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Preferences and willingness to pay for recreation in Port Moresby Nature Park

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Background information

- ❑ According to the National Capital District Commission (NCDC) open Space Policy 2016, the provision of recreational areas in the National Capital District (NCD) has been a long-standing issue.
- ❑ The continued development in the NCD has increased the need for recreation areas.
- ❑ Section 37 of the Physical Planning Regulation 2007, stipulates that 4 hectares of open space is required per 1000 anticipated residents.

Continuation of background info

- ❑ Funding and investment in recreation areas by the NCDC has diminished resulting in the deterioration in quality of the areas and the conversion of some of the areas to other uses.
- ❑ To maintain the quality of some recreation areas in NCD, visitors to the areas pay an entrance fee.

Several factors have been identified in the literature that influence trips to recreation sites. These include:

- ❑ Recreation activities and nature types (Cho et al., 2014; Ezebilo, 2016).
- ❑ Travel time, travel cost and time spent at recreation site (Fezzi et al., 2014; Lundevaller, 2009; Ezebilo, et al., 2015).

Continuation

- ❑ Income, education and gender (Ovaskainen et al., 2012; Chen and Jim, 2010; Nuva and Shamsuden, 2009).
- ❑ Distance of home from recreation site and age (Shang et al., 2012; Oladele, 2008).
- Knowledge of demand side associated with nature-based recreation is necessary for planning and management of a recreation site.
- However, provision of amenities for recreation has often focused on the supply side and less effort has been made to understand the demand side.

Objectives of the study

This study focuses on the demand side of nature-based recreation using the Port Moresby Nature Park (PNP) as a case. ***The objectives are:***

- ❑ To examine PNP visitors' preferences for various strategies for improving recreation experience and factors influencing it using the choice experiment method.

- ❑ To estimate how much visitors would pay as entrance fee to the PNP for improved recreation experience using the contingent valuation method.

Study site

- ❑ PNP contains the remaining rainforest area in Port Moresby.
- ❑ PNP is home for endemic species of plants and animals such as: orchids, palms, gingers, tree kangaroos, cassowaries, bird of paradise, parrots, wallabies, hornbills.
- ❑ PNP was initially established in 1971 as the National Capital Botanical Gardens (NCBG) by the NCDC.
- ❑ The NCBG management was dissolved in 2011 and PNP Trust was given mandate of managing the NCBG in 2012 and the name was changed to PNP.
- ❑ The PNP provides opportunities for recreation, research and education. The park has an average of 120,000 visitors annually.

Data collection

- ❑ Data collected by means of face-to-face interviews involving visitors to PNP.
 - ❑ Questions for interview were generated from discussions with academics, manager of PNP and previous publications related to the subject, as well as a pre-test.
 - ❑ Questions include socio-economics such as:
 - income, education, age, gender, distance of home to PNP, number of visits to PNP in the last 12 months and time spent during visit.
- Other questions include:
- Areas of the PNP visited and recreation activities engaged in.
 - PNP improvement strategy that interviewees preferred most.

The Choice question

- The PNP improvement strategy was to improve visitors recreation experience by increasing exhibits there as:
 - A. No change in the PNP + entrance fee for adult remains K7.
 - B. Current exhibits in PNP + exhibits of different types of snakes + entrance fee to PNP raised to K8.
 - C. Current exhibits in PNP + new bird of paradise walk through + entrance fee to PNP raised to K9.
 - D. Current exhibits in PNP + exhibits of different types of snakes + new bird of paradise walk through + entrance fee to PNP raised to K10.

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- ❑ Main survey was conducted in September 2017 with the help of 10 students from UPNG that were trained for two days, as well as 2 NRI Research Project Officers and a Cadet.
 - ❑ The research assistants were distributed to different recreation areas.
 - ❑ Visitors were selected randomly and interviewed.
 - ❑ Survey took place on Saturdays and Sundays for 2 weeks.
 - ❑ A total of 295 visitors were interviewed.

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- ❑ **Factors influencing the choice of PNP improvement strategy was examined using the multinomial logit regression model as:**

$$WTC_{is} = \beta_0 + \beta_1 INCOME + \beta_2 DIST + \beta_3 TIME + \beta_4 PRICE + \beta_5 EDU + \beta_6 AGE + \beta_7 GENDER + \beta_8 PICNIC_A + \beta_9 BIRD_A + \beta_{10} GRILL_P + \beta_{11} WALK_N + \beta_{12} ANIMAL + \varepsilon$$

- ❑ Annual mean willingness to pay entrance fee was calculated by multiplying number of visits to PNP per year by the price of the chosen strategy to get the total price of visits per year. The total price was divided by the number of interviewees.

Results

- ❑ 295 people were interviewed.
- ❑ 291 (98.6%) interviewees answered all questions relevant for this analysis.
- ❑ 22% of the interviewees prefer STATUS QUO strategy (A).
- ❑ 13% prefer SNAKE strategy (B)
- ❑ 14% prefer PARADISE strategy (C)
- ❑ 51% prefer SNAKE + PARADISE strategy (D)

Fig 1 Areas mostly visited by interviewees

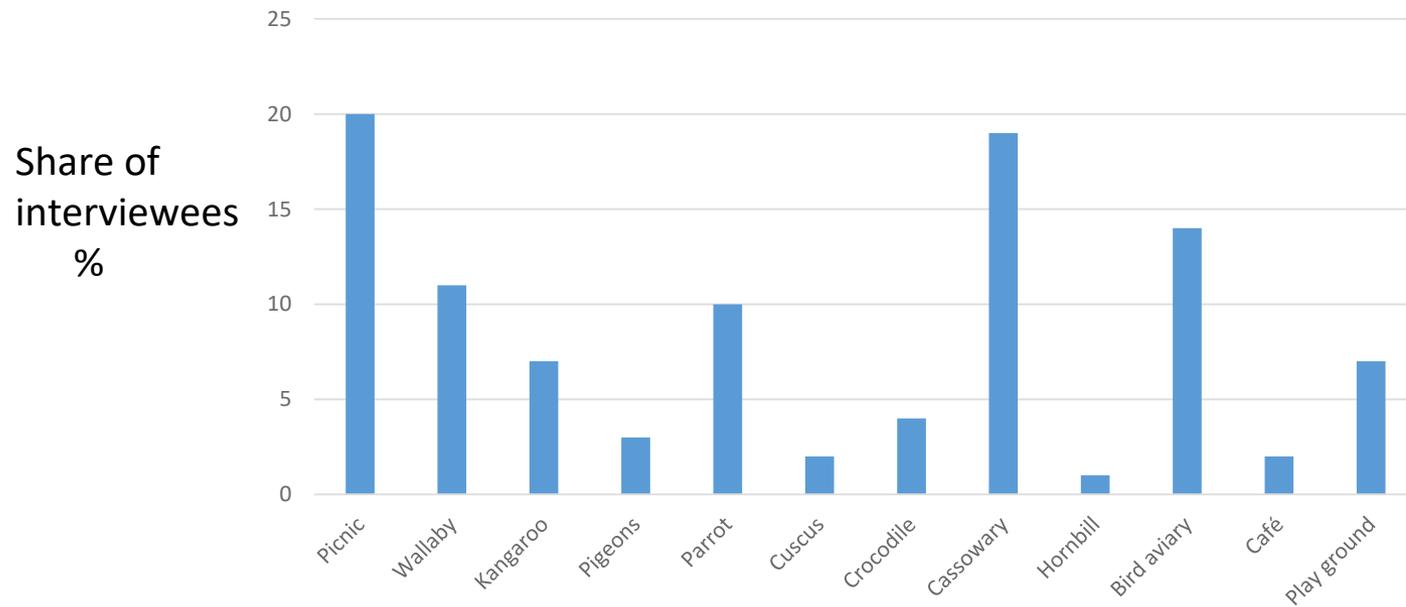
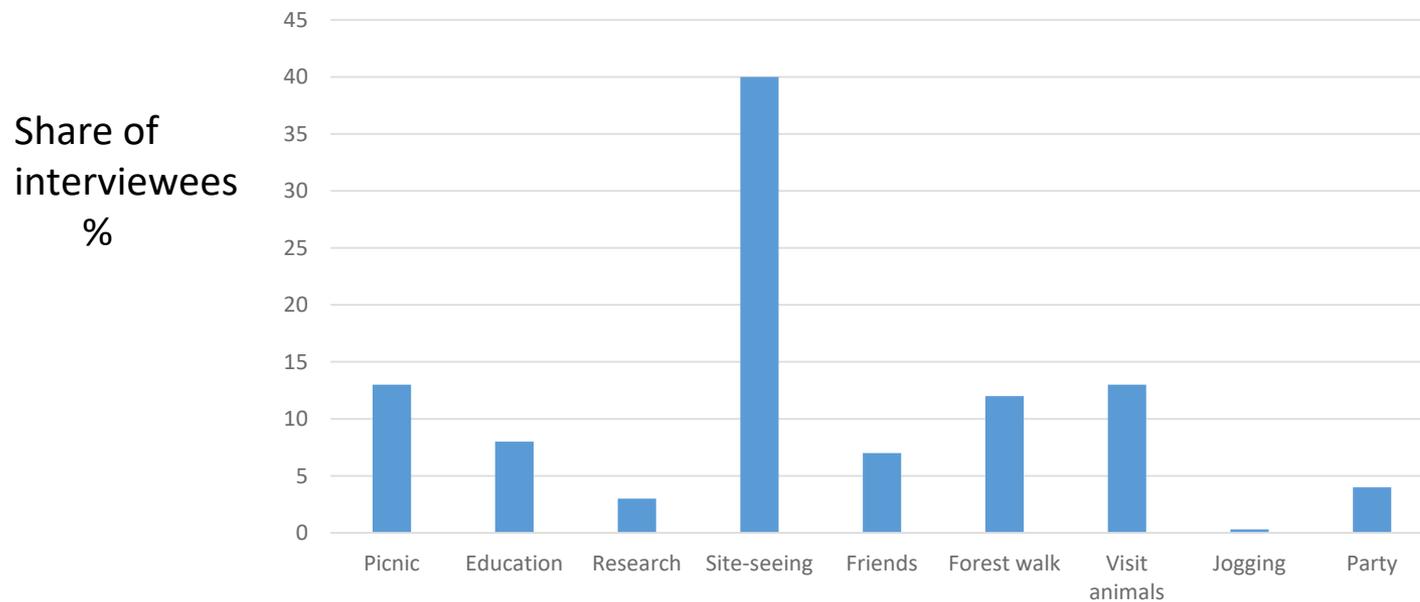


Fig 2 Recreation activities most engaged in by interviewees



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- ❑ No. of visits per year: 1,300 visits;
 - Average: 5 visits.

 - ❑ Interviewees would pay K9.5 (AUD3.8) per visit to PNP.
 - They would pay K42 (AUD16.8) per year.

 - ❑ Aggregate for all interviewees: K12,390 (AUD4,959) per year

 - ❑ Assume that all visitors are adults, non-student and not visiting as a group. The aggregate WTP per year for improved recreation experience for 120,000 visitors is:

K5.04 million (AUD2.02 million)..

Table 1 Description of variables used in statistical analysis

Variable	Description	Mean
WTC _{is}	Willingness to choose improvement strategy:	2.01
	0 = Nature park without improvement (STATUS QUO)	0.22
	1 = Nature park remains the same plus snake exhibits (SNAKE)	0.13
	2 = Nature park remains the same plus bird of paradise exhibits (PARADISE)	0.14
	3 = Nature park remains the same plus snake and bird of paradise exhibits (SNAKE + PARADISE)	0.51
INCOME	Interviewee's household disposable income in Kina per year	53,763
DIST	Distance in kilometres from interviewee's home to PNP	4.53
PRICE	Money that interviewee would pay to enter PNP per year	42.19

Continuation of Table 1

EDU	The interviewee had university education: Yes = 1, No = 0	0.50
AGE	The interviewee's age in years	31.19
GENDER	The gender of the interviewee: Female = 1 Male = 0	0.55
PICNIC_A	The interviewee mostly use picnic area for recreation: Yes = 1 No = 0	0.21
BIRD_A	The interviewee mostly use bird aviary for recreation: Yes = 1 No = 0	0.14
GROUND	The interviewee mostly use children's playground: Yes=1 No=0	0.07

Continuation of Table 1

GRILL_P	The interviewee mostly engage in grilling and partying:	Yes = 1	0.13
		No = 0	
WALK_N	The interviewee mostly engage in wandering in nature:	Yes = 1	0.51
		No = 0	
ANIMAL	The interviewee mostly engage in visiting animal exhibits:	Yes = 1	0.13
		No = 0	

A\$1 = K 2.5

Table 2 Multinomial logit results for factors influencing Preference for PNP improvement strategy

SNAKE in relation to STATUS QUO

Variable	Coeff	SE	ME
Constant	-2.45	0.59	-
INCOME	0.00	0.00	0.00****
DIST	0.05	0.02	0.01**
TIME	0.09	0.07	0.01
PRICE	-0.00	0.00	-0.00**
EDU	0.14	0.27	0.06
AGE	0.01	0.02	0.00
GENDER	0.93	0.26	0.03****

, **, *, **** represent 0.1, 0.05, 0.01 and 0.001 statistical significance level*

Continuation of Table 2

PICNIC_A	0.44	0.43	0.09
BIRD_A	1.09	0.44	0.01**
GROUND	-2.39	0.64	-0.23****
GRILL_P	0.09	0.54	0.11
WALK_N	1.99	0.31	0.06****
ANIMAL	0.03	0.52	0.15
LogL		-983.86	
RLogL		-1287.24	
Chi-squared statistic		606.76	
McFadden Pseudo R ²		0.24	
No. of observations		273	

What can we say about the findings?

- ❑ Interviewees who had much money, resides further away from PNP, female, mostly visits bird aviary, engaged in wandering in nature were more likely to choose SNAKE Strategy.
- ❑ Interviewees who were willing to pay more for recreation, mostly used children's playground were less likely to choose SNAKE Strategy.
- ❑ In terms of marginal effects (ME), use of children's playground and wandering in nature were the most important variables for predicting choice of SNAKE Strategy.

PARADISE Strategy in relation to STATUS QUO

Variable	Coeff	SE	ME
Constant	-0.12	0.63	-
INCOME	0.00	0.00	0.00****
DIST	-0.06	0.03	-0.01*
TIME	-0.34	0.09	-0.02****
PRICE	-0.01	0.00	-0.00****
EDU	-0.38	0.28	-0.00
AGE	-0.01	0.02	-0.01
GENDER	1.25	0.28	0.08****
PICNIC_A	0.99	0.41	0.02**
BIRD_A	0.52	0.49	0.07

Continuation of PARADISE Strategy

GROUND	-0.74	0.53	-0.02
GRILL_P	1.79	0.45	0.12****
WALK_N	1.61	0.32	0.02****
ANIMAL	1.47	0.46	0.03***

What can we say about findings?

- ❑ Interviewees who had much money, female, mostly use picnic area, engaged in grilling and partying, engaged in wandering in nature and mostly visit animal exhibits were more likely to choose PARADISE Strategy.
- ❑ Interviewees who live further from PNP, spent longer time in PNP and were willing to pay more for recreation were less likely to choose PARADISE.
- ❑ In terms of marginal effects, grilling and partying and gender were the most important variables predicting the choice of PARADISE.

SNAKE + PARADISE Strategy in relation to STATUS QUO

Variable	Coeff	SE	ME
Constant	-2.15	0.47	-
INCOME	0.00	0.00	0.00****
DIST	-0.10	0.02	-0.02****
TIME	-0.24	0.06	-0.02****
PRICE	0.00	0.00	0.00***
EDU	0.47	0.20	0.10**
AGE	0.06	0.01	0.01****
GENDER	0.66	0.20	0.02***
PICNIC_A	1.81	0.33	0.25****
BIRD_A	1.54	0.39	0.19****

Continuation of SNAKE + PARADISE

GROUND	-0.27	0.39	-0.15
GRILL_P	1.33	0.35	0.12****
WALK_N	1.98	0.24	0.14****
ANIMAL	1.97	0.34	0.27****

What can we say about the findings?

- ❑ The interviewees who had much money, were willing to pay more for recreation, had university education, female, mostly visits animal exhibits, visits picnic area and had many years of age were more likely to choose SNAKE + PARADISE.
- ❑ Interviewees who live further away from PNP and stay longer time in PNP during recreation were less likely to choose SNAKE + PARADISE
- ❑ In terms of marginal effects, animal exhibits and picnic area were the most important variables for predicting the choice of SNAKE + PARADISE Strategy.

Conclusions

- ❑ Visitors to PNP would pay for an improvement in exhibits found in the park.
- ❑ Visitors prefer improvement that will result in provision of largest number of exhibits.
- ❑ Visitor's preferences for exhibits are strongly linked to the type of recreation area visited and recreational activities.
- ❑ The findings will assist nature-based recreation managers in planning and making informed decisions by considering visitor's preferences and demand for recreation.
- ❑ The findings contribute to the tenets of the NCDC Open Space Policy.

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Thanks for your attention

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