of those most important is the first step in meeting the challenge of improving governance to meet those threats. The results we found here were unequivocal—that it is forest resource extraction and use that should be the focus for improved governance. People considered their own use to be the most critical. Harvesting by outsiders, particularly the harvest of commercially valuable medicinal plants, was also of concern but much less than that of local use. Studies elsewhere suggest that the effects of medicinal plant harvesting are species and area-specific and need not necessarily be harmful (Kunwar et al. 2020, 2021).



**Fig. 4** Perceptions of responsibility for ensuring there is no over-use of forest resources among villagers in western Nepal





**Fig. 5** Preferences for governance principles on a scale from 0 to 1 relating to forest resource use among villagers in western Nepal as assessed using Best–Worst Scaling

**Table 4** The effects of respondent’s socio-economic characteristics on their preferences for good governance principles

Characteristics	Accountability	Efficiency	Effectiveness	Fairness	Participation	Transparency
Male	ns	ns	ns	ns	ns	ns
Outside Protected Area	** (–)	ns	ns	** (+)	ns	ns
Transhumance	ns	* (–)	ns	ns	ns	ns
Medicinal plant collection	ns	ns	ns	ns	ns	ns
Bamboo collection	ns	** (+)	ns	ns	* (–)	ns
Age	ns	Ns	ns	ns	ns	ns
Education	ns	* (–)	*** (+)	** (–)	ns	ns

– signifies a negative relationship, + a positive relationship

Other threats mooted as important were not considered significant. Of these, tourism affects a small part of the forest, with most emphasis on the focal lake of RNP, and is at a scale likely to cause little harm while also producing local economic benefits (Regmi and Walter 2017). The shift from pastoralism and transhumance to intensified agriculture in the arable lands and emigration to the cities is, if anything, likely to be advantageous for the forests by reducing pressure from resource use (Jaquet et al. 2016). Perhaps the most surprising was that the lowest concern was environmental change, given the impact of climate change in the country, generally (Bocchiola et al. 2019). It may be that the area around RNP is low enough that glacial meltwater, a concern elsewhere in the Himalayas, is not critical to local livelihoods and that the topography is so extreme that shifts in climatic suitability do not necessarily mean large changes in the distance between altered climatic zones, if in fact these zones have moved upwards. There is also substantial local adaptation to climate change

among other Himalayan communities (Adhikari et al. 2018).

### Existing state of environmental governance

The extraction of forest resources is locally recognised as a major problem, so the high level of satisfaction with existing laws was perhaps surprising. There was, however, a marked contrast between areas inside and outside the PA and a probable gap between the presence of the laws and their implementation. Inside the PA, there was much greater satisfaction with the prevailing laws and policies than outside. Respondents there felt that the rules were being enforced, that payments were equitable and efficient, that they had at least some opportunities to participate and they were reasonably well-informed about processes. However, confidence that the laws and policies protected forest resources was much lower, with about 40% of the respondents feeling that the laws did nothing or even had a

negative effect. Less than a third were confident that their means of livelihood was secure. Outside the park, impressions of almost all facets of good governance were less favourable. A far smaller proportion of respondents outside than inside considered that there was much enforcement of rules and regulations, though it was still well over half (65%). Less than half had faith in the effectiveness of law enforcement, thought resource use rights were equitable, felt there were opportunities to engage in decision-making and or felt informed and involved in decision-making.

While the park management seemed to be complying with policies to engage with local communities, there was much less connection with forestry officials. Partly this is likely to be a result of a long-standing policy to increase community engagement in PAs, particularly through support of buffer zones (Wells and Sharma 1998) like that around RNP. Buffer zones were introduced as a means of ending conflict between parks and surrounding regions (Budhathoki 2004). While there are still many flaws in the operationalisation of buffer zones (Thing and Poudel 2017), the fact that RNP is one of only seven national parks in the country is likely to mean that there are more resources dedicated to it than to the nearby state forests. From the central government's point of view, the forests in Jumla district may be seen as a small part of extensive forests remote from Kathmandu. PAs in Nepal have also become involved in the political evolution of Nepal following the civil war of 1996–2006. Compliance in RNP is assisted by the Nepal Army, a collaboration characterised as re-establishing central government control over areas that, in some parts of the country, became refuges for Maoist forces (Dongol and Neumann 2021). While the presence of the army did not feature in any commentary by those surveys or in any of the FGDs, there may be greater attention paid to communities in buffer zones near parks than similar communities more distant from PAs. Whatever the underlying cause, respondents outside the PA viewed existing governance arrangements far less favourably than those inside.

What 95% of respondents from all villagers shared, however, was the view that “the use of forest resources” was either corrupt or very corrupt (Table 3). Corruption is seen as inimical to good governance globally and a major reason for environmental degradation (Morse 2006; Tacconi and Williams 2020). Such a finding needs to be seen in context. Nepal has a corruption score of 33 out of 100 on the 2020 Corruption Perception Index (Transparency International 2021), 117th out of 180 ranked countries. Corruption, however, takes many forms from small-scale bribery through to extortion and political favouritism. Some theorists believe corruption is partly a social construct, and that gift exchange in one country can be viewed

as graft in another (Granovetter 2007). Traditions, such as *chakari*, *natabad*, *cryabad*, *phariyabad* and *hanumanbad*, influence the influential advisers (*afno manche*) are deeply embedded in Nepalese life (Bista 1991) and, even if some traditions were deliberately introduced by the elites to maintain power by distributing favours (Subedi 2005), empirical research in Kathmandu suggests there is widespread tolerance of small-scale bribery (Truex 2011). The development of corrupt practice is also more likely where people are well known to each other, as was the case with 60% of respondents within the PA and almost half outside, because private traditions and expectations of gift exchange can influence impartiality when exercising public duties (Rose-Ackerman 1999). However, recent research at a global level challenges acceptance of corruption as a cultural norm, arguing that there are strong universal correlates of corruption despite wide variation in social context (Jetter and Parmeter 2018).

Such correlations include the rule of law, government effectiveness, urbanisation, the number of women in parliament and the extent of primary schooling (Jetter and Parmeter 2018), with the correlation between level of education and intolerance to corruption being particularly strong in Nepal (Truex 2011). However, measures of these indicators are mostly low in Nepal, and are particularly low in the study region. Furthermore, while there have been some improvements in national corruption indices in the last decade (Transparency International 2021), local level corruption has been exacerbated by the partial decentralisation that has been occurring with the policy of federalism that has been pursued since the civil war ended in 2006. While extensive powers have been devolved to local regions, this has not been accompanied by fiscal decentralisation (Ghimire 2018), which promotes budget capture by local elites (Hart and Welham 2016). It is therefore unsurprising that there should be high levels of perceived corruption in and around a remote national park. That few people have been charged with corruption (Table 3) does not invalidate the finding that over 95% of responses consider the governance of forest resources corrupt or very corrupt (Table 3, Q1).

That local corruption is a social norm in the region is not so much a reflection on the behaviour of individual government officers, most of whom are junior functionaries in a national hierarchy, but is indicative of systemic institutional failure at a national level. The universal recognition of the pervasiveness of corruption by respondents is simply a reflection of this national failure. Corruption is the most likely reason for the disconnect between a belief that the laws and regulations are beneficial and the opinion of most respondents that they have little impact on the sustainability of forest resource use.

## Preferences for governance principles

Widespread concern with corruption may be the reason that *Participation* emerged from the BWS as the most preferred good governance principle, and why there was such enthusiasm to assume personal or village responsibility for ensuring resources are not over-used. Unlike in some situations where wildlife conservation is the purpose of land use (Robbins et al. 2009) and there are strong motivations for multiple actors to extract resources excessively (Taconi and Williams 2020), the livelihoods of many of the respondents in our study were being affected detrimentally by poor governance. Greater participation in government necessarily also increases the likelihood of greater *Transparency*, *Effectiveness* and *Accountability* among those involved in governance. *Fairness* and *Efficiency* might be considered more distant aspirations that are contingent on raising the standards of the other good governance characteristics. Sectoral differences are less readily interpreted without more detailed understanding of the drivers of preferences by groups like bamboo collectors or transhumant pastoralists. Some, like the greater priority placed on *Fairness* by those outside the PA may reflect the example given relating to compensation following damage to crops by wildlife. Almost no respondents from outside the PA were satisfied with the compensation they received. However, it also reflects the sentiment that less than half the respondents considered they had the ‘same access to forest resources as everybody else’ in their village, compared to 93% inside the PA. What the sectoral variation does illustrate, however, is that any improvements to governance need to be tailored to local needs (Heywood 2018), just as any compensation scheme for reduced resource use will need to incorporate different incentives for different population sectors.

## Cautions in interpretation of the results and research needs

Interviewing heads of household in Nepal inevitably leads to a male bias among the respondents. Our selection of participants also tended to favour males and those in positions of power. Nevertheless, the highest percentage of potential survey households (over 60%) means it unlikely that our results would vary greatly. Some results may also have been affected by the examples chosen, particularly in the Best–Worst scaling. While these grew out of a range of earlier fieldwork, examples inevitably focus respondents’ thoughts on the specific issues described (such as compensation from wildlife losses with respect to fairness) than on the more general principles we aimed to consider. Nevertheless, we do not believe our results would have been greatly affected given the divergence between the

most and least favoured attributes to be considered in any improved governance regime. The strength of the results also implies that ambiguities in meaning that must inevitably have arisen as a result of translation of the questionnaire from English through Nepali to *Khas bhasa* and back again are unlikely to have had much impact on the conclusions.

The area where greatest research is needed is on the design of a participatory governance approach tailored to the local communities of western Nepal. Such a governance regime must account not just for existing trends in resource use and availability, and on existing relationships between the State and the local community, but also anticipate changes that are inevitably going to occur in the near future, and indeed are already underway. These include environmental changes as a result of both resource use and climate change, in the demographic composition of the local population, changes in access as infrastructure is improved and shifts in sources of income from transhumance and harvesting of resources to intensified agriculture and remittances. The most important feature of this research, if it is about the development of a governance regime, is that the research itself is participatory with adequate resourcing and involvement of the local community in the formulation of the final research questions, the conduct of the research and the analysis and interpretation of the research. Such community driven research not only ensures that understanding of the research results is embedded in the community but can itself be transformative (Garnett et al. 2009; Fazey et al. 2013).

## Policy implications

The unintended consequences of the nationalisation of state forests in 1957 followed by the fairly rapid transition to community-based forests means that Nepal has led the way globally in the development of appropriate governance regimes over the last 40 years (Acharya 2002; Fisher et al. 2018). However, governance regimes need to be tailored to local conditions (Heywood 2018)—as noted above, communities, both natural and human, are changing rapidly in the region and research is needed to develop a regionally targeted governance regime. One potential form of governance is payments to communities to reduce their resource use. Such a payment for ecosystem service (PES) scheme is considered highly acceptable by many communities in the region (e.g. Leimona et al. 2015; Paudyal et al. 2018). Our results showed that most respondents to the survey, both inside and outside the PA, are concerned for the future of their existing form of livelihood and might also be willing to participate in PES schemes. While existing payments made by those harvesting from the forest or taking their stock to highland pastures were considered by most

respondents to achieve little for forest sustainability, reversing the financial flows so that the forest users receive money as compensation for lower resource use may be an effective way to reduce local over-exploitation.

The research also highlighted the differences between forest users inside and outside the PA, with environmental management thought to be more effective inside. This suggests a particularly strong appetite among those communities outside the PA for more information, additional participation, expanded investment in compliance and greater equity in access among users. In many ways, the additional investment in communities away from the PA can be seen as compensation for not having the good fortune to live within the buffer zone of a national park, particularly their distance from an attractive feature like Rara Lake. The forests outside the PA, however, still support red panda and other valuable biodiversity. Indeed, the populations of panda and other species protected by the relatively small RNP would be unlikely to persist in the long term without additional protection of populations in the broader forest matrix of north-western Nepal, justifying biodiversity investment across the broader landscape, and the associated improvements in governance.

Both improving compliance and access equity would help deal with the most fundamental problem of effective governance of the red panda habitat, corruption. As noted by Tacconi and Williams (2020), systemic corruption of the type embedded in the Nepalese government defies traditional approaches to countering corruption which are built on the theory that honest principals are misled by dishonest agents (Lambsdorff 2007; Mungiu-Pippidi 2015). They consider that communal action theory may be more relevant, although admit the difficulties in its implementation. One aspect is to strengthen civil society, a key part of the participation favoured by respondents in this study, although the means by which that is done are unclear. One approach could be to consider changing, at a local scale (Heywood 2018), the type of governance currently being enacted within the forests. A corrupt system is essentially fragmented because the interactions are generally specific to specific sectors or groups within the circle of corrupt practice (Zelli and van Asselt 2013). However, the official system of governance, in both inside and outside the PA, is monocentric (Kim 2020), with a hierarchy of responsibilities leading back to Kathmandu bureaucracies and politicians. Perhaps a more effective and fair system of governance would be to extend the *polycentric* governance systems already in place, albeit unofficially, whereby units of authority have separate but overlapping responsibilities. Grounded in local participation (Carlisle and Gruby 2019), the more widely recognised and supported *polycentric* system could promote not just the absence of corruption, since the different governance centres would monitor

performance of each other, but improve integrity in performance (Heywood 2018).

## CONCLUSIONS

While there is general agreement that the laws and regulations in place to manage resource use ought to be effective, there is little confidence that they do so, particularly outside the PA. Respondents to a survey of local residents identified that increased participation in forest governance would be the change most likely to improve the sustainability of resource use. This would probably have flow on benefits to the transparency and effectiveness of governance and would, in turn, be the change most likely to reduce the local expression of the systemic corruption that afflicts governance at a national level in Nepal. Increase in participation could be achieved by shifting the governance regime from one that is monocentric, if not fragmented, to one that is polycentric with greater power over some aspects of forest governance devolved to local communities. Creation of a PES-like compensation scheme to reduce extraction of forest resources could contribute to this change in governance with benefits for forests, people and biodiversity.

**Acknowledgements** The authors would like to acknowledge the contributions and support of local communities, key informants, focus group discussants and household survey respondents. We are thankful to the Department of National Parks and Wildlife Conservation and the Department of Forests and Soil Conservation, Nepal for providing research approval. We are equally grateful to District Forest Office, Jumla, Rara National Park (RNP), Mugu and RNP buffer zone committee members for their constant assistance and cooperation in data collection. Special thanks to Field Research Assistants, Dikra Prasad Bajgai (team leader), Madan Subedi, Bhim Fadera, Raj Bauwal and Dipesh Acharya for their efforts and integrity during the fieldwork. Our thanks and appreciation to Er. Abhishek B.C., executive chairman of Pact Consultant (P.) Ltd., Kathmandu, Nepal, who facilitated with arrangements of field assistants and provided office space during the planning phase of the field study. The research was funded by an Australian Postgraduate Award under the College of Engineering, IT, and Environment at Charles Darwin University, Australia.

**Author contributions** MB involved in conceptualisation, methodology, investigation, formal analysis, data curation, writing- original draft preparation and project administration. KZ and SG participated in conceptualisation, methodology, formal analysis, writing- original draft preparation and supervision.

## REFERENCES

- Acharya, K.P. 2002. Twenty-four years of community forestry in Nepal. *International Forestry Review* 4: 149–156.
- Acharya, D., and N.R. Baral. 2017. Neglected high altitude rangelands of Nepal: Need for reform. *Journal of Forest and Livelihood* 15: 103–119.



- Adhikari, S., H. Baral, and C. Nitschke. 2018. Adaptation to climate change in Panchase Mountain ecological regions of Nepal. *Environments* 5: 42.
- Albrich, K., W. Rammer, and R. Seidl. 2020. Climate change causes critical transitions and irreversible alterations of mountain forests. *Global Change Biology* 26: 4013–4027.
- Arun, A. and V. Ritu. 2017. Natural resource governance at multiple scales in the Hindu Kush Himalaya. ICIMOD Working Paper.
- Baynham-herd, Z., T. Amano, W.J. Sutherland, and P.F. Donald. 2018. Governance explains variation in national responses to the biodiversity crisis. *Environmental Conservation* 45: 407–418.
- Bhatta, L.D., B.E.H. Van Oort, I. Rucevska, and H. Baral. 2014. Payment for ecosystem services: Possible instrument for managing ecosystem services in Nepal. *International Journal of Biodiversity Science, Ecosystem Services and Management* 10: 289–299.
- Bhatta, M., K.K. Zander, B.J. Austin, and S.T. Garnett. 2020. Societal recognition of ecosystem service flows from red panda habitats in Western Nepal. *Mountain Research and Development* 40: R50–R60.
- Bhatta, M., 2021. *Conservation governance of ecosystem goods and services obtained from the red panda habitats of western Nepal*. PhD thesis, Charles Darwin University, Darwin.
- Bhujii, U.R., P.R. Shakya, T.B. Basnet, and S. Shrestha. 2007. *Nepal biodiversity resource book: Protected areas, Ramsar sites, and World Heritage sites*. Kathmandu: ICIMOD.
- Bista, D.B. 1991. *Fatalism and development: Nepal's struggle for modernization*. Calcutta: Orient Longman Limited.
- Bocchiola, D., L. Brunetti, A. Soncini, F. Polinelli, and M. Gianinetta. 2019. Impact of climate change on agricultural productivity and food security in the Himalayas: A case study in Nepal. *Agricultural Systems* 171: 113–125.
- Budhathoki, P. 2004. Linking communities with conservation in developing countries: Buffer zone management initiatives in Nepal. *Oryx* 38: 334–341.
- Carlisle, K., and R.L. Gruby. 2019. Polycentric systems of governance: A theoretical model for the commons. *Policy Studies Journal* 47: 927–952.
- Chaudhary, R., S. Bhattarai, G. Basnet, K. Bhatta, Y. Uprety, L. Bhatta, R. Kotru, and B. Oli. et al. 2017. Traditional practice and knowledge of indigenous and local communities in Kailash Sacred Landscape, Nepal. ICIMOD Working Paper.
- Cresswell, J.W., and V.L. Plano Clark. 2011. *Designing and conducting mixed method research*, 2nd ed. Thousand Oaks: Sage.
- Davis, C., L. Williams, S. Lupberger, and F. Daviet. 2013. *Assessing forest governance—the Governance of Forests Initiative Indicator Framework*. Washington: World Resource Institute.
- DFRS. 2015. *High Mountains and High Himal Forests of Nepal*. Kathmandu: Forest Resource Assessment Nepal, Department of Forest Research and Survey.
- DNPWC. 2015. *Annual Report*. Department of National Parks and Wildlife Conservation
- Dongol, Y., and R.P. Neumann. 2021. State making through conservation: the case of post-conflict Nepal. *Political Geography* 85: 102327.
- Elo, A.E. 1973. The international chess federation rating system. *Chess* 38: 293–296.
- Fazey, I., A.C. Evely, M.S. Reed, L.C. Stringer, J. Kruijssen, P.C. White, A. Newsham, and L. Jin et al. 2013. Knowledge exchange: A review and research agenda for environmental management. *Environmental Conservation* 40: 19–36.
- Ferraro, P.J., and S.K. Pattanayak. 2006. Money for nothing? A call for empirical evaluation of biodiversity conservation investments. *PLOS Biology* 4: e105.
- Finn, A., and J.J. Louviere. 1992. Determining the appropriate response to evidence of public concern: The case of food safety. *Journal of Public Policy and Marketing* 11: 12–25.
- Fisher, R., R. Thwaites, and M. Poudel. 2018. The history and context of community forestry in Nepal. In *Community forestry in Nepal*, ed. R. Thwaites, R. Fisher, and M. Poudel, 22–36. London: Routledge.
- Flynn, T.N., J.J. Louviere, T.J. Peters, and J. Coast. 2007. Best–worst scaling: What it can do for health care research and how to do it. *Journal of Health Economics* 26: 171–189. <https://doi.org/10.1016/j.jhealeco.2006.04.002>.
- Garnett, S.T., G.M. Crowley, H. Hunter-xenie, W. Kozanayi, B. Sithole, C. Palmer, R. Southgate, and K.K. Zander. 2009. Transformative knowledge transfer through empowering and paying community researchers. *Biotropica* 41: 571–577.
- Ghimire, D.K. 2018. Decentralization and corruption: Does decentralization lead to corruption in local level in Nepal? *Molung Educational Frontier* 8: 17–36.
- GoN. 2014. *National Biodiversity Strategy and Action Plan: 2014–2020*. Government of Nepal, Ministry of Forests and Soil Conservation, Kathmandu
- Granovetter, M. 2007. The social construction of corruption. In *On Capitalism*, ed. V. Nee and R. Swedburn, 154–172. Stanford: Stanford University Press.
- Gronow, J., and K. Shrestha. 1991. *From mistrust to participation: The creation of a participatory environment for community forestry in Nepal*. London: ODI Social Forestry Network.
- Hart, T., and B. Welham. 2016. *Fiscal decentralisation. A public financial management introductory guide*. London: Overseas Development Institute.
- Heywood, P.M. 2018. Combating corruption in the twenty-first century: New approaches. *Daedalus* 147: 83–97.
- Hollis, G. 2018. Scoring best-worst data in unbalanced many-item designs, with applications to crowdsourcing semantic judgments. *Behavior Research Methods* 50: 711–772.
- Ichiyanagi, K., M.D. Yamanaka, Y. Muraji, and B.K. Vaidya. 2007. Precipitation in Nepal between 1987 and 1996. *International Journal of Climatology* 27: 1753–1762.
- Jaeger, S.R., and A.V. Cardello. 2009. Direct and indirect hedonic scaling methods: A comparison of the labeled affective magnitude (LAM) scale and best–worst scaling. *Food Quality and Preference* 20: 249–258.
- Jaquet, S., G. Shrestha, T. Kohler, and G. Schwilch. 2016. The effects of migration on livelihoods, land management, and vulnerability to natural disasters in the Harpan watershed in western Nepal. *Mountain Research and Development* 36: 494–505.
- Jetter, M., and C.F. Parmeter. 2018. Sorting through global corruption determinants: Institutions and education matter–Not culture. *World Development* 109: 279–294.
- Kim, R.E. 2020. Is global governance fragmented, polycentric, or complex? the state of the art of the network approach. *International Studies Review* 22: 903–931.
- Kishor, N., T. Castren, E. Namubiru-mwaura, and K. Rosenbaum. 2009. Roots for good forest outcomes: an analytical framework for governance reforms. Report No. 49572-GLB. Agriculture and Rural Development Department, The World Bank, Washington.
- Kishor, N., and K. Rosenbaum. 2012. *Assessing and monitoring forest governance: A user's guide to a diagnostic tool*. Washington: PROFOR.
- Kjaer, A.M. 2004. *Governance*. Cambridge: Cambridge University Press.
- Kreye, M.M., D.C. Adams, F.J. Escobedo, and J.R. Soto. 2016. Does policy process influence public values for forest-water resource protection in Florida? *Ecological Economics* 129: 122–131.



- Kunwar, R.M., A. Evans, J. Mainali, A.S. Ansari, B. Rimal, and R.W. Bussmann. 2020. Change in forest and vegetation cover influencing distribution and uses of plants in the Kailash Sacred Landscape Nepal. *Environment, Development and Sustainability* 22: 1397–1412.
- Kunwar, R.M., B. Rimal, H.P. Sharma, R.C. Poudel, D. Pyakurel, A. Tiwari, S.T. Magar, and G. Karki et al. 2021. Distribution and habitat modeling of *Dactylorhiza hatagirea* (D. Don) Soo, *Paris polyphylla* Sm. and *Taxus* species in Nepal Himalaya. *Journal of Applied Research on Medicinal and Aromatic Plants* 20: 100274.
- Lambsdorff, J.G. 2007. *The institutional economics of corruption and reform: Theory, evidence and policy*. Cambridge: Cambridge University Press.
- Leimona, B., M. Van Noordwijk, R. De Groot, and R. Leemans. 2015. Fairly efficient, efficiently fair: Lessons from designing and testing payment schemes for ecosystem services in Asia. *Ecosystem Services* 12: 16–28.
- Louviere, J.J., T.N. Flynn, and A.A.J. Marley. 2015. *Best-worst scaling: Theory, methods and applications*. Cambridge: Cambridge University Press.
- Marshall, G.R. 2009. Polycentricity, reciprocity, and farmer adoption of conservation practices under community-based governance. *Ecological Economics* 68: 1507–1520.
- Morse, S. 2006. Is corruption bad for environmental sustainability? A cross-national analysis. *Ecology and Society* 11: 22.
- Mueller loose, S., and L. Lockshin. 2013. Testing the robustness of best worst scaling for cross-national segmentation with different numbers of choice sets. *Food Quality and Preference* 27: 230–242.
- Mungiu-pippidi, A. 2015. *The Quest for good governance: How societies develop control of corruption*. Cambridge: Cambridge University Press.
- Ojha, H.R., R. Ghate, L. Dorji, A. Shrestha, D. Paudel, A. Nightingale, K. Shrestha, and M.A. Watto et al. 2019. Governance: Key for environmental sustainability in the hindu kush himalaya. In *The Hindu Kush Himalaya assessment: Mountains, climate change, sustainability and people*, ed. P. Wester, A. Mishra, A. Mukherji, and A.B. Shrestha, 545–578. Cham: Springer International Publishing.
- Palomo, I. 2017. Climate change impacts on ecosystem services in high mountain areas: A literature review. *Mountain Research and Development* 37: 179–187.
- Paudel, N. S., Jana, S. and RAI, J. 2010. Protected areas and rights movements: the inadequacies of Nepal's participatory conservation. Discussion Paper Series 10: 3. Forest Action, Kathmandu, Nepal.
- Paudyal, K., H. Baral, S.P. Bhandari, and R.J. Keenan. 2018. Design considerations in supporting payments for ecosystem services from community-managed forests in Nepal. *Ecosystem Services* 30: 61–72. <https://doi.org/10.1016/j.ecoser.2018.01.016>.
- Pokharel, R.K., and K.R. Tiwari. 2013. Good governance assessment in Nepal's community forestry. *Journal of Sustainable Forestry* 32: 549–564. <https://doi.org/10.1080/10549811.2013.779902>.
- Pomeranz, E.F., and R.C. Stedman. 2020. Measuring good governance: Piloting an instrument for evaluating good governance principles. *Journal of Environmental Policy and Planning* 22: 428–440. <https://doi.org/10.1080/1523908X.2020.1753181>.
- Price, M. 2015. *Mountains: A very short introduction*. Oxford: Oxford University Press.
- PROFOR and FAO. 2011. *Framework for assessing and monitoring forest governance*. Program on Forests (World Bank) and Food and Agriculture Organization of the United Nations, Rome.
- Regmi, K.D., and P. Walter. 2017. Modernisation theory, ecotourism policy, and sustainable development for poor countries of the global South: Perspectives from Nepal. *International Journal of Sustainable Development and World Ecology* 24: 1–14.
- RNP. 2019. *Rara National Park and its Buffer Zone Management Plan 2076/77–2080/81*. Rara National Park, Mugu
- Robbins, P., K. Mcsweeney, A.K. Chhangani, and J. Rice. 2009. Conservation as it is: Illicit resource use in a wildlife reserve in India. *Human Ecology* 37: 559–575.
- Robichau, R.W. 2011. The mosaic of governance: Creating a picture with definitions, theories, and debates. *Policy Studies Journal* 39: 113–131.
- Rose-Ackerman, S. 1999. *Corruption and government: Causes, consequences, and reform*. Cambridge: Cambridge University Press.
- Sailer, O. 2015. Crossdes: construction of crossover designs. R package version 1.1–1. <https://cran.r-project.org/web/packages/crossdes/index.html>. Accessed March 2021
- Secco, L., R. Da Re, D.M. Pettenella, and P. Gatto. 2014. Why and how to measure forest governance at local level: A set of indicators. *Forest Policy and Economics* 49: 57–71.
- Soto, J.R., F.J. Escobedo, H. Khachatryan, and D.C. Adams. 2018. Consumer demand for urban forest ecosystem services and disservices: Examining trade-offs using choice experiments and best-worst scaling. *Ecosystem Services* 29: 31–39.
- Subedi, M.S. 2005. Corruption in Nepal: An anthropological inquiry. *Dhaulagiri Journal of Sociology and Anthropology* 1: 110–128.
- Tacconi, L., and D.A. Williams. 2020. corruption and anti-corruption in environmental and resource management. *Annual Review of Environment and Resources* 45: 305–329.
- Termeer, C.J.A.M., A. Dewulf, and M. Van Lieshout. 2010. Disentangling scale approaches in governance research: Comparing monocentric, multilevel, and adaptive governance. *Ecology and Society* 15: 29.
- Thing, S.J., and B.S. Poudel. 2017. Buffer zone community forestry in Nepal: Examining tenure and management outcomes. *Journal of Forest and Livelihood* 15: 57–70.
- Transparency International. 2021. <https://www.transparency.org/en/countries/nepal>. Accessed March 2021
- Truex, R. 2011. Corruption, attitudes, and education: Survey evidence from Nepal. *World Development* 39: 1133–1142.
- Tyner, E.H., and T.A. Boyer. 2020. Applying best-worst scaling to rank ecosystem and economic benefits of restoration and conservation in the Great Lakes. *Journal of Environmental Management* 255: 109888.
- Van Doeveren, V. 2011. Rethinking good governance. *Public Integrity* 13: 301–318.
- Wells, M.P., and U.R. Sharma. 1998. Socio-economic and political aspects of biodiversity conservation in Nepal. *International Journal of Social Economics* 25: 226–243.
- Zander, K.K., G. Petersonstlaurent, C.J. Hogg, P. Sunnucks, J. Woinarski, S. Legge, M. Burton, and R. Pandit 2021. Measuring social preferences for conservation management in Australia. *Biological Conservation* 262: 109323.
- Zelli, F., and H. Van Asselt. 2013. The institutional fragmentation of global environmental governance: Causes, consequences, and responses. *Global Environmental Politics* 13: 1–13.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## AUTHOR BIOGRAPHIES

**Manoj Bhatta** (✉) is a PhD student at the Research Institute for the Environment and Livelihood at Charles Darwin University. Prior to his PhD studies, Manoj Bhatta worked as an Environmental Officer for various development projects in Nepal. Manoj holds a BSc and

MSc in Environmental Science from Tribhuvan University where he also worked as a lecturer.

*Address:* Research Institute for the Environment and Livelihoods, Charles Darwin University, Ellengowan Drive, Darwin, NT 0909, Australia.

e-mail: manojenvbhatta@gmail.com

**Kerstin K. Zander** (✉) is an Associate Professor at the Northern Institute at Charles Darwin University. She is an environmental economist with research focus on climate change impacts and adaptation.

*Address:* Northern Institute, Charles Darwin University, Ellengowan Drive, Darwin, NT 0909, Australia.

e-mail: kerstin.zander@cdu.edu.au

**Stephen T. Garnett** is the Professor of Conservation and Sustainable Livelihoods at Charles Darwin University. He has been working on threatened species conservation for over thirty years.

*Address:* Research Institute for the Environment and Livelihoods, Charles Darwin University, Ellengowan Drive, Darwin, NT 0909, Australia.

e-mail: stephen.garnett@cdu.edu.au