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► **To cite this version:**

Trupthi Narayan, Sherub Sherub, Meredith Root-Bernstein. A culturally appropriate redesign of the roles of protected areas and community conservation: understanding the features of the Wangchuck Centennial National Park, Bhutan. *Biodiversity and Conservation*, 2022, 10.1007/s10531-022-02515-5. hal-03892586

**HAL Id: hal-03892586**

**<https://hal.science/hal-03892586>**

Submitted on 9 Dec 2022

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Accepted version

A culturally appropriate redesign of the roles of protected areas and community conservation: understanding the features of the Wangchuck Centennial National Park, Bhutan

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Keywords: National parks, protected areas, Bhutan, tacit working models, conservation, ICDP

#### Acknowledgements

We are very grateful to the following people and institutions for permissions and support in carrying out this project: The Royal Government of Bhutan; Dr Nawang Norbu, Dr Tshering Tempa, Wangchuk Dorji and the staff at Ugyen Wangchuck Institute of Conservation and Environment Research, Bhutan; Dr D. S. Rai and staff at Wangchuck Centennial Park; Dr Sonam Wangyel Wang for sharing the initial questionnaire and for guidance on research design; Phurba Lhendup, WWF Bhutan; Dr Paul Jepson and Dr Shonil Bhagwat, School of Geography and the Environment, University of Oxford; Dr Uri Roll from Oxford University Centre for the Environment for advice on data analysis for an earlier version of the manuscript; Menlha Wangmo for cultural introductions. We are grateful to all our interviewees and survey respondents for their time. We gratefully acknowledge a bursary from the Mulder House trust fund, Linacre College, Oxford.



## Abstract

Conservation projects in developing countries that depend on international donors or international capacity building partnerships often have to bridge a gap between donors' or experts' ideas of best practice and local ideas of best practice. We examine how this gap may be successfully bridged by examining the case of the Wangchuck Centennial National Park (WCNP) in Bhutan. This protected area was attracting considerable outside investment but presented an unusual situation in 2013: it was largely viewed positively by local communities living in the park, even though, five years after it was gazetted, it had no clear boundaries, and its management was identical to management outside the park. Why did the WCNP have this form, and why was it viewed favorably by local people? Our interviews and survey reveal that this may be due to practical and favourable integrated conservation and development projects implemented by the park management, more people-friendly rules adopted by the Bhutanese government, and a cultural ethos of sustainable development and environmentalist Buddhist sentiments. Applying the tacit working models of conservation framework, we argue that although the protected area as a form of conservation normally is designed to fit the 'uniformity model' of a bounded area with specific rules and management, the WCNP has been culturally re-designed to fit the more culturally suitable 'normative model' that is territorially extensive and values-based. We suggest that this adaptation of global conservation concepts to local cultural perspectives may be a factor in Bhutanese conservation success.

## Introduction

The modern conservation management intervention known as 'community conservation' originated as a solution to the social problems caused by national park models that restricted human occupation or uses of the nature inside their borders (Hayes 2006; Brandon & Wells 1992). However, the effectiveness or success of community conservation, including integrated conservation and development projects (ICDPs) (Wells et al. 2004), can be hard to assess as such projects' interventions and specific objectives are not often based on an articulated theory of change. Rather, such approaches tend to try to harness social dynamics in their totality to spontaneously alter society itself (Root-Bernstein 2020). This intuitive collective approach to project design may indeed be more successful than approaches based on narrow mechanistic theories of social change and positivist cause-and-effect thinking, but the absence of clear theories of change also impedes developing more sophisticated knowledge about why and when certain approaches work best. Various studies and reviews have suggested a large number of factors from post-hoc analysis that explain the success or failure of such projects, such as seeing people as solutions not problems, individual benefits, devolution of decision-making, community rights and adaptive approaches to problem resolution (e.g. Horwich & Lyon 2007; Jacobson & Roberston

2012; Butler et al. 2015 Ruiz-Mallén et al. 2015; Galvin et al. 2018). Yet how exactly to define success and failure of community conservation and ICDPs in the first place is somewhat unclear. Whose idea of a desirable community or socioecological outcome should be used as the benchmark?

Conservation projects in developing countries that depend on international donors or international capacity building partnerships often have to bridge a gap between donors' or experts' ideas of best practice and local people's ideas of best practice (Delay et al. 2022). As policies and approaches that have worked well in some circumstances are globalized and applied in new situations where they are not appropriate, the situated reasons why they worked in the first place may be lost in translation and overlooked (Temenos and McCann 2013). This is all the more possible when 'why something is expected to work' (a theory of change) cannot be clearly articulated *a priori*, thus creating a "black box" effect (Goulden et al. 2017). Here we ask how countries may successfully avoid these problems and bridge the gap between international best practice concepts around ICDPs and national parks, and local preferences about how best to implement conservation. We argue that a certain strategic ambiguity allows both international donors or experts and local communities to be satisfied with the outcomes. To examine this dynamic we consider the case of conservation in Bhutan.

The Wangchuck Centennial National Park (WCNP) is a national park in northern Bhutan that was established in 2008 and formally gazetted in 2009, being the first and only park to be established after Bhutan's transition from an absolute to a democratic constitutional monarchy. Since the first creation of national parks in Bhutan in 1983, Bhutanese conservation policies have always explicitly recognised the right of people to live inside them. ICDP have been in place in Bhutanese national parks since the 1990s (Wang et al. 2006). Attitudes towards existing national parks were negative at that time however, due to regulations over access to or exploitation of natural resources and increasing crop damage from wild animals (Wang et al. 2006). The WCNP, by contrast, was gazetted at a time when conservation policy in Bhutan was shifting away from seeing people as needing regulation to prevent damage to trees and wildlife, towards a people-centred view of conservation premised on mutual benefits. The WCNP's three pillars include conserving species, ecosystems and natural processes; preserving heritage elements; and sustainable development, with

ICDPs as a means to achieve this (WCNP fact sheet obtained from WCNP staff, Anonymous no date).

Although the WCNP appears to be a good example of a national park, a closer look at some of its details may not fully conform to prescribed definitions of a protected area. For example, five years after its legal establishment in 2008, our survey and interviews revealed that the WCNP's borders had not been clearly defined, and there was some question as to whether people living inside the park were even aware that they lived inside a protected area, or if people living near the edges knew whether they were inside or outside the national park. Furthermore, all rules and regulations around timber and non-timber forest product use, and other environmental regulations, are national in scope, rather than particular to the WCNP. The lack of well-defined borders and strict rules differentiating areas within the park from the area outside is unconventional for a protected area, given that borders that delineate the space in which specific regulations are imposed are typically essential characteristics of protected areas (Geldmann et al. 2015; Bruner et al. 2001; Dudley 2008). Is the WCNP in fact just a park on paper? Is this lack of delineation and specific regulations due to lack of capacity or incompetence? Indeed not, because since its establishment, ICDP projects and wildlife-oriented conservation actions inside it have been carried out and have been funded and co-managed primarily by WWF Bhutan (Lham et al. 2019). But other than attracting NGO programmes and projects, what does the WCNP do and how is it supposed to work in the absence of the main features of typical protected areas? Are the ICDPs intended to compensate for the absence of these typical national park features, and if so, how?

### Theoretical framework and hypotheses

To help analyse why the WCNP is designed the way it is, and which ideas about how to do conservation are being satisfied, we draw on a framework developed by Root-Bernstein (2020). Root-Bernstein (2020) and Root-Bernstein et al. (2020) propose that acceptance of conservation interventions by all actors can in part be explained by whether project or programme structures' implicit theories of change match local actors' implicit theories of human behaviour. The proposed schema of "tacit models of human behaviour" in conservation contexts proposes a gradient space of different ways of understanding the relationship between assumptions about individual motivation, and how individuals react to systemic factors (summarized in Figure 1). According to the schema,

people fall somewhere on the gradient between thinking that individual actions are value-led and universal, or context-dependent and inconsistent. At the same time, people fall somewhere on the gradient between following rules and regulations because they represent shared social norms, or people generally use their discretionary capacities to do what they think is best despite rules and regulations. At the intersection of these two gradients is a model space that represents how stakeholders think of themselves and others as distributing or changing their behaviour over space and time, and thus how conservation projects should be structured to account for this. This model space can be described as consisting of four models: the Persuasion model—people’s behaviour is changed by appealing to and strengthening their values—the Normative model—people’s behaviour is changed by enforcing norms that represent shared values—the Uniformity model—people’s behaviour is changed contextually by creating bounded regulatory zones—and the Implication model—people’s behaviour is changed through personal choice or management of contexts for action (Root-Bernstein 2020). In addition, null models include the assumption that behavioural change is random and inexplicable, or that people merely do whatever is easiest (Root-Bernstein 2020). When conservation programmes or projects are designed so that their own theories of change, and thus modes of programme or project implementation, correspond to key stakeholders’ own tacit models of human behaviour, key stakeholders are expected to approve of, be satisfied by, to cooperate with, and/or to expect their peers to cooperate with programmes and projects (Root-Bernstein 2020). By contrast, if a programme or project’s theory of change and modes of implementation are different to key stakeholders’ tacit models of human behaviour, they are more likely to have low confidence, to opt out, to see it as having the wrong effects or as not working properly, or to be frustrated by or opposed to the implementation because it does not allow them to behave in their preferred way.

Protected areas have been extensively studied and critiqued from both ecological and social perspectives, and the understanding of how they work fits a classic example of a Uniformity Model conservation intervention. Protected areas create a bounded spatial context in which some norms and regulations apply, and outside of which they do not (Geldmann et al. 2015). If the WCNP is nominally a bounded spatial context of norms and regulations, but in an unclear or under-implemented way, individuals whose views fit Uniformity Models, or even those who disagree with this tacit working model, may feel unable to clearly assess whether the WCNP is an example of a

Uniformity Model or not. One would predict that local stakeholders would feel unengaged by, confused, frustrated, or in conflict with a protected area whose spatial extent and/or regulatory quality was absent or unclear.

Bhutan has successfully developed the values of its national culture into unique normative institutions, and so Normative Models are also likely to be common or important. For example, Bhutan's Gross National Happiness approach to development provides a strong normative framing of economics, society, and relations to the environment, in synergy with the national Buddhist and animist religions (Allison 2017). In this context, it would seem that an ICDP approach implicitly comes with a strong normative framing (see Wang & MacDonald 2006). The Buddhist and animist religions in Bhutan have been integrated into the constitution and support environmental policy, as well as contribute to a general environmentalist ethic among people: "...Bhutanese Buddhism and government policy provide the 'carrot' and the 'stick', respectively, to ensure that actions harmonize with local ethics, contributing to a flourishing environment..." (p. 201, Allison 2017). In support of the view that application of collective or government-promoted norms is a common and successful intervention type in Bhutan, regulations imposed between the 1960s and 1990s have successfully eliminated traditional swidden agriculture (Siebert & Belsky 2004) and raising animals for meat has also reportedly been reduced through the influence of Buddhist ethical awareness campaigns (Allison 2017). From this perspective, we might expect that local stakeholders do not really mind that the park is poorly delimited or weakly regulated, because the existence of ICDP and other national environmental programmes with a strong cultural normative framing gives the impression that stakeholders are in a Normative Model situation, not a Uniformity Model situation (prediction shown visually in Figure 2).

Root-Bernstein et al. (2020) demonstrate that multiple positions within the gradient space of tacit models may coexist within a local community. Thus, some local stakeholders may be frustrated by the vague delimitation and regulatory quality of the WCNP, and others may assume that it is not the WCNP *per se* that actually makes, or should make, any difference to conservation, sustainability, or development. We draw on the schema of tacit models to develop two predictions of clusters of attitudes and perceptions of the Wangchuck Centennial National Park (predictions are presented in Table 1). Our predictions are intended to help clarify both whether and why the park is perceived as successful or effective at doing something, and/or as socially acceptable. We consider



these to be different considerations: a park that is perceived as not meeting the standard definition of a national park may be highly acceptable to certain actors precisely because they oppose the national park model.

In this study we analyse data from a pre-existing unpublished survey of local attitudes to the Wangchuck Centennial National Park in Bhutan from 2013, to try to understand positive perceptions of a national park lacking typical national park features including a clear boundary and specific management and regulations. We hypothesize that this unusual form of national park is designed to accommodate the local people's tacit working models of human motivation in conservation contexts. Drawing on the survey results we show that local people's views are consistent with a Normative model of human motivation in conservation contexts. Drawing on qualitative interviews with conservation officials, also performed as part of this study, we show that although national parks are globally associated with Uniformity models, the Wangchuck Centennial National Park has been deliberately designed to function consistently with a Normative model. This may explain high levels of local satisfaction with the WCNP.

## Methods

We use a multi-method approach, combining a questionnaire with both closed and open questions, and a set of semi-directed interviews of key conservation officials. The survey questionnaire was essentially the same as the one used by Wang et al. (2006) and Wang & MacDonald (2006), provided to TN by the lead author of the study, Dr Sonam Wangyel Wang. The initial goal of the research was to repeat the studies cited above in the Wangchuck Centennial National Park in 2013. Subsequently, we adapted the analysis of the survey questions to respond to hypotheses derived from the tacit theories of human behaviour framework, as described below in the subsection *Analysis*. To arrive at our conclusions we consider the survey results in the context of the interview material.

*Study Area.* The study is centred on the Wangchuck Centennial National Park (WCNP), one of ten protected areas in Bhutan (Lham et al. 2018). WCNP, located in the north-central part of the country, is the largest protected area in Bhutan, spanning an area of 4914 sq. km. It comprises about 12.8% of the 38,394 sq. km. land area of the country (WCNP management plan 2012). It connects the Jigme Dorji National Park in the west with the Bumdeling Wildlife Sanctuary in the east. It also

shares its border with the Phrumshingla National Park in the south east and is bounded on the south by a biological corridor. To the north, it borders Tibet. The park overlaps five of Bhutan's 20 dzongkhags (districts); namely Bumthang, Wangdue Phodrang, Gasa, Lhuntse and Trongsa; and 10 gewogs or sub-districts. WCNP was created as a national park under Bhutan's protected area system on June 10, 2008. After the country elected its first democratic government, the park was declared a tribute to the Wangchuck dynasty to celebrate 100 years of monarchy. Officially, WCNP was notified and gazetted in March 2009 and management started in April 2009. The park has been co-managed by WWF Bhutan along with the Bhutanese government since its inception. The park straddles the Palaearctic and Indo Malayan zoogeographic realms and comprises cool temperate, sub alpine and alpine ecological zones (as defined by Wangda and Ohsawa 2006). Six habitat types: cool broad leaved forest, mixed conifer forest, fir forest, juniper forest, alpine meadows and scrubs, and alpine scree are represented in the park (WCNP management plan, 2012). Elevation of the area ranges from 2700m to 5100m. The park encompasses critical watersheds feeding four major rivers of Bhutan: Punatsangchhu, Mangdechhu, Chamkharchhu and Kurichhu. Nearly 85% of the park is under snow cover for about four months a year. 693 species of vascular plants, 250 species of birds and 41 mammal species were recorded in the first biodiversity survey conducted in October, 2008. Of the 41, eight mammal species are protected under Schedule I of Forest and Nature Conservation Act: Royal Bengal Tiger (*Panthera tigris tigris*), Common Leopard (*Panthera pardus*), Snow Leopard (*Panthera uncia*), Himalayan Black Bear (*Ursus thibetanus laniger*), Leopard Cat (*Felis bengalensis*), Himalayan Musk Deer (*Moschus chrysogaster*), Himalayan Serow (*Capricornis sumatraensis thar*) and Bhutan Takin (*Budorcas taxicolor*) (WCNP management plan, 2012). WCNP is also known to host a wide range of plants of medicinal value, including the highly priced Yartsa Goenbup (*Ophiocordyceps sinensis*) (WCNP management plan, 2012). In spite of its large size, the park does not have many settlements since large parts of the area, particularly in the north, are at high altitudes in inhospitable terrain and extreme cold conditions. There are a total of 1601 households comprising 10588 people living inside the park, and the population density is about 2.15 persons per square kilometer (Dendup 2011). However, villages are clustered around valleys or rivers, with the majority of the population in Bumthang district.

There are broadly three types of inhabitants who use the park area. The yak herders (11.9%) have traditional grazing rights and use the area exclusively for grazing. They move their herds from

the north into villages in the south during the winter. They also collect forest products such as mushrooms and cordyceps (Dendup 2011). The park is inhabited predominantly (88%) by farmers with holdings varying greatly in size, from 0.1 acres to 25 acres, which is the ceiling for individual land ownership in Bhutan (Land Act, 2007). They supplement their income with small cattle herds, the collection of forest products such as mushrooms and, where permits have been given, cordyceps (Dendup 2011).

In addition, community forestry existed in the area before the park was created. The new park area overlapped previous community forests which were retained inside the park boundary and new community forests (CFs) were allowed to be set up inside WCNP. CFs allow the harvesting and use of wood and NTFP by CF management groups as well as the sale of such products under certain regulations (DS Rai, pers comm.).

*Survey sampling.* In July 2013, 250 households were surveyed in two valleys close to the border of the Wangchuck Centennial National Park as defined to TN by the park management. Of the 250, half of the respondents lived inside the park and half outside. The aim of the survey was to gauge the attitude of residents as well as non-residents living near the ‘border’ towards the park and its policies, as well as to understand what factors were correlated with these attitudes. Due to the large area covered by the park, it was logistically difficult to cover all five districts under the park in such a short time. Hence, after consultations with the park manager, Bumthang district was chosen for the survey. Bumthang has four gewogs or sub-districts with two of them having a part of their area under the park, while the other two gewogs were completely outside the park. Hence these two gewogs, Choekhor and Tang, which had a part of the area under the park, were chosen for the survey. 27 villages, with 15 from Choekhor and 12 from Tang were chosen for the survey with the aim of choosing sites approximately equidistant from the park border both inside and outside. The topography and vegetation zones are also similar in the sites chosen. This was verified based on conversations with the community leaders as well as park staff. The sampling intensity was close to 90% in Tang and about 53% in Choekhor. Since the two gewogs have unequal areas under the park, it was not possible to include the exact number of households from each gewog inside and outside the park. Hence we arrived at an approximate of 70-30 split. Houses inside and outside the park were chosen from both gewogs in order to account for any bias due to gewog level activities. Several villages also fell in the buffer zone of the park, which is defined as an area within 5km of

the park boundary. However, since a clear boundary demarcation exercise was not yet in place at the time of the study, there is ambiguity with regard to which villages lie in the buffer area. Therefore, in consultation with the park authorities, villages were classified as lying inside or outside the park only, based on park activities conducted in these areas as defined by the park management.

The survey was administered orally to heads of households or, in case they were unavailable, to adult members of the family by trained enumerators. The survey had a near 100% response rate with only one household refusing to participate. This may be due to cultural ethos prevalent in Bhutan where people are generally very hospitable and would not turn away anyone turning up at their doorstep. Enumerators introduced themselves to participants as researchers interested in conservation policy. The survey took approximately 25 minutes to be administered. Several languages are spoken by residents of this area, and except for the national language, Dzongkha, none of the other languages has a script. It was therefore impossible to translate the questionnaire and it was administered orally with spot translations by enumerators. During the training workshop, enumerators arrived at a common translation of each question on the questionnaire. Due to the limited time and resources available, quota sampling was used for this study. As a non-probability sampling method, it is therefore not statistically possible to extrapolate these findings to the rest of the park, or, indeed to the rest of the country.

*Survey analysis.* Our dataset was not originally designed for a multifactorial approach to testing the hypotheses presented. For example, some questions in the present dataset were only presented to subset of respondents who answered a particular way on a previous question, and other questions had significant levels of abstention. We could not therefore form indices by combining related variables because not all respondents replied to all questions, which would distort the indices due to a high number of “no data” entries. The questions are also not on a Likert scale, which forces us to adopt a categorical rather than a parametric or linear modelling statistical approach. Nevertheless, the interpretation of the tacit models of human behaviour is not intended to be dependent on a specific validated survey instrument, but should be interpretable from a variety of forms of data. We thus identified in Table 2 variables in the dataset that correspond to each of the key elements as shown in Table 1.

The variable for which we make predictions related to the value-led actors cluster, ‘landowning and livestock owning’, consists of rankings of importance in terms of income for each respondent. As all respondents answered the question about sources of income, we were able to form an index of landowning and livestock owning or “LLO” from these two variables. These two variables were combined to form a class for which land and livestock were first and second (in either order) (LLO3), an intermediate class in which only one was first or second (LLO2), and a final class in which neither was the first or second source of income (LLO1). We then set up  $\chi^2$  comparison tables across these three classes, for each of the variables representing acceptability, success, and participation. We also separately set up  $\chi^2$  comparison tables looking at the inside-outside WCNP difference, considering only its relation to the acceptability variables, in accordance with our predictions (Table 1).

The survey dataset also included open-ended explanations for the rating given for several of the variables, which, where available, we also consider in terms of the most common types of answers.

*Interviews.* To supplement understanding of policy formation as well as values, attitudes and strategies associated with conservation in Bhutan, semi-directed interviews were conducted with key stakeholders. We explained the purpose of the project beforehand and obtained the interviewee’s consent. There was a 100% response rate, with no participants turning down the interview. Interviewees have been anonymized. A total of 28 interviews were conducted with stakeholders from the government, academia, NGOs, media and businesses. Interviewees were identified based on an initial stakeholder map created following key informant interviews. Individual interviewees were then identified through named government reports as well as snowballing. Except for two interviewees, all the other interviewees consented to an audio recording of the conversation. We transcribed these with automated transcription software which we corrected by hand where errors were found. We searched the interviews for discussions of or references to assumptions, attitudes, and value statements related to the elements of the tacit models of human behaviour in conservation design and management (Root-Bernstein 2020), as well as statements about social acceptability of the WCNP or other elements of conservation policy and management, its success or efficacy, and people’s participation in WCNP management.

*Ethics.* The methods were approved by the Oxford University Research Ethics Committee.

Responses of the survey and the interviewees were anonymous, no personally identifying questions were part of the questionnaire and respondents were informed about the overall aim of the study. Respondents were free to disagree to participate in the survey or interview and to refuse to answer at any point of time. Participants were informed that their responses would be completely confidential.

## Results

### *Do people know whether they live inside or outside the WCNP?*

Nearly all of the people living inside the park (n = 126) had heard of the WCNP (98.4%, n = 124), whereas only 73.4% (n = 91) of the villagers living outside (n = 124) had heard of it. Of those who had heard about the WCNP, 5.6% (n = 7) of residents inside the WCNP reported not knowing if they were inside or outside it, and 13% (n = 16) of residents outside reported not knowing if they were inside or outside it. Only one resident (inside the WCNP, according to the park service) was mistaken about whether they were inside or outside the WCNP.

### *Sources of income and capital*

Owning land is the main first source of income both inside (49.2%, n = 53) and outside the park (79%, n = 98). For the secondary source of income, owning livestock was most common, followed closely by gathering forest products. Our index of land and livestock owning (LLO) found 31 respondents (13%) in LLO1 (having neither land nor livestock as primary or secondary source of income), 161 (64%) in LLO2 (having either land or livestock as primary or secondary source of income but not both), and 58 (23%) in LLO3 (having both land and livestock as primary and secondary sources of income in either position).

### *Measures of WCNP success or efficacy.*

When asked whether the forest department established any developmental activity in their villages, there were no significant differences between those residing inside and outside the park (Yates corrected 2\*2 Chi-square test, Chi-square=1.19, P-value=0.275). 46% (n = 57) of villagers from within the park testified to the establishment of developmental activities by the forest department compared to 39.8% (n = 47) of those living outside it. Those in LLO3 were less likely to have experienced development activities, compared to other LLO groups ( $\chi^2 = 6.799$ , df = 4, p-value = 0.1469).

Respondents were then asked how their and their neighbours' living conditions had changed in the last five years. No-one reported that living conditions had worsened. There were no differences in the response to this question between people living inside and outside the park ( $\chi^2 = 0.055429$ ,  $df = 1$ ,  $p\text{-value} = 0.8139$ ). The vast majority of respondents answered that their lives had improved in the past five years (inside: 91.2%  $n = 114$ , outside: 89.5%  $n = 111$ ). However, the group with lowest level of LLO (LLO1) was more likely to say that conditions were "about the same" ( $\chi^2 = 8.7405$ ,  $df = 2$ ,  $p\text{-value} = 0.01265$ ). In comments, a majority of respondents who thought that living conditions had improved related this to agriculture and other sources of income such as the collection of non-timber forest products (particularly the very valuable cordyceps fungus). About a third pointed to development projects, roads, electricity, and other infrastructures or government services.

Respondents were asked if there are more or fewer restrictions to collect timber and non-timber forest products now compared to five years ago, before the WCNP was formed. The majority of respondents were split almost evenly between "more restrictions" and "about the same" with no differences between LLO levels ( $\chi^2 = 6.799$ ,  $df = 4$ ,  $p\text{-value} = 0.1469$ ). There were significant differences in the responses to this question when comparing people living inside or outside the park ( $\chi^2 = 17.983$ ,  $df = 2$ ,  $p\text{-value} = 0.0001245$ ). Proportionately more people inside the park (59.5%,  $n = 75$ ) thought that there were about the same restrictions compared to only 41% ( $n = 50$ ) of people living outside it. In comments, a majority of respondents had no specific changes to propose to restrictions on forest products, but a notable minority mentioned the need to be able to gather more firewood and cut more timber for construction, or to better regulate these. Of those who thought that restrictions had increased, they explained that this was due to rules, permits, or park staff; the small minority who thought forest regulations were less strict pointed to community forestry as the reason for this.

When asked whether wildlife is better protected within the national park again no differences were found between respondents within and outside the park ( $\chi^2 = 2.6108$ ,  $df = 3$ ,  $p\text{-value} = 0.4556$ ), or between LLO categories ( $\chi^2 = 7.5818$ ,  $df = 4$ ,  $p\text{-value} = 0.1082$ ). The vast majority of respondents thought a national park provides better protection for wildlife.

Livestock depredation was reported by 29.6% ( $n = 74$ ) of all respondents. The livestock being attacked were reported to include yaks, cattle, horses, and least frequently sheep; the

attacking wildlife were believed to be wild dogs, Tibetan wolves, black bears, and least frequently, snow leopards. The majority solution in response to these experiences was “nothing” (44.6%, n = 111), followed by “guarding” (36%, n = 90). There was no difference in perception of livestock depredation between LLO categories ( $\chi^2 = 4.6064$ , df = 2, p-value = 0.09994). Nearly half of the respondents living inside the park (50.07%, n = 62) claimed to have suffered from livestock predation, as opposed to only 9.6% (n = 12) of respondents living outside it ( $\chi^2 = 44.984$ , df = 1, p-value = 1.987e-11).

When asked about damage to crops inflicted by wildlife, the majority of respondents reported having experienced it. Respondents from within and outside the parks differed significantly ( $\chi^2 = 9.5921$ , df = 1, p-value = 0.001954). More villagers from outside the park report crop damage (90.3 %, n = 112) compared to those living within the borders of the national park (74.6%, n = 94). There was also a difference according to LLO category ( $\chi^2 = 31.383$ , df = 2, p-value = 1.532e-07), with the LLO1 group least likely to have experienced crop damage. Both within and outside the park the majority of villagers reported an increase in crop damage (inside: 61.4%, n = 51, and outside: 56.4%, n = 53), and just under a third reported no difference in the trends in crop damage (inside: 28.9% n = 24, and outside: 29.8% n = 28).

#### *Perceptions of acceptability of the WCNP.*

Respondents who had heard of the park (n = 215) were asked about their perceptions of it. Altogether, the most common answer was “good” (58%, n = 78) followed by “not sure” (26%, n = 35). There were significant differences in the perceptions of people about the park between those living inside or outside it ( $\chi^2 = 43.717$ , df = 3, p-value = 1.733e-09). Most respondents within the park thought the park was a good thing (65%, n = 76) whereas most respondents outside the park claimed that the park either doesn't affect them or they don't care (56.3%, 9). There was no difference by LLO category ( $\chi^2 = 7.5907$ , df = 6, p-value = 0.2697).

All respondents were asked about their perceptions towards development activities. Most people thought these activities were good (72%, n = 83). There were no significant differences between those living inside and outside the park in their perceptions ( $\chi^2 = 1.1278$ , df = 1, p-value = 0.2882), nor between LLO groups ( $\chi^2 = 7.8575$ , df = 6, p-value = 0.2487).

All respondents were asked about their perceptions of the forest policy. A near-majority of respondents reported that forest policy was “good” (45%, n = 108), with the next-largest group of



responses being “can’t say/ don’t know” (31.3%, n = 75). No differences were found between the villagers living inside and outside the park ( $\chi^2 = 2.6211$ , df = 3, p-value = 0.4538) or between LLO categories ( $\chi^2 = 6.391$ , df = 6, p-value = 0.3808). There was also no difference in perceptions regarding the forest policies between different LLO levels ( $\chi^2 = 6.391$ , df = 6, p-value = 0.3808). However, no one in these three categories depends on forest products as their primary source of income. There were significant differences in perceptions regarding forest policies between those who use forest products as a source of income (n = 140) and those who do not ( $\chi^2 = 8.87$ , df = 3, p-value = 0.031). In general those using forest products were more favourable towards forest policies, thinking it was good more often (using forest products: 61%, n = 85, not using forest products: 41.7%, n = 58). None of the respondents using forest products reported thinking that the policies were bad.

#### *Involvement in the WCNP.*

The respondents were asked whether or not they were currently involved in the management of the park. Around 16% of all respondents were involved in the park management. No significant differences were found between those living within and outside the park ( $\chi^2 = 2.2432e-30$ , df = 1, p-value = 1). Proportionally more people in category LLO3 were involved in park management, and proportionally less in category LLO1 ( $\chi^2 = 6.1213$ , df = 2, p-value = 0.04686). Perceptions of the WCNP did not affect involvement in its management ( $\chi^2 = 5.5981$ , df = 3, p-value = 0.1329). In contrast, respondents with positive and unsure perceptions of development programmes in the WCNP were significantly more likely not be involved in park management ( $\chi^2 = 8.0303$ , df = 3, p-value = 0.04539).

When asked if they were involved in forest management, a majority answered “no”. Respondents living outside the park answered “yes” significantly more (45.2%, n = 56) than those living inside it (19%, n = 24) ( $\chi^2 = 18.404$ , df = 1, p-value = 1.787e-05). Further, people in LLO2 were much less likely to be involved in forest management than in LLO1 or LLO3 ( $\chi^2 = 8.1955$ , df = 2, p-value = 0.01661). In comments, a majority of reasons for being involved referenced protecting the forests, while a minority referenced benefits, resources and sustainability.

Respondents were further asked if they would like to be involved in it. Here again, the respondents living outside the park showed a significantly higher proportion of a desire to be involved in forest management in the future ( $\chi^2 = 18.404$ , df = 1, p-value = 1.787e-05). 74.1% (n =

86) of people living outside the park, not currently involved in forest management, expressed a desire to do so compared with only 40.8% (n = 49) of respondents living inside the park. Looking according to LLO, people in category LLO3 were much more likely to want to participate in forest management (75%, n = 42) ( $\chi^2 = 10.792$ , df = 2, p-value = 0.004535). By contrast, perception of the WCNP as “good” did not increase desire to participate in forest management, with twice as many respondents who thought it was “good” not wanting to participate in management (n = 52) as wanting to (n = 24), and almost as many respondents who were “not sure” about their perception of the WCNP wanting to participate in forest management (n = 19) ( $\chi^2 = 21.008$ , df = 6, p-value = 0.002). More specifically, of those who thought that development programs in the WCNP were good, more wanted to participate in forest management (n = 49) than not (n = 28) but those with negative or unsure opinions mainly did not want to participate in forest management (n = 24) ( $\chi^2 = 22.149$ , df = 1, p-value = 2.523e-06). In comments, respondents who wanted to be involved mainly gave reasons related to protecting forests, getting to know more about forestry, or employment or other benefits that they expected from involvement. Reasons given for not wanting to be involved mainly included having no time or capacity for extra activities, or lacking interest or ideas about it. When asked how they would like to be involved, of those who responded, a majority referenced community forestry, which had pre-existed the Park in this area, and was still present.

Finally, respondents were asked to state how they thought democracy would change their participation in forest management. There were significant differences in responses to this question between those living inside and outside the park ( $\chi^2 = 21.932$ , df = 3, p-value = 6.74e-05). About a third of respondents both inside and outside the park answered that democracy will improve their participation in forest management, but more people outside the park said it won't change (36.3%, n = 45) to those inside it (14.3%, n = 18), who rather tended to answer “can't say/ don't know”. There was no difference in answers according to LLO ( $\chi^2 = 6.6022$ , df = 6, p-value = 0.3592).

The key results for responding to the predictions (Table 1) are summarized in Table 3.

#### *Interviews of representatives of major stakeholder groups and institutions*

Many interviewees stated that the Bhutanese conservation system was unique because it was influenced by, and designed to suit, the local population, culture, ecology, and geography (Table 4, theme 1). Furthermore, all laws and regulations regarding conservation and development, like other policies, are harmonized with the four pillars of the Gross National Happiness Approach, through

the intervention of the Gross National Happiness Commission. This also exerts a significant influence on conservation policy (Table 4, theme 2). At least one interviewee recognised that the design or functioning of the WCNP and other national parks in Bhutan could be confusing to outsiders (Table 4, theme 3). Interviewees also confirmed that one of the unique features of Bhutanese protected areas is that there are few differences in conservation implementation inside and outside national parks. For example, each person is allocated a specific amount of timber that they can obtain a permit for, and this is the same inside and outside the WCNP and other National Parks. This is one reason why it was possible to have vague boundary designations for the WCNP at the time of the study (Table 4, theme 4). While one interviewee claimed that fines were higher inside the Parks, other interviewees did not confirm this. However, all agreed that regulations governing individuals' behaviour were the same inside and outside. This lack of distinction between regulations inside and outside the National Parks, was, according to most interviewees, not a weakness of the Bhutanese conservation system, but rather ensured that conservation was as good outside National Parks as inside them (Table 4, theme 5).

Although one interviewee claimed that the main difference inside National Parks was a focus on wildlife management, in addition to this, another main difference was the concentration of ICDP projects funded through the WWF and other international NGOs and donors (Table 4, theme 6). Some interviewees thought that ICDP was a logical and well-suited approach to conservation implementation in Bhutan because it reflected the fact that Bhutanese people had practices, traditions and beliefs that were inherently conservationist, and ICDP allowed communities to express this, or allowed governance to preserve or recover this latent resource of existing suitable behaviours (Table 4, theme 7). Others argued that ICDP was important mainly because it provided economic and infrastructural development, which was important since people lived in national parks and thus needed to be provided with sustainable development options (Table 4, theme 8). One of the interviewees refers to ICDP compensating local people for restrictions, by which they appear to mean the historical restrictions, prior to the reform of the Forestry Law in line with Gross National Happiness in 1999-2000. However, there also seemed to be a widespread view that inside national parks it was extremely important that any development be sustainable, a view that itself could have led to uneven development without ICDPs. However, not all interviewees were sure that ICDPs worked well. In part this reflected the difficulty of evaluating them (Table 4, theme 9). But some skepticism about ICDP also reflected a concern that rural dwellers in national parks

where ICDP was concentrated would become dependent on these programmes. This was a concern because the funding for those programs came from international donors, which was good while it lasted, but could dry up (Table 4, theme 10).

Almost all the respondents were very skeptical about the impact of democracy on conservation. Most feared that sooner or later democracy would lead to short-termism and prioritizing development over sustainability or nature conservation (Table 4, theme 11). Nevertheless, several interviewees expressed the opinion that the Bhutanese approach to conservation had been so far, and would probably continue to be, a success (Table 4, theme 12).

## Discussion

### *Comparison to previous studies in National Parks in Bhutan*

Previous studies show that attitudes to other modes of national park implementation have not been as positive as what we observe for the WCNP in 2013. Wang (2006) found that 52.2% of respondents had a negative attitude to a different national park, JSW (Jigme Singye Wangchuck National Park). By contrast, we found that 58% of respondents who were aware of WCNP had a positive attitude to it. While Wang (2006) shows that owning larger herd sizes was associated with more negative attitudes to JSW, we found that dependence on livestock for primary or secondary sources of income did not affect attitudes to WCNP. Wang & MacDonald (2006) report that 21.2% of households in JSW reported livestock losses due to wildlife, while we find that just over 50% of all residents inside the WCNP reported livestock losses due to wildlife. A study in 2014-15 throughout Bhutan found that although most mammal species detected avoid human settlements and prefer forest cover, they increase in areas with around 20% agricultural landcover and at least 10% forest cover (Penjor et al. 2021). Finally, Wang & MacDonald (2006) report that the 52.2% of respondents who had a negative attitude to JSW traced this to the park regulations that prevented them from killing wildlife, gathering forest products, or grazing freely; they argue that high concentrations of livestock together with lax herding practices had resulted in very high rates of predation that were reducing the economic benefit of having livestock. Another study in JSW in 2008 found that the majority of respondents had heard of the JSW but around half were not aware of the location of its boundaries; those who were aware were more likely to complain about restrictions or loss of ownership of forest resources (Katel & Schmidt-Vogt 2011). Some

respondents continued, in 2008, to practice shifting cultivation even though it was outlawed, due to lack of other subsistence options. Katel & Schmidt-Vogt (2011) argued that the JSW in 2008 represented top-down “fortress conservation” which was alienating local residents.

ICDP was originally intended to palliate the problem of alienated park residents. Wang et al. (2006) found that 76% of respondents reported that ICDP actions had improved their lives, and that this was slightly higher within the JSW than in the buffer zone. By contrast, in the WCNP in 2013 we found that while 72% of respondents reported positive attitudes to ICDP actions, their position inside or outside the park (not the same as a buffer zone, which had not yet been created at the time of our survey) made no difference to their attitudes. It is notable that in WCNP in 2013, despite not seeming to have solved the problem of livestock predation, which may even be worse than in the JSW in 2001, attitudes towards the park, forest regulations, and the viability of economic options, are much more positive. Similarly, Lham et al. (2018) carried out a study in 2015-16, in which they also report that despite livestock predation and crop damage increasing, relationships between local communities and all national parks in Bhutan were generally positive.

#### *The shifting role of ICDP*

It is typical of the evolution of many community conservation situations that ICDP in Bhutan shifted from a solution to a problem of dissatisfaction with national park regulations (Wang et al. 2006), to a program closely associated with, and to some extent representing or standing in for the social and cultural context itself (Wells et al. 2004; Safalsky & Margoluis 2004; Root-Bernstein 2020). In this case, the original problem of dissatisfaction was solved in a different (and unusual) way, i.e. making regulations uniform inside and outside of protected areas. This is a unique solution in comparison to the directions in which other countries were moving in attempting to solve the joint problems of PAs and ICDPs at the time (e.g. Wells & McShane 2004; Martin et al. 2011; Ojha & Sarker 2012; Atela et al. 2015). Solving discontent with PA regulations by uniformizing them inside and outside PAs, rather than by rewarding PA inhabitants with ICDP benefits, did not eliminate a role for ICDP. As Interviewee 10 explained, building things and training people are interventions that are easy to quantify and assess, whether or not they are the things that conservation progress rests on (compare Li et al. 2021). Indeed some interviewees feared that these programs did not lead to sustained change, because when the funding came to an end, locals’ acquired patterns of behaviour might be disrupted or lost. The disruption of poverty

alleviation and conservation activities after funding ends has also been observed in other ICDP contexts (Uchida et al. 2009; Gurney et al. 2014).

#### *A Bhutanese concept of National Parks*

The decision to implement people-centered conservation in the form of identical regulations on individuals inside and outside parks is a unique and creative solution to the problems evident in PAs in the 1990s and early 2000s. The national park as a bounded space of tighter regulations no longer exists, as stated by Interviewee 1 and confirmed by other interviewees. The WCNP, since its inception, has existed primarily to prevent extractive industries from destroying sensitive hydro-ecological systems (WCNP Management Plan), although concessions to hydropower infrastructure development are a main cause of protected area downgrading in Bhutan (Dorji et al. 2018). The nomenclature of ‘national park’ also makes it easy to channel donor funding towards ecosystem services, biodiversity conservation and sustainable development. The benefits and outcomes (related to wildlife, forests, etc.) that it channels are expected and designed to circulate or spread beyond the PA boundaries with little risk of being lost in an inhospitable “matrix” outside of PAs (which no longer exists). This is the opposite to most terrestrial PAs, which have marked benefits inside their borders and only small positive spillover effects even within short distances from their borders (e.g. Adnam et al. 2008; Rodríguez-Rodríguez et al. 2019). A study of negative spillover effects (“leakage”) of deforestation outside of PAs in Bhutan (excluding WCNP) found that deforestation rates were < 1% both inside and outside parks (Bruggeman et al. 2018). A couple of our interviewees even speculated as to whether there was any reason not to make the entire country 100% covered in national parks.

At the time of the interviews, the competent authorities continued to work towards indices of spatial differentiation, such as demarcating the boundary and implementing zoning around the WCNP, which presumably would have little effect on the functioning of the park, but would make it more fully resemble a Uniformity Model protected area. In essence and on the ground the WCNP functioned as a national-scale normative framing of happiness and coexistence, not as a circumscribed context altering behaviour within it. In this sense, the Bhutanese conservation authorities can be seen to have made the impressive move of culturally reinterpreting a major global conservation tool and implementing it according to an entirely different tacit model of human

motivation from the one to which it is classically associated (Figure 3; Root-Bernstein 2020). At the same time, it remains legible to foreign donors as a classical PA.

We can observe a kind of double lag in the circulation of ideas about how best to manage the environment for conservation. The modernizing Bhutanese state, after a couple of decades (1983-2000) of applying protected areas according to a standard model of isolation and control, with the WCNP managed to accommodate traditional ideas and practices into modern Western conservation formalities. At much the same time, the global conservation community has come around to valuing traditional management through a new set of formalities such as Indigenous and Community Conserved Areas (ICCAs). ICCAs are defined as “natural and/or modified ecosystems containing significant biodiversity values and ecological services, voluntarily conserved by (sedentary and mobile) indigenous and local communities, through customary laws or other effective means” (World Parks Congress Recommendation V26, 2003). As local communities continue to live within national park boundaries and carry on traditional ways of life including agriculture, resource use and nomadic herding, some parts of WCNP function more like an ICCA. ICCAs are likely to fit into the Involvement Model approach (Root-Bernstein 2020), as they are culturally specific, community-led, and do not necessarily depend on a clearly demarcated geographical boundary.

*The tacit models of human behaviour of local Bhutanese residents and non-residents of the WCNP.*

As predicted for the value-motivated models, the majority of all responses for questions about park acceptability were positive. In terms of perceptions of success or efficacy, they appear to be mixed, and depend on the issue considered. Although most perceptions were that the WCNP had specific impacts or had led to specific changes, which is more consistent with the contextual-motivation tacit model, there were, as predicted for the value-led tacit model, differences within LLO groups and across inside-outside of the WCNP such that LLO3 and outside dwellers experienced fewer effects of the WCNP. The majority of respondents agreed that wildlife is better protected in national parks, which interestingly contradicts what many conservation authorities claimed, and which could be read as a validation of a Uniformity Model approach.

Finally, the splits in opinion that we see in the perceptions of participation and representation are partially along the lines of what we predicted for value-motivated models. We

predicted that participation would be relatively low, and we found that only small minorities participated in forest and park management, [independent of their views of the WCNP](#). [Positive views of development programmes actually reduced interest in park management](#). Our prediction that most people would be uninterested in participation and that landowners and livestock owners would be particularly uninterested, was largely supported but did not account for a strong interest in forest management among those currently not participating, and among those with positive views of development programmes. Respondents explained this with a desire to protect forests or, in a smaller degree, to obtain benefits. Complaints about lack of timber and firewood access were only made by a minority. Considering this evidence together, it seems that involvement was understood less as a tool to improve or adjust management to contextual needs, and more about “doing one’s part” to contribute to the normative goal of forest conservation. If so this would also represent a value-based motivation.

Thus, on the whole we find that most people seem to assess the WCNP’s social acceptability, success or efficacy, and their interest in participating in its management, from the position of tacitly comparing it (in a positive way) to something close to a Normative Model intervention. We also observed some responses that pointed to perceiving the WCNP in terms of features of a Uniformity Model: in some ways the WCNP channels certain impacts and outcomes into the space inside the WCNP, which seems broadly to be understood as acceptable. Although participants showed evidence of wanting to participate in forest management, it was not clear that they had, or believed they had, sets of distinctive needs corresponding to social groups, to which they thought management should be adjusted. We would thus conclude that participants’ tacit models fall along a range closer to the Normative Model than the Uniformity Model (Figure 3).

### Conclusion

We propose that understanding the implementation of the WCNP in terms of its repositioning within the gradient space of tacit models of human behaviour gives some insight into why it lacks expected protected area features, and why the WCNP is viewed much more favorably than the JWP was in 1999-2001. It would be a reasonable assumption, upon discovering the details of its implementation, that the WCNP was only a park on paper, due to its lack of clear boundaries (five years after its founding), lack of specific regulations on individuals’ behaviours, and reliance on the mechanism of ICDPs (which even some Bhutanese officials expressed some doubts about).



Yet it is clear that the WCNP operated that way because its implementation has been repositioned to integrate norms or regulations across specific issues rather than within geographic zones. It may seem likely that it was the removal of the strict and punitive regulations from the Forest Law and the National Parks that makes the difference between the negative views of JWP in 1999-2001 and the positive views of WCNP in 2013. However, we suggest that an equally important factor may be the harmonization of existing regulations with collective values that apply universally within Bhutan, so that programme implementation corresponds to the tacit working models of human motivation apparently held by most Bhutanese people in the WCNP area. Conservation authorities hoped and believed that this harmonization of regulations would match widely-held views within the Bhutanese population. While we cannot make a statistically valid imputation of our survey results outside the surveyed population, at least with reference to our sample, our predictions appear to have been right. The Wangchuck Centennial National Park in Bhutan represents a very interesting case of adapting international conservation methods to local values, practices, and beliefs, and we hope that further research will follow its progress.

#### Declarations

Competing interests:

None

Authors' contributions:

TN conceived of the project, collected and analyzed the data, and co-wrote the manuscript. SS provided guidance and support in the field. MR-B conceived and carried out the data analysis, and co-wrote the manuscript.

Funding:

TN received a bursary from the Mulder House trust fund, Linacre College, Oxford.

Availability of data and materials:

Data will be made available upon publication on ResearchGate.

#### References

Allison E (2017) Spirits and Nature: The Intertwining of Sacred Cosmologies and Environmental Conservation in Bhutan. *J Study Rel, Nat & Cult* 11(2):197-226

- Andam KS, Ferraro PJ, Pfaff A, Sanchez-Azofeifa GA, Robalino JA (2008) Measuring the effectiveness of protected area networks in reducing deforestation. *PNAS* 105(42):16089-16094.
- Anonymous, no date. WCNP fact sheet. Obtained from WCNP staff, not available online.
- Atela JO, Quinn CH, Minang PA, Duguma LA (2015) Implementing REDD+ in view of integrated conservation and development projects: Leveraging empirical lessons. *Land Use Pol* 48:329-340.
- Brandon KE, Wells M (1992) Planning for people and parks: design dilemmas. *World dev* 20(4):557-570.
- Bruner AG, Gullison RE, Rice RE, Da Fonseca GA (2001) Effectiveness of parks in protecting tropical biodiversity. *Science* 291:125–128.
- Butler JRA, Young JC, McMyn IAG, Leyshon B, Graham IM, Walker I. et al. (2015) Evaluating adaptive co-management as conservation conflict resolution: learning from seals and salmon. *J Environ Manage* 160:212-225.
- Delay E, Ka A, Niang K, Touré I, Goffner D (2022) Coming back to a Commons approach to construct the Great Green Wall in Senegal. *Land Use Pol* 115:106000.
- Dendup N (2011) Socio-economic report, Wangchuck Centennial Park. Department of Forests and Park Services, Government of Bhutan.
- Dorji T, Linke S, Sheldon F (2020). Freshwater conservation planning in the context of nature needs half and protected area dynamism in Bhutan. *Biol Cons* 251:108785.
- Dorji T, Linke S, Sheldon F (2019) Half century of protected area dynamism in the country of Gross National Happiness, Bhutan. *Cons Sci Practice* 1(7):e46.
- Dudley N (ed.) (2008) Guidelines for applying protected area management categories. IUCN, Gland, Switzerland.
- Galvin K, Beeton T, Luizza M (2018) African community- based conservation: A systematic review of social and ecological outcomes. *Ecol Soc* 23:588–597.
- Geldmann J, Coad L, Barnes M, Craigie ID, Hockings M, Knights K, et al (2015) Changes in protected area management effectiveness over time: A global analysis. *Biol Cons* 191:692-699.
- Goulden S, Erell E, Garb Y, Pearlmutter D (2017) Green building standards as socio-technical actors in municipal environmental policy. *Building Res & Info* 45(4):414-425.
- Gurney GG, Cinner J, Ban NC, Pressey RL, Pollnac R, Campbell SJ et al. (2014) Poverty and protected areas: an evaluation of a marine integrated conservation and development project in Indonesia. *Global Environ Change* 26:98-107.
- Hayes TM (2006) Parks, people, and forest protection: An institutional assessment of the effectiveness of protected areas. *World Dev* 34:2064–2075.
- Horwich RH, Lyon J (2007) Community conservation: practitioners' answer to critics. *Oryx* 41(3):376-385.
- ICCA Handbook, version 1.2. 2003. UNEP. Retrieved 2021 from: [https://wedocs.unep.org/bitstream/handle/20.500.11822/8448/-A%20handbook%20for%20the%20indigenous%20and%20community%20conserved%20areas%20registry-2010ICCA\\_Handbook.pdf?sequence=3&%3BisAllowed=](https://wedocs.unep.org/bitstream/handle/20.500.11822/8448/-A%20handbook%20for%20the%20indigenous%20and%20community%20conserved%20areas%20registry-2010ICCA_Handbook.pdf?sequence=3&%3BisAllowed=)

- Jacobson C, Robertson AL (2012) Landscape conservation cooperatives: bridging entities to facilitate adaptive co-governance of social–ecological systems. *Human Dim Wildlife* 17(5):333-343.
- Katel ON, Schmidt-Vogt D (2011) Use of Forest Resources by Residents of Jigme Singye Wangchuck National Park, Bhutan. *Mountain Res Dev* 31(4):325-333.
- Land Act of Bhutan, 2007. Royal Government of Bhutan.
- Lham D, Wangchuk S, Stolton S, Dudley N (2019) Assessing the effectiveness of a protected area network: a case study of Bhutan. *Oryx* 53(1):63-70.
- Li BV, Kim MJ, Xu W, Jiang S, Yu L (2021) Increasing livestock grazing, the unintended consequence of community development funding on giant panda habitat. *Biol Cons* 257:109074.
- Martin A, Rutagarama E, Gray M, Asuma S, Bana M, Basabose A, Mwine M (2011) Linking Development Interventions to Conservation: Perspectives From Partners in the International Gorilla Conservation Programme. *Soc Nat Res* 24(6):626-636.
- Ojha AP, Sarker TK (2012) Effectiveness of the integrated conservation and development program (ICDP) in conserving wildlife in the Annapurna Conservation Area in Nepal. *Int J Biodiv Cons* 4(6):237-242.
- Penjor U, Wangdi S, Tandin T, Macdonald DW (2021) Vulnerability of mammal communities to the combined impacts of anthropic land-use and climate change in the Himalayan conservation landscape of Bhutan. *Ecol Indic* 121:107085.
- Rodríguez-Rodríguez D, Martínez-Vega J, Echavarría P (2019) A twenty year GIS-based assessment of environmental sustainability of land use changes in and around protected areas of a fast developing country: Spain. *Int J App Earth Obs Geoinfo* 74:169-179.
- Ruiz-Mallén I, Schunko C, Corbera E, Rös M, Reyes-García V (2015) Meanings, drivers, and motivations for community-based conservation in Latin America. *Ecol Soc* 20:393–406.
- Salafsky N, Margoluis R (2004) Using adaptive management to improve ICDPs. In McShane, T., & Wells, M., *Getting biodiversity projects to work: Towards more effective conservation and development*. Columbia University Press, New York, pp 372-394
- Siebert SF, Belsky JM (2014) Historic livelihoods and land uses as ecological disturbances and their role in enhancing biodiversity: an example from Bhutan. *Biol Cons* 177:82-89.
- Temenos C, McCann E (2013) Geographies of policy mobilities. *Geo Compass* 7(5):344–357.
- Uchida E, Rozelle S, Xu J (2009) Conservation payments, liquidity constraints, and off-farm labor: impact of the Grain-for-Green Program on rural households in China. *Am J Ag Econ* 91(1):70-86.
- Wang SW, Lassoie JP, Curtis PD (2006) Farmer attitudes towards conservation in Jigme Singye Wangchuck National Park, Bhutan. *Env Cons* 33(2):148-156.
- Wang SW, Macdonald DW (2006) Livestock predation by carnivores in Jigme Singye Wangchuck National Park, Bhutan. *Biol Cons* 129(4):558-565.
- Wangchuck Centennial National Park management plan.
- Wangchuck Centennial National Park. No date. Informational sheet. Obtained during fieldwork in 2013.

- Wangda P, Ohsawa M (2006) Gradational Forest Change along the Climatically Dry Valley Slopes of Bhutan in the Midst of Humid Eastern Himalaya. *Plant Ecol* 186(1):109-128.
- Wells MP, McShane TO (2004) Integrating protected area management with local needs and aspirations. *AMBIO* 33(8):513-519.
- Wells MP, McShane TO, Dublin HT, O'Connor S, Redford KH (2004) The Future of Integrated Conservation and Development Projects: Building on What Works. In *Getting biodiversity projects to work*. Columbia University Press, New York, pp. 397-422





	<b>Systemic factors</b>	
<b>Personal factors</b>	People ignore and work around policies to do whatever they want	Programmes and policies enshrine collective values that influence or control behaviours
Strongest values motivate actions	<b>Persuasion Model</b>  sign: "Wli is beautiful, use the litter bins"	<b>Normative Model</b> 
Context-dependent choices determine actions	<b>Involvement Model</b> 	<b>Uniformity Model</b> 
People are hypocrites or behave randomly	<b>Indolence Model (null model)</b>	<b>Regulation Model (null model)</b>

Figure 1. The four main tacit models are the Persuasion Model, the Normative Model, the Involvement Model, and the Uniformity Model. The “null models” of Indolence and Regulation propose that there is nothing predictable or regular about the interaction between values and actions, but relatively few people actually espouse such views in practice. Each of the four main tacit models is illustrated with a typical example of how they are implemented in conservation practice. For the Persuasion Model, appeals to values, aesthetics or emotions are often used to

promote specific actions without coercion on the assumption that these appeals will strengthen values and render them most motivating; this approach is often viewed as the ideal. In the Normative Model, shared values are enforced through regulations wherever they apply, usually along thematic lines or across production chains, exemplified by certification schemes. In the Uniformity Model, a set of shared values are enforced only within a bounded context, often spatially defined as in the case of protected areas and programmes like the Man and Biosphere Reserves. Finally, in the Involvement Model, communities or stakeholder groups are understood as having specific contextual needs, to which programmes should be adapted through consultation, participatory mechanisms, devolution, and so on. These models form a gradient, and intermediate models are possible.

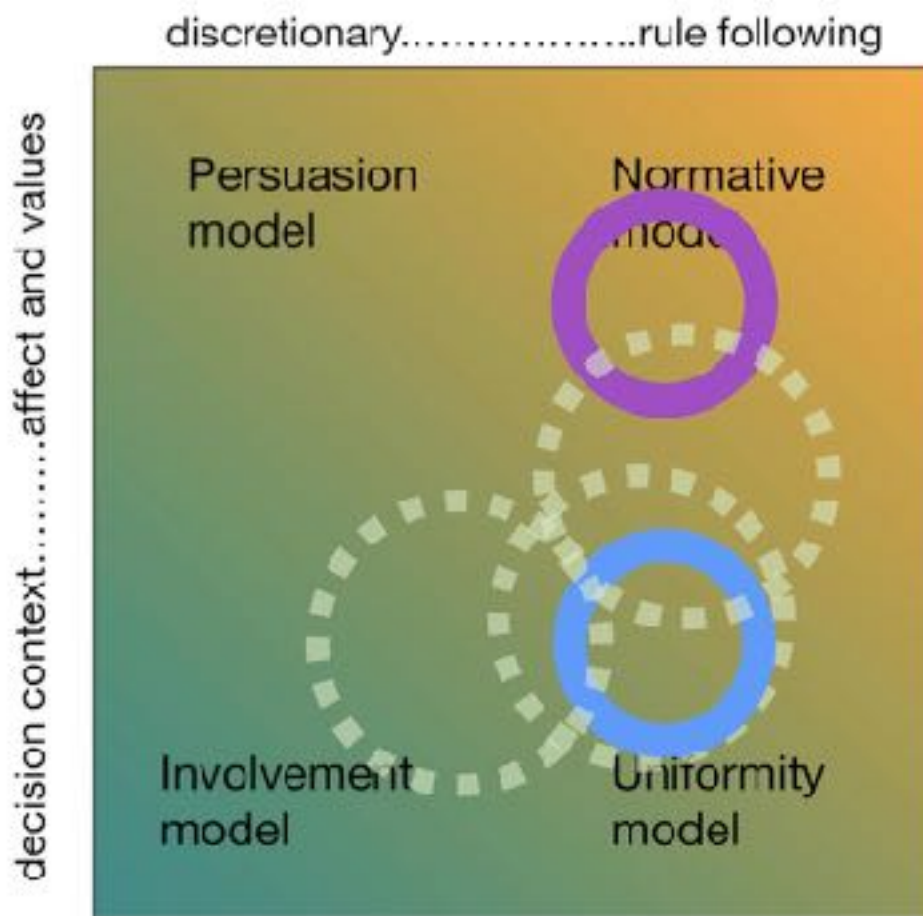


Figure 2. Visual representation of the predictions. The actual positioning of how the WCNP is implemented is somewhat ambiguous and appears to be poorly defined (dashed line). We thus predict that local residents who tacitly support a Uniformity Model for conservation program implementation (blue circle) will be at least somewhat satisfied, although the lack of correspondence between certain expectations (e.g. a defined boundary) and the reality of implementation may cause dissatisfaction or perceptions of lack of success of implementation. We also predict that local residents who support a Normative Model of conservation programme implementation (purple circle) will also find that their tacit models do not correspond to implementation and will be dissatisfied or perceive a lack of success for other reasons. Due to previous literature suggesting that normative environmental values are believed to be widely shared, and are explicitly codified in religion, politics, and policy in Bhutan, we do not anticipate finding residents' tacit models on the right side of the gradient.

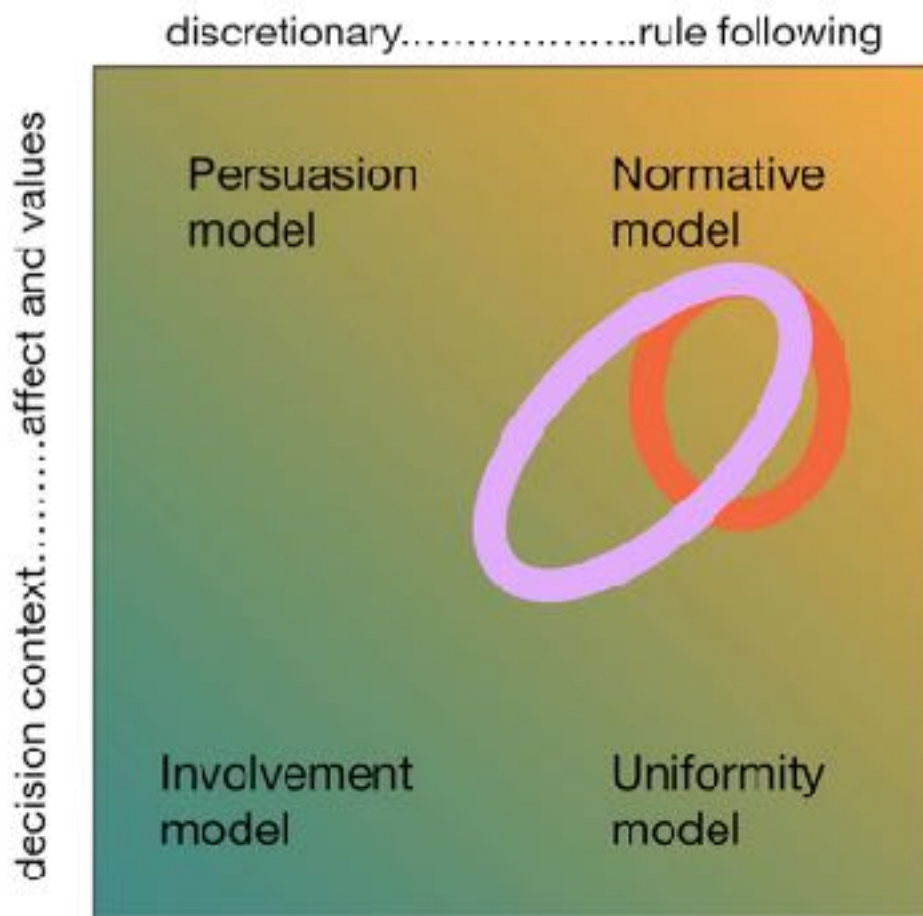


Figure 3. Visual representation of the results. The observed positioning of the WCNP is shown as a red oval. We find that the WCNP, while still largely top-down with some consultative but no participative or devolved aspects, is conceived of and enacted (by conservation authorities) as a Normative Model implementation, with some features similar to a Uniformity Model (e.g. a nominal spatial designation). We also find that the observed tacit models of the residents of WCNP whom we surveyed are relatively close to this positioning, with evidence of some expectations that spatialized regulations should make a difference to programme success, and perhaps some interest in participatory processes.

Narrative description of predictions	Elements	Prediction
<p>In this particular situation, one would expect a <b>person who believes that decisions are contextually motivated</b> to have negative perceptions of the project and its acceptability, because they are likely to perceive the park as not adequately incorporating special regulations adapted to local contextual needs, but rather as arbitrary and poorly fit to people’s needs. Such people should also, according to our model, be interested in participation or representation to adjust regulations to their own perceptions of relevant contextual conditions. They may however be attentive to the fact that the park receives more funding and programmes and thus attribute some success to it. These perceptions are likely to be similar for residents both inside and outside the park.</p>	<p>Acceptability of park</p> <p>Success or efficacy of park</p> <p>Participation and representation</p> <p>Inside-outside residents</p> <p>Landowners and those with livestock</p>	<p>Low, negative perception</p> <p>Medium-high, positive</p> <p>High interest</p> <p>No differences</p> <p>No differences</p>
<p>People who think of <b>action as value-led</b> should not have negative perceptions of the vague park structure, since they would not view the definition of local areas with contextual regulations as relevant to promoting conservation action. Value-led actors are more likely to assume that, or act as if, they are actually in a Normative model, and may thus report high satisfaction with the project. Such people should, in addition, not be particularly interested in participatory or representational structures within the conservation project (compare Root-Bernstein et al. 2020). At the same time, they may perceive low levels of success, if the question of success is framed as outcomes specific to the park area alone; they would not be likely to understand the park as making the difference to outcomes. However, residents outside the park may be dissatisfied or see the park as unsuccessful if they notice that residents in the park receive more funding and programmes, as they are likely to feel that they deserve as many benefits as residents inside the park. For similar reasons, landowners and those with more livestock are more likely to be satisfied with the project if they believe it operates like a Normativity model, which provides regulatory clarity and equal conditions for all producers.</p>	<p>Acceptability of park</p> <p>Success or efficacy of park</p> <p>Participation and representation</p> <p>Inside-outside residents</p> <p>Landowners and those with livestock</p>	<p>Medium-high, neutral or positive perception</p> <p>Low-medium, negative</p> <p>Low interest</p> <p>Outside may be less satisfied, lower perception of success</p> <p>Strongest reactions in this group; associated with being in this group</p>

Table 1. Narrative development of the predictions. We draw on the framework of tacit theories of human behaviour (Root-Bernstein 2020). This framework posits two axes: on the “individual motivation” axis, at one extreme people believe that actions are value-led. At the other extreme, people believe that actions or decisions are context-dependent. On the second axis, there are two extremes of reaction to systemic factors: on one extreme, people believe that rules and regulations govern behaviour. On the other extreme, people believe that personal discretion governs behaviour. In this study, regarding the systemic factors axis, we believe there is evidence that the Bhutanese culture operates on shared norms incorporated into law and governance, rather than valuing personal discretion and freedom (e.g. Allison 2007). We predict that we can characterize local



residents' views of human behavioural change in the context of the WCNP as either value-led or context-dependent. This will allow us to place residents in one of the tacit models: value-led pole of personal axis crossed with rule-driven pole of systemic axis gives Normative model; context-dependent pole of personal axis crossed with rule-driven pole gives Uniformity model (see Figure 1). We will then compare the dominant model with the design of the WCNP to understand attitudes towards it.

Element	Variable- survey question
Acceptability of park	Perceptions of Park Perceptions of forest policy Perceptions of development activities in villages
Success or efficacy of park	Restrictions on collecting foresting products Living conditions Wildlife protection Development activity in villages Livestock depredation Damage to crops by wildlife
Participation and representation	Involved in Park management Desire to be involved in Park management How democracy will change participation
Inside-outside residents	Inside or outside
Landowners and those with livestock	Income from landowning Income from livestock

Table 2. Choice of survey questions to correspond to elements of the predictions.

Element	Variable- survey question	Result	Model
Acceptability of park	Perceptions of Park  Perceptions of forest policy Perceptions of development activities in villages	Majority GOOD, then NOT SURE; majority Inside GOOD, majority Outside DOESN'T AFFECT Majority GOOD, then DON'T KNOW; no dif. I/O or LLO Majority GOOD, then NEUTRAL; no dif. I/O or LLO	Value
Success or efficacy of park	Restrictions on collecting forest products  Living conditions  Wildlife protection in WCNP Development activity in villages Livestock depredation Damage to crops by wildlife	NO CHANGE or MORE for majority; O more likely to perceive change (neg. or pos.)  Majority BETTER but proportionally more LLO1 say NO CHANGE; Majority YES  Split evenly YES and NO, no dif I/O; Greater proportion LLO3 did not experience (NO) NO for majority, higher proportion YES for I Greater proportion YES for LLO2 & LLO3; greater YES for O	Value
Participation and representation	Involved in Park management Involved in forest management Desire to be involved in forest management How democracy will change participation	YES relatively more LLO1, less LLO3; majority YES YES relatively much higher for LLO2; others split; majority YES Higher proportion NO for LLO3; majority NO  Majority BETTER or DON'T KNOW	Value

Table 3. All mentioned differences or relative proportions are statistically significant. Where no differences across categories are mentioned, they were non-significant. The results are primarily consistent with the Value-driven motivation tacit behavioural model for all three groups of questions. See Discussion for reasoning. LLO1, LLO2, LLO3 = increasing dependence on livestock and land ownership as sources of income. I = inside WCNP, O= outside WCNP.

Theme	Quotes
1	<p>“I don't know whether any other country will be able to do what we have done. Honestly, why not? Because we have this advantage of having a very low population, it has nothing to do with us being very, very good people. Nothing to do with that, it's just geography... It's just, it's a rugged land, we can't cut [trees] wherever we want.” [Interviewee 6]</p> <p>“I think the respect towards other life forms is the principal belief that many Buddhists in Bhutan believe, not harming other animals, not killing, I think that forms the cornerstone of the conservation policies in Bhutan and also the important thing that we have is that before Buddhism there, we Bhutanese followed some sort of a animism that where they respect nature, they respect mountains, they respect rivers, I think those elements had also come in and then formed...part of our belief system.” [Interviewee 12]</p>
2	<p>“..the concept of change is basically creating from the government perspective, [the] demand is to create this enabling condition for people to pursue and seek happiness,... The philosophy [of Gross National Happiness] is founded on four pillars, you know, one is on socio-economic development, mostly under the sustainable limitation, you have this preservation and promotion of your culture, then conservation of environment and good governance now on the environment. I think, since the beginning of the development plan in Bhutan, environmental conservation has received an adequate attention and focus and that's why we have now this pristine environment and natural settings, everything almost intact.” [Interviewee 7]</p>
3	<p>“I think a lot of people view [the protected areas in Bhutan] through the lens of the proper definition of protected areas, which means [that it] is protected and that, you know, human activities, especially, extracting resources are not allowed...I think for a lot of people who are, whose conservation background is not grounded into the culture of this country, I think it automatically and fairly gives them the suspicion that it perhaps is not a [protected] area, because you know, these things are happening.” [Interviewee 1].</p>
4	<p>“..conservation outside and within protected areas — we don't have definitive boundaries because we go by [the] same books, same laws, same acts, same rules, but then, the main difference is [that] within protected areas they are focussed, they have focussed mandates for wildlife management...So within a given protected area they focus on wildlife management whereas outside PAs we have all kinds of general forestry activities, conservation inclusive. But then we don't have time for focussed wildlife management...That is the main difference actually.” [Interviewee 3]</p> <p>“I think that's a that's very wrong thing, I think...it's unfair to say that wildlife inside [a protected area] is protected more than the outside. Of course, we have policies and of course, we [have] stricter, more and more rigid rules... for example, [if] people kill a wildlife inside, [then] they have to pay higher fines compared to the outside, but then we do have same rules, application of same rules or whatever... The only thing is ...large commercial extraction of resources is not allowed, mining, all this, is not allowed inside but all done outside the Park. There's the difference.” [Interviewee 2]</p>
5	<p>“To me, there's no difference, I mean, tigers roam, both inside and outside parks. And I think the danger for a country like Bhutan, you know, is this falling into this trap of treating parks like India, in any other countries. I think here, we should view it in a slightly different way.” [Interviewee 6]</p> <p>“..the question of what is the difference between the park and outside of the park? That question often arises. But is it [the same inside and outside] because the park is degrading [in environmental quality]? Or is it because outside of the park is equally good? You know, it's something that can be argued, we, by saying this is a park, it doesn't mean, we cannot have wildlife outside of the park. Or it doesn't mean, the forest outside of the parks are good, [or] not good.” [Interviewee 4].</p>

6	<p>“So, we have this co management system here [in WCNP]...So after this park has been created, we have ensured that there is biological connectivity in the whole northern area by way of linking this to parks...[W]e have also been able to do for the first time, the systematic study on snow leopards using the camera traps...And apart from this, we are also focusing a lot on the improvement of socio economic conditions of the park residents. By way of our ICDP integrated conservation and development program activities, we have been able to improve the livelihoods of the park residents and also gain their support.” [Interviewee 9]</p> <p>“The other difference is since protected areas have a focussed kind of wildlife management, they also get huge projects. Not like our area. Mine is a territorial division [outside the WCNP]. The protected areas, for example Wangchuck Centennial [National] Park, these days they have huge projects sitting there... supported by WWF. So protected areas get a lot of projects, funds, and people within the protected areas, get so many benefits. So that is one major difference... And in [Merak Sakteng] for example, the projects are funded, [for example a] livestock development program, to reduce pressure on forest...They call it you know ICDP. That component is extra in protected areas, and we don't have it outside PAs. Basically funds.” [Interviewee 3]</p>
7	<p>“Traditionally, I mean, if you go to, like, these villages, I mean, there used to be an elaborate set of rules, which everybody followed. Well, you're entitled to this many trees per year or whatever, all this there was a system which was perfectly self governing, and somehow somewhere along the way, again, Western influence or whatever, opening the doors to the West, we have lost this. And we now if you ask people, wait, how did we do this before? Nobody knows.” [Interviewee 1]</p> <p>“Yes, we did a lot of ICDPs, one advantage especially in our context is conservation as a way of life has always been there traditionally with nice people, you see that most daily habits have been nice or have some element of conservation inbuilt... I think if you talk from a perspective of how we live traditionally in villages, in rural communities, there's conservation, [it] is a strong part of rural communities and how they live. But then as we increasingly become urbanized, and all that, then some of the those things you forget.” [Interviewee 5]</p>
8	<p>“I think the concept of ICDP started from [19]96/7 when we first started functioning five of the nine PAs across the country. Unlike in many countries, we allow people to continue living inside the PA. The idea is that we want to take the existing human population as part of the ecosystem. But when you do that, there is always pros and cons. The good part is that people will be friendly but since they are human they need some basic needs like health facility, education, accessibility. So when we talk about that there is some impact on the surrounding habitat. To offset or balance their losses, we thought [to take] the ICDP examples from Southeast Asia and Africa. We started having a pilot project on ICDP and it really worked well.” [Interviewee 8]</p> <p>“...the ICDP programs,... they actually have them, firstly, to actually meet the immediate needs and requirements [of people] through the project. And in the process, it actually helped [prevent] them from sort of exploiting the natural resources unsustainably, because the park actually provided those [people with] the most urgent requirement and needs of the communities themselves, [via] subsidy.” [Interviewee 7]</p> <p>“...when you look at the protected area policies in the country, I think those people who are residing in protected areas, they have some restrictions compared to people residing outside the protected areas. So in terms of the natural resource management, some restrictions are there. So we do work with the communities and then try to balance out you know, the [progress] that the communities living outside protected areas have with the communities living inside the protected areas.” [Interviewee 13]</p>

9	<p>“I think it is very difficult to sometimes even [evaluate] .. because conservation projects take a long time to get the impact and you don’t see the impact except for if you are building infrastructure or training people, then those things are easy to measure but I would say it is not 100% possible to measure the progress of a conservation program.” [Interviewee 10]</p> <p>“Also after 5-7 years we also realised that since we have invested a lot of money on ICDP we want to know how much impact it has brought on conservation. We tried to assess [the] impact of ICDP on people’s attitudes, people’s behaviour and also on the habitat itself. Some of the parks have attempted this. But we are not in a position to look into the impact of ICDP on habitat or environment because it was too immature at that point of time. You need to wait at least 10-15 years... we have realised that in the initial stage of ICDP, the programme spread over so many things and we did not have any focus. So if you look at some of the ICDP packages in the later stages like in late 90s and early 2001-3 you’ll see ICDP [had become] more focussed. Those were some of the lessons we learnt. Result oriented and focussed projects.” [Interviewee 8]</p>
10	<p>“I think ICDP is a great tool for conservation. And especially in the developing country context, I think it's an effective package, or sort of a segue to get benefits to the people from more developed countries and conservation agencies.” [Interviewee 6]</p> <p>“But we’ve also learnt lots of lessons about ICDP. If you are not careful you make your park residents very much dependent.” [Interviewee 8]</p> <p>“I mean, because with ICDP, I think you make people very dependent on the resources that they get from protected areas. And I think after some time... nice rural people, they become too dependent on support... And when it slowly phases out, at the end of a project as ICDP, it's been particularly difficult to depend [on], it's difficult for them to [cope] with, without any support for the project from the government... [M]aybe initially in the beginning ICDP was one of the ways to help the people in the protected areas, [it] was a compensation or for being in the protected areas, of not having rights to certain forest products and forest use. But I think now, if you really look at it, maybe in a way, ICDP is not very effective.” [Interviewee 11]</p>
11	<p>“Democracy shouldn’t have come in. I don’t think democracy is the best form of government. It spoils the unity of the people, it spoils the structure of society.” [Interviewee 3]</p> <p>“And democracy means, you know, people who are running the government will get elected by the people... The other side of the democracy is that the money works. And people who have money who like to exploit natural resources, and that definitely will have impact on democracy or you know, on the environment. But I do have faith in the goodness [of] democracy, that you will have educated people in politics and they will be able to [resist] you know, those pressures. I'm just being hopeful.” [Interviewee 1]</p>
12	<p>“...it's a shifting target, because we haven't defined [success]. I mean, there's no way you're going to measure it. I mean, because success will be different things to different people in our context. But if you talk, I mean, if you're looking at it from a Western perspective, just from a policy point of view, I think there has been a lot of success: 60% forest cover, more than half of all Bhutanese land under parks, you can’t ask for much more. I mean, the challenge now is to see what's going on inside those spaces or outside.” [Interviewee 6]</p> <p>“I would say that there is very high chance of success in Bhutan, particularly because if you compare Bhutan to most other neighboring countries we [have much, much] less population. Now for any conservation strategy or in a protected area management strategy to succeed, it is being... able to shield protected area management from development. So conservation success probably lies in there to some extent. And in Bhutan, by virtue of the fact that we are very [little] population, it is automatically, you know, you probably have high chances of success.” [Interviewee 5]</p>

Table 4. Illustrative quotes from the interviews, arranged according to the point in the text that they support. Refer to the Results section for the thematic numeration.

