Visitors' environmental attitudes and willingness to pay for nature conservation: the case of Langtang National Park in the Himalayas

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Graphical abstract

Abstract

National parks are a destination for nature-based tourism (NBT) in both the developed and developing countries. National Park visitors with pro-environmental attitudes may be more likely to support the management's conservation efforts. However, managing and funding national parks and protected areas is a significant challenge, particularly in low-income countries. Visitor entrance fees to national parks are an often-heard option to secure sustainable funding for the management. This study aimed to measure environmental attitude and willingness to pay (WTP) for park entrance fees of international visitors to Langtang National Park in the Nepal Himalayas. The New Ecological Paradigm (NEP) scale was applied to assess environmental attitude, while a contingent valuation survey was carried out to explore WTP. International visitors of the park (n= 476) were surveyed over two years. The survey results suggest that national park visitors exhibited comparatively high pro-environmental attitudes, with a NEP score of 3.72 (5 being the highest score). Visitors were willing to pay a new entrance fee of USD 57.51 (mean) in comparison to the existing fee of USD 30. The willingness to pay a higher entry fee was positively correlated with a pro-environmental attitude and income. The increase in entrance fees could significantly improve the funding of national parks in Nepal and lead to an upgrade of its infrastructures without reducing the overall number of visitors.

1. Introduction

In many countries around the world, governments have set up governance systems for the conservation and management of the natural environment (Skordoulis *et al.*, 2020; Skordoulis *et al.*, 2022; Delegkos *et al.*, 2022) such as national parks and other forms of protected areas, are included in such. Apart from biodiversity conservation, protected areas are essential for provisioning, regulating, maintenance and cultural ecosystem services (CBD, 2021; CICES, 2023).

Recently, the Conference of the Parties (COP) of the Convention on Biological Diversity (CBD) agreed on conserving 30% of land and sea to protect biodiversity.[1]

Besides conserving biodiversity, protected areas also improve individuals' and visitors' emotional and recreational lives (Sofios *et al.*, 2008; Arabatzis and Grigoroudis, 2010). In particular, national parks raise positive environmental awareness by offering education, environmental awareness, opportunities for research, and the promotion of various nature-based tourism activities. Thus, individuals with positive environmental attitudes are particularly motivated to visit protected areas such as national parks (Wilhelm-Rechmann *et al.*, 2014).

Impacts of nature-based tourism on the local culture, economy, environment and society (Drosos and Skordoulis, 2018), especially in communities living near or in protected areas, are inevitable (Andrea et al., 2013; Arabatzis et al., 2010). Often, these communities may need more benefits but bear substantial shares of the costs and may not even be included in the benefit-sharing plans advocated by the CBD. On the contrary, communities near protected areas often experience costs, such as human-wildlife conflicts or restrictions on using ecosystem services for their livelihood. If compensated, local communities might retain substantial sources of their livelihood income (Christopoulou et al., 2007; Akwetaireho and Getzner, 2010). The compensation for the impacts of protected areas on local societies and their environment is often asked for (KC et al., 2021).

Various evaluation and assessment tools and indicators of the visitors' appreciation of the environment and ecosystems with a due focus on residents have been developed. Among these, the New Ecological Paradigm (NEP) scale is a widely used indicator to measure environmental concerns, such as the environment-friendly attitude and intentions of visitors of national parks (Jeong *et al.*, 2021). The NEP scale is often used to explore people's degree of eco-centricity and measure the extent to which they endorse pro-nature views and perspectives (Wilhelm-Rechmann *et al.*, 2014). Visitors who exhibit

strong environmental attitudes in this respect are often found to care mainly for the well-being of local communities and the environment. Moreover, they can motivate policymakers to focus on agroeconomic expansion measures and tools (Tsiantikoudis *et al.*, 2019; Arabatzis *et al.*, 2010) based on productivity or to support the use of marginal lands instead of land-use change based on deforestation (Zafeiriou *et al.*, 2023).

The NEP scale can be integral to research and practical action on various environmental issues. This integration can be done by evaluating or persuading stakeholders on land use planning, for example, local governments, to implement conservation-oriented action in their jurisdiction (Wilhelm-Rechmann *et al.*, 2014). Such land use planning for development activities and promotion of nature-based tourism is necessary to tackle the environmental changes.

There are various proposals on management frameworks for nature-based tourism businesses including sustainability examination of community-based conservation initiatives in nature-based tourism destinations (Buckley, 2009; Chen, 2015; Jeong *et al.*, 2021; Mudzengi *et al.*, 2021). The NEP scale has proven effective in exploring stakeholders' connectedness to the natural environment and evaluating differences among various cultural groups, suggesting that the NEP scale is equally essential for the social assessment of conservation intervention. The compatibility of the NEP scale and other scales can be recommended for the social assessment of conservation projects in different cultural contexts (Wilhelm-Rechmann *et al.*, 2014). Such compatibility between the NEP scale and other scales, such as of (urban) sustainability, has been suggested regarding the "Human Exemptionalism Paradigm" (HEP), which emphasizes the capacity of humans to overcome environmental problems (McDonald and Patterson, 2007). In this context, the NEP scale has focused on determining the ecological limits to economic growth in the light of urban metabolism, energy analyses and ecological footprints.

In earlier studies, NEP revealed that urban nature-based tourism should be considered an environmentally conscious tourism activity while cultivating individual environmental awareness among locals and tourists to pursue environment-friendly behaviour (Jeong *et al.*, 2021). Such environment-friendly behaviour of tourists faces the challenges of the steady and rapid growth of nature-based tourism in national park regions, which makes adopting managerial practices consistent with the resulting environmental impact even more urgent. Other indicators of management effectiveness in protected areas (e.g. Getzner *et al.*, 2012; Thapa and Lindner, 2023), including the ecological tourism footprint (TEF) and the ecological tourism capacity (TEC) are also widely used. These tools are used to evaluate the ecological conditions of a national park in Taiwan over ten-year period (Chen, 2015). It was argued that with the growing number of nature-based tourists, the ecological pressure of nature-

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[1] "Ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity" (CBD-COP15, 2023).

based tourism on the national park exceeded its ecological carrying capacity (Chen, 2015).

It is noteworthy that compared to other forms of nature-based tourism, ecotourism is more likely to support biodiversity conservation, promote alternative or renewable energy, and sustainable waste management (KC *et al.*, 2021). However, not all nature-based tourism is ecotourism (Thapa *et al.*, 2022). Ecotourism is more prescriptive and requires three stringent criteria: conservation of the environment, sustaining the well-being of local people and interpretation/education for locals and visitors (TIES, 2024). Ecotourism can (and should) enhance women's empowerment and that of other marginal social groups, provide institutional support, promote infrastructure development, and enhance local cultural values. From a social development perspective, increasing tourism employment and entrepreneurship can support the livelihood of residents (Thapa *et al.*, 2022). Local economic development promoted by tourism may also change the price levels of goods and services for tourists, lead to higher local production and value-added, and improve technical and social infrastructure (Grigoroudis *et al.*, 2012). On the other side, intensified tourism may also aggravate inflation and bring local environmental problems such as poor waste management, displacement of residents, and degradation of traditional cultural values (Chambers, 2000; KC *et al.*, 2021; Thapa *et al.*, 2022). While increased nature-based tourism has helped developing countries with low per capita income generate income (Wishitemi *et al.* 2015), this may come at the expense of natural environments such as national parks and protected areas. The study by Wishitemi *et al.* (2015) assessed the state and nature of poverty and the environment-ecotourism nexus in Kenyan protected areas, which otherwise would have to confront even more declining agricultural productivity and a rising population. In addition, residents were explicitly affected by protected areas, as a significant share of productive arable land (about one-third of Kenya's land) was transformed into a wildlife-protected area (Wishitemi *et al.*, 2015).

Non-compliance (decisions not to comply with protective recommendations) in and around the national parks is a global problem, such as violating regulations by tourists, including walking off the marked and designated trails (Randale and Hoye, 2016; Goh *et al.*, 2017). Failure to comply may lead to wildlife disturbance, soil erosion, injuries, and even death of visitors owing to human-wildlife conflicts. Pro-environmental values are an essential component of the decision-making process that influences behaviours concerning environmental issues (Dunlap *et al.*, 2000, Tonge *et al.*, 2015). However, as measured through NEP, environmental values did not predict the (non-) compliance (off-trail hiking) as observed in the Blue Mountains National Park, Australia (Goh *et al.*, 2017). In another study in the Central Karakorum National Park (Pakistan), it was found that tourists were less eco-centric and more egoistic than protected area authorities and local communities (Imran *et al.*, 2014). Other studies

suggested that environmental concerns rather than socio-economic and demographic variables determine trip behaviour and site-specific preferences (Uysal *et al.* 1994). However, it needs to be clarified which and to what extent international visitors of a national park in a developing country, e.g., during a multiday hiking (trekking) trip, hold environmental values.

Numerous studies have linked the NEP scale with the Willingness-to-Pay (WTP) concept, such as WTP for conservation policies or entrance fees to protected areas, including national parks. These papers include NEP and WTP analyses of renewable energy expansion (Ntanos *et al.*, 2019), marine biodiversity conservation (Halkos and Matsiori, 2015), riparian ecosystem protection (Meyerhoff, 2006), wetland ecosystem restoration (Milon and Scrogin, 2006), forest management (Taye *et al.*, 2018) and endangered species recovery (Aldrich *et al.*, 2006). Pro-environmental limitations and WTP for a conservation tax have also been explored in regional protected areas such as Natura 2000 sites (Kafyri *et al.* 2012). Similarly, there are studies on WTP either for entrance fee or species conservation (say, tiger or snow leopard) conservation in Nepalese protected areas that are popular ecotourism destinations (Baral and Dhungana 2014; Pandit *et al.* 2015; Baral *et al.*, 2017; Schutgens *et al.*, 2018; Bhattarai *et al.*, 2021). Other relevant studies revealed the role of trail paths in supporting sustainable land use planning to support feasible and realistic green environment services. Such approaches could demonstrate the priority and the emerging fields of land use planning to create dynamics of trail paths and human interventions to keep a positive environmental footprint (Kyriakopoulos, 2023).

Few studies link the NEP with WTP for national park entrance fees in a developing country addressing international visitors. To the authors' best knowledge, an empirical study addressing the linkages between the NEP and visitors' WTP for entry fees and biodiversity conservation is limited to national parks in Nepal and their specific frameworks of management and conservation (Getzner and Thapa, 2015). This paper provides an empirical result from a contingent valuation survey of the entrance fee for a national park that is a nature-based tourism destination under the environmental attitudes of visitors. The objectives of this paper are four-fold:

1) to assess the environmental attitude of international visitors in Langtang National Park (LNP) through the NEP scale;

2) to assess the Willingness to Pay (WTP) for an entry fee at LNP;

3) to explore the relationship between the environmental attitude (NEP score) and the WTP for an entry fee in LNP and

4) to explore the relationship between the visitor's environmental attitude (NEP score) and the willingness to revisit LNP.

The paper is structured as follows: Section 2 provides overview of the study site and the methodology applied.

Section 3 details the empirical results, while section 4 discusses the empirical approach and results and draws a range of conclusions for conservation policies and future research linking the NEP and visitors' WTP for nature conservation.

2. Materials and methods

2.1. Study site

The Langtang National Park (LNP) was established in 1976 as the first Nepalese Himalayan (mountain) national park. The core zone of the national park is 1,710 sq km, with an additional buffer zone of 420 sq km, which was added in 1998 (Figure 1). The Himalayan range, including Langtang Lirung (7,243 meters above sea level), is inside the park (Shrestha and Pantha, 2018). High mountain lakes like the Gosaikunda are listed under the Ramsar convention and inside the national park. The lake is of religious importance to Buddhism and Hinduism, with the main religious celebrations being the Gangadashara and Janai Purnima festivals. A religious ban on wildlife hunting protected the park's wildlife (RAMSAR 2021). The region's rich natural and cultural heritage provides manifold opportunities to experience cultural and nature-based tourism and has attracted many visitors. The *Tamang* and *Hyolmo* ethnic people of Tibetan origin inhabit the national park's upper part. Tourism is expected to contribute significantly to residents' income inside and around the park. However, tourism is seasonal, with most tourists visiting the park in spring and autumn.
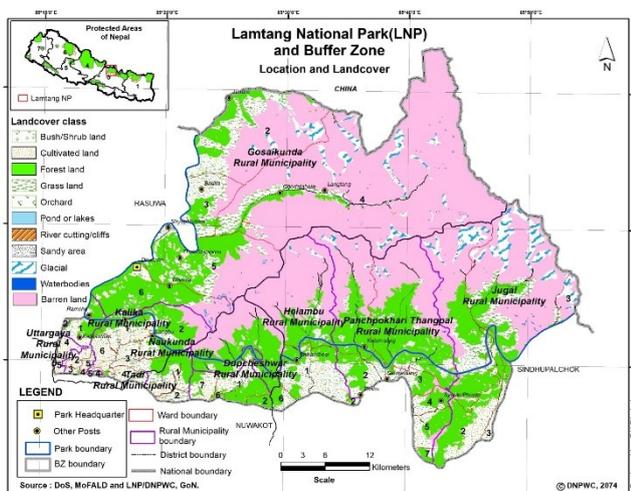

Figure 1. Langtang National Park and buffer zone. Source: DNPWC (2024)

Nepalese visitors were allowed free entry to the park until around mid-October 2018. Since then, Nepalese visitors have also had to pay a park entry fee of NPR 100 (LNP, 2019). Therefore, there was record-keeping of Nepalese visitors to the park when the fee payment was made mandatory. Visitors from South Asian Association for Regional Co-operation (SAARC) countries and other international visitors must pay a much higher park entry fee of NPR 1,500 and 3,000, respectively. This fee was increased from the previous entry fee of NPR 100 for SAARC countries citizens and NPR 1,500 for international visitors since 2012.

In Nepal, LNP is the third most visited national park by international visitors among mountain-protected areas. The park has experienced a continuous growth of visitors, with about 17,000 international visitors per year. However, there were slight fluctuations over the years due to domestic conflict, natural disasters such as earthquakes, and the COVID-19 pandemic (LNP, 2019; DNPWC, 2020).

2.2. Data collection methods

To address the four research objectives, a structured questionnaire was conducted with international visitors (excluding SAARC visitors) in LNP using convenience sampling. The survey was carried out over two years during the primary tourism season in autumn. The questionnaire was pre-tested (n=20) before the actual survey, which led to the adoption, clarification and appropriate wording of some questions. This resulted in a more precise formulation of the WTP elicitation procedure.

International visitors completed a total of 476 self-administered questionnaires. The survey was conducted when visitors could be approached in their hotel. Visitors were asked to complete the survey while waiting for dinner or lunch or when visitors seemed to have leisurely time. This process was used to minimize the disturbance to visitors as much as possible. Permission and verbal consent were sought from the visitors before the survey, and clarifications of the research purpose were provided. If the visitors agreed to participate in the survey, the survey proceeded. Most of the survey was performed at Kyanjin Gompa (elev. 3,850 m), the main camp and the final destination in Langtang National Park. However, before the researcher reached Kyangjin Gompa, a few tourists (the first three days of the survey each year) were also surveyed at SyafruBensi (the gateway rural town to the LNP trekking) returned from the LNP trekking trip. Only international visitors (excluding SAARC visitors) were surveyed because they were the ones who were required to pay the highest entry fee of NPR 3,000 (about USD 30 at the time of the survey).[2] These international visitors constituted the largest group of visitors to the park.

The survey used a Contingent Valuation (CV) approach in order to explore the WTP of international visitors for entry to LNP, Nepal. For reasons of simplicity, a payment card was used to elicit the WTP of visitors, where the bids ranged from USD 0 to USD 300. A hypothetical scenario of the future national park management was provided to the visitors in order to elicit their WTP for a park entry fee. Visitors were asked regarding their WTP for a new entry fee for the national park entrance based on their experience (Supplementary material 1).

Following the WTP question, statements to measure environmental attitude were presented to the respondents. The environmental attitude of respondents was measured through the standard NEP scale consisting

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[2] One US dollar was equivalent to approximately 100 Nepalese Rupees (NPR) during the study period.

of 15 statements. These statements account for both the social and the environmental paradigm (Dunlap *et al.*, 2000). Both groups of questions were presented to the respondents alternatively. The statements were measured using a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

2.3. Data analysis methods

Firstly, we computed visitors' environmental attitudes by using the NEP Scale. The scale's negative statements were reverse-coded before analysis. We calculated the composite score by summing the score of each individual statement and then dividing it by number of statements (15). Secondly, we estimated a WTP-function (maximum likelihood) to explore the determinants of the visitors' WTP for an increased entry fee. Thirdly, the factors associated with the willingness to revisit the park in the frame of a logit model were analyzed.

Table 1 describes the dependent and explanatory variables used and the hypothesized influence direction. WTP and willingness to revisit the park were used as dependent variables. At first glance, this paper's two main explanatory variables of interest are the respondents' income and the average score on the NEP scale. Both variables are hypothesized to exhibit a significant and positive influence on WTP. Regarding income, it is usually assumed that WTP depends crucially on the respondent's economic resources (income as the ability to pay), and that – ceteris paribus – a higher income leads to more WTP.

Concerning the NEP scale, an increase in environmental awareness and attitude is significantly and positively correlated to WTP, reflecting general preferences for the natural environment and conserving protected areas. Both income and the NEP scale thus mirror the main

determinants of WTP typically assumed in environmental valuation models: economic resources (income) and preferences (NEP scale).

However, to test for the influence of additional variables, we also include three socio-economic variables in addition to income. While there is no a priori hypothesis regarding the potential influence of age and gender on WTP, it can be reasonably assumed that the respondent's education might be positively correlated with WTP. Education is regularly proven to influence environmental preferences, given that increased information leads to higher environmental awareness, and thus higher WTP. It is also noteworthy to consider that sustainable development and green policy interventions are directly associated with environmental awareness of urban space along with its economic and social benefits, taking into account the quality of life and ecological environment, areas that have been underscored by relevant studies (Yu *et al.*, 2020).

A further group of potentially explanatory variables include attributes of the current visit to the Langtang National Park. As discussed in more detail below, most visitors stated that the primary purpose of their travel would be the possibility to trek and hike in the national park. The influence on the respondent's WTP is unclear. Thus, we cannot offer a prior hypothesis regarding to the direction of influence (i.e., whether respondents with a primary focus on trekking would pay more or less than the other respondents). Regarding the quality of the guide who led visitors through the park, as well as the overall experience, it can reasonably be assumed that – ceteris paribus – these variables positively influence WTP.
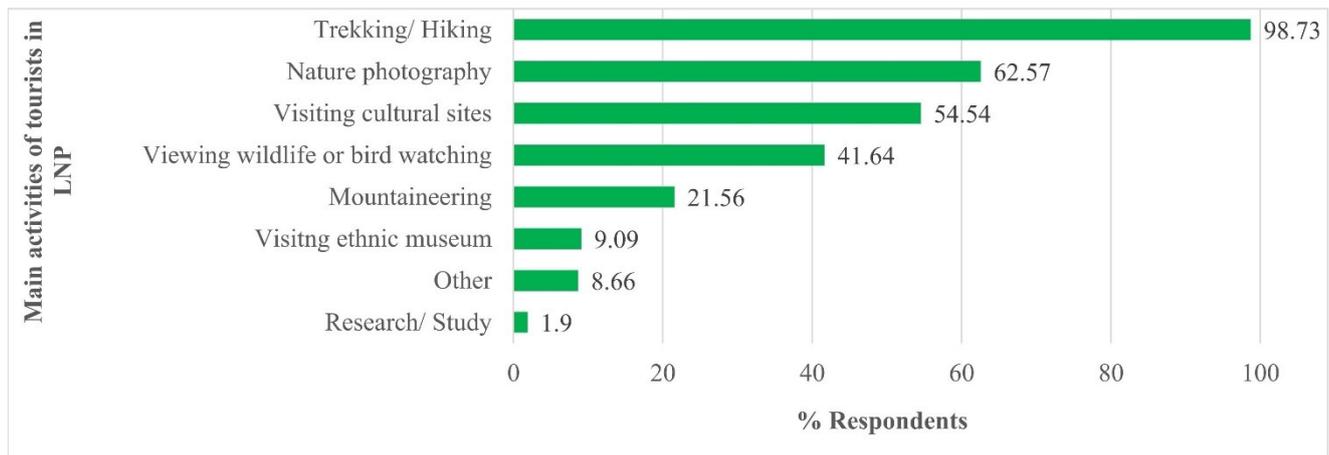

Figure 2. Main activities of visitors in Langtang National Park (multiple responses provided, n= 476)

Finally, WTP is typically associated with the visitors' prior experience with the destination and the possibility of satisfying travelling needs in other (alternative) locations. It can be hypothesized that respondents who had visited the area before have a lower WTP. With existing alternatives perceived by respondents, WTP may be lower than otherwise.

3. Results

3.1. Demographic profile of visitors

The visitors had an average age of 38.5 years, with most visitors (49%) belonging to the age group of 26-45 years. Similarly, 57% of the respondents were male. Furthermore, most respondents (53%) were full-time employees and 70% held at least a Bachelor's degree. More than half of the visitors (61%) had an annual

household income of up to USD 59,999. Most visitors (69%) originated from European countries. Finally, 23% of the visitors were members of environmental NGOs (Table 2).

Table 1. Dependent and explanatory variables for estimating the respondents' willingness-to-pay and their willingness to revisit the National Park

	Description	Expected sign[a]
Dependent Variable		
WTP	Willingness-to-pay for a new entry fee (ln USD)	
Revisit	Willingness to revisit the park in the future (=1 for respondents stating that they likely revisit the park in the future)	
Explanatory variables		
	Socio-economics and environmental preferences	
Income	Household income, per month (before taxes; ln USD)	+
NEP	New Environmental Paradigm (average score of NEP items, 1= lowest, 5= highest)	+
Age	Age of the respondent (ln years)	?
Gender	Gender of respondent (=1 for male respondent)	?
Edu	Education of respondent (=1 for college/university degree)	+
	Attributes of the current visit to Langtang national park	
Purpose	Trekking is the main purpose of the whole visit to Langtang National Park (=1 for trekking, 0= otherwise)	?
Guide	Quality of the guide (e.g. excellent knowledge; =1 for excellent guide's knowledge and tour quality)	+
Experience	Experience of the whole trip (=1 for an excellent overall experience)	+
Arrangement	Individual travel arrangements (=1 for respondents who arranged their travel to Langtang National Park individually)	
	Earlier visits and potential alternatives (substitutes)	
Before	Respondent has visited Langtang National Park before (=1 for earlier visits)	-
Alternative	Respondent can think of alternatives to the Langtang National Park (=1 for existing alternatives)	-

[a]Assumed direction of the correlation with the respondent's willingness-to-pay. Source: Own draft

3.2. Visitors' environmental attitude, purpose and motivation to visit the Langtang National Park

As expected, visitors' main activities in the national park were closely connected to the ecosystem services provided by the park. Almost all respondents stated that trekking or hiking was their primary activity; however, wildlife and landscape observation are also significant activities, as are visits to cultural heritage sites (figure 2).

The main motivations of visitors to Langtang National Park also mirror these activities. To spend time in the natural environment and get away from the daily routines are the motivations most stated by respondents (Table 3).

Table 2. Socio-demographics of visitors at Langtang National Park

Demographics		% (n= 476)
Gender	Male	57.0
	Female	43.0
Education	No formal schooling	1.3
	High school	16.0
	Associate degree/ Diploma	12.7
	Undergraduate/ Bachelor and above	70
Age	16-25	17.9
	26-45	48.9
	46-65	31.3
	> 66	3.3
Employment status	Full time	53.1
	Part-time	8.3
	Homemaker, retired or temporarily unemployed	19.7
	Student	10.7
	Other	8.3
Annual household income	< USD 20,000	22.1
	USD 20,001 – 39,999	22.6
	USD 40,000 – 59,999	16.3
	USD 60,000 – 79,999	12
	> USD 80,000	26.9
Region	Europe	68.6
	North America	11.4

Oceania (only from Australia and New Zealand)	10.3	
Asia (including Russia)	5.8	
Africa	0.4	
Other	1	
Member of an environmental NGO	Yes	22.6

Table 3. Motivation of visitors to visit Langtang National Park

Motivations	Cumulative percent[a]			Mean	S.D.
	IMP	UnIMP	NEU		
Relaxation	52.6	21.4	26	3.36	1.1
Do things with other people	58.4	18.1	23.5	3.51	1.04
Get away from the everyday routine	86.3	3.8	9.8	4.31	0.84
Opportunities for solitude	41.5	27.9	30.7	3.15	1.16
Tell others about it at home	27.7	43.6	28.8	2.74	1.19
Keep fit	45.2	20.7	34.1	3.27	1.03
Be in a natural setting	93.8	1.3	4.9	4.55	0.67
Opportunities to self-challenge	78.4	6.6	15	4.02	0.91
To see wildlife and natural wilderness	90.9	2.5	6.6	4.5	0.75

[a]IMP refers to "totally important" and "important", UnIMP refers to "totally unimportant" and "unimportant", and NEU refers to "neutral" statements.

Source: Own survey

The activities and motivations are based on visitors' environmental preferences and attitudes towards the natural environment. On the NEP scale – with 1 being the minimum and 5 the maximum score – respondents had an aggregated mean score of 3.72 (std. dev. 0.54). Individual NEP scores ranged from 1.93 to 5. This revealed that visitors in LNP held comparatively high environmental attitudes. Table 4 displays the various components of the NEP scale and the agreement to the statements by respondents.

Table 4. Range and mean values of the NEP scale as stated by visitors of the Langtang National Park

NEP scale statements[a]	Percent of respondents					Mean	S.D.
	SD	D	N	A	SA		
We are approaching the limit of the number of people the Earth can support	7.3	8.4	22.4	24.0	37.9	3.77	1.24
Humans have the right to modify the natural environment to suit their needs	**4.5**	**15.2**	**31.2**	**26.2**	**22.9**	**3.48**	**1.13**
When humans interfere with nature it often produces disastrous consequences	2.7	7.3	21.8	32.0	36.1	3.92	1.05
Human ingenuity will ensure that we do not make the Earth unlivable	**9.2**	**20.1**	**38.2**	**19.0**	**13.5**	**3.07**	**1.14**
Humans are seriously abusing the environment	3.9	3.9	11.9	30.7	49.7	4.18	1.04
The Earth has plenty of natural resources if we just learn how to develop them	**37.7**	**32.0**	**18.6**	**6.6**	**5.0**	**2.09**	**1.12**
Plants and animals have as much right as humans to exist	1.4	3.9	13.6	22.7	58.4	4.33	0.94
The balance of nature is strong enough to cope with the impacts of modern industrial nations	**6.5**	**7.4**	**16.7**	**32.8**	**36.5**	**3.85**	**1.18**
Despite our special abilities, humans are still subject to the laws of nature	1.4	3.5	12.9	29.2	53	4.29	0.91
The so-called "ecological crisis" facing humankind has been greatly exaggerated	**5.9**	**8.5**	**22.6**	**26.7**	**36.3**	**3.79**	**1.19**
The Earth is like a spaceship with very limited room and resources	7.1	8.5	20.2	28.7	35.4	3.77	1.22
Humans were meant to rule over the rest of nature	**7.2**	**8.4**	**20.1**	**17.5**	**46.8**	**3.88**	**1.28**
The balance of nature is very delicate and easily upset	2.4	5.9	17.2	30.4	44.2	4.08	1.02
Humans will eventually learn enough about how nature works to be able to control it	**9.0**	**16.3**	**31.2**	**26.7**	**16.8**	**3.26**	**1.18**
If things continue on their present course, we will soon experience a major ecological catastrophe	2.6	5.5	20.2	27.2	44.5	4.05	1.05

[a] Statements in bold are reverse coded. SD – Strongly disagree, D – Disagree, N – Neutral, A – Agree, SA – Strongly agree

Source: Own survey

3.3. Visitors' WTP for funding further management and conservation efforts

The first significant result was that most visitors (66%) were willing to pay more than USD 30 as a new entry fee,

while only 25.5% were willing to pay less than USD 30 as a new entry fee (Figure 3). The mean WTP for a new entry fee was USD 57.51 (*std. dev.* USD 48.23). Most of the visitors (33.3%) were willing to pay in the range of USD 41–60 (Figure 3).
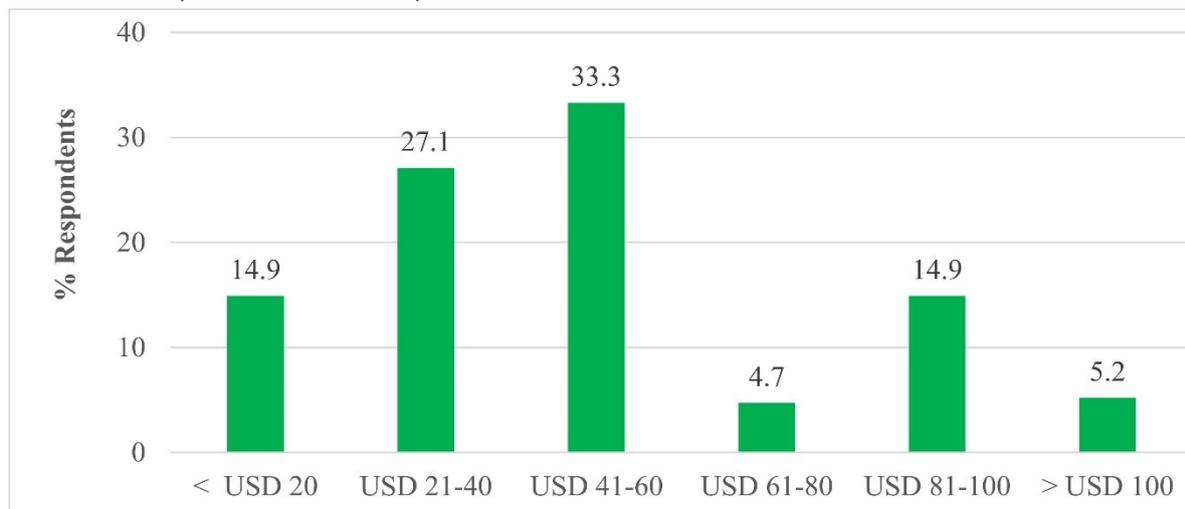

Figure 3. Visitors' WTP as a new entry fee in Langtang National Park

In order to assess the determinants of the respondents' willingness-to-pay and test the correlation between WTP and the NEP scores, a number of regression models were estimated (maximum likelihood Tobit regression, logistic distribution assumed; Table 5).

We present four estimations of a WTP function, which include different assumptions about relevant determinants of WTP. Model 1 presents an estimation that includes only the two main variables, income and environmental attitude (NEP scale score), that are assumed to be the main determinants of the respondent's willingness-to-pay. The estimation shows that WTP is highly correlated with the respondent's income, as expected. In addition, the hypothesis that the NEP scale is closely connected to WTP is also corroborated by the estimation, with a highly significant positive coefficient. Considering the relatively small and comparatively homogenous sample of respondents, the explanatory power of the estimation with only two explanatory variables is satisfactory.

The estimation displayed in model 2 accounts for the socio-economic variables, such as age, gender and education. While the coefficients are insignificant, their sign suggests a specific direction of influence. For instance, the coefficient of the education variable is positive. However, the statistical quality is close to one of the prior estimations. Model 3 includes an estimation with variables denoting attributes of the travel to the Langtang National Park. Respondents who strongly stated that the main purpose of the visit of the national park was trekking, exhibited a significantly higher WTP. However, the coefficient is only significant at the $p=0.06$ significant level (slightly larger than the usually assumed threshold of $p<0.05$). While we hypothesized that the quality of the guide and the experience with the whole visit would positively influence WTP, the coefficients of both variables exhibit a positive sign. However, their coefficients are not significant at any reasonable level of significance.

Finally, we present an estimation in model 4 that keeps the three significant predictors in the earlier models and includes the two variables that describe respondents' earlier visits to the national park and potential alternative destinations. Both variables are negatively correlated with WTP but do not significantly influence the respondent's willingness to pay higher admission fees. The statistical quality of model 4 is finally the highest of all estimations; measured as McFadden's R^2, the explanatory power reaches close to 0.3 and thus be considered a robust estimation given the limitations as presented above.

Summing up, visitors who exhibit an above-average income, have a positive environmental attitude (measured by the NEP scale), and with trekking being their primary purpose of the visit to the Langtang National Park would be willing to pay higher entry fees to the national park than the existing entry fee. However, are respondents willing to revisit the park in the future? The next section deals with this issue by exploring the determinants of the probability that respondents are willing to revisit the park.

3.4. Willingness to revisit Langtang National Park

The visitors in LNP exhibited a generally excellent experience during their trip with a mean score of 8.41 (std. dev. 1.05) on a 10-point rating scale (1 refers to the lowest and 10 to the perfect trip experience). The survey showed that 71.3% of the respondents were willing to revisit the LNP in the future. However, the probability and certainty of their visit, respectively, were not elicited in the survey.

In order to provide a further example of the importance of the NEP in explaining the travel behaviour of visitors, we estimated a logit model to assess the probability of future travel to the Langtang National Park (Table 6), in addition to the statistical analysis of the willingness-to-pay an entry fee in section 3.3 above.

Table 5. Determinants of WTP for entry fee to the Langtang National Park

Variable	Model 1 Coefficient	z-Stat.	Prob.	Model 2 Coefficient	z-Stat.	Prob.	Model 3 Coefficient	z-Stat.	Prob.	Model 4 Coefficient	z-Stat.	Prob.
Constant	0.628	0.817		0.482	0.587		0.851	1.099		0.982	1.251	
Income	0.231	3.476	***	0.216	3.048	***	0.197	2.908	***	0.189	2.769	***
NEP	0.197	2.503	***	0.19	2.355	**	0.188	2.413	**	0.215	2.677	***
Age				0.101	0.773							
Gender				-0.062	-0.672							
Edu				0.024	0.268							
Purpose							0.165	1.884	*	0.174	1.915	**
Guide							0.127	1.294				
Experience							0.074	0.856				
Before										-0.252	-1.305	
Alternative										-0.100	-1.104	
S.E. of regression	0.971			0.981			0.970			0.943		
Log likelihood	-381.75			-379.22			378.61			-338.52		
Avg. log likelihood	-1.268			-1.273			-1.258			-1.231		
McFadden R^2	0.198			0.203			0.204			0.289		
n	301			298			301			275		

Maximum likelihood Tobit estimation (logistic distribution), *** p<0.01, ** p<0.05, * p<0.1.
Source: Own estimations.

The logit model results (Table 6) infer that socio-economic variables are essential for assessing the likelihood of revisiting the area. Respondents with an above-average age are less likely to revisit the area as also respondents with higher household income. The age of respondents could be argued by the sizeable physical stress of visiting the national park (e.g., trekking at high altitude). The negative coefficient of the income variable could point to the wider range of options for traveling in the future. However, as discussed before, the socio-economic variance of the sample is certainly limited. The statement mentioned above of the strong relationship between socio-economic variables and the intention of revisiting areas of environmental importance is consistent with similar studies, especially in cases where the coordination among economic, social, and environmental indicators is complex and requires a detailed analysis for a more comprehensive understanding. While the economic dimension is bound to the society and the environment, these three entities are intricately interconnected, making it important to understand that any individual group of economic, social or environmental indicators should be interpreted in alignment with the other two dimensions since only in this way, an integrated view of the functioning of any economy action (in our study that WTP) can be ensured (Sinha Babu and Datta, 2015). Such a bi-directional relationship between different developmental and environmental aspects in developing countries cannot reflect the true interdependence without consideration of depreciation/depletion charges for the environmental capital (Sinha Babu and Datta, 2015).

Table 6. Determinants of willingness to revisit to the Langtang National Park

Variable	Model 1 Coefficient	z-Stat.	Prob.
Constant	10.762	4.121	***
Income	-0.364	-1.855	*
Age	-2.256	-4.619	***
NEP	0.573	2.266	**
Experience	0.597	2.040	**
Arrange	-0.628	-1.939	*
WTP	-0.051	-0.338	
S.E. of regression	0.431		
Log likelihood	-148.676		
LR statistic	44.224***		
McFadden R^2	0.129		
Correct predictions	71.84%		
n	277		

Logit estimation (logistic distribution), *** p<0.01, ** p<0.05, * p<0.1.

The NEP is visible as a further predictor of the probability of revisiting the national park. Respondents with an above-average environmental attitude are more likely to express an interest in visiting the area again. As expected, respondents who were more satisfied with the visit (trip experience) also exhibited a significantly higher probability of revisiting the national park. Visitors who arranged the travel to the national park by themselves seem to be less likely to revisit the park, presumably owing to the substantial efforts of planning the travel.

Finally, the estimation shows that the probability of revisiting the area is not affected by the respondent's willingness-to-pay an entry fee. The overall statistical quality is sufficient, given the relatively small sample of survey participants with complete information. About 72% of statements could be correctly predicted.

4. Discussion, summary and conclusions

Many protected areas, especially in low-income countries need more funding. Levying entry fees particularly from international visitors has been proposed to support park management. However, there is only scant evidence on the nexus between willingness-to-pay, environmental attitude measured on the NEP scale, and several characteristics of respondents in the context of protected areas in Nepal. This paper provides an empirical estimation of the entry fee for nature-based tourism destinations under the environmental attitudes of the visitors.

In order to close this research gap, a survey at Nepal's LNP eliciting international visitors' WTP for a new entry fee and their environmental attitude, was carried out with over 400 respondents. While the results infer that respondents generally hold strong environmental preferences, their WTP is substantial. On average, respondents stated a WTP of about USD 60 as a new entry fee to secure sustainable management and funding of the national park, almost double the existing entry fee of USD 30.

As can be hypothesized based on the theories of environmental economics and environmental psychology, the respondents' WTP is closely linked to both economic resources (income) and environmental attitudes and awareness. The econometric estimations revealed this linkage, while other potentially explanatory variables (e.g., other socio-economic variables, attributes of the current visit to the park) are less significant or even insignificant.

In the scholarly debate, on-site surveys have been questioned, especially about the sample's representativeness and the reaction of demand to a rise in entry fees. While the survey presented in this paper is based on a convenience sampling of visitors, it is certainly not representative of potential visitors who might express an interest in travelling to Langtang National Park. However, there are indications in the estimations of this paper that the reaction of demand to rising entry fees may be minimal, or even non-existent. On the one hand, even substantially increased entry fees would only comprise a tiny proportion of the costs of traveling to Nepal and the national park. On the other hand, an estimation of the willingness to revisit the area exhibited that the respondent's value of the NEP scale and the quality of the visit (trip experience) are significant predictors of the likelihood of further visits. Neither the willingness-to-pay nor other variables (such as, high travel cost or travel spent to arrive in Nepal) are significant predictors. Thus, it can reasonably be argued that higher entry fees would not deter substantial numbers of visitors from traveling to the national park. Increasing entry fees

could provide a substantial addition to the financial base of park management that can lead to upgrading the park by building new trails and upgrading the touristic infrastructures.

In general, the results of this study can be helpful to national park and protected area managers and decision-makers, as well as to policymakers in countries that share similar visitor profiles and protected area features. Since we discovered that the visitors' environmentally solid attitude was associated with a higher acceptance of entry fees for further improvements of the national park, up-to-date record keeping of the visitors' profile could be helpful for appropriate decision making. However, no detailed profile of visitors is recorded by the park authority other than the nationality of the visitors and the visit month.

The main challenges of planning and governance related to protected areas, nature-based tourism and biodiversity conservation, are, among others, population growth in and around protected areas and exclusion of certain social groups such as women and marginalized. In addition, ongoing worsening climate crisis, macro-economic instabilities (e.g. hyperinflation), donor fatigue, conflicts and the volatile international tourism markets of destinations (e.g. changing airfares and prices of travels, potential travel restrictions) (Diakakis *et al.*, 2017; Diakakis *et al.*, 2018; Diakakis *et al.*, 2021) may restrict visitors in visiting protected areas. Such challenges in terms of changes in the tourism sector may cause adverse effects on the wildlife resources, environmental amenities, the attraction of the area for tourists, the accessibility of the region, and the governance and management system of conservation (Mudzengi *et al.*, 2021). The results of this paper underline that international visitors may support and be partners in local, sustainable development, increasing the funding and, thus, stability of protected area management.

The managerial role of the NEP can frame and highlight those interventions that can make nature-based tourism in ongoing and evolving destinations more sustainable. Adopting such interventions and strategies can build strong community cohesion, develop self/ sustainable financing mechanisms, promote multiple income sources, carry out conservation and environmental education programs, and manage tourism ventures during hyperinflation (Mudzengi *et al.* 2021). As this paper shows, international visitors hold strong environmental preferences measured by the NEP scale, and therefore, visitors accept policies that support such sustainable strategies.

New compensation systems, substantially funded by international visitors, can be recommended while supporting permanent or temporary job creation through development and economic interventions. This can also be helpful for national park neighboring communities to empower locals and poverty alleviation. In the context of an integrated approach, there is a need for policymakers to consider integrated protected landscape management as a feasible option where biodiversity will be conserved, not only in the designated protected areas but in the

surrounding landscape through multi-stakeholder engagement. As this paper shows, international visitors should be a supportive part of this vital conservation endeavour.

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1. Kamal Thapa: Conceptualization, Methodology, Field work/Data collection, Data curation and analysis, Writing - draft, review and editing, Funding
2. Stamatios Ntanos: Data analysis, Writing - review and editing;
3. Grigorios L. Kyriakopoulos: Writing – draft, review and editing;
4. Michalis Skordoulis: Data analysis, Writing – review and editing;
5. Michael Getzner: Supervision, Methodology, Data analysis, Writing – draft, review and editing

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Supplementary information 1

The scenario description and elicitation question of the willingness to pay

Visitors were asked regarding their WTP for a hypothetical new entry fee for the national park entrance based on the experience they had. The scenario description and the elicitation question read as follows:

"The lack of financial resources is a major challenge for protected area management in Nepal. At present, ecotourism seems to be a viable option to generate revenues from a tourist entry fee.

An increase of the current entry fee means more budget for buffer zone development because 30% to 50% of the park income has to be channelized back to the conservation and development activities of the buffer zone and to local people. This can lead to a reduction in poaching and illegal activities, encourage local participation to achieve better nature conservation, improve the wildlife population so that chances of wildlife viewing also increases. Sufficient budget to government means it can manage Langtang National Park on par with international standards to achieve sustainable protected area management, and also help in improving visitors' infrastructure and the operation of the park.

If the management authority increases the current entry fee (NPR 3,000 = USD 30) in order to have more funds to enhance visitors' experience, conserve biodiversity, and promote economic development, how much would you be willing to pay more (or less) as a new entry fee for the experience you had. [A payment card with bids from Zero to over USD 300 followed.]"