



THE NATIONAL
RESEARCH INSTITUTE
PAPUA NEW GUINEA

DISCUSSION PAPER

VISITORS' PREFERENCES FOR Eugene E. Ezebilo
IMPROVED RECREATION
EXPERIENCE AT AN URBAN
NATURE PARK: EVIDENCE
FROM PORT MORESBY
NATURE PARK

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Abbreviations & Acronyms

CE	choice experiment
IIA	Independence of Irrelevant Alternatives
PNG	Papua New Guinea
PNG NRI	Papua New Guinea National Research Institute
PNP	Port Moresby Nature Park
WTP	willingness to pay

Abstract

Urban nature parks provide recreation opportunities that contribute to the physical, health, and social wellbeing of urban dwellers. However, while much attention has been given to the supply of amenities for recreation in the park, little attention has been given to visitors' preferences for the amenities. This paper reports a study of visitors' preferences for improved recreation experience in an urban nature park in Port Moresby. Data were collected by interviews with visitors to Port Moresby Nature Park (PNP) and was analysed using multinomial logit model. The results show that the improvement of recreation associated with the provision of reptiles and bird of paradise exhibits, in addition to keeping the current exhibits in the park, was the most preferred option. The interviewees reported that they would pay an average of additional 35 percent of the entrance fee for improved recreation experience at PNP. The nature area reserved for picnics was the most visited and the area containing Papuan hornbills was the least visited. On average, visitors spent three hours at PNP for recreation and travelled 4.5 km from their homes to the park. Preferences for improved recreation experience were influenced by factors such as income, entrance fee to PNP recreation area, distance to PNP, time spent at PNP, nature type, recreation activity, gender and education. The findings can assist land use planners and recreation managers to make informed decisions by considering visitors' preferences for recreation experience in land use planning.

Introduction

Urban nature parks provide ecosystem services such as habitats for plant and animal species, air purification and an area for recreation experience (Baur & Tynon, 2010; Filyushkina et al., 2016). The recreation opportunities provided by a nature park contribute to the physical, psychological, health, and social wellbeing of urban residents (Moore et al., 2010; Peschardt et al., 2016). In order to develop an effective management system that sustains the provision of recreation experience in a nature park, it is necessary to understand the supply of and demand for recreation opportunities that the park provides (Martin-Lopez et al., 2014). The capacity of the park to provide opportunities for recreation experience determine the potential uses of the park. This influences the socio-cultural and monetary value of recreation that the park provides (Martin-Lopez et al., 2014). This highlights the need to incorporate the supply and demand aspects of recreation into management decisions of a nature park.

The international policy commitments for the provision of ecosystem services including recreation have highlighted the importance of incorporating findings from valuation of demand and supply sides of the services into nature park management decisions (Millennium Ecosystem Assessment, 2005; Daily et al., 2009). However, most papers have focused on a few nature types and recreation activities (e.g. Mwebaze & Bennett, 2012; Casey et al., 2010; Abuamoud et al., 2014). Furthermore, nature park managers often focus on the supply of recreation and give little attention to the demand. This often makes it difficult to make informed decision in the sustainable management of an urban nature park. To address some of the limitations, this study has focused on the demand for several recreation activities of different nature types. Information about the demand for recreation experience in an urban park can assist land use planners allocate resources between competing uses of land efficiently (Carpenter et al., 2009). The value associated with demand for recreation in an urban park represents a loss to urban residents if the park is converted to other uses (Simos et al., 2013).

Several factors that influence demand for recreation experience have been identified in the literature. These include income and membership of an environmental organisation (Hakim, 2011; Bernath & Roschewitz, 2008; Ezebilo, 2014); educational level (Abuamoud et al., 2014); age and gender (Ransom & Mangi, 2010; Kamiri, 2013); and family size (Naeemifar et al., 2011). Others are category of visitors; that is, domestic or international visitors (Tuan et al., 2014; Ovaskainen et al., 2012); travel time to recreation site (Fezzi et al., 2014; Wolff, 2014); recreation activities available and nature type (Cho et al., 2014; Ezebilo, 2016a); access fee to recreation site (Casey et al., 2010; Rosenberger et al., 2012); proximity of alternative recreation site (Mwebaze & Bennett, 2012); home location (Norman et al., 2010); distance of home to recreation site (del Saz Salazar & Menendez, 2007; Tu et al., 2016); and length of time spent at recreation site (Rulleau et al., 2012).

Papua New Guinea (PNG) has the third largest tropical forest area in the world and has five percent of the world's biodiversity (World Wildlife Fund, 2019). The country has huge potential for nature-based recreation (Brooks et al., 2006; Ezebilo, 2016b). However, as in most developing countries, the protection of biodiversity is challenging for the government. This is because livelihoods of most people in PNG are strongly linked to natural resources. This often generates competition between uses of land for agriculture, housing, and urban parks for recreation (Ezebilo, 2013; Ezebilo, 2017). The provision of information associated with demand for recreation in urban parks in PNG can assist land use planners to make informed decisions by considering trade-offs between different uses of land (Carrasco et al., 2014). However, few published papers focus on the subject in PNG (e.g., Pondorfer & Rehdanz, 2015; Ezebilo, 2016b). As a result, evidence that can assist land use planners to justify the need to incorporate nature parks in urban development is limited. This study attempts to fill the knowledge gap by providing information about demand for recreation experience in an urban park in the largest city of PNG.

The objective of the study

The objective of the study reported in this paper is two-fold. The first is to examine visitors' preferences for exhibit alternatives for the improvement in recreation experience in Port Moresby Nature Park (PNP) and how much they would pay as the park entrance fee for the improvement. The second is to determine factors that influence visitors' preferences for exhibit alternatives and potential strategies for meeting their recreation needs.

It is hoped that findings from this study will provide land use planners and policy makers justification to incorporate urban parks in urban development planning and funding for the sustainable management of the parks. The findings will also be useful for managers of urban nature parks to make informed decisions about potential strategies for improving visitor's recreation experience.

Conceptual framework

The economic theory of individual preferences and demand posits that consumers have correct information of the satisfaction (utility) they get from goods and services consumed (Varian, 2010). If an individual prefers one consumption bundle over another bundle, the former consumption bundle is the utility-maximising bundle to the individual. In the so-called perfect market, consumers choose goods that maximise their utility subject to the level of their income (budget constraint). The higher the price of a good, the lower would be the quantity of that good that will be bought (Varian, 2010).

The PNP provides opportunities for recreation experience to visitors. During the period of this study, a full-fee paying adult must pay PGK7 or USD2 as entrance fee to access the recreation area of the park.

In order to improve the recreation experience provided to visitors, PNP managers are considering providing more exhibits of different animal species. However, the improvements would increase the cost of managing the park. A strategy to offset the park management cost is to increase the park entrance fee to a level that the visitors would be able to pay and that does not reduce the current level of number of visits. For the improvements to be effective, it is necessary for visitors to be involved in negotiations concerning the preferred exhibits and the corresponding entrance fee they are being offered.

In this study, the interviewees were required to indicate their preferred exhibit from a set of alternatives that PNP managers are considering introducing (which would be in addition to the current exhibits in the park).

A rational interviewee would choose an alternative that maximises his or her utility (Varian, 2010). If the interviewee chooses alternative c , we assume that the utility from alternative c is greater to him or her than the utility from other set of alternatives d as:

$$U_c > U_d = \forall d \neq c \quad (1)$$

Where U_c is the utility to the interviewee for alternative c , and U_d is the utility to the interviewee for other set of alternatives d . The interviewee's choice can be modelled as maximising the expected utility from alternative c as the following:

$$\text{Max}_c E(U_c) = f_c(p, y, b, a) + \varepsilon_c \quad (2)$$

Where $E(U_c)$ is the expected utility of alternative c to the interviewee, f_c is a function of price of composite goods p (i.e., other goods bought by the interviewee), income y , characteristics of exhibit alternative b and personal attributes of the interviewee a , whereas ε_c is a disturbance term, which is assumed to be independently and identically distributed. As $E(U_c)$ is not observable, let L_c be the random variable representing the alternative chosen by the interviewee. It is assumed that the interviewee faces a set of discrete, mutually exclusive choice of exhibit alternatives and that the final choice depends on the interviewee's personal attributes such as their income, as well as the exhibit price and characteristics.

The knowledge of visitors' preferences for improved recreation experience can assist urban park managers to provide the needed recreation opportunities. The preferences can be elicited by examining the value that the visitors held for various exhibits associated with recreation experience. Stated preference methods such as the choice experiment (CE) (Adamowicz et al., 1998) can be applied in such a study. In a CE survey, the interviewees are presented with alternatives and asked to choose their most preferred alternative. The values of the interviewees are inferred from the choices or trade-offs they make (Ezebilo, 2013). The CE approach is based on the Lancasterian consumer theory and random utility theory. The Lancasterian entails that the choices that consumers make is strongly linked to their preferences for the attributes of a good (Lancaster, 1966). For the case of random utility theory, it states that utility that a consumer gets from a good cannot be observed. However, it can be split into a systematic component, which depends on a vector of attributes that can be estimated, as well as a random component that cannot be estimated (Greene & Hensher, 2009; Hearne & Santos, 2005).

Material and methods

The study area

PNP was established in 1975 as the National Capital Botanical Gardens for recreation and conservation of biodiversity. However, the name was changed to PNP in 2012, following a shift of management from Botanical Gardens' Management to PNP Trust (Port Moresby Nature Park, 2019). PNP is located in Port Moresby, which is the capital of PNG. It is in the northern part of the Waigani suburb near the University of Papua New Guinea. PNP covers an area of 30 acres (Port Moresby Nature Park, 2019). PNP is located in Port Moresby, which is the capital of, and contains the only remaining rainforest area in Port Moresby (Figure 1). The park is home to several endemic plant species such as palms, gingers, heliconias, and orchids (Botanical Gardens Conservation International, 2017). Animal species found there include tree kangaroos, cassowaries, birds of paradise, parrots, pigeons, crocodiles, wallabies, hornbills, and fruit bats.

Figure 1: Map of Papua New Guinea showing the location of Port Moresby Nature Park



PNP is the only area in PNG where botanical and zoological parks are combined with the aim of promoting plant and animal species found in the country (Botanical Gardens Conservation International, 2017). PNP is also intended to promote community nature-based education. Officials of the park often conduct environmental education programs such as school excursions that help students learn more about the natural environment.

PNP has several facilities for recreation, such as walkways through rainforest jungle, as well as a walk-through exhibit for tree kangaroos, a wallaby exhibit, and aviaries that house parrots. Other facilities include a café, souvenir shop, and a picnic area that includes facility for grilling and party. During the period of this study, the entrance fee was PGK7 for full-fee paying adults. The park's manager (Michelle McGeorge) during the period of this study reported that the park attracts an average of 120,000 visitors annually. At the time of this study, the park had 71 employees.

Survey design and data collection

The data for this study were collected by face-to-face interviews in which the questions were designed through discussions with academics and practitioners and pre-test interviews. The academics were three people whose

works were related to recreation and land use planning, and the practitioners were the manager and supervisor of the PNP. Prior to discussions with the academics and practitioners, a literature review was conducted and potential questions were identified from published papers on the subject. The practitioners were consulted for discussions about the activities of the park. Questions were drafted based on information generated from the discussions and were sent to academics and the PNP manager for their comments. The draft questions were modified and subsequent drafts were sent to the academics on two further occasions before a final draft was produced. To validate the draft, pre-test interviews were conducted in August 2017 with eight PNP visitors. This was followed by feedback from research assistants (i.e., interviewers) of concerns raised by the pre-test interviewees. The concerns resulted in further modification of the draft and a final version of the questions was produced. The questionnaire used for the interviews consists of 43 questions. This paper reports on data from 14 of the questions.

The main interviews were conducted in September 2017 with the help of 12 research assistants, which included undergraduates from the University of Papua New Guinea and project officers from the PNG National Research Institute. They were trained in interview techniques for two days. The interviews were administered at PNP on two consecutive Saturdays and Sundays. The interviews were held during the weekends because the PNP manager reported that more people visit the park on a weekend days. The research assistants were delegated different areas of the PNP, where they approached adult visitors and asked whether they would like to be interviewed. Visitors who said 'yes' were asked whether they have been interviewed recently about the subject (visitors' preferences for recreation experience in PNP).

The visitors who said they have not been interviewed were told about the purpose of the interview (i.e., increasing the understanding on potential strategy for improving park visitor's recreation experience). They were also assured of the confidentiality of their responses and were asked whether they would participate in the interview. Only the visitors who agreed to participate were interviewed.

The visitors who agreed to participate were asked socioeconomic and demographic questions such as income and education. Their age and gender was recorded. They were asked about the area that they mostly visited at the PNP and the number of times they had visited PNP in the last 12 months (i.e., September 2016 to September 2017), the length of time they spent during their visit(s), the recreation activity they mostly engaged in, and the distance from their home to the PNP. They were asked questions about potential strategies for improving their recreation experience at PNP. The interviewees were asked which exhibit alternatives they preferred most, as detailed in the choice question below.

The choice question

The exhibit alternatives were developed to determine how to improve recreation experience of visitors. The exhibit alternatives were described to the interviewees, and the costs and benefits associated with each alternative were highlighted. The interviewees were asked to choose the alternative that they preferred most.

First, the interviewees were asked whether they would support the introduction of new exhibits to PNP. Interviewees who said 'yes' were asked whether they would still support this alternative if it would cost them money.

Second, the interviewees who reported they would support the introduction of new exhibits to the PNP if it cost them money were asked to choose their most preferred alternative from the following four exhibit alternatives:

- **STATUS QUO.** New exhibits will not be introduced to the PNP. The current entrance fee (PGK7) for a full-fee paying adult will remain the same.
- **REPTILE.** In addition to the current exhibits in the PNP, about 20 species of venomous and nonvenomous snakes will be introduced. However, the current entrance fee for a full-fee paying adult will increase by PGK1 (i.e., entrance fee will be PGK8).
- **PARADISE.** In addition to the current exhibits in the PNP, bird of paradise walk-through with seven big aviaries will be introduced. The entrance fee to PNP for a full-fee paying adult will increase by PGK2(i.e.,

entrance fee will be PGK9).

- REPTILE + PARADISE. In addition to the current exhibits in the PNP, about 20 species of venomous and nonvenomous snakes and bird of paradise walk-through with seven big aviaries will be introduced. The entrance fee to PNP for a full-fee paying adult will increase by PGK3 (i.e., entrance fee will be PGK10).

Statistical consideration

In this study, four exhibit alternatives were presented to the interviewees and they were asked to choose the one they preferred most. For this reason, the variable to be predicted (exhibit alternatives) is discrete and the discrete choice model could be used for data analysis. The ordered and multinomial regression models can be used for analysing data that have more than two dependent variables. The ordered regression model, which has a restrictive assumption known as the Parallel Regression Assumption, was first explored. The Parallel Regression Assumption posits that the relationship between each pair of the dependent variable (exhibit alternatives) is the same (Harrell, 2001). The Brant test (Greene & Hensher, 2009) was used to explore whether the data met the Parallel Regression Assumption. The test revealed that Chi-squared statistic was 68.53, which corresponds to a P-value of 0.00001 and was statistically significant at 0.001 levels. This indicates that the assumption required for using ordered model was violated.

The multinomial regression model, which could be used for analysing unordered data, was applied. However, the multinomial has a restrictive assumption known as the Independence of Irrelevant Alternatives. The Independence of Irrelevant Alternatives (IIA) implies that the ratio of probabilities of choosing an exhibit alternative c over other alternatives d is independent of the offered choice (Bjorn & Vuong, 1985). The Hausman–McFadden test (Hausman & McFadden, 1984; Greene, 2003) was used to explore whether the data from this study met the IIA. The Hausman–McFadden test was not statistically significant, which indicates that the IIA assumption was not violated and that the use of multinomial regression for data analysis was justified.

Multinomial probit and multinomial logit regression models could be used for data analysis. However, the probit model has restrictive assumptions (Greene, 2003). These include normal distribution and that the variance around the regression line is the same for all values of the predictor variance (homoscedasticity). To explore whether the probit model is suitable for modelling the data, the Lagrange multiplier statistic was calculated as 62.69. This is asymptotically distributed as Chi-squared with 14 degrees of freedom. Given that the Chi-squared of 14 degrees of freedom at 1% statistically significance level is 29.14, the hypothesis that the model is homoscedastic was rejected. The test for normality was computed as 231.77 with 2 degrees of freedom. Given that the Chi-squared statistic at 2 degrees of freedom is 9.21, the hypothesis that the error term is normally distributed was also rejected at 1% significant level. These test results indicate that the assumptions required for using multinomial probit could not be satisfied. The multinomial logit model was used in the continued analysis. Correlations between independent variables did not exceed 0.4. The Variance Inflation Factor did not exceed 2, which indicates that multicollinearity is not a serious problem (Chatterjee & Price, 1991) in the estimated model.

Assuming that the error term is independently and identically distributed according to the logistic function, the probability that the interviewee will choose alternative L_c can be modelled (Greene, 2003) as:

$$pr(L_c = c) = \frac{\exp(\beta_c)}{\sum_{d=0}^c \exp(\beta_d)} \quad (3)$$

Where $pr(\cdot)$ is the probability that the interviewee prefers c alternative and β_c represents the parameters to be estimated. Normalisation of the alternatives by one of the categories ($\beta_d = 0$) yields the multinomial logit model as:

$$pr(L_c = c) = \frac{\exp(\beta_c)}{1 + \sum_{d=1}^c \exp(\beta_d)} \quad (4)$$

The valuation function for the probability of choosing exhibit alternative c , i.e., the interviewee's willingness to choose an exhibit alternative (WTC_c), could be written as:

$$\begin{aligned}
WTC_{is} = & \beta_0 + \beta_1 INCO + \beta_2 DIST + \beta_3 TIME + \beta_4 FEE + \beta_5 EDUC \\
& + \beta_6 AGE + \beta_7 GEND + \beta_8 PICNIC + \beta_9 BIRD + \beta_{10} GROU + \beta_{11} GRILL \\
& + \beta_{12} WALK + \beta_{13} ANIM + \varepsilon
\end{aligned} \quad (5)$$

Where β is a vector of parameters to be estimated, INCO is household disposable income, DIST is distance from home to the PNP, TIME is length of time spent at PNP, FEE is the expected annual entrance fee, EDUC is educational level, AGE is age of the interviewee, GEND is gender of the interviewee, PICNIC is picnic area, BIRD is bird aviary, GROU is children's playground, GRILL is grilling and partying, WALK is wandering in nature, ANIM is animal exhibits, and ε is the error term.

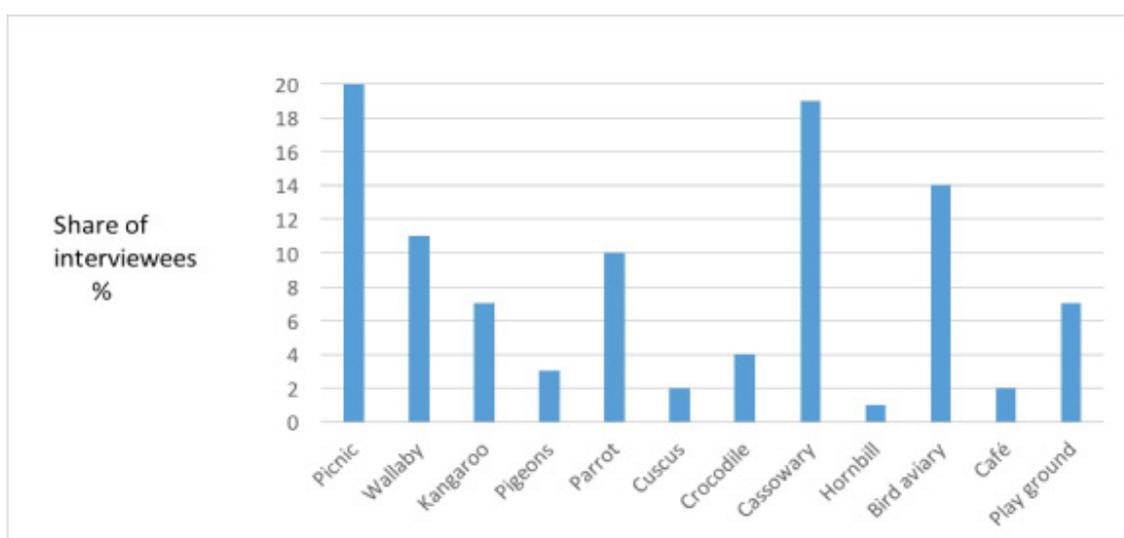
The multinomial logit regression model was estimated using the LIMDEP NLOGIT version 4.01 econometric software (Econometric Software Inc., 2007) and factors influencing the interviewee's preferences for exhibit alternatives were analysed.

Results

Of the 295 interviewees, 99 percent (n = 291) answered all questions relevant to this study. All 291 interviewees reported that they would support the introduction of new exhibits to the PNP. However, of the 291 interviewees, 94 percent (n = 273) would support the new exhibits if it would cost them money. Of these interviewees, 22 percent preferred the STATUS QUO, 13 percent for REPTILE, 14 percent for PARADISE and 51 percent preferred REPTILE + PARADISE.

Approximately 20 percent of the interviewees visited the picnic area followed by the cassowary/rainforest area (19%), and bird aviary (14%), whereas only a few (1%) visited the Papuan hornbill (see Figure 2).

Figure 2: Areas most visited by interviewees



On average, the interviewees had visited the PNP 4.47 times in the last 12 months, which corresponds to an aggregate of 1,300 visits each year. The interviewees would pay an average of PGK2.5 (USD0.76) above the current entrance fee per visit, which corresponds to PGK11 (USD3.4) each year. The aggregate annual value of the improvement for all the interviewees is PGK3,252 (USD985.4). As the PNP attracts 120,000 visits each year, assume that all the visitors are full-fee paying adults (i.e., not students), the aggregate value for the improvement is PGK1,320,000 (USD400,000). This is the perceived value of the improvement in recreation experience to the visitors each year.

In terms of the value of improvement in relation to nature areas, parrot aviary had the highest (PGK23 or USD7) and Papuan hornbill area had the lowest (Table 1). The interviewees spent the longest time in Nature's Café and the shortest time in the crowned pigeons' area.

Table 1: Areas visited in relation to value of improvement and time spent there

Recreation area	Value (PGK)	Time in hours
Picnic area	17.41	3.41
Wallaby walk	17.02	2.94
Tree kangaroo trail	8.72	3.31
Crowned pigeons	6.18	2.78
Parrot aviary	23.10	3.34
Cuscus	12.60	3.33
Crocodile	14.41	3.00

Recreation area	Value (PGK)	Time in hours
Rainforest/cassowary	12.83	3.03
Papuan hornbill	3.50	3.00
Walk-through bird aviary	12.35	2.87
Children's playground	15.98	2.79
Nature's Café	12.83	3.67

Value is improvement value per year. USD = PGK3.3

The interviewees had an average annual disposable income of PGK53,763 (USD16,291) and spent an average of three hours at the PNP during each visit (Table 2). More women visited the PNP than men and 50 percent of the interviewees had university education.

Table 2: Description of variables used in statistical analysis

Variable	Description	Mean	SD
WTC _{is}	Willingness to choose improvement strategies.	2.01	1.17
	PNP without improvement (STATUS QUO).	0.22	
	PNP remains the same plus snake exhibits (REPTILE).	0.13	
	PNP remains the same plus bird of paradise exhibits (PARADISE).	0.14	
	PNP remains the same plus snake and bird of paradise exhibits (REPTILE + PARADISE).	0.51	
INCO	Interviewee's household disposable income in Papua New Guinea Kina (PGK) per year.	53,763	82,995
DIST	Distance in kilometres from interviewee's home to PNP.	4.53	4.98
TIME	Time in hours that the interviewee spent in PNP.	3.13	1.69
FEE	The amount of money (PGK) that the interviewee would pay for recreation in PNP per year = Entrance fee per visit multiplied by number of visits per year.	42.19	63.91
EDUC	The interviewee had university education: Yes = 1; No = 0.	0.50	0.50
AGE	The interviewee's age in years.	31.19	10.26
GEND	The gender of the interviewee: Female = 1; Male = 0.	0.55	0.49
PICNIC	The interviewee mostly used picnic area for recreation: Yes = 1; No = 0.	0.21	0.41
BIRD	The interviewee mostly used bird aviary for recreation: Yes = 1; No = 0.	0.14	0.35
GROU	The interviewee mostly used children's playground for recreation: Yes = 1; No = 0.	0.07	0.25
GRILL	The interviewee mostly engaged in grilling and partying: Yes = 1; No = 0.	0.13	0.33
WALK	The interviewee mostly engaged in wandering in nature: Yes = 1; No = 0.	0.51	0.50
ANIM	The interviewee mostly engaged in visiting animal exhibits: Yes = 1; No = 0.	0.13	0.34

USD1 = PGK3.3; PNP is Port Moresby Nature Park.

SD is standard deviation; INCO is household disposable income; DIST is distance from home to PNP; TIME is length of time spent at PNP; FEE is the expected annual entrance fee; EDUC is educational level; AGE is age of the interviewee; GEND is gender of the interviewee; PICNIC is picnic area; BIRD is bird aviary; GROU is children's playground; GRILL is grilling and partying; WALK is wandering in nature; and, ANIM is animal exhibits.

To examine factors that might have influenced preferences for PNP exhibit alternatives, a multinomial logit regression model was estimated (Table 3). The model requires that one of the dependent variables (exhibit alternatives) should be used as a base or control (redundant variable), i.e., 'no-change' alternative, which could be used for comparison with other alternatives. STATUS QUO was used as the redundant variable, because it

was in use during this study. The results of marginal effects (Table 3) revealed that the coefficients associated with children's playground, grilling and partying, visits to animal exhibits, and picnic area were the most important variables for predicting choice of exhibit alternatives.

The results show that the interviewees who had much income, lived further away from PNP, were female, visited the bird aviary, and engaged in wandering in nature during recreation were more likely to choose REPTILE than STATUS QUO. The interviewees who would pay for improved recreation experience and used children's playground for recreation were less likely to choose REPTILE than STATUS QUO. The marginal effects revealed that the use of children's playground and wandering in nature were the most important variables for predicting choice of the REPTILE.

The interviewees who had much income, were female, used the picnic area, engaged in grilling and partying, engaged in wandering in nature and visited the animal exhibits were more likely to choose PARADISE than STATUS QUO. The interviewees who lived further from PNP, spent longer time in PNP and would pay for improved recreation experience were less likely to choose PARADISE than STATUS QUO. In terms of marginal effects, grilling and partying and gender were the most important variables for predicting choice of PARADISE.

Table 3: Multinomial logit regression results for factors influencing choice of exhibit alternatives

Variable	REPTILE			PARADISE			REPTILE + PARADISE		
	Coeff.	SE	ME	Coeff.	SE	ME	Coeff.	SE	ME
Constant	-2.45	0.59	-	-0.12	0.63	-	-2.15	0.47	-
INCO	0.00	0.00	0.00****	0.00	0.00	0.00****	0.00	0.00	0.00****
DIST	0.05	0.02	0.01**	-0.06	0.03	-0.01*	-0.10	0.02	-0.02****
TIME	-0.09	0.07	-0.01	-0.34	0.09	-0.02****	-0.24	0.06	-0.02****
FEE	-0.00	0.00	-0.00**	-0.01	0.00	-0.00****	0.00	0.00	0.00***
EDUC	0.14	0.27	0.06	-0.38	0.28	-0.00	0.47	0.20	0.10**
AGE	0.01	0.02	0.00	-0.01	0.02	-0.01	0.06	0.01	0.01****
GEND	0.93	0.26	0.03****	1.25	0.28	0.08****	0.66	0.20	0.02***
PICNIC	0.44	0.43	0.09	0.99	0.41	0.02**	1.81	0.33	0.25****
BIRD	1.09	0.44	0.01**	0.52	0.49	0.07	1.54	0.39	0.19****
GROU	-2.39	0.64	-0.23****	-0.74	0.53	-0.02	-0.27	0.39	-0.15
GRILL	0.09	0.54	0.11	1.79	0.45	0.12****	1.33	0.35	0.12****
WALK	1.99	0.31	0.06****	1.61	0.32	0.02****	1.98	0.24	0.14****
ANIM	0.03	0.52	0.15	1.47	0.46	0.03***	1.97	0.34	0.27****

LogL -983.86

RLogL -1287.24

Chi-squared statistic 606.76

McFadden Pseudo R² 0.24

Number of observations 273

*, **, *** and **** represent 10%, 5%, 1% and 0.1% levels of statistical significance, respectively. SE is standard error and ME is marginal effect. INCO is household disposable income; DIST is distance from home to PNP; TIME is length of time spent at PNP; FEE is the expected annual entrance fee; EDUC is educational level; AGE is age of the interviewee; GEND is gender of the interviewee; PICNIC is picnic area; BIRD is bird aviary; GROU is children's playground; GRILL is grilling and partying; WALK is wandering in nature; and, ANIM is animal exhibits.

The interviewees who had the much income, would pay for improved recreation experience, had university education, were female, visited the bird aviary, engaged in grilling and partying, engaged in wandering in nature, visited animal exhibits, visited picnic area and were older were more likely to choose REPTILE + PARADISE

than STATUS QUO. However, the interviewees that lived further from the PNP and spent longer time in the PNP during recreation were less likely to choose REPTILE + PARADISE. In terms of marginal effects, visit to animal exhibits and use of picnic area were the most important variables for predicting the choice of REPTILE + PARADISE.

The coefficients associated with time spent in PNP, education, age, picnic area, animal exhibits, and grilling and partying were not statistically significant for choice of REPTILE. The coefficients associated with education, age, bird aviary, and children's playground were not statistically significant for choice of PARADISE. The coefficient associated with children's playground was not statistically significant for the REPTILE + PARADISE alternative.

Potential strategies for improving PNP as perceived by visitors

The visitors perceived the following as potential strategies for improving PNP:

- It is necessary to install appropriate rails on the sides of footbridges at PNP to reduce the possibility of visitors, especially children, falling off the bridge.
- It is common to see some adults kissing or caressing in the presence of toddlers and teenagers in the PNP. This is not in line with PNG culture and tradition. It is important to develop an area for use by adults who wish to show love to their loved ones.
- It is necessary to construct more toilets because the current toilets appear not to be enough for visitors. The toilets should be cleaned more frequently and toilet paper replaced when it is exhausted.
- The PNP is an area where people, including older people, visit for relaxation. However, there are only a few benches where they could rest. The children's playground contains only a few benches, which makes it difficult for parents to relax while their children play. There is a need to increase the number of benches for visitors.
- Water is one of the most important nature types. However, water features and facilities are lacking in the PNP. It is important to introduce a water body or water fountains in various areas of the PNP.
- To improve visitor's satisfaction, it is important to train more PNP staff on customer care services.
- Most visitors would like to buy items from the Nature's Café. However, food and drinks are expensive there. Prices of items at the café should be reviewed so that more visitors can afford these items.
- It is important to expand the children's playground because it is becoming crowded. More facilities, such as swings and water fountains, should be introduced there.

Discussion

The findings of this study show that visitors to an urban nature park would pay for an improved recreation experience. However, their preferences for the improved recreation is strongly linked to the type of nature area they most often visit. The findings are supported by published papers on the subject. For example, in a Mexican study of willingness to pay (WTP) for the protection of corals, Casey et al. (2010) found that tourists would pay additional fees for the protection of corals. In a Swedish study of WTP for outdoor recreation, Ezebilo et al. (2015) found that residents of Sweden would pay not to lose recreation and that their WTP is linked to nature type visited. They found that mountainous areas had the highest WTP and forest dominated areas had the lowest. However, mountainous areas were not considered in this study and forest dominated areas were not associated with the lowest amount that visitors would pay for improved recreation. A possible reason for the difference between the findings of Ezebilo et al. (2015) and findings of the current study is that Sweden has the policy of “Right to Public Access” to forests for recreation, which makes access to forests for recreation free. Further, urban forests are promoted in Sweden, which contributes to making forests more accessible to urban residents for recreation. In PNG, there is no free access to forests for recreation. In addition, PNP contains the only remaining rainforest in Port Moresby, which might have provided visitors incentive to be willing to contribute more for an improved recreation experience there. This suggests the need for land use planners and urban development managers to consider promoting urban forests in Port Moresby. It is important for policy-makers to see the establishment of urban forests as an investment rather than cost. This is because forests provide services that contribute to health and welfare of people (Peschardt et al., 2016).

The findings from this study also conform to Ezebilo (2013) Nigerian study of preferences for different incentives to promote local support for conservation, which found that locals preferred an incentive that provided them the greatest benefit. In this study, more than 50 percent of the visitors preferred REPTILE + PARADISE. This could be because it contains the highest number of exhibits, which has the potential to provide the greatest recreation experience to visitors. This suggests that, if urban park managers intend to sustain and attract more visitors to PNP, it is important to introduce and promote new exhibits in a timely manner.

The concerns raised by visitors about potential strategies for improving recreation experience in PNP reaffirm the importance of involving key stakeholders in decision-making activities. The findings from this study underscore the need to consider the tradition and customs of locals when designing a recreation site. For example, it is rare to see people kissing and caressing in public places in PNG because it is not in line with the tradition of the people. This suggests that urban park managers in PNG should develop a strategy for creating awareness of the traditions of locals. These findings are in line with those of Moore et al. (2010) Canadian study of associations among urban park users, which found that adults are not likely to use the park where young people use for recreation.

People may not use a site for recreation if they consider their safety might be compromised (Won et al., 2008). The finding from this study is in line with this premise: visitors to PNP were concerned for their safety in relation to use of the park's footbridges. This conforms to Tarrant and Smith (2002): their United States study of customer satisfaction for outdoor recreation found that hazard is one of the most important attributes considered by customers when choosing a site for recreation. To encourage revisits to urban parks such as the PNP, it is necessary for the manager to address the safety concerns raised by visitors.

The findings from this study show that the picnic area was mostly used for recreation by visitors. Several activities such as jogging and grilling could be carried out at the area, which could be a reason for attracting many visitors there. It is made up of evergreen lawn and few shrubs, which makes it easier for people to move around there. This indicates that ease of moving around and availability of facilities is linked to willingness to use an area for recreation. The findings conform to those of Won et al. (2008) who found that the condition of amenities in a recreation area is strongly linked to visitation. If the aim of urban park managers is to improve picnic area to meet visitors' needs, it is necessary to carry out maintenance work on the facility used for grilling and more benches provided.

According to the economic theory associated with payment for environmental resources, people who have much income would pay more for improvement of the resources (Champ et al., 2003). The findings from this study conform to the theory. For example, an increase in income is associated with preference for REPTILE, PARADISE, and REPTILE + PARADISE alternatives. This is in line with findings from published papers on the subject such as Hakim (2011), who found in an Indonesian study of economic valuation of nature-based tourism that people who have much money would pay more for tourism than people who have little money. In a Swiss study of recreational benefits of urban forests, Bernath and Roschewitz (2008) found that an increase in income of visitors result in an increase in WTP for urban recreational forests. In a Nigerian study of WTP for the maintenance recreation amenity, Ezebilo (2014) found that locals who have much income would pay more. Visitors to PNP are heterogeneous in terms of income (i.e., low, middle, and high-income groups), and urban park planners should consider this heterogeneity in the design of a recreation improvement strategy. If low-income households find it difficult to afford the entrance fee to PNP, recreation in the park might become a luxury good. This has the potential of restricting low-income households from using the park.

Findings from this study show that the interviewees who lived furthest distance from PNP preferred STATUS QUO compared to PARADISE and REPTILE + PARADISE. This is in line with findings of del Saz Salazar and Menendez (2007) Spanish study of WTP for recreation in an urban park, who found that people who live furthest from the park would pay the least for recreation. In a French study of preferences for urban green spaces, Tu et al. (2016) found that an increase in distance to urban forests reduced visitor's WTP for its use for recreation. In a Chinese study of WTP for river network protection, Shang et al. (2012) found that an increase in distance of home from the river results in a decrease in WTP. In a Swedish study of preferences for distance to recreational forests, Hörnsten and Fredman (2000) found that residents would pay to avoid an increase in distance to forests. This highlights the need for urban park managers to consider that visitors to the park come from different segments of the city and the associated transport costs in determining the new entrance fee associated with improvement in recreation amenities.

It was found that interviewees who spent a long time at PNP preferred STATUS QUO than PARADISE and REPTILE + PARADISE. This finding conforms to that of Rulleau et al. (2012) who found, in a French study of recreational value of urban forests, that residents of Gironde who spent a long time in the forest had lower WTP than those that spent a short time in the forest. However, the finding is not in line with those of Mwebaze and Bennett (2012), who found in an Australian study of value of botanic collections that people who spent a long time at the recreation site had a higher WTP than people that spent a short time at the site. A possible reason for the difference is that Mwebaze and Bennett (2012) used the contingent valuation method, whereas several alternatives and attributes using the CE approach was applied in the current study. This indicates that findings from an economic valuation are strongly linked to the method that was applied in the valuation exercise.

According to the theory of demand, as the price of a good increases the quantity that would be bought decreases (Varian, 2010). The findings from this study are in line with this theory. The interviewees preferred STATUS QUO, which is associated with a lower entrance fee, than REPTILE and PARADISE. The findings conform to those of Asafu-Adjaye and Tapsuwan (2008) who found, in a study of scuba diving benefits in Thailand, that visitors faced with higher prices were less likely to pay to dive in Mu Ko Similan Marine National Park. In a South Korean study of economic value of a World Heritage site, Kim and Cho (2007) found that an increase in price to access the site resulted in a decrease in WTP. This highlights the need for urban park managers to consider the potential reaction of visitors to changes in price when fixing an entrance fee.

Education provides people with opportunities to access information about the benefits of recreation on wellbeing. In this way, people who have higher levels of education might pay more for an improved recreation experience. Findings from this study are in line with this assertion, and conform to those of published papers such as Abuamoud et al. (2014), who found in a Jordanian study of willingness to visit cultural heritage site that, people who had more education were more willing to visit and pay for recreation. In a Chilean study of residents' WTP for a cultural heritage site, Bâez-Montenegro et al. (2012) found that residents who had higher levels of education would pay more to visit the site. This highlights the need for visitors to be well informed about the

recreation strategy being proposed at an urban park before it is introduced. This can be achieved by developing an awareness program that informs visitors about recreation improvement alternatives.

The interviewees who were older were more likely to choose REPTILE + PARADISE than STATUS QUO. This is in line with Ransom and Mangi (2010), who found in a Kenyan study of recreational benefits of coral reefs that people who were older had a higher WTP. A possible reason is that people who are older are more likely to have experienced the importance of nature to human wellbeing and would therefore be more likely appreciate nature conservation than people who do not have as much experience. This highlights the need for urban park managers to consider age distribution of visitors when designing strategies for improving recreation.

Women were more likely to choose REPTILE, PARADISE, and SNAKE + PARADISE than STATUS QUO. This could be because women like to experience new things and appreciate nature more than men do. This finding is in line with Ezebilo (2014) who found in a Nigerian study of WTP for maintenance of amenities for recreation that men would pay less for the amenities compared to women. However, the finding is not in line with Kamri (2013), who found in a study of WTP for conservation of natural resources in the Gunung Gading National Park that men had a higher WTP than women. Men and women might have different recreational needs, which should be reflected in the design of recreation strategies.

The findings from this study revealed that choice of recreation improvement alternatives depended on the area of the urban park most often visited by the interviewees. This is in line with findings of Ezebilo (2016a), who found in a Swedish study of travel cost to nature areas for recreation that nature types are strongly linked to recreation trips. In this study, it was found that visits to picnic and bird aviary areas result in the choice of REPTILE, PARADISE, and REPTILE + PARADISE, whereas visits to the children's playground results in the choice of STATUS QUO. As nature types visited by visitors often reflect their interests, urban park managers should consider this in developing an improved recreation strategy.

Recreation activities that visitors often engaged in have the potential to determine their preferences for exhibits. In this study, it was found that visitors who engaged in grilling, wandering in nature, and visits to animal exhibits were more likely to choose REPTILE, PARADISE, and REPTILE + PARADISE, respectively than STATUS QUO. This is in line with findings of Ovaskainen et al. (2012), who found in a Finnish study of recreational demand that nature types visited is linked to demand for recreation. This highlights the need for urban park managers to develop a strategy that promotes different recreation activities that visitors often engage in. This has the potential to attract new visitors, as well as returning visitors, to the park.

Conclusions

This study provides an insight into preferences for improved recreation experience at an urban nature park using the PNP as a case study. The findings revealed that most visitors would pay for an improved recreation experience. Preferences for improved recreation are strongly linked to areas visited, recreation activities, entrance fee, income, distance to, and time spent in nature park. If the intention is to improve visitors' recreation experience in the PNP, the introduction of the exhibits associated with REPTILE + PARADISE should be considered. This has the potential to provide the greatest recreation experience to visitors. In determining a new entrance fee that could be used to off-set cost associated with facilities required to improve recreation experience, it is necessary to consider the impact of any fee increase on frequency of visits. If the fee is not affordable to potential visitors, the number and frequency of visits might diminish and lead to a reduction in revenue generated from recreation.

PNP managers should address all concerns raised by visitors, such as improving safety by installing appropriate rails on the sides of footbridges. Visitors should be well informed about the need to respect the tradition of locals. The findings could assist land use planners to allocate resources among uses of land, and will assist nature-based recreation managers to create strategies for improving recreation experience by considering visitors' preferences for recreation.

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