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# Estimating the Economic Recreational Value of Paracas National Reserve in Ica Peru: A Fair Fee Implementation Approach

Jaqueline Garcia-Yi

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**ESTIMATING THE ECONOMIC RECREATIONAL VALUE  
OF PARACAS NATIONAL RESERVE IN ICA, PERU:  
A FAIR FEE IMPLEMENTATION APPROACH**

By

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A THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

(in Ecology and Environmental Sciences)

The Graduate School

The University of Maine

December, 2004

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Thesis Advisor: Dr. Deirdre Mageean

An Abstract of the Thesis Presented  
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December, 2004

Paracas National Reserve (PNR) is one of the fifty-seven protected areas that belong to the National System of Protected Areas (SINANPE) of Peru. Located in Ica Department, on the Pacific coast of Peru, it is the only coastal-marine ecosystem currently protected by the Peruvian government. PNR has been internationally recognized, principally as a wintering area for bird migrations. It has been designated as a Regional Shorebird Reserve by the Western Hemisphere Shorebird Reserve Network (1991), a Ramsar site by the Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1992), and a Particular Sensitive Sea Area by the International Marine Organization (2003).

In addition, its scenic beauty and the ninety-five archaeological sites attributed to the Nazca culture located inside its boundaries are main attractions of the protected area (GTZ, 1999, and INRENA, 2003a). Currently, PNR is the third most visited

protected area of Peru and receives around one hundred thousand national and foreign tourists per year (INRENA, 2002).

The agency in charge of the management of SINANPE (INRENA) charges a flat fee to enter the protected areas that have local administration and defined tourism zones. This flat fee has been established without economic evaluations and does not take into consideration the specific protected areas visitors' willingness and ability to pay. Some exceptions to the flat fee have been implemented in selected protected areas, but not in PNR. The revenues collected are directed to a central fund, which distributes the money back to the protected area local administration.

The goal interest of this research is to provide an evaluation of possible fee policies for PNR by addressing a series of questions namely: does the current fee correspond to the tourists' willingness to pay (WTP) at PNR's present conditions? If INRENA decides to improve the infrastructure and services inside PNR through changes in the fee, what are the protected area's attributes that enhance the tourists' recreation experience, or the attributes that the users appreciate the most?, and what would be the visitors' marginal WTP for each of them? In addition, what would be the potential impact of changing the fee in the different income groups? Finally, what would be the fair fees for PNR, considering the potential revenues and the effects of the fees in the different types of tourists who visit the protected area (national local tourists, national non local tourists, foreign tourists, wildlife recreation and beach recreation tourists)?

In this thesis, contingent behavior (CB) and conjoint analysis (CA) models were used to answer the policy-related questions indicated above. The data for the models were collected from a survey conducted on site and off site PNR in August

2003. The results indicate that the mean WTP were S/.10.8 (wildlife recreation), 9.5 (national local), 8.6 (national non local), 7.9 (beach recreation), and 23.9 (foreign tourists). The mean marginal willingness to pay for potential infrastructure and service improvements in PNR are between S/.6.2 and 10.0 for availability of interpretative signs at landscape and wildlife point of interests, S/. 5.6 and 17.5 for implementation of monitoring activities of endangered endemic species, and S/.5.1 and 13.6 for availability of operative and well-maintained rustic toilets (the former amounts correspond to national tourists and the latter to foreign tourists).

The analysis of the impact of fees on different income groups for national tourists, divided according to Peruvian socio-economic classes, suggests that PNR is an inferior good for lower income non local tourists. Local tourists do not present different preferences in WTP according to socio-economic classes. Thus, in the case of an increase in the fee, there is not statistical evidence that lower income national tourists would be affected by a larger proportion than higher income national tourists.

The hypothetical demand curves constructed from the probability of rejection curves for national tourists are highly elastic; therefore, increases in fee could cause elevated drops in the number of national tourists who visit the protected area. This is not the case for foreign tourists. Fee option evaluations that included profit maximization with and without price differentiation suggest that fair fee policies need to consider the implementation of differential fees for national and foreign tourists and the establishment of fees that would not significantly reduce the number of future tourists to the protected area.

## ACKNOWLEDGEMENTS

I would like thank to my advisor, Deirdre Mageean, who was always involved in all the steps of this research, and to Kevin Boyle who orientated this research and spent considerable amount of his time explaining many environmental economics concepts. Mario Teisl also spent a lot of his time in finding logical explanations for a student without an economist's background and provided important guidance to this research.

I am also thankful to Manuel Cabrera and Miriam Garcia from INRENA who helped me by providing useful information for this research, and Sandra Martinez from Pluspetrol S.A. who provided me with the financial resources to pay for my air tickets and the expenses of the interviewers who participated in this research in Peru.

Rafael Tamashiro, Pepe Untama, former chief and coordinator of PNR, respectively, and all the personnel of PNR facilitated this research by answering my questions about the current situation inside PNR in person while I was in Peru and even by telephone while I was in U.S. That really helped me in designing the survey and in filling some informational gaps.

Sonia Wallenberg and Marcela de Harth, from Fulbright in U.S. and Peru, respectively, gave me administrative guidance in the issues related with the scholarship program.

My mother, father and sister provided me emotional support while I was doing my master's studies. I am going home soon to meet my handsome first nephew!

Finally, I appreciate the time spent in filling out the survey by all the national and foreign tourists who participated in this research. Thank you again for your collaboration!



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# **CHAPTER 1**

## **INTRODUCTION**

This thesis focuses on the evaluation of fee policies for Paracas National Reserve (PNR), a protected area located in Ica Department, on the Pacific coast of Peru. PNR contains the only coastal-marine ecosystems currently protected by the Peruvian government. This protected area has been designed by international conventions as a Regional Shorebird Reserve (Western Hemisphere Shorebird Reserve Network), a Ramsar Site (Ramsar Convention), and a Particularly Sensitive Sea Area (International Marine Organization).

At present, the agency in charge of the protected areas in Peru (INRENA) charges a flat fee for the entrance to any of the protected areas that has local administration, including PNR. This flat fee has been established without detailed evaluations and consists of S/.5 (US\$1.45). For many protected areas, this fee could be below the amount the visitors are willing and able to pay, particularly in the case of foreign tourists.

In recent years, mostly during 2002 and 2003, some exceptions to the flat fee policy, based on specific economic studies done by consultants paid by non profit organizations or international donations, have been implemented in selected protected areas. All of these studies have been conducted in protected areas that predominantly receive foreign tourists. Thus, no comprehensive analyses of the impact of fees on different income groups have been performed, and due to political reasons, no differential fees for national and foreign tourists have been implemented. In addition, there is a lack of information about the attributes of the protected areas that the users

appreciate the most, and the visitors' marginal willingness to pay for potential improvements in those attributes, using the fee as payment vehicle.

INRENA is willing to establish fair fees in protected areas such as PNR that receive a high number of national tourists, where the number of national tourists is around two thirds of the total number of tourists. However, the agency personnel have been reluctant due to the fear of potential impact in lower income tourists and tourism industry economic losses due to the probable decline in the number of tourists if the fees were increased. A fair increase in fee that considers the potential effects in the different income groups, the effects in tourism activities, and the use of part of the money in the users' most desired improvements in infrastructure and services could help to collect additional revenues with reduced social and economical impact.

In this thesis fee policies for PNR were evaluated using the information obtained from analyses of the willingness to pay at PNR's current conditions and marginal willingness to pay values for potential improvements inside the protected area. These analyses were done by tourists' origin (national local, national non local, and foreign tourists), primary reason for visiting PNR (wildlife recreation and beach recreation tourists), and income groups (lower and higher income groups). Additionally, the potential impact of a change in fee on the number of future tourists who will visit the protected area were assessed, and the profits of the different fee policies were calculated. It is expected that the results of this research could contribute to INRENA to determine the best fee options that could be implemented in PNR.

## **1.1 Objectives of the Thesis**

The goal interest of this research is to provide an evaluation of potential fair fee policies for PNR by addressing a series of questions namely: does the current fee correspond to the tourists' willingness to pay (WTP) at PNR's present conditions? If INRENA decides to improve the infrastructure and services inside PNR, what are the protected area's attributes that enhance the tourists' recreation experience, or the attributes that the users appreciate the most?, and what would be the visitors' marginal WTP for each of them, if the fee is used as the payment vehicle? In addition, what would be the potential impact of changing the fee in the different income groups? Finally, what would be the fair fees for PNR, considering the potential revenues and the effects of the fees in the different types of tourists who visit the protected area (national local tourists, national non local tourists, foreign tourists, wildlife recreation and beach recreation tourists)?

Thus, the objectives of this research are:

- a) Estimate the visitors' willingness to pay for the recreational use of PNR at its current situation.
- b) Estimate the users' marginal willingness to pay for infrastructure and service improvements in PNR.
- c) Identify differences in willingness to pay and marginal willingness to pay according to visitors' origin (national local, national non local, and foreign tourists), primary reason for visiting PNR (wildlife recreation and beach recreation), and income groups (lower and higher income tourists).
- d) Calculate the potential decrease in number of the different type of tourists at different fee levels, according to the tourists' probability of rejection curves.

- e) Estimate the expected revenues and profits of different fee policies for PNR.
- f) Provide policy recommendations related to fair fee policies for PNR.

## **1.2 General Methods**

The objectives of this thesis were accomplished by designing and administering a face-to-face survey to national and foreign tourists older than 18 years old who visited PNR from August 2002 to August 2003. The survey was implemented on site and off site PNR from August 8 to 26, 2003. A complete description of the survey design and implementation can be found in Chapter 3.

The willingness to pay (WTP) and marginal WTP values were elicited by two valuation questions: a contingent behavior (CB) question and a conjoint analysis (CA) question, respectively. It is important to mention that in this thesis, the term CB is used instead of contingent valuation (CV). CB is a particular type of the CV method. CB refers to the use of hypothetical questions about activities to obtain data for use in behavioral models (Freeman, 2003). For example, in this research, the tourists were asked whether or not they would change their visitation behavior in the hypothetical situation of a fee increase at PNR.

The CB question was a dichotomous choice question of which the objective was to determine the WTP for entrance fee if there were no change in PNR's conditions. The respondents received no information about the current status of PNR, so their WTP reflects the value they place on PNR according to the perception they had of the protected area during their last visit.

In contrast, in the CA question the respondents were provided with a general description of the current status of PNR and information about the proposed level

changes of selected attributes. The response format was choose one. The selected attributes were defined as percentage of roads repaired and permanently maintained, availability of interpretative signs at wildlife and landscape points of interest, evaluation of endemic endangered species, availability of operative and well-maintained toilets at recreational beaches, and the payment vehicle was PNR's entrance fee. The objective of this question was to estimate entrance fees options if PNR attributes levels were improved.

Independent logit and multinomial logit models according to the tourists' origin (national local, national non local and foreign tourists) and primary reason for visiting PNR (wildlife recreation and beach recreation) were analyzed for the CB and CA questions, respectively. Local and non local tourists were subgroups of the national tourists group, where local tourists' designation corresponded to national tourists who came from Ica Department and non local tourists' designation to national tourists who came from the remaining departments.

The reason for evaluating different models according to tourists' origin was that national local, national non local and foreign tourists have a different income range, and thus they could have different WTP preferences. In addition, national local and national non local models independent calculations could allow assessing the effects of potential reduced fee policies for the former type of tourists. In contrast, the reason for running independent models according to tourists' primary reason for visiting PNR was based on the hypothesis that different motivations for visiting PNR could lead to different WTP preferences. Empirical evidence shows that the two groups behave differently while having recreation inside PNR. Moreover, the evaluation according to the primary reason for visiting could allow assessing the

possibility of establishing seasonal fee policies because the majority of beach recreation tourists visits the protected area during the summer months.

An analysis of the differential impact of fees on national tourists' lower and higher income groups was performed by calculating and comparing independent logit models for those groups. This was done to determine if a higher proportion of lower income tourists could be excluded from having recreation in PNR, in comparison from higher income tourists, if the fee were changed. The evaluation included assessments for national local, national non local, wildlife recreation and beach recreation higher and lower income tourists.

To determine the proportion of tourists who would still visit the protected area if the fee were increased, the percentage of rejection curves (or probability to say "no" to the CB question) at different fee levels were calculated using the estimates of the independent logit models obtained by tourists' origin, primary reason for visiting PNR, and income groups. Likelihood ratio specification tests (LRST) were performed to determine if the imposed restrictions (tourists' origin, primary reason for visiting PNR and income groups) were true.

### **1.3 Study Area - Paracas National Reserve**

Paracas National Reserve (PNR) is located on the Pacific coast, 220 km south of the capital of Peru, Lima, in the Department of Ica (Ramsar Convention, 1992). Its total extent is 335,000 Ha. Thirty five percent is comprised of land and islands and 65 percent of sea water (INRENA, 2003). It is one of the fifty seven protected areas of Peru and the only protected coastal-marine system in that country (INRENA, 2004a). PNR is one of the most biologically diverse marine sites of South America (GTZ,



1999). Its floristic and faunistic features include autochthonous Peruvian coastal desert plant communities and a diverse fauna with numerous threatened and endangered species, including endemic ones<sup>1</sup>. PNR is of further international relevance as a wintering area for migratory bird species (GTZ, 1999).

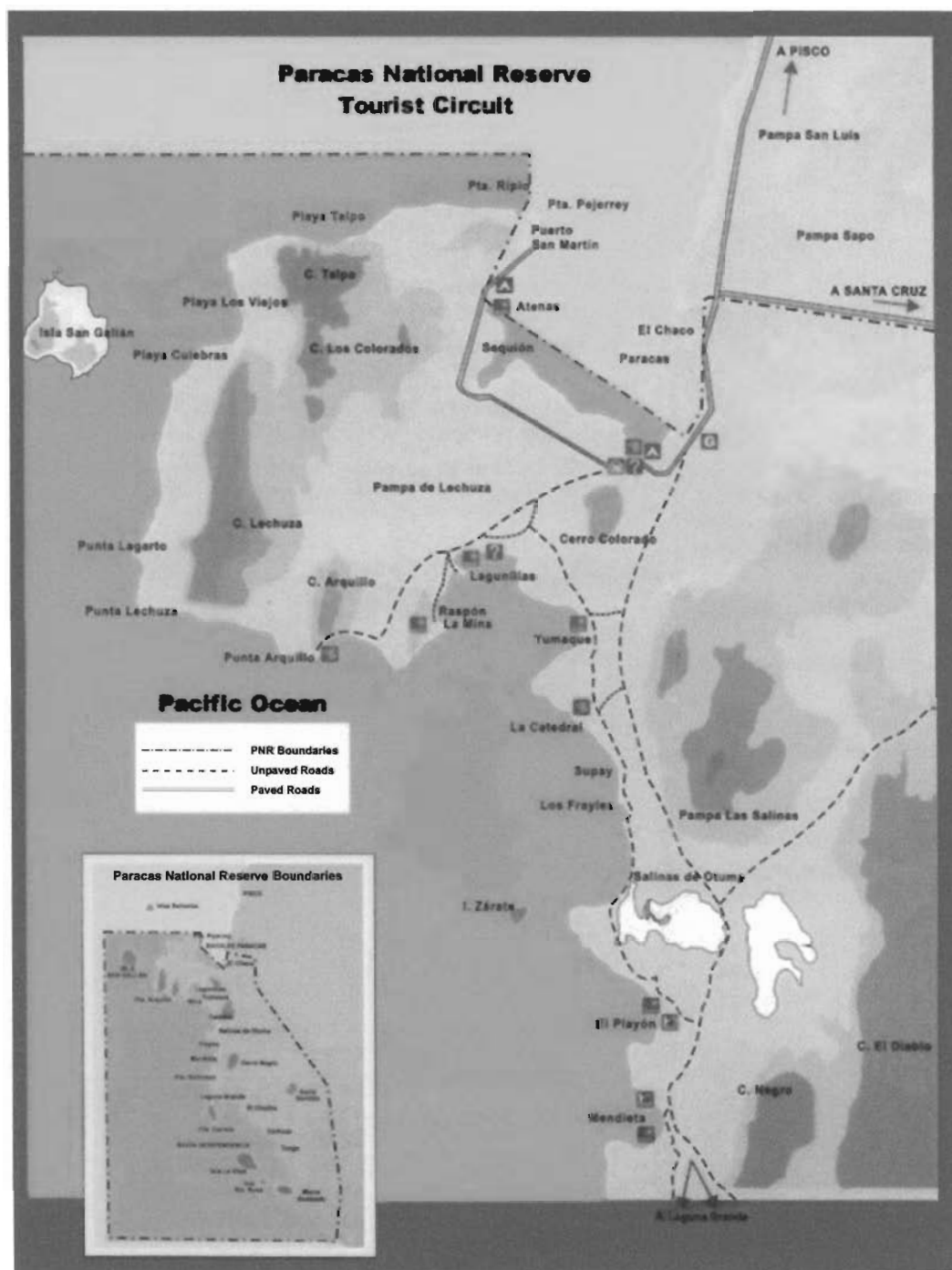
The international recognition of PNR includes its designation as a Regional Shorebird Reserve by the Western Hemisphere Shorebird Reserve Network (WHSRN) in 1991 (WHSRN, 1994), a Ramsar site under the Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat in 1992 (Ramsar Convention, 1992), and as a Particularly Sensitive Sea Area by the International Maritime Organization (IMO) in 2003 (IMO, 2004).

In addition to its special biodiversity, the scenic beauty of the PNR and its archaeological sites of worldwide renown, attributed to pre-colonial Nazca culture, are the main attractions for the growing tourism in the area (GTZ, 1999). Ninety five archaeological sites have been identified inside PNR boundaries (INRENA, 2003). Currently, PNR is the third most visited protected area of Peru with more than one hundred thousand national and foreign visitors per year (INRENA, 2004b). A reference map of PNR is presented in Figure 1.1.

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<sup>1</sup> The endemic endangered species are the Humbolt penguin (*Spheniscus humboldti*), and the Peruvian potoyunco (*Pelecanoides garnotii*). The list of endangered species includes: the sea cat or marine otter (*Lontra felina*), fine-hair sea lion (*Archthocephalus australis*) and the humpback whale (*Megaptera novaeangliae*). There are many other species in vulnerable situation inside the protected area (INRENA, 2003a).

**Figure 1.1: Reference Map of Paracas National Reserve**



**Source: Paracas National Reserve Information Brochure**

#### 1.4 Protected Area Entrance Fee System in Peru

The protected area entrance fees are established by the National Institute of Natural Resources of Peru (INRENA), the governmental institution in charge of SINANPE. Traditionally, the entrance fees have been implemented without specific economic evaluations and calculated as a percentage of the Peruvian Imposed Tax Unit (*Unidad Impositiva Tributaria –UIT*, personal conversation with Miriam Garcia, Director of Protected Areas Planning - INRENA). As a result, the current entrance fee system does not take into account the recreational benefits obtained by the users and the amount that tourists are willing and able to pay. The current established entrance fee is a flat fee. Table 1.1 shows the general adult flat entrance fees in Peru.

**Table 1.1: General Entrance Adult Fees in Protected Areas in Peru**

Concept	Fee Amount
One-Day Fee	S/.5 (\$1.45)
Three-Days Fee	S/.10 (\$2.89)

US\$ 1 is equivalent to S/.3.45

Dollar amounts in parenthesis

Source: INRENA (2004b)

In the last years, exceptions to the flat fees have been implemented in six protected areas. The recent changes as approved during 2002 and 2003 are illustrated in Table 1.2. The decision for the exceptions was based on independent studies of WTP in each protected area. These studies were conducted by private consultants.

**Table 1.2: Exceptions to Adult Entrance Fees in Protected Areas in Peru**

Concept	Area	Fee Amount
<b>Huascarán National Park</b>		
Seven-Days Fee	All Areas	S/.65 (\$18.84)
<b>Manu National Park*</b>		
Five-Days Fee	Manu River Basin	S/.150 (\$43.47)
	Pusharo Cultural Historic Area	S/.50 (\$14.49)
Two-Days Fee	Acjanaco Area	S/. 10 (\$2.89)
<b>Pacaya Samiria National Reserve*</b>		
Eight-Days Fee	All Areas	S/.100 (\$28.98)
<b>Tambopata National Reserve and Bahuaja Sonene National Park*</b>		
One-Day Fee	From Sandoval Lake to Chuncho Collpa	S/.30 (\$8.69)
Five-Days Fee	From Sandoval Lake to Chuncho Collpa	S/.65 (\$18.84)
	From Chuncho Collpa to Colorado Collpa	S/.100 (\$28.98)
Seven-Days Fee	From Alto Tambopata to Colorado Collpa	S/.150 (\$43.47)
<b>Macchu Picchu Historic Sanctuary</b>		
One-Day Fee	Different routes that could include the areas of: Piscacucho, Cusichaca, Huayllabamba, Wiñaywayna, Qoriwayrachina, Salcantay, Piscacucho, Pacaymayo Bajo, Chacabamba, Paucarcancha Bridge, Machupicchu Citadel**	S/.51.75 (\$15)
	Route Salcantay – Huayllabamba – Qorihuayrachina	S/.25.87 (\$7.5)
	Different routes that could include Chacabamba - Wiñaywayna – Machupicchu Citadel**	S/.8.62 (\$2.5)

Fee in New Soles (S/.). Dollar (US\$) amounts in parenthesis / US\$1 is equivalent to S/.3.45

\* There is a 50% discount for local tourists to Tambopata National Reserve, Bahuaja Sonene National Park, Pacaya National Reserve and Manu National Park valid for one year starting in September 15, 2003.

\*\* Check <http://www.inrena.gob.pe> to obtain specific information about the different proposed routes.

Source: INRENA (2004a)

The fees collected in the protected areas are placed in a central government fund, which distributes the money back to the protected areas' local administration. In 2003, only twelve of the fifty seven protected areas generated revenues that were partially or totally collected by INRENA (INRENA, 2004b). The current policy does not allow any protected area local administration to retain a part or a percentage of their fees revenues. In Table 1.3 the revenue generating protected areas in the year 2003 are identified along with the amount of revenues collected in each site.

**Table 1.3: Fee Revenues in Protected Areas (Year 2003)**

Protected Area	Fee revenues (S/.)
Machupicchu Historic Sanctuary	3,102,385
Huascarán National Park	519,544
Tambopata National Reserve	505,875
Paracas National Reserve	480,761
Manu National Park	469,338
Pacaya Samiria National Reserve	237,295
Tingo Maria National Park	88,225
Lachay National Reserve	86,201
Chacamarca Historic Sanctuary	5,575
Lagunas de Mejía National Sanctuary	4,336
Yanachaga Chemillén National Park	1,628
Junín National Reserve	1,340

Source: INRENA (2004b).

Many protected areas are established by law but do not have local administration or pre-defined tourism zones. In those protected areas, no entrance fees

are currently charged. The 25 protected areas that have some level of tourism control and that counted the number of visitors received in 2002 are listed in Table 1.4.

**Table 1.4: Number of Visitors to Protected Areas (Year 2002)**

<b>Protected Area</b>	<b>TOTAL</b>
Titicaca National Reserve	149,781
Machu Picchu Historic Sanctuary	134,139
Paracas National Reserve	98,461
Huascaran National Park	97,017
Salinas y Aguada Blanca National Reserve	26,825
Lachay National Reserve	23,053
Huayllay National Sanctuary	21,994
Tingo Maria National Park	15,121
Bosque de Pomac Historic Sanctuary	13,005
Pantanos de Villa Reserve Zone	11,722
Tambopata National Reserve	8,661
Chacamarca Historic Sanctuary	6,216
Ampay National Sanctuary	3,648
Manu National Park	2,992
Pacaya Samiria National Reserve	2,912
Lagunas de Mejia National Sanctuary	941
Tumbes Reserve Zone	937
Cerros de Amotape National Park	832
Manglares de Tumbes National Sanctuary	694
Cutervo National Park	389
Yanachage Chemillen National Park	361
Rio Abiseo National Park	72
Tabaconas – Namballe National Sanctuary	62
Bahuaja Sonene National Park	35
Junin National Reserve	22
<b>Total 25 ANP</b>	<b>619,892</b>

Source: INRENA (2003b).

The issue of no collected fees and underestimated fee values is relevant because the costs to manage SINANPE are much higher than the revenues directly obtained from the protected areas. For example, it was calculated that the income that would be needed to manage the protected areas system next year (2005) would be S/. 51,697,495. It is expected that this amount would consist on S/. 19,998,751 (38.7%) from the central government own funds, S/. 3,159,494 (6.1%) from revenues directly collected from the protected areas (almost all from entrance fees), and S/. 28,539,250 (55.2%) from international donations. That would be the result of a significant increase in the transfer of funds from the central government. Traditionally, only 8% of the protected areas system's budget corresponds to central government own funds, 9% to revenues directly collected from the protected areas, and the remaining 83% to international donations (INRENA, 2004c).

## **1.5 Thesis Organization**

A general description of the economic value of protected areas and the conceptual frameworks of CB and CA are presented in the second chapter, along with examples from the literature of entrance fee evaluations in developing countries protected areas. Chapter Three provides information about CB and CA models, the questionnaire design and data collection. Chapter Four contains a description of the socio-economic characteristics of the respondents, tourists' preferences, and response rates. The results of the fee evaluations, the impact of fees on different income groups and financial analysis are presented in Chapter Five. Chapter Six examines the policy implication of the results, the limitations associated with the research, and provides suggestions for future research.

## **CHAPTER 2**

### **LITERATURE REVIEW**

To determine entrance fees, it is critical to understand the general theory of the evaluation of economic values of protected areas. Therefore, this chapter first describes the theoretical background related to the definition and assessment of the economic values of protected areas. Next, the chapter continues with an explanation of the economic valuation techniques for protected areas. Special emphasis was placed in the stated preference methods conceptual frameworks. Finally, the chapter discusses previous studies in entrance fees for protected areas recreation in developing countries, impact of fees on different income groups, and fee policies in developed and developing countries.

#### **2.1 Concept of Economic Value in Protected Areas**

At the 1992 Earth Summit, a new agenda for sustainable development was approved. This agenda included the implementation of the Convention on Biological Diversity which appeals to establish protected areas systems (IUCN, 1998). Protected areas have been designated as one of the principal strategies for biodiversity conservation around the world. According to international agreements, protected areas have been defined as “ areas of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means” (IUCN, 1994).

This traditional approach has implicitly supported the belief that there is an inverse relationship between human actions and the well-being of the natural



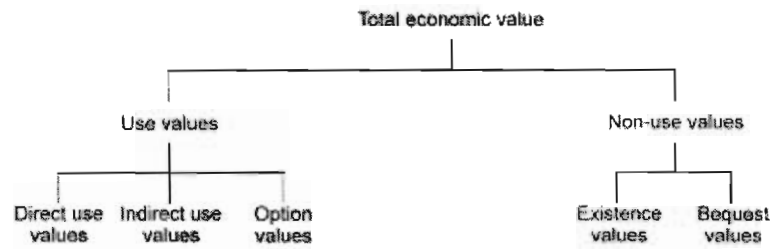
environment. Traditional conservationists see the aesthetic, biological and ecological value of protected areas but do not necessarily see the people who depend on them (Gomez-Pompa and Kaus, 1992). According to Gomez-Pompa and Kaus (1992), traditional conservationists “often fail to see the effects of past and current human actions, to differentiate among types of human use, or to recognize the economic value of sustainable use”.

Recently, governments have recognized protected areas as economic institutions which have a key role in the alleviation of poverty and the maintenance of biodiversity and critical life-support systems (IUCN, 1998). Governments have agreed that protected areas should be managed in support of conservation, sustainable use and local equitable benefit sharing. This new vision for protected areas requires an awareness and understanding of the economic values of protected areas (IUCN, 1998).

The assessment of the economic value of protected areas can be a prominent factor in altering decisions about their management. Such decisions are being faced in both developed and developing countries, where a great number of competing social and economic claims increasingly conflict with the natural resources conservation inside protected areas (Pearce, 1994).

To explain the concept of economic value of a protected area, the components of the total economic value used in environmental and natural resource economics literature are illustrated in Figure 2.1.

**Figure 2.1: Total Economic Value**



Source: IUCN (1998)

The total economic value comprises two components: use and non-use values. A use value is a value arising from an actual use of the protected area. This might be the recreational use of the protected area. Use values are further divided into direct use values, which refer to actual uses for economic activities such as implementation of tours by tourism agencies; indirect use values, which refer to the benefits deriving from the protected area functions, such as protecting the local watershed and so on; and option values, which is a value an individual places on the protected area for the option of using it at a future date (adapted from Pearce, 1994).

Turner (1999) indicates that the non-use category is bounded by the existence value concept, which is still the subject of much debate. Turner (1999) suggests that the existence value may encompass, among others, the following motivations: (i) intragenerational altruism (existence value): resource conservation to ensure availability for others and (ii) intergenerational altruism (bequest value): resource conservation to ensure availability for future generations.

The economic values cited above are anthropocentric and refer to instrumental values. Something has instrumental value if it is valued as a means to some other end or purpose, in this particular case for a human end or purpose (Callicott, 1989; cited in

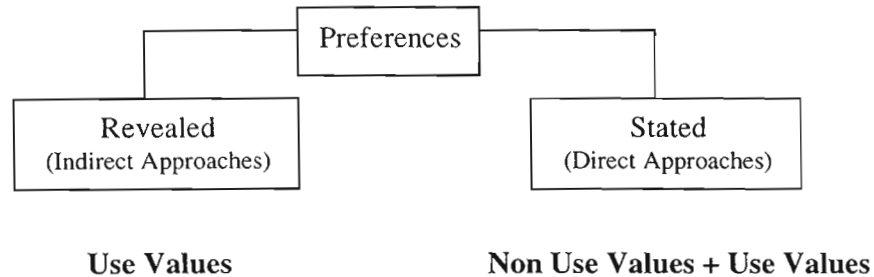
Freeman, 2003a). Therefore, they do not account for possible intrinsic values of natural ecosystems. An intrinsically valuable entity is said to be an 'end-in-itself', not just a 'means' to another's ends (Costanza and Folke, 1997; cited in Freeman, 2003a). There is a continuing debate within the conservation community over whether protected areas and nature in general have values unrelated to humans (IUCN, 1998).

## **2.2 Economic Valuation Techniques for Protected Areas**

In a world of limited financial and natural resources, society must choose the optimal quantity of environmental goods, including protected areas, it wishes to establish and can maintain; and, within this set of goods, it must also select the desired quantity and quality of different environmental and natural resources. Choices logically imply some form of valuation. A number of potential techniques are available to value protected areas in economic terms (Garrod and Willis, 1999).

The principal distinction among the potential methods for valuing protected areas is based on the source of the data (Mitchell and Carson, cited in Freeman, 2003a). The data can come either from observations of people acting in real-world settings where people must live with the consequences of their choices or from people's responses to hypothetical questions of the form, what would you do if...? or, how much would you willing to pay or accept for...?. The first source of data refers to revealed preference methods and the second to stated preference methods. Therefore, the principal difference between revealed preference and stated preference methods is that the latter obtains its data from people's responses to hypothetical questions rather than from observations of real world choices (Freeman, 2003a). Figure 2.2 illustrates the two types of techniques to value environmental goods.

**Figure 2.2: Technique Types to Value Environmental Goods**



The main economic methods specifically used to evaluate recreational fee values in protected areas are described below.

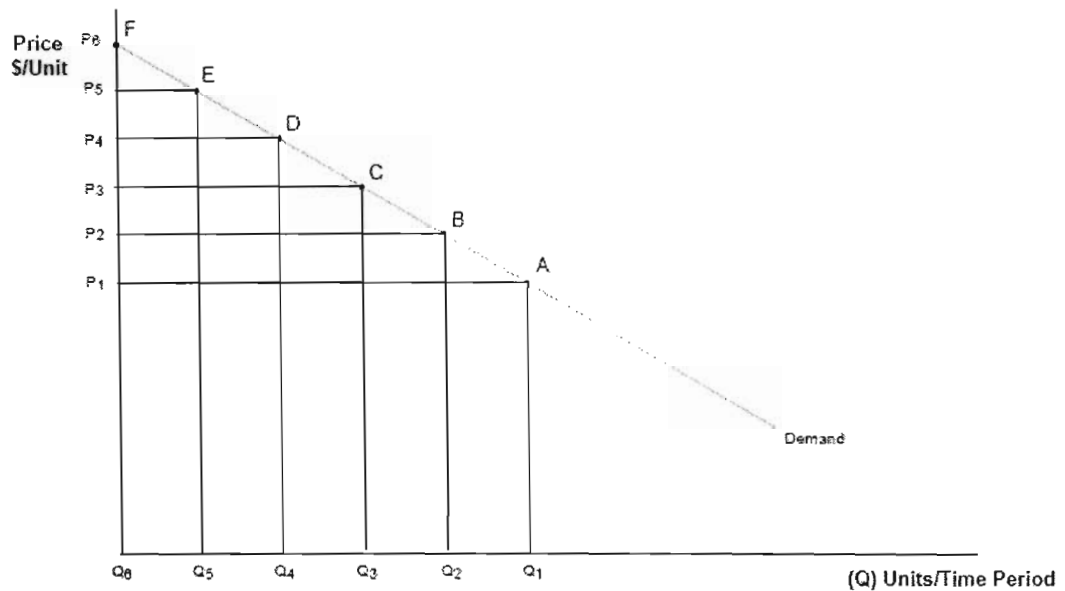
### **2.3 Measuring Protected Areas Recreational Fee Values**

The revealed preference method used to evaluate the recreational fees in protected areas is the travel cost method, which calculates trip expenditure and time costs to estimate the demand curves from which consumer surplus could be derived (Liston-Heyes and Heyes, 1999). TCM works like conventional downward sloping demand functions. The quantity demanded for a person is the number of trips taken to the protected area in a period of time and the price is the cost of the trip for reaching the site. Variation in price is generated by observing people living a different distances from the protected area. Number of trips decline with distance to the site (Parsons, 2003).

Figure 2.3 illustrates a travel cost demand curve. The hypothetical curve shows the relationship between travel cost and the number of visits, holding all other

factors that determine demand constant (for example income, taste and preferences and environmental quality) (Leeworthy and Bowker, 1997).

**Figure 2.3: Travel Cost Demand Curve**



Source: Leeworthy and Bowker (1997).

Among the limitations of the travel cost method and of the revealed preference methods in general is the inability to estimate levels of quality that have not been experienced. The travel cost method faces other particular limitations. For example, the measurement of travel costs and accounting for multiple-days trips to a site and multiple-destination trips remain uncertain issues (Boyle, 2003b). Other problems could arise in the treatment of travel time and the division of out-of pocket expenses amongst members of a group (Liston-Heyes and Heyes, 1999)

Despite the various practical and theoretical problems with TCM it remains a popular technique in recreational benefit evaluation and is frequently used by governmental agencies (Liston-Heyes and Heyes, 1999).

On the other hand, the stated preference methods that could be used to estimate fee values principally include the contingent valuation and the conjoint analysis methods. These methods involve the construction of hypothetical markets to obtain tourists' willingness to pay to access or use a protected area (King, 1995). The importance of stated preference methods is that they filled a substantial void by providing means to estimate non use economic values where revealed preference methods are not applicable (Boyle, 2003a).

In this thesis, the stated preference methods of contingent valuation, in the particular form of contingent behavior as explained in 1.2, and conjoint analysis were the approaches used for the tourists' fees evaluations. The travel cost method was proved not to be a very suitable technique for PNR particular case due to most of the trips to that protected area were multiple-destination trips, especially for foreign tourists for whom the main attraction is the Machu Picchu citadel (Incas' ruins) in Peru. A further explanation of the two stated preference methods used in this research is provided below.

### **2.3.1 Contingent Valuation Method**

The term contingent valuation (CV) is derived from the nature of the method: responses are sought from respondents as to their actions contingent on the occurrence of a particular situation. For example, respondents might be asked their WTP to access a protected area contingent on an increase in the entrance fee. Alternatively,

they might be asked to state the minimum compensation required to maintain their original utility level if the protected area was closed to the public (Garrod and Willis, 1999).

One key characteristic that differentiates various types of CV questions is the response format. The three primary formats are open ended, dichotomous choice and payment card (Boyle, 2003a). In an open-ended format question, no value is specified and individuals are requested to simply state their WTP. In a dichotomous choice format question a single payment amount is presented to the individual who either agrees or disagrees with the quantity. On the other hand, in an iterative bidding format the CV question begins with a dichotomous choice question. Then the individual is asked if he/she would be willing to pay a higher amount if the respondent answers yes or lower amount if the respondent answers no (Garrod and Willis, 1999). It is important to indicate that the iterative bidding format has been dismissed due to an anchoring effect where the final bid was found to be significantly correlated with the starting bid (Boyle, 2003a). The payment card method is an approach in which individuals are presented with a card with different potential contributions to the environmental good being valued from \$0 to some upper payment limit (Garrod and Willis, 1999).

The use of contingent valuation methods has been the subject of considerable criticism due to the methods' reliance on people's statements of preference (their intentions) (Bennett and Blamey, 2001). According to Bennett and Blamey (2001), in CV applications, concerns regarding the validity of the results of this method have mainly been expressed as a result of:

- a. Strategic bias (respondents deliberately misrepresent their preferences to influence the decision making process),
- b. Yea-saying (respondents agree to pay because of a desire to make themselves look good),
- c. Insensitivity to scope variations (respondents' values are invariant to the extend of the environmental and natural resources involved),
- d. Framing (respondents' values do not reflect the availability of substitutes).

Due to the concerns about the applicability of the CV method, specially related to the assessment of non use damage caused by environmental disasters in the early 1990s, the National Oceanic and Atmospheric Administration (NOAA) set up a prestigious “blue ribbon panel” of economists and survey specialists to investigate the CV method. The panel concluded that CV could produce estimates reliable enough to be the starting point for administrative and judicial determinations (Arrow *et al*, 1993). The panel recommended that CV studies should follow general guidelines, although a CV study does not have to meet each of the guidelines fully in order to qualify as a source of reliable information. The main panel's guidelines are indicated below (Arrow *et al*, 1993):

- a. Adequate sample type and size.
- b. Minimize non responses. High non responses would make the survey results unreliable
- c. Face to face interviews are usually preferable.
- d. Pretesting for interviewer effects. It is possible that interviewers contribute to “social desirability” bias.



- e. Every CV study report should make clear the definition of the population sampled, the sampling frame used, the sample size, the overall non-response rate and its components, and item non-responses on all important questions.
- f. Carefully pretesting of a CV questionnaire and photographs when they are used
- g. Conservative survey design. The option that tends to underestimate willingness to pay is preferred.
- h. The willingness to pay format should be used instead of compensation required because the former is the conservative choice.
- i. The valuation question should be posed as a vote on a referendum
- j. Accurate description of the program or policy and reminder of substitute commodities
- k. Adequate time lapse (from the environmental accident)
- l. Time dependent measurement noise should be reduced by averaging across independently drawn samples taken at different points in time
- m. A “no answer” option should be explicitly allowed in addition to the “yes” and “no” vote options.
- n. The survey should include a variety of other questions that help to interpret the responses to the primary valuation questions by cross-tabulations.
- o. Check on understanding and acceptance. The survey should not be so complex that it poses tasks that are beyond the ability or interest level of many participants.

The term contingent behavior (CB) is commonly used instead of CV when assessing price changes at a recreational site, as in the case of this research. The theory underneath both definitions is the same, although specifically, in the CB framework, respondents are asked to make statements about their intended behavior (e.g. visitation to a site) given a change (e.g. price). CV elicits a value statement, while CB specifically refers to the estimation of changes in behavior of the respondent (Grijalva *et al*, 2002).

### 2.3.2 Conjoint Analysis Method

The conjoint analysis (CA) method is a generalization of the contingent valuation method in the sense that rather than asking the respondents to choose between an alternative and the status quo, conjoint analysis asks respondents to choose between two or more alternatives containing different levels of the attributes for the protected area (Adamowicz *et al*, 1998). Figure 2.4 illustrates the structural difference between the two methods.

**Figure 2.4: Comparison of Structure of Contingent Valuation and Conjoint Methods**

Contingent Valuation Method		Vs.	Conjoint Analysis Method		
Scenario A	Scenario B		Scenario A	Scenario B	Scenario C
P <sub>i</sub>	Status Quo		P1	P2	Status Quo
			a1	a2	
			b1	b2	
			c1	c2	

Where:  $a_i$ ,  $b_i$ ,  $c_i$ , and  $P_i$  are the attributes of the protected area

In general, the CA assumes that people base their choices of which recreation sites to visit on the attributes of the sites. When fees are included as an attribute in a choice model it becomes possible to examine the impact of fee changes on peoples' choices (Schroeder and Louviere, 1999). It is assumed that individuals are able and willing to exchange one bundle or combination of attributes levels for another and can do so without affecting their utility. That is, there are numerous bundles of attributes levels that an individual would regard as equivalent to the current combination of attributes levels which they consume (Spash, 2000).

The response formats used in the CA method are rating, rank, and choice (or choose one). The rating format requires individuals to make judgments about the magnitude of utility associated with profiles presented in an attribute-base experiment. It is implicitly assumed that judgments directly transform utility to the rating scale. In the rank format, the respondent has to rank a set of profiles from most preferred to least preferred. Alternatively, the choice problem asks respondents to choose the most preferred alternative from a choice set. Boyle, Holmes, Teisl and Roe (2001) studied the convergent validity of the different response format used in CA. The authors indicate that the concerns related to the cardinality of rating response format and the fact that it does not recover rank and choose one responses would seem to eliminate this type of format. They concluded that choose one may be the desirable response format because it avoids concerns of cardinality and provides the most conservative welfare estimate.

Holmes and Adamowicz (2003) suggest that the advantages of CA in relation to other methods are: (a) the experimental stimuli are under the control of the

researcher allowing the introduction of new attributes that cannot be observed in the market place; (b) greater statistical efficiency and collinearity elimination; (c) a richer description of the preferences is obtained which enhances the application of the method to managerial decision making; and (d) attributes are trade off in the process, so a reduction of one attribute level could be compensated by an increase in other attribute level.

CA is still a comparatively new technique for estimating environmental values, although the method shows some real promise as a way forward (Bennett and Blamey, 2001).

## **2.4 Conceptual Framework of Contingent Behavior and Conjoint Analysis**

### **Methods**

CB and CA are empirical approaches to measuring economic concepts. Therefore, it is useful to appraise the economic theory of what is being measured by these stated preference methods, namely for this research purposes, respondents' willingness to pay for having access to the protected area or marginal willingness to pay (implicit prices) for different improvements at PNR.

Habb and McConnell (2002) suggest that the theoretical background of the value of public goods begins with the preference function for an individual. The individual preference function is defined by  $u(x, q)$ , where  $x = x_1 \dots x_m$  is the vector of private goods and  $q = q_1 \dots q_n$  is the vector of public goods. Individuals choose their  $x$  but their  $q$  is exogenous.

The  $x$  is assumed to be available at prices,  $p_1, \dots, p_m = p$ . The individual maximizes utility subject to income  $y$ . The indirect utility function,  $V(p, q, y)$ , is given by

$$(2.1) \quad V(p, q, y) = \max\{ u(x, q) : p \cdot x \leq y \}$$

The minimum expenditure function  $m(p, q, u)$  is dual to the indirect utility function

$$(2.2) \quad m(p, q, u) = \min\{ p \cdot x : u(x, q) \geq u \}$$

The indirect utility function and the expenditure function provide the theoretical structure for welfare estimation in the stated preference methods. The stated preference methods can be viewed as a way of estimating the change in the expenditure function or the change in the indirect utility function. The concept of WTP or WTA is one way of describing money welfare measure using CB (Habb and McConnell, 2002).

It is important to mention that the difference in the use of WTP or WTA in CB is underlined in the question of property rights. If the respondent does not own the right to an environmental good, then the relevant measure of the utility of the good to the respondent is the maximum he or she would be willing to pay to acquire it. On the other hand, if the respondent owns the right to the environmental good, then the minimum the respondent would be willing to accept as just compensation for its loss is the relevant utility measure, since this is the amount that would restore the

individual to his/her utility level before being deprived of the environmental good. WTP and WTA should be similar in value (Garrod and Willis, 1999). However, it is common to find that for the same environmental good in the same setting, WTA exceeds WTP. There is widespread belief that stated preference methods cannot use the WTA frame due to the fact that they are not incentive-compatible with this type of measure (Haab and McConnell, 2002). In this research, it is consider that a protected area is a publicly provided good, and the respondent does not have the property rights; consequently, WTP is the appropriate type of welfare measurement.

Continuing with the theoretical framework explanation, in the particular case of the CB question of this research, where there is not change in the attributes of PNR,  $q_0$ :

$$(2.3) \quad V_0(p_0, q_0, y) > V_I(p_{max}, q_0, y) \quad \text{if } p_0 < p_{max}$$

If the mean WTP is the change in price that makes the individual indifferent:

$$(2.4) \quad V_0(p_0 + WTP, q_0, y) = V_I(p_{max}, q_0, y)$$

Then:

$$(2.5) \quad WTP = p_{max} - p_0$$

In the CA question, there is a change in the attributes of PNR from  $q_0$  to  $q_1$ . In order to make the individual indifferent then:

$$(2.6) \quad V_0(p_0, q_0, y) = V_1(p_0 + WTP', q_1, y)$$

where  $q_1 > q_0$  and improvements of the levels of the attributes  $q$  are desirable ( $\partial V_i / \partial q_i > 0$ ).

Following Hanemann (1984), the random utility model (RUM) is appropriate to represent the individuals' behavior in relation to changes in fees. In RUM it is assumed that, while the individual knows his/her preferences with certainty, they contain some components that are unobservable to the researcher and are treated by the researcher as random (stochastic). Thus, the individual  $n$  have a utility function of the form:

$$(2.7) \quad V_{in} = U(Z_{in}, S_n) + \varepsilon$$

where,  $Z$  represents the attributes of the option;  $S$  indicates the socio-economic characteristics of the respondent;  $U$  is the deterministic component; and  $\varepsilon$  represents the stochastic component of the equation.

According to Hanley *et al* (1998) and Garrod and Willis (1999), it is assumed that the individual's utility depends on choices made from a set  $C$  of options, where for an individual  $n$ , a given level of utility will be associated with any option  $i$ . Option  $i$  will be chosen over some other option  $j$  if  $V_i > V_j$ .

In the simplified bivariate case for the CB question, the probability that individual  $n$  will choose option  $i$  over other option  $j$  is:

$$(2.8) \quad Prob(i) = Prob\{U_{in} + \varepsilon_{in} > U_{jn} + \varepsilon_{jn}\}$$

So:

$$(2.9) \quad Prob(i) = Prob\{\varepsilon_{jn} - \varepsilon_{in} < U_{in} - U_{jn}\}$$

If the random terms are assumed to be independently, identically distributed with Weibull density functions, then the above probability can be expressed as:

$$(2.10) \quad Prob(i) = \exp [U_{in}] / \exp [U_{jn}]$$

The errors terms are thought to be normally distributed. In the probit model,  $Prob(i)$  is the standard normal cumulative distribution function (c.d.f.), while in the logit model, it is the c.d.f. of a standard logistic variate (Hanemann, 1984). In this research the logit model is used instead of the probit model. According to Greene (2002) “because of the need to evaluate multiple integrals of the normal distribution, the probit model has found rather limited use (in this setting). The logit model, in contrast, has been widely used in many fields...”. The differences between probit and logit models are slight. The distributions typically yield similar ratios of parameter estimates (Habb and McConnell, 2002).

Dividing both numerator and denominator by  $\exp [U_{in}]$ :



$$(2.11) \quad Prob(i) = 1 / \{1 + \exp[ U_{jn} - U_{in} ]\}$$

The utility difference  $[ U_{jn} - U_{in} ]$  can be expressed as a function of the characteristics of each choice and associated price. If we assumed that  $i$  is “yes” response to pay the proposed fee amount, then

$$(2.12) \quad Prob(\text{“yes”}) = 1 / \{1 + \exp[ f(x) ]\}$$

where  $f(x)$  is the functional specification of the utility difference and Prob (“no”) or probability of rejection to the proposed fee amount is:  $1 - Prob(\text{“yes”})$ .

In the case of the CA question, Equation 2.8 is estimated by means of multinomial logit regression, which assumes that choices are consistent with the Independence from Irrelevant Alternatives (IIA) property (for any individual, the ratio of choice probabilities of any two alternatives is unaffected by the systematic utilities of any other alternatives). The model becomes:

$$(2.13) \quad Prob(i) = \exp [U_{in}] / \sum \exp [ U_{jn} ]$$

Hanemann (1984) indicated that one way of welfare measurement in CB is to determine the quantity of money needed when the individual is just at the point of indifference between paying or not paying the fee to enter to the protected area (mean or median WTP). Thus, considering the corresponding deterministic components ( $U_i$ ) of equation 2.4,

$$(2.15) \quad \alpha_0 + \beta p = \alpha_1 + \beta(p + WTP)$$

where  $\alpha_i$  is the slope parameter estimate and  $\beta$  the marginal utility of income, then

$$(2.16) \quad WTP = (\alpha_0 - \alpha_1)/\beta$$

Similarly, the compensating surplus for the CA method is calculated as follows (Bennett and Adamowicz, 2001):

$$(2.17) \quad CS = (1/\beta) [V'_1 - V'_0]$$

where  $\beta$  represents the marginal utility of income, and  $V'_1$  and  $V'_0$  are the utility component without income for the altered and base case, respectively. If  $V'_1$  and  $V'_0$  are linear in attributes and a change in a single attribute is wanted, then the equation 2.17 is reduced to the ratio of the attribute coefficient wanted and the marginal utility of income. This ratio is called “implicit price” or “marginal willingness to pay”.

## 2.5 Previous Studies in Entrance Fees in Protected Areas

Until recently, public land managers, especially in developing countries, have had little experience in establishing fee programs and, in particular, in choosing the appropriate price level for protected areas. Using stated preference methods,

especially CA, to estimate visitors' marginal WTP for recreation experiences offers protected area's managers one helpful means of modeling the tradeoff between higher revenues and greater public satisfaction, particularly when attributes are improved according to tourist's demands (Richer and Christensen, 1999). Table 2.1 provides some examples of the work done by a number of researchers to estimate WTP for entrance fees to protected areas or marginal WTP using entrance fees as payment vehicle in developing countries.

## **2.6 Impact of Fees on Different Income Groups in Protected Areas**

### **Recreation**

One issue that needs to be assessed in designing effective pricing strategies for protected areas is the impact of fees in different income levels of tourists so that appropriate policies can be devised and implemented, and resources can be managed in an optimal manner (Chase et al, 1998).

In that sense, the main arguments against the implementation of user fees focus on the idea that fees may exclude low income users from access to public recreation areas (More and Stevens, 2000). Some people are interested in maintaining access to public lands for everyone who wishes to visit them. Related to this is the idea of public land access as a right that must be able to be afforded for everyone (Richer and Christensen, 1999).

Table 2.1: Examples of Entrance Fee Estimated Values using Stated Preferences Methods in Developing Countries

Mean WTP In US\$	Protected Area/ Environmentally Sensitive Area	Method	Country	Source / Observations
7	Mt. Minju	CV (Dichotomous choice)	South Korea	Lee (1997) / Implementation of entrance fee.
21.60	Poas Volcano	CV (Payment card)	Costa Rica	Chase <i>et al</i> (1998) / Change in daily entrance fee. Only foreign visitors' responses.
21.75	Irazu Volcano			
24.90	Manuel Antonio National Park			
17	Etosha National Park	CV (Open ended)	Namibia	Barnes <i>et al</i> (1999) / Change in daily entrance fee. The open ended question was addressed only to the tourists who considered the current fee too low or too high.
19.93	Montego Bay Park	CV (Payment card)	Jamaica	Dharmaratne <i>et al</i> (2000) / Implementation of entrance fee (first time visitors with an average stay of seven days).
35.54	Proposed Barbados National Park		Barbados	
Rp. 33,346 and Rp. 4,955*	Menjangan Island in Bali Barat National Park	CV (Open ended)	Indonesia	Setiasih (2000) / The first amount is the WTP is money goes directly to the park and the second if it goes to the government.
Rp. 6,042*		CA (Ranking)		Setiasih (2000)/ Marginal WTP for one unit decrease in number of boats
Rp. 1,629*				Setiasih (2000)/ Marginal WTP for 1% increase in reef living cover

\* In Indonesian currency (Rupiah)

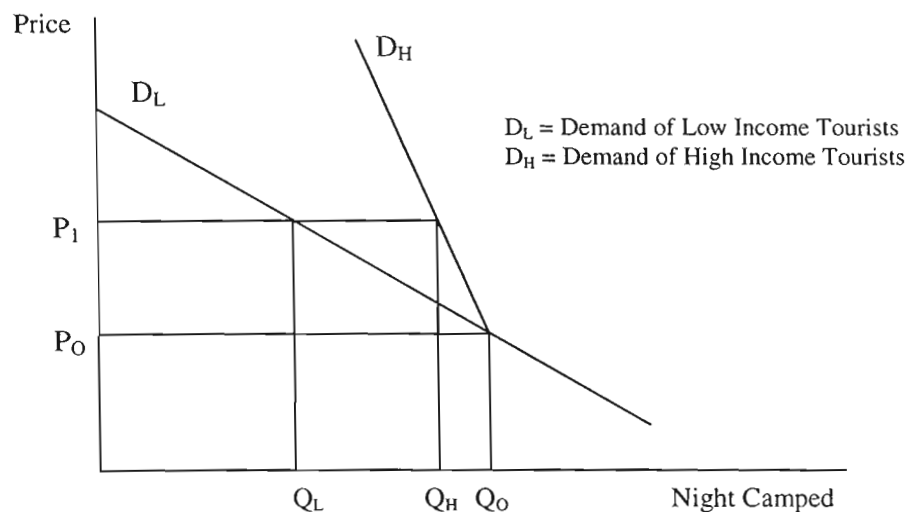
Mean WTP in US\$	Protected Area	Method	Country	Source / Observations
11.7	Komodo National Park	CV (Dichotomous choice - bidding format)	Indonesia	Walpole <i>et al</i> (2001) / Change in entrance fee
3.7	Philippine Anilao	CV (Payment card)	Philippines	Arin and Kramer (2002) / Implementation of entrance fee for visit (commonly one-day trip). The number of respondents varied from 37 to 44 in each site.
5.5	Mactan Island			
3.4	Alona Beach			
14.3	Mt. Soraksan	CV (Dichotomous choice)	South Korea	Lee and Han (2002)
13.1	Hallyo-Haesang			
11.7	Mt. Kayasan			
4.8	Taeon-Haeon			
9.5	Pukhansan			
1.54 and 1.01**	Barba Volcano sector in Braulio Carrillo National Park	CA	Costa Rica	Hearne and Salinas (2002) / Marginal WTP for availability of information.
2.11 and 2.00**				Hearne and Salinas (2002) / Marginal WTP for availability of viewing infrastructure.
3.31 and 0.73**				Hearne and Salinas (2002) / Marginal WTP for restrictions to use the trails.
10 and 1**	Eduardo Avaroa Reserve	CV (Dichotomous choice)	Bolivia	Recommended fees. Drumm (2004)

\*\* The first amount corresponds to the WTP or marginal WTP for foreign tourists and the second for national tourists

On the contrary, those who favor fees argue that exclusionary pricing is not at important issue in resource-based recreation because: low-income people are already priced out by high travel and equipment costs (Clawson and Knetsch, 1996, Vaux, 1975, cited in More and Stevens, 2000), and low-income people have other priorities about how to spend their money and resource-based recreation ranks relatively low among their priorities (Rosenthal, Loomis and Peterson, 1984, cited in More and Stevens, 2000).

Valuation studies should assess not only the probability of success of a fee system but also the possible equity consequences of fee structures. With such information, decision makers could relate the revenues from user fees with possible social conflicts (Adams *et al*, 1989). Figure 2.5 illustrates the potential impact of higher fees by income groups. The increase in the fee from  $P_0$  to  $P_1$  generates a reduction in number of night camped only from  $Q_0$  to  $Q_H$  to high income tourists but a larger reduction from  $Q_0$  to  $Q_L$  for low income tourists.

**Figure 2.5: Impact of Higher Fees by Income Groups**



Source: Reiling *et al*, 1992

The evidence of discriminatory impact due to changes in recreation prices is mixed. More and Stevens (2000) suggest that it is quite clear that fees have a major discriminatory impact on low-income people. These researchers found that a \$5 daily fee for use of public lands in New Hampshire and Vermont would affect about 49% of low income people as compared to 33% of high income people.

In contrast, Teisl, Boyle and Record (1999) found that among residents, the higher the income, the less they participate in fishing in Maine; although for non residents, higher income increases their purchases of certain fishing licenses.

## **2.7 Governmental Recreational Fee Policies in Protected Areas**

A rapidly growing segment of the tourism industry is nature-based tourism (Schroeder and Louviere, 1999). Worldwide, protected areas are often the main attraction and destination for ecotourists (Brown, 2001). Given the growing demand for access to protected areas, it is important that adequate pricing mechanisms be implemented to ensure that recreational opportunities contribute to the conservation goals of the protected areas (Drumm, 2003). Governments are finding it difficult to finance protected areas through public funds. As a result, many protected areas, mainly in developing countries which are home to much of the world's biodiversity, have become "paper parks" (Dharmaratne *et al*, 2000).

Faced with financial limitations, public agencies are looking more and more to user fees to raise the funds needed to maintain and improve sites and facilities (Schroeder and Louviere, 1999). While there is significant potential to finance protected areas through the recovery of their use values from tourists, lack of

understanding of the magnitude of these values has resulted in inefficient revenue generating mechanisms. In instances where user fees have been implemented, the amount is usually determined by guesswork, or what the national or local managers/policymakers consider “fair” (Dharmaratne *et al*, 2000). Entrance fees and other charges for access or use of protected areas commonly are below amounts visitors are willing and able to pay, and below amounts required to finance protected area operating budgets (Laarman and Gregersen, 1996).

Although imposing entrance fees could be a popular measure for the governments trying to raise revenues, entrance fees in protected areas continue to be a controversial issue because they restrict access to public lands to some groups of the general population. The specific benefits that proponents argue in support of charging user fees are: “(1) recover costs and provide revenues to improve protected areas’ quality; (2) allocate recreation resources efficiently, relieving congestion and its effects by shifting use among sites; (3) stimulate the production of recreation opportunities by avoiding unfair competition with the private sector; (4) provide a comprehensive index of relative recreation preferences to facilitate resource allocation across programs; and, (5) promote equity by shifting the burden of paying to those who actually use the resource” (Harris & Driver, 1987; Sanderson, 1995; Manning *et al*., 1984; La Page, 1976; Binkley *et al*, 1987; Crompton & Lamb, 1986; cited in More, 1999). An appropriate fee policy in protected areas is one that allows a balance between the need for fee revenues, the desire to maintain access and four related concerns: fairness, equity, other users’ ability to pay and congestion (Richer and Christensen, 1999).



It is hoped that tourist dollars can contribute to the financial self-sufficiency of protected areas. Because of limited national government funds and donor assistance, the financial self-sufficiency of these protected areas is crucial for their sustainability (Hearne and Salinas, 2002). A general review of user fee policies in both developed and developing countries is presented below because they could provide guidance for potential future fee policies to be implemented in Peru.

### **2.7.1 The U.S. Case**

In U.S. the topic of visitor use fees has occasioned controversies over the past century (Brown, 2001). Broad authority for Federal agencies to collect recreation fees dates back to 1951. Fees collected under the 1951's Public Law 82-137 were deposited into the U.S. Treasury (USDA and U.S. Department of Interior, 2002). In 1996, the U.S. Congress authorized the Fee Demo Program. This program directs governmental agencies to experiment by changing existing or establishing new recreation entrance and use fee. This is a unique opportunity for the bureaus to develop and test a broad variety of cost recovery methods at 100 units per agency. The Fee Demo Program has been extended several times. The current authorization expires in September 30, 2004 (USDA U.S. Department of Interior, 2002).

Unlike previous recreation fee programs, the Fee Demo program allows the agencies to retain all the revenues collected. Eighty percent of the fees are to be used for improvements at the site where the fees were collected and the remaining 20 percent are to be used on an agency-wide basis (USDA U.S. Department of Interior, 2002). This program has led to innovations and increased incentives in fee collection by park managers (Brown, 2001).

### **2.7.2 The Canadian Case**

Traditionally, the Canadian government placed all income from protected areas, including licenses and user fees, into one central consolidated revenue fund. In turn, central government administration distributed the money back to park agencies. There was little incentive for site managers to emphasize revenue generation, and the related issues of service quality and customer satisfaction. However, in 1994 policy changes took place that allow some park agencies to retain all or part of their fee income, with the goal of allowing these agencies to become partially self sufficient in their financial operations (Van Sickle and Eagles, 1998).

According to Van Sickle and Eagles (1998), there was a continuing loss of management capability due to the reliance on insufficient government funding. Therefore, there has been a shift to higher utilization of fees and other tourists' charges. Overall the trend is away from tax-based government allocations, toward revenues from fees and other services provided to protected area visitors.

When setting fees, Parks Canada considers market factors such as supply and demand, the price, the quality and location of substitutes outside the park. The agency conducts visitor surveys and maintain database to encourage better management of park programs and develop new methods of generating revenue (Brown, 2001).

### **2.7.3 The Costa Rican Case**

Costa Rica's national park system is relatively young, established in 1969 with the main focuses being conservation and protection of biological resources rather than for enjoyment and recreation as is the case in the U.S (Brown, 2001). The first fee to

be charged was instituted in 1972, and it was a flat fee valued around US\$0.10 (Lindberg and Aylward, 1999). During the 80's, the flat entrance fee was raised to US\$1.25 for foreign and national tourists. In 1994, the flat entrance fee was increased only for foreign visitors by 1,100 percent, to US\$15 (Chase *et al*, 1998).

However, after much criticism from the tourism industry, the government implemented two concessions. The first concession allowed foreign tourists to purchase an entrance in advance for a reduced fee of US\$10. The second allowed the tourism industry to obtain a reduced price of US\$5 for tourists on package tours (Lindberg and Aylward, 1999). Chase *et al* (1998) indicates that throughout Costa Rica, a local black market for these discounted tickets developed and the entrance tickets were sold by private business for prices anywhere between US\$5 to 10.

In 1995, the fee system was further revised and included differential pricing across protected areas. However, in 1996, a US\$6 flat entrance fee for foreign visitors was applied to all protected areas (Lindberg and Aylward, 1999). The current fee structure is thought to be insufficient by some economists. The park system is funded through governmental funds and through financial support from the Costa Rican Tourism Institute (Brown, 2001).

## **2.8 Summary**

Entrance fees could help to raise the needed revenues for the operation of protected area local administration, especially in developing countries where most of the protected areas work with minimum personnel and equipment. Many protected area entrance fees are established much below the amounts the tourists are willing and able to pay. CV and CA are two stated preferences techniques that could be used to

evaluate appropriate fee options. The latter, as a generalization of the CV methods, could be helpful to evaluate tourists' marginal WTP for potential changes in selected attributes levels of protected areas.

The implementation of entrance fee in protected areas is still a controversial issue. Those who are against fee establishment focus on the idea that fees may exclude lower income visitors for having recreation in public land. Analyses of the effects of fees on different income groups could help to identify if proposed fee options could have that excluding impact.

### **CHAPTER 3**

#### **CONTINGENT BEHAVIOR AND CONJOINT ANALYSIS MODELS AND DESCRIPTION OF THE SURVEY DESIGN AND IMPLEMENTATION**

The contingent behavior and conjoint analysis models are described at the beginning of this chapter. The data required to reach the goals of this thesis were obtained from a face-to-face survey conducted on-site and off-site PNR in Ica Department, Peru. Thus, this chapter also explains the survey design; how this design facilitates acquiring the information to elicit the tourists' preferences, WTP and implicit prices; and how it attempts to reduce potential bias. Finally, the chapter provides an explanation of the survey's implementation procedures.

#### **3.1 Contingent Behavior and Conjoint Analysis Models**

To address the research questions indicated in section 1.1 of this thesis, first we need to determine the tourists' WTP at PNR's current conditions and marginal WTP for infrastructure and service improvements in PNR. In this thesis, the WTP corresponds to the additional amount of money that the respondent is willing to pay to access to PNR, and the marginal WTP to the individual's willingness to pay for an improvement in one of the attributes of PNR being evaluated: percentage of roads permanently repaired and maintained (roads), availability of interpretative signs at PNR's wildlife and landscape points of interest (information), implementation of monitoring activities of endemic endangered species (evaluation), and availability of operative and well-maintained rustic toilets at recreational beaches (restrooms). The fee is the payment vehicle.

The WTP and marginal WTP are supported by the individual ability of pay or income. National local, national non local and foreign tourists have different income range. Thus, we hypothesized that those three groups have different WTP and marginal WTP preferences. In addition, it is hypothesized that different motivations for visiting PNR (wildlife recreation and beach recreation) could lead to different WTP and marginal WTP preferences.

Then, according to the conceptual framework in section 2.4 of this thesis, the individual  $n$  have an indirect utility function of the form:

$$(3.1) \quad V_{in} = U(Z_{in}, S_n) + \varepsilon$$

where,  $Z$  represents the attributes of the option;  $S$  indicates the socio-economic characteristics of the respondent;  $U$  is the deterministic component; and  $\varepsilon$  represents the stochastic component of the equation.

At the change in price that makes the respondent indifferent, the utility functions that are the basis to calculate the mean WTP and marginal WTP of  $i$  = national local (L), national non local (NL), foreign (F), wildlife recreation (WR) and beach recreation (BR) tourists are:

$$(3.2) \quad V_0(p, q, y_i) = V_1(p + WTP_{i, q^*, y_i})$$

where  $p$  is the current fee amount,  $q$  the attributes of PNR,  $y_i$  is the respondents' income,  $0$  corresponds to the status quo, and  $1$  to the changed scenario.

In the case of this research, if  $q = q^*$ ,  $WTP_i$  is the mean or median willingness to pay. If  $q^* > q$ , where  $\partial V / \partial q_i > 0$ ,  $WTP_i$  is the mean or median marginal willingness to pay of the attribute of concern being evaluated (roads, information, evaluation or restrooms).

The deterministic component of the indirect utility function in the case of the CB question is the following:

$$(3.3) \quad U_i = \alpha_i + \beta_i Price$$

where  $\alpha_i$  is the slope parameter estimate and  $\beta_i$  the marginal utility of income.

In the case of the CA question is the following:

$$(3.4) \quad U_i = \alpha_i Roads + \gamma_i Information + \phi_i Evaluation + \delta_i Restrooms + \beta_i Price$$

Then, the mean WTPs for  $i = L, NL, F, WR, \text{ or } BR$  can be represented as follows:

$$(3.5) \quad WTP_i = (1/\beta_i) [(\alpha_{0i} - \alpha_{1i})]$$

where  $\alpha_i$  is the slope parameter estimate, and  $\beta_i$  represents the marginal utility of income.

The estimates of the marginal WTP are made on a ‘ceteris paribus’ basis – that is, they are estimates of the respondent’s willingness to pay for an increase in the attribute of concern, given that everything else, including the other attributes, are held constant. Then, the mean marginal WTP for roads, information, evaluation, and restrooms for  $i = L, NL, F, WR$  or  $BR$  can be calculated as follows:

$$(3.6) \quad \text{marginal WTP (roads)}_i = (1/\beta_i) [(\alpha_{0i} - \alpha_{1i})]$$

$$(3.7) \quad \text{marginal WTP (information)}_i = (1/\beta_i) [(\gamma_{0i} - \gamma_{1i})]$$

$$(3.8) \quad \text{marginal WTP (evaluation)}_i = (1/\beta_i) [(\phi_{0i} - \phi_{1i})]$$

$$(3.9) \quad \text{marginal WTP (restrooms)}_i = (1/\beta_i) [(\delta_{0i} - \delta_{1i})]$$

To evaluate the potential impact of fees in different tourists’ income groups, each of the national tourists subgroups (L, NL, WR and BR) can be sub divided in lower income and higher income type of tourists, according to the Peruvian socio-economic classes. No evaluation of potential impact of fees in foreign tourists’ income groups was done under the assumption that the fee represents a low (or insignificant) percentage of the total cost of their trip to Peru. Thus, the mean WTP according to income groups,  $j = LI, HI$  ( $LI = \text{low income}$  and  $HI = \text{high income}$ ), for  $i = L, NL, WR$  and  $BR$  are the following:

$$(3.10) \quad WTP_{ij} = (1/\beta_{ij}) [(\alpha_{0ij} - \alpha_{1ij})]$$

And the mean marginal WTP are:



$$(3.11) \quad \text{marginal WTP (roads)}_{ij} = (1/\beta_{ij}) [(\alpha_{0ij} - \alpha_{1ij})]$$

$$(3.12) \quad \text{marginal WTP (information)}_{ij} = (1/\beta_{ij}) [(\gamma_{0ij} - \gamma_{1ij})]$$

$$(3.13) \quad \text{marginal WTP (evaluation)}_{ij} = (1/\beta_{ij}) [(\phi_{0ij} - \phi_{1ij})]$$

$$(3.14) \quad \text{marginal WTP (restrooms)}_{ij} = (1/\beta_{ij}) [(\delta_{0ij} - \delta_{1ij})]$$

Likelihood ratio specification tests (LRST) were run in order to evaluate if the imposed restrictions (L, NL, F, WR, BR, and  $L_{LI}$ ,  $L_{HI}$ ,  $NL_{LI}$ ,  $NL_{HI}$ ,  $WR_{LI}$ ,  $WR_{HI}$ ,  $BR_{LI}$ , and  $BR_{HI}$ ) were true. Following Swait and Louviere (1993), we wish to test whether they share the same population parameters, given the specification of the models with and without the restrictions are identical, so the  $H1: \beta_1 = \beta_2$ .

To test whether  $H1$  can be rejected, the likelihood ratio test statistic can be used:

$$(3.15) \quad LRST = -2 [LL_U - (LL_{R1} + LL_{R2})]$$

where  $LL_U$  is the log-likelihood obtained from the pooled data set ( $X_1 + X_2$ ), and  $LL_{R1}$  and  $LL_{R2}$  are the log-likelihoods corresponding to separate estimations on the original data sets  $X_1$  and  $X_2$ .

This test statistic is asymptotically chi-square distributed with  $[K]$  degrees of freedom, where  $K$  is the number of common parameters across the two treatments. If the LRST results are higher than the corresponding chi-square value, then  $H1$  is rejected. For the CB question models  $K = 2$ , and the chi-square probability at  $0.05 =$

5.99; and for the CA question models  $K = 5$ , and the chi-square probability at 0.05 = 11.07.

To evaluate the revenues and profits at different fees, it is necessary to calculate the number of respondents who will pay the proposed fee options. This was done by determining the probability of rejection curves. Following equation 2.12 in section 2.4 of this thesis, the probabilities of rejection of  $i = L, NL, F, WR$  and  $BR$  to the randomly selected fee amounts of the questionnaires are ( $\Pi = 1 - Prob(\text{"yes"})$ ):

$$(3.16) \quad \Pi_i = 1 / (1 + e^{\alpha_i - \beta_i Price_i})$$

It is important to mention that the probabilities of rejection curves were corrected to allow them to intersect the x-axis at S/.5 (current fee level). If we consider that the probability of rejection tends to 0 when the fee is S/.5, then

$$(3.17) \quad 0.001 = 1 / (1 + e^{(\alpha_i - \beta_i 5) / \delta_i})$$

Therefore, the correction factor  $\delta$  is the following:

$$(3.18) \quad \delta_i = (\alpha_i - \beta_i 5) / \ln(1/0.001)$$

The profits of each fee policy were calculated as follows:

$$(3.19) \quad Profit = Revenues - Costs$$

where  $\text{Costs} = \text{Number of Tourists at the Proposed Entrance Fee} * \text{Unitary Costs}$ , and  $\text{Revenues} = \text{Number of Tourists at the Proposed Entrance Fee} * \text{Proposed Entrance Fee}$

### **3.2 Questionnaire Design**

A pre-pilot questionnaire was designed based on previous recreation surveys conducted in Peru and U.S. (EFTEC Ltd., 2000; USDA, 1999; and USDA, year?) and on personal interviews with the ex-chief, current chief and personnel of PNR. After the pre-pilot was conducted, a pilot survey was designed using the preliminary results of the pre-pilot survey and additional personal interviews with surveyed tourists, the transitional chief and personnel of PNR.

The pre-pilot and pilot questionnaires consisted of 26 and 23 questions, respectively. The number of questions was reduced to 21 on the final survey. The main changes were related to the reduction in the number of tourists' preferences questions and in the extension of the description of the current situation at PNR. In addition, there were some final adjustments of the attributes and levels to be evaluated in the CA part. The final version of the questionnaire is showed in Appendix A.

The final questionnaire consisted of a presentation part and three sections. In the presentation part, the interviewer introduced him/herself and explained the scope of the survey. The interviewer also informed the potential respondent that the questionnaire was directed to tourists older than 18 years old who had visited the area during the last 12 months. In addition, he/she indicated to the potential respondent that PNR does not include the Ballestas' Islands. This was done because the general

public usually believes that those highly visited islands are located inside PNR's boundaries. The first section consisted of tourists' preferences questions. The second included the valuation questions (CB and CA questions) and the last the socio-economic questions. There were English and Spanish versions of the questionnaire. Although it was expected that national and foreign tourists have different preferences and WTP; the questionnaire was identical across tourists' origin to allow comparisons of responses.

### **3.2.1 Tourists' Preferences Questions**

First, the respondents were asked to identify the activities they performed inside PNR during their last visit and to specify which one of those activities was the primary reason for their visit to PNR. This allowed testing of whether there was any change in visitors' WTP preferences according to their primary reason for visiting PNR. The respondents were also requested to indicate the specific sites they visited in their last visit.

Next the respondents were requested to rate their overall satisfaction with their visit to PNR. The scale ranged from 1 for "not at all satisfied" to 5 for "extremely satisfied". As well, respondents were requested to state their opinion about the fact that PNR charges fees, the potential implementation of different entrance fees for national and foreign tourists, charging reduced fees for national local tourists, and paying extra for their entrance fee if there were conservation program improvements and if there were infrastructure and service improvements on PNR. In these cases the scale used ranged from 1 for "strongly disagree" to 5 for "strongly agree".

The opinions about the fact that PNR charges fees were used to elicit protest responses related with fees as a payment vehicle. Respondents who “strongly disagree” were considered to be protesting the payment vehicle. Their opinion about differential fees and reduced fees was used to determine potential social conflicts if these type of fee policies were implemented at PNR. In addition, the respondents’ opinions about paying extra for their fees for conservation programs, infrastructure and service improvements provided information to contrast these responses with the CA question responses, where the respondents were asked to evaluate different alternatives containing different improved attributes of PNR along with a raise in the entrance fee.

Finally, the questionnaire included inquiries about the number of days spent at PNR, and number of times the respondent plans to visit PNR in the next 12 months.

### **3.2.2 Contingent Behavior Question**

The WTP for entrance fees for the recreational use of PNR of each respondent was elicited through the CB question, which is showed in Figure 3.1. The maximum WTP is defined as the amount that would make the respondent indifferent between not paying an entrance fee and thus not being allow to enter to PNR, and paying the fee and enjoying his optimal number of visits there (Arin and Kramer, 2002).

**Figure 3.1: Format of the Contingent Behavior Question**

<p>Currently, the entrance fee is S./5 (US \$ 1.4) for one day visit at Paracas National Reserve. On a scale from 1 to 5, where 1 is "Very Unreasonable" and 5 is "Very Reasonable". How do you consider this amount?</p>					
Very Unreasonable				Very Reasonable	No Opinion
1	2	3	4	5	<input type="checkbox"/>
<p>Please imagine the following situation. Suppose that, while you were planning your trip to Paracas National Reserve, you learned that the entrance fee had been raised and was now S./<u>  </u>*. This means that your trip to Paracas National Reserve would become more expensive. Would you still have decided to visit Paracas National Reserve?</p>					
<p>1) Yes 2) No 3) I do not know</p>					
<p>* Randomly designated bid: S/. 7, 10, 12, 15, 17, 20, 22, 25, 30 or 55.</p>					

The wording of the CB question was similar to the one used by EFTEC Ltd. (2000) in a survey conducted in Machu Picchu, Peru, although the type of response format used by that consulting company was payment card and the one used in our questionnaire was the dichotomous choice format. The particular reasons for choosing the dichotomous choice format is that it has at least three advantages relative to the other formats (Freeman, 2003a). First, it places people in a familiar market context. The situation given to the individual is similar to the one where the individual decides whether or not to buy a good at the offered price. Second, it is relatively easy to answer because only a "yes", "no" or "I do not know" is required. Third, it is relatively incentive compatible. The respondent's best strategy is to be truthful in his/her answer.

In addition dichotomous choice is the type of response format recommended by the NOAA Panel on CV (Arrow *et al*, 2003), although the general literature does not support the choice of dichotomous choice nor does it exclude the use of payment

card and multiple-bounded questions (Boyle, 2003a). Boyle (2003a) suggests that the dichotomous-choice response format approach is "... less likely to be challenged when welfare estimates are used in policy analyses and when the study results are submitted to a peer-reviewed journal for publication".

The CB question started with a direct reminder about the amount the respondents paid as the current entrance fee and a request to rate this amount from 1 "very unreasonable" to 5 "very reasonable". This was done to help the respondents to clearly identify the change in fee amount being evaluated. Then, the respondents were asked to situate themselves in the hypothetical case that the entrance fee was raised while the respondents planned their visit to PNR. An explicit reminder that the price of their trip would be higher for the respondents if the entrance fee were raised was included in the question format. The reason for specifically including that reminder was to help the respondents to be conscious about their potential income limitations. The respondents were told to indicate if they would pay the randomly designated bid to visit PNR. An "I do not know" option was included in addition to the "yes" and "no" vote options. This option was included to be consistent with the "no-answer" recommendation of the NOAA Panel on CV (Arrow *et al*, 1993). The questionnaire was administered to tourists who had already visited PNR, so they had general knowledge of the main characteristics of the area they had already paid to visit before. Therefore no description of PNR was included before the CB question. Further, no change in the current condition of PNR was implied in any part of the CB question.

The dichotomous choice response format of the CB question required a preliminary selection of bids. The selected bids were obtained from analyzing the responses to an open-ended questionnaire conducted during the Southern hemisphere

summer months (January – April) in 2003 by PNR's personnel inside the protected area and in nearby locations. One hundred seventeen national responses and 83 foreign responses were evaluated to obtain the selected bids. The criteria for bids selection was to establish a small number of bids (10), clustered near the median WTP and not placed in the tails of the distribution, according the recommendation of Alberini (1995). To allow comparisons in responses, the same bids were used for both types of tourists.

### **3.2.3 Conjoint Analysis Question**

First, a list of attributes relevant to the respondents' recreational experiences was selected. This selection was based on bibliographic material, previous studies and personal interviews with foreign and national tourists and PNR's personnel. The attributes selected were percentage of roads repaired and permanently maintained inside PNR, availability of interpretative signs at PNR's wildlife and landscape points of interest, implementation of monitoring activities of endemic endangered species and availability of operative and well-maintained rustic toilets at main recreational beaches.

#### **3.2.3.1. Roads Permanently Repaired and Maintained**

The first characteristic selected as an attribute for the CA question was the percentage of roads repaired and permanently maintained inside PNR. PNR's personnel reported multiple verbal complaints made by national tourists in relation to the generally bad condition of the roads. This was confirmed by the results obtained in a survey conducted by Falero (2000) who analyzed the perceptions of visitors to



PNR's beaches and found that a significant number of national tourists considered that the roads were in less than average or bad condition (75% of a sample consisted on 111 responses), and by personal conversations with some national tourists. According to an analysis of the roads' status information contained in INRENA (2000), only 5% of the total extension of the roads is permanently repaired and maintained because they are used by Quimpac's personnel. Quimpac is a natural salt extraction company which was located inside PNR's boundaries before the marine reserve was established, and the company continues to operate there. It is this company which permanently repairs and maintains those roads. The levels considered for this attribute were continuing with the current condition (5%) and 20, 40, 60 and 80% of roads repaired and permanently maintained.

#### **3.2.3.2. Interpretative Signs at PNR's Wildlife and Landscape Points of Interests**

The second attribute selected was availability of interpretative signs at PNR's wildlife and landscape points of interests. More availability of information about PNR was a main request obtained from personal conversations with visitors, principally from foreign tourists who visit the area to appreciate the wildlife and landscape of the protected area. Currently, official interpretative signs about the wildlife and landscape characteristics of the protected area are provided at INRENA's Interpretation Center but not in other specific relevant locations such as La Aguada (birdwatching area) and Punta Arquillo (sea lions watching area). Although some guided tours are organized by PNR's personnel in La Aguada, most of the time tourists have to rely on tour guides (certified or not) to provide them with specific information in relevant locations. A number of general informative brochures that include a map of PNR are

freely distributed at the protected area's entrance, but the ratio between the number of brochures available and the number of tourists is 1 to 12 (according to an analysis of data obtained from the PNR's administrator). The brochure only contains information in Spanish.

The levels included for this attribute were continuing with the current situation and implementation of interpretative signs at PNR's wildlife and landscape points of interest.

### **3.2.3.3. Monitoring Activities of Endemic Endangered Species**

In a personal conversation with the Patricia Saravia (current chief of PNR) about the monitoring activities of endemic endangered species such as the Peruvian potoyunco and Humbolt penguins, she pointed out that the reduced budget available for PNR's operation does not allow making the necessary minimum trips to PNR's islands to regularly monitor these species. At August 2003, monitoring activities of Humbolt penguins were performed but only of the ones that live near the shoreline.

The Peruvian potoyunco and the Humbolt penguin are endangered endemic species from the Humbolt current and both reproduce inside PNR. In the case of the Peruvian potoyunco, the only areas in Peru where this species reproduces are La Vieja and Sangayan Islands, located inside PNR's boundaries (INRENA, 2003a).

The levels included for this attribute was continuing with the current situation and implementation of monitoring activities for these two species at PNR's islands.

#### **3.2.3.4. Rustic Toilets at Recreational Beaches**

The inoperative conditions of the rustic toilets at recreational beaches were one of the main complaints of tourists who visit PNR. According to the results of the survey conducted by Falero (2000), an overwhelming 95% (of 94 responses) considered that the toilets were from less than average to deficient conditions. The main recreational beaches where INRENA currently have restrooms are the Mine, Lagunillas and Yumanque. The levels considered for this attribute were: continuing with the current condition and availability of operative and well-maintained rustic toilets at the beaches indicated above.

The same entrance fee options used in the CB question were used CA question. The number of attributes and levels was kept low to avoid a complex CA design, taking in consideration the limited time that the respondents had to answer the face to face survey and therefore potentially reduce item non - response.

Next, the different attributes levels were randomly combined into two possible alternatives for PNR (A and B). The number of possible combinations without considering the entrance fee attribute was  $5 \times 2 \times 2 \times 2 = 40$ , considering the entrance fee was 10 times more. Certain illogical combinations within the same alternative were eliminated such as a scenario A with availability of interpretative signs in relation to scenario B with higher fee and no availability of interpretative signs. The attribute and attribute's levels were summarized in Table 3.1.

**Table 3.1: Attribute and Levels used in the Conjoint Analysis Question**

Attribute (short name)	Description	Type of Variable	Levels
Roads	Roads repaired and permanently maintained	Continuous	Current conditions, 20%, 40%, 60% and 80%.
Information	Interpretative signs at PNR's wildlife and landscape points of interest	Dummy	Current conditions and availability of interpretative signs with interpretative information at PNR's wildlife and landscape points of interest.
Evaluation	Monitoring activities of the endemic endangered species Peruvian potoyunco birds and Humboldt's penguins in islands.	Dummy	Current conditions and implementation of monitoring activities of Peruvian potoyunco birds and Humboldt's penguins in islands.
Restrooms	Rustic toilets at the Mine, Lagunillas, and Yumaque recreational beaches	Dummy	Current conditions and availability of operative and well-maintained rustic toilets at the Mine, Lagunillas and Yumaque beaches.
Price	Amount paid for entrance fee to PNR in Peruvian currency, New Soles (S/.)	Continuous	S/. 7, 10, 12, 15, 17, 20, 22, 25, 30 and 55.

The response format used was choose one format that mimics actual market behavior. This model estimates are based on utility differences across the alternatives of the choice set and it has been found to be useful for estimating use values and passive use values as well (Holmes and Adamowicz, 2003).

Choose any alternative or keep the current conditions was also included as a possible alternative to the CA question. This alternative was included following Holmes and Adamowicz's (2003) recommendation that "...choice scenarios should include opt-out options because in most real world choice situations, individuals are not in a situation of "forced choice" and they have the option to choose not to choose". Figure 3.2. shows a representative CA choice set.

### Figure 3.2: A Representative Conjoint Analysis Choice Set

FEATURES	CURRENT CONDITIONS	OPTION A	OPTION B
ENTRANCE FEE	S/. 5 (US \$ 1.4)	S/.7	S/.20
Roads	5% of the roads are repaired and permanently maintained	Current Conditions	80% of the roads are repaired and permanently maintained
Interpretative information	There are no interpretative signs at Paracas National Reserve wildlife and landscape points of interest	Implementation of interpretative signs at Paracas National Reserve wildlife and landscape points of interest	Current Conditions
Endemic (wildlife animals that only exist in this region) endangered species evaluations	There are no monitoring activities of Peruvian potoyunco birds. There are no monitoring activities of Humboldt's penguins in islands.	Monthly monitoring activities of Peruvian potoyunco birds. Monthly monitoring activities of Humboldt's penguins in islands	Monthly monitoring activities of Peruvian potoyunco birds. Monthly monitoring activities of Humboldt's penguins in islands
Toilets at recreational beaches	3 inoperative rustic toilets at the Mine, Lagunillas, and Yumaque beaches	Current conditions	3 operative and well-maintained rustic toilets at the Mine, Lagunillas and Yumaque beaches

1) On a scale from 1 to 5, where 1 is "Not at all desirable" and 5 is "Very desirable", how desirable is Option A to you?

Not at all desirable 1 2 3 4 5 Very desirable

2) On a scale from 1 to 5, where 1 is "Not at all desirable" and 5 is "Very desirable", how desirable is Option B to you?

Not at all desirable

Very desirable

1                  2                  3                  4                  5

3) If 100% of the entrance fee's revenues were invested in the area, which option, if any, would you choose? Please, consider carefully the increment in the entrance fee.

- a) Option A  
b) Option B  
c) Any alternative / keep the current conditions

4) If the option you chose were implemented, how many trips in addition to your most recent trip would you take to Paracas National Reserve in the next 12 months?

# of trips

For analysis purposes, it was stated that 100% of the revenues from the entrance fee were invested in the protected area, although the current situation is that the money collected is deviated to a governmental central fund.

#### **3.2.4 Socio-Economics Questions**

The questionnaire included additional socio-economics questions about the nationality; the country of residence; gender; age; level of education; income range of the respondents; if the respondent works for or is member of an ecological, environmental, or natural resources conservation organization; employment status; and the number of dependents who live in the household. The income range used was different for national and foreign tourists. An additional open-ended question was included to allow the respondent to express his/her opinion about anything else he/she considers important related to the questionnaire or PNR's situation in general.

### **3.3 Survey Procedures**

The pre-pilot survey was conducted on Lagunillas Beach (inside PNR) in July 27, 2003. 64 responses were obtained. The pilot survey was conducted during three days (from August 1 to 3, 2003) on Lagunillas Beach, Plaza de Pisco and El Chaco, and 104 responses were obtained.

The final survey was conducted from August 8 to 26, 2003. A total of 854 surveys were collected. 23 surveys were eliminated because they did not include a response to the country of residence question. This criterion was used because independent analysis for national and foreign tourists was implemented. At the end, 412 surveys corresponded to national tourists and 419 to foreign tourists.

The final survey locations were: Lagunillas Beach, Plaza de Pisco and El Chaco. Lagunillas Beach was the only survey location inside PNR. This area was chosen because it is the last visited location for most of the tour agencies, so we could obtain responses from tourists who have already finished their visit. Moreover, it is the area where the restaurants are located, so the tourists usually have more free time in this location than in other sites inside PNR. Plaza de Pisco and El Chaco are located outside PNR and were chosen because they are frequent additionally visited sites by national and foreign tourists who visited PNR.

All the pre-pilot, pilot and final surveys were face to face administered surveys, following the recommendation of NOAA Panel (Arrow *et al*, 1993). Four final year undergraduate students from San Luis Gonzaga de Ica University, a local public university, and I conducted the surveys. Face-to-face surveys have the advantage that the interviewers can actually interact with the respondents, and can clarify respondents' doubts, thereby minimizing non-response rates. They also have the added advantage that interviewers may judge the sincerity of respondents. As a result, the quality of the data generated can be expected to improve (Bandara and Tisdell, 2004). The respondents were randomly selected in each location where the surveys took place.

### **3.4 Summary**

The CB and CA models were specified according to the main objectives of the research. The final questionnaire was designed using data from the pre-pilot and pilot surveys, and personal interviews with visitors and PNR's personnel. The

questionnaire consisted of the introduction and three main parts: the tourists' preferences, valuation and visitors' socio-economic characteristics sections.

The valuation section included the CB and CA questions. The response formats used were dichotomous choice for CB and choose one for the CA question. The attributes evaluated in the CA question were roads repaired and permanently maintained, interpretative signs, monitoring activities of endemic endangered species, and operative and well-maintained restrooms.

The final survey was conducted in three locations: one on site and two off sites of PNR during August, 2003.



## **CHAPTER 4**

### **CHARACTERISTICS OF THE RESPONDENTS**

The first section of this chapter describes the main socio-economic characteristics of the national local, national non local and foreign tourists. The attitudes and preferences of the tourists in relation to the attributes of PNR are indicated in the second section. The third section reports the responses rate and the fourth section evaluates whether the respondents represents the present visitors of PNR. Finally, a summary of the characteristics of the respondents, their attitudes and preferences and the comparison of the survey's respondents with the visitors of PNR is presented.

#### **4.1 Socio-economic Characteristics of the Respondents**

Of 831 responses, 50.4% were foreign tourists and 49.6% national tourists. More than half of the foreign tourists came from European countries (67.1%). In addition, North American (U.S. and Canada) and Latin American tourists combined represented more than 25% of the total number of foreign tourists.

In relation to national tourists, responses of tourists from 19 of the 24 departments of Peru were obtained. Most of the tourists came from the Department of Ica, where PNR is located (41.3%). On the other hand, 38.3% came from Lima Department, where the capital city is located and the reminder 20.4% from other departments.

The average annual income of national non local was higher than the income of national local tourists by 62.3%. The income of foreign tourists was 529.9% higher

than the income of the national tourists. The average age of the respondents was 32 for foreign, 33 for national local, and 34 for national non local tourists. The average household size was 2 for foreign tourists and 3 for national tourists. Most of the respondents were males. The percentage of female respondents was slightly higher for foreign tourists (45.9%) than for national local (42.5%) and national non local tourists (34.6%).

The number of respondents with completed or uncompleted university or technical degrees was higher for national non local tourists (87.8%) than for national local tourists (82.8%). The percentage of foreign tourists with university or technical degree was lower (73.1%) than the two former groups, nevertheless foreign tourists had the highest percentage of respondents with postgraduate studies (19.0%) in comparison with national non local tourists (5.9%) and national local tourists (0.6%). Most of tourists were employed part or full time. The percentage of full time employed national non local tourists was 79.0%, of national local tourists was 76.2% and of foreign tourists was 69.5%. As an additional observation, there were no unemployed tourists in the national tourists group and no homemaker/caregiver respondents in the foreign tourists group. The percentage of respondents who work or are member of environmental organizations was low, 7.8% for national local tourists, 7.1% for national non local tourists and 12.1% for foreign tourists. In Table 4.1 a summary of the socio-economic characteristics of the respondents is presented.

**Table 4.1: Socio-Economic Characteristics of Respondents**

<b>Characteristics</b>	<b>Mean</b>	<b>Median</b>	<b>Range</b>	<b>Stand. Dev.</b>
<b>Annual Income (US\$)</b>				
National Local	5,089	4,348	0 - 17,391	3,230
National Non Local	8,245	7,826	0 - 17,391	4,715
Foreign	43,846	40,000	0 - 170,000	40,498
<b>Age (Years)</b>				
National Local	33	31	18- 70	9.5
National Non Local	34	32	18- 60	8.0
Foreign	32	30	18- 68	9.6
<b>Household Size (Number of People Living in the Household)</b>				
National Local	3	3	1 – 8	1.6
National Non Local	3	3	1 – 10	1.6
Foreign	2	2	1 – 7	1.2
<b>Characteristics</b>	<b>Percentage (%)</b>			
	<b>National Local</b>	<b>National Non Local</b>	<b>Foreign</b>	
<b>Female</b>	42.5	34.6	45.9	
<b>University or Technical Education</b>	82.8	87.8	73.1	
<b>Employed Full Time</b>	76.2	79.0	69.5	
<b>Worker or Member of Environmental Organization</b>	7.8	7.1	12.1	

#### 4.2 Tourists' Attitudes and Preferences

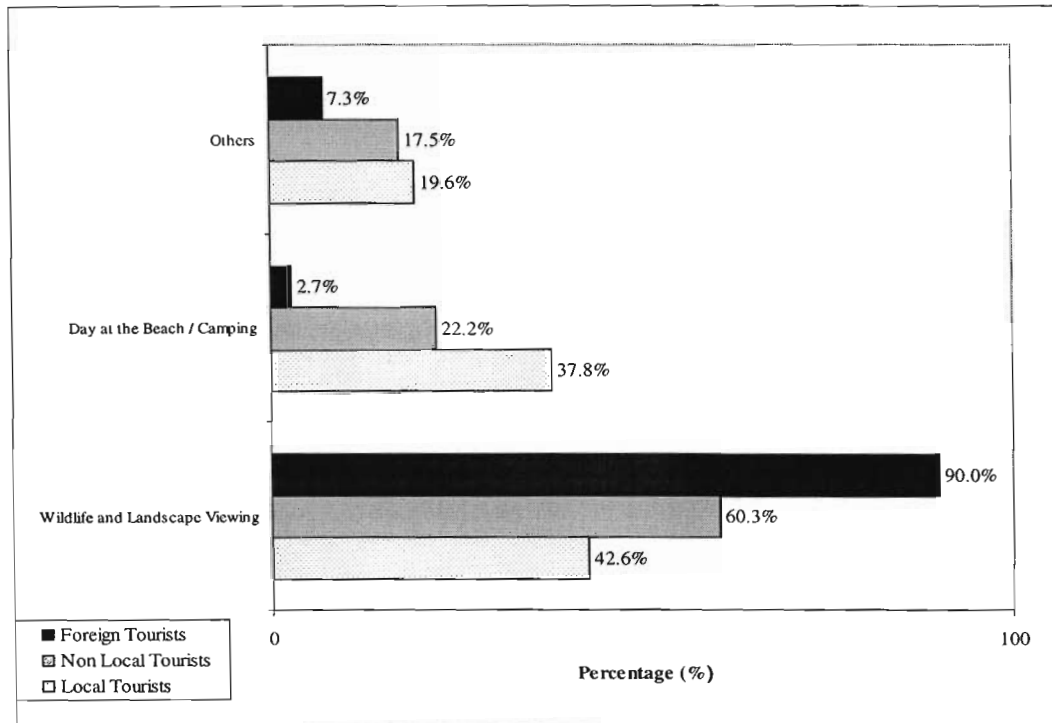
The questionnaire was designed to obtain the attitudes and preferences of the tourists in order to acquire information about the primary reason of visit, to detect protest responses to the payment vehicle and to check for consistency with the conjoint analysis question. Respondents were asked to rate their overall satisfaction with PNR and their opinion about the fact that PNR charges a entrance fee, the current fee, charging different fees for national and foreign tourists, charging reduced fees for national local tourists, paying higher fees if there were conservation programs improvements, and paying higher fees if there were infrastructure and service improvements.

The results indicated that most of the respondents spent one day at PNR. The percentage of foreign tourists who spent just one day at PNR is 96.2%, for national non local tourists is 89.1% and for national local tourists is 74.6%.

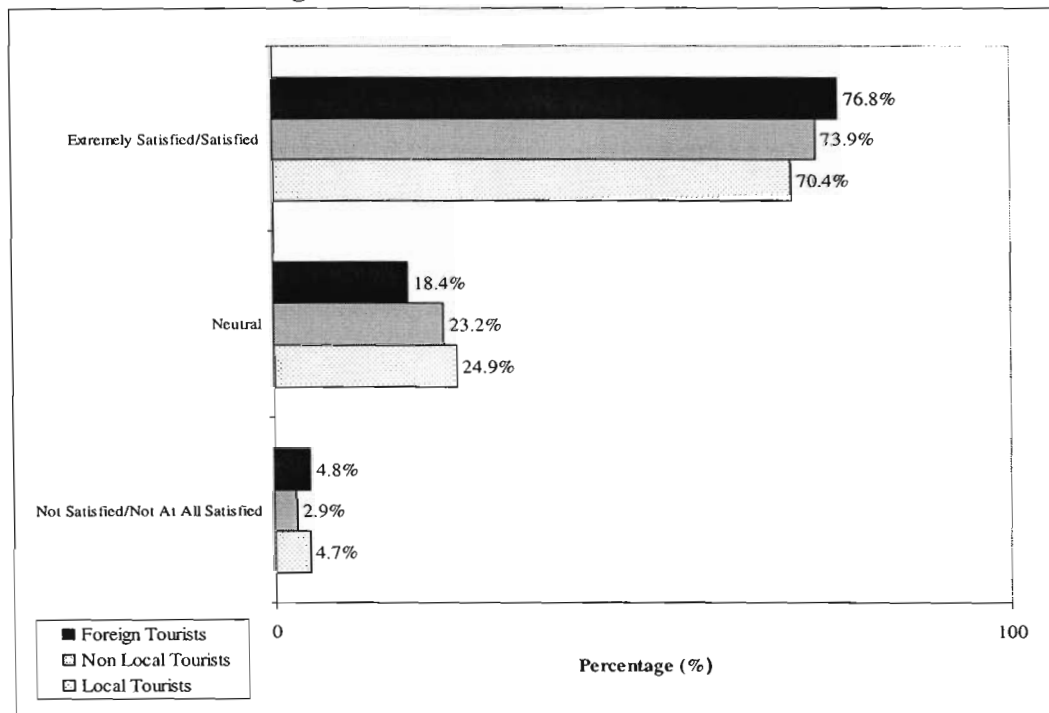
Their primary reason of visit was wildlife and landscape viewing (90.0%, 60.3% and 42.6% for foreign, national non local and national local tourists, respectively). One reason that influenced the high percentage of national tourists' responses to this category could be that the survey was implemented during the Southern hemisphere winter, so this category of national tourists was over sampled. It would be expected to obtain a higher percentage of tourists who spent the day at the beach or camping if the survey were implemented during the summer. In Figure 4.1, the distribution of primary reason of visit is showed for national local, national non local and foreign tourists.

Most of the tourists were extremely satisfied or satisfied overall with their visit to PNR. The percentage of foreign tourists that indicate that they were extremely satisfied or satisfied was higher (76.8%) in comparison with the percentage of national non local (73.9%) and national local tourists (70.4%). Only a low 4.8% of foreign tourists indicated that they were not satisfied or not at all satisfied with their visit. This percentage was slightly higher than the one obtained for the national local (4.7%) and national non local tourists (2.9%). In Figure 4.2, the overall satisfaction with the visit to PNR is appreciated by tourists' origin.

**Figure 4.1: Tourists' Primary Reason of Visit**

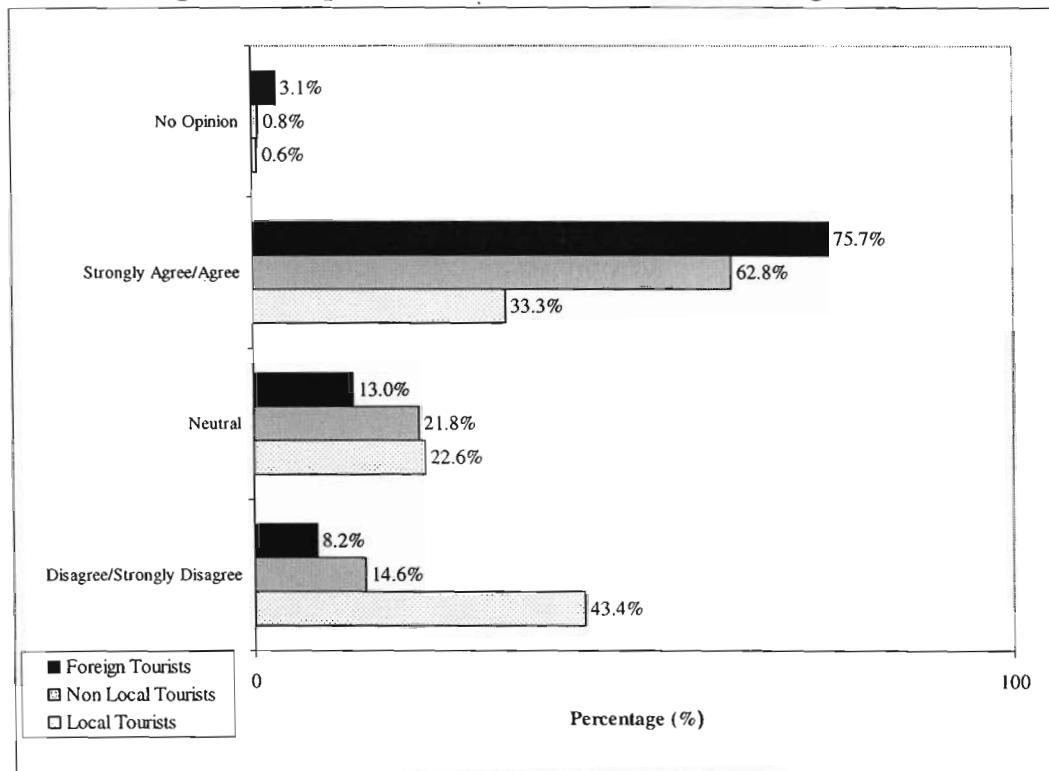


**Figure 4.2: Tourists' Overall Satisfaction**



There was strong support for fee policies at PNR by foreign and national non local tourists. Most of the foreign (75.7%) and national non local tourists (62.8%) strongly agree or agree with the fact (or support the fact that) that PNR charges fees. On the contrary, most of national local tourists disagree or strongly disagree with the fact that PNR charges fees (43.4%). The percentage of national local tourists who strongly agree or agree was 33.3% and the percentage who was neutral with the fact that PNR charges fee was 22.6%. Figure 4.3 shows these results.

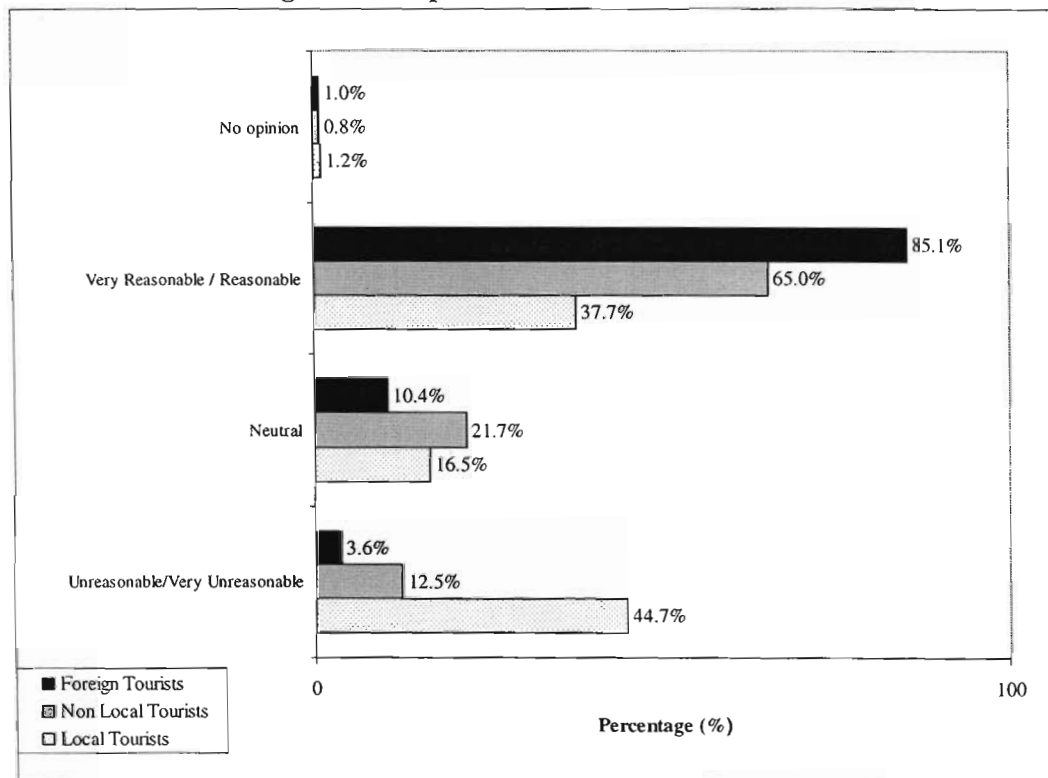
**Figure 4.3: Opinion about the Fact that PNR Charges Fees**



In relation to tourist opinion about the current fee, a high majority of foreign tourists (85.1%) think that the amount is very reasonable or reasonable. Most of the

national tourists have the same opinion (65.0%). On the other hand, the majority of national local tourists think that the amount is unreasonable or very unreasonable (44.7%). Only 16.5% of national local tourists have a neutral opinion about the current fee. The summary of these results are presented in Figure 4.4.

**Figure 4.4: Opinion about the Current Fee**



In addition, it is important to note that less than a half of foreign respondents strongly agree or agree with the proposal to charge differential fees for foreign and national tourists (48.3%), although the support was higher in the case of national non local (67.1%) and national local tourists (70.2%).

There was strong support for improvements in conservation programs inside PNR. 75.3% of foreign, 63.3% of national non local and 39.6% of national local

tourists would be willing to pay higher fees if these types of programs were improved. In relation to infrastructure and services inside PNR, 56.6% of foreign, 68.8% of national non local and 41.3% of national local tourists would be willing to pay higher fees if improvements in infrastructure and services were implemented. For more reference, in Tables B.1 to B.20 in Appendix B a complete summary of statistics for each question of the survey is presented.

#### **4.3 Response Rates**

The refusal rate was calculated to be between 5 to 10%. There was an average of two refusals per interviewer per day (20-30 responses). It is consistent with the refusal rate of less than 5% obtained by Chase *et al* (1999) in a face to face survey conducted in Costa Rica and with the refusal rate of less than 10% reported by Barnes *et al* (1999) in the same type of survey conducted on Namibia. Face to face surveys usually have higher responses rates in relation to the other types of surveys (mail, telephone, etc.). In addition, Whittington (1998) suggests that responses rates are typically very high in developing countries, where respondents are often quite receptive to listening and considering the questions posed.

#### **4.4 Do Respondents Represent PNR Tourists?**

There is a lack of information about the characterization of the PNR types of tourists. The results from a previous tourist survey conducted by Falero (2000) and the characteristics of the tourists who visit Ica Department obtained by PROMPERU (2002), the governmental office in charge of the promotion of tourism in Peru, were used as proxies to identify if our respondents represent PNR tourists.



Our survey' respondents present a similar educational level to the other surveys' respondents (85.6% and 73.1% in our survey versus 87.0% and 79.0% in the other surveys have technical or university education, the first percentage corresponds to national tourists and the second to foreign tourists). Our percentage of national tourists' female responses, North American tourists' responses, and foreign tourists' average annual income were lower in relation to the other surveys' responses.

**Table 4.2: Comparison of Respondents Characteristics with Results from Previous Surveys**

	National		Foreign	
	Our Survey	Falero	Our Survey	PROMPERU
<b>Survey's Target Population</b>	PNR tourists	Only recreational beaches type of tourists	PNR tourists	Ica Department foreign tourists*
<b>Period when the survey was conducted</b>	August, 2003	April and September, 2000	August, 2003	2001
<b>Origin</b>	Ica (41.3%)	No Data	North America (13.4%)**	North America (19%)**
<b>Female (%)</b>	37.7	50	45.9	39
<b>Age</b>	33	25-35 (49%)	32	25-34 (45%)
<b>Annual Income (\$)</b>	6,961	No data	43,846	54,629
<b>University or Technical Education (%)</b>	85.6	87	73.1	79
<b>Number of Responses</b>	412	112	419	880

\*Only 11% of the tourists who visited Ica Department visited Pisco. The main attraction in Ica Department is the Nazca's Lines (PROMPERU, 2002).

\*\* North America includes U.S. and Canada.

#### **4.5 Summary**

The majority of foreign tourists came from European countries and national tourists from Ica Department. Most of the tourists have a university or technical education. The mean age of total respondents was between 32 and 33 years old. There are differences in income of national local and national non local tourists, being higher for the latter. Foreign tourists have a much higher income than national tourists.

In addition, more than 70% of all types of tourists reported that they were satisfied or extremely satisfied with their visit to PNR. The majority of national non local and foreign tourists agree with the fact that PNR charges fees and with the current fee amount. In contrast, national local tourists presented mixed opinions.

Due to the number of responses obtained and the high responses rates, the responses should be considered to be a good approximation of a representative sample, although there is not specific official information available about the main characteristics of PNR's tourists.

## **CHAPTER 5**

### **RESULTS**

This chapter presents the results of the fair fees that were calculated for national local, national non local and foreign tourists using the CB and CA methods. Additional evaluations were done according to the primary reason for visiting PNR and income groups for national tourists. The fee options obtained from the CB method were evaluated following the policies of profit maximization with and without price differentiation, and minimum decrease in number of visitors.

It is important to mention that the questionnaires where the respondents indicated that they strongly disagree with the fact that PNR charges fees were not included in the evaluation (11.4% and 3% of national and foreign tourists, respectively). This was done to minimize the number of potential protest responses to the payment vehicle (entrance fee). Limdep 7 was the program used to calculate the models to estimate the WTP values.

#### **5.1 Estimating Fees using Contingent Behavior**

The data were analyzed to determine the mean WTP and probability of rejection curves for the tourists according to their origin (national local, national non local and foreign tourists). Further, national tourists' evaluations according to primary activity (wildlife and beach recreation) and income range were performed. The primary activity analysis was not conducted for foreign tourists due to the fact that 97.3% of them indicated that their primary reason for visiting PNR was wildlife

recreation or related activities. The financial analysis for fee policies was assessed by the tourists' origin and primary activity independently.

### 5.1.1 Results According to Tourists' Origin

The WTP responses according to the tourists' origin are shown in Table 5.1. The percentage of "yes" and "I do not know" responses was lower for national local (20 and 7.4%, respectively) than for national non local tourists (25 and 11.4%, respectively). Foreign tourists had the highest percentage of "yes" (55.7%) and "I do not know" (21.9%) responses. These results are related to the tourists' income: higher "yes" responses to the proposed new higher fees for foreign and national non local tourists than for national local tourists. The average bids for national local, national non local and foreign tourists are significantly equivalent when tested using the ANOVA test at 0.05 confidence level (Appendix C, Table C.1).

**Table 5.1: Willingness to Pay Responses Distribution**

WTP Responses	Percentage (%)		
	National Tourists		Foreign Tourists
	Local	Non Local	
Yes	20.0	25.0	55.7
Do not know	7.4	11.4	21.9
Average Bid (S/.)	19.3	21.2	21.5
Number of Responses	135	228	402

The utility of the respondent derived from his/her choice (pay or not pay the fee) is the following:

$$Utility = \alpha - \beta Price$$

The WTP values were calculated treating “I do not know” responses as “no” responses, although some authors have suggested other procedures such as estimating WTP values using “do not know” as middle responses between “yes” or “no” or omitting “do not know” responses from the data set (Wang, 1997; Groothuis and Whitehead, 2002; and Chambers and Whitehead, 2003). Arrow *et al* (1993) specified that in order to ensure reliability and usefulness of the information obtained from CV surveys, when the analysis of responses are ambiguous, it is recommended to select the option that tends to underestimate WTP values. Wang (1997) found that when “do not know” are treated as “no” responses, the model gives the lowest estimate of the mean WTP in comparison with the other models (middle response or omitted do not know responses from the data set). In addition, Carson *et al* (1998) indicates that when “would not vote” or “do not know” answers are treated conservatively as “no” votes, the addition of this option in the CV survey does not alter: (a) the distribution of “yes” and “no” responses, (b) the estimates of WTP derived from these choices, or (c) the construct validity of the results. The WTP results are showed in Table 5.2.

The likelihood ratio specification test (LRST) results support independent logit models for national local, national non local and foreign tourists. The results of the LRST are presented in Table 5.3.

The probability of rejection at different fee levels curves were constructed using the logit models estimates. The national local, national non local and foreign tourists probability of rejection estimates and curves are presented in Table 5.4 and Figure 5.1, respectively.

**Table 5.2: Willingness to Pay Values**

Variable	National Tourists		Foreign Tourists
	Local	Non Local	
Price	-0.441929* (0.094372)	-0.120911* (0.026066)	-0.077552* (0.011283)
Constant	4.191401* (1.006128)	1.044168** (0.439482)	1.849988* (0.246536)
Log Likelihood function	-34.91355	-110.7039	-239.4100
Chi-Squared	65.28156	35.01703	73.19506
Number of Observations	135	228	402
WTP (S/.)	9.5	8.6	23.9

\* Significant at 0.01 level of confidence

\*\* Significant at 0.05 level of confidence

Standard Errors are in parenthesis

**Table 5.3: LRST by Tourists' Origin**

Group of Tourists	LRST Results
National Local and National Non Local	22.0471
National Local and Foreign	105.1633
National Non Local and Foreign	68.5768

Chi-Square Probability at 0.05 = 5.99

**Table 5.4: Probability of Rejection at Different Fee Levels by Tourists' Origin**

Probability of Rejection	Fee Levels (S/.)		
	National Tourists		Foreign Tourists
	Local	Non Local	
0.1	8.1	7.5	17.9
0.2	8.6	7.9	20.1
0.3	8.9	8.2	21.5
0.4	9.2	8.4	22.7
0.5	9.5	8.6	23.9
0.6	9.7	8.8	25.0
0.7	10.0	9.1	26.2
0.8	10.4	9.4	27.6
0.9	10.9	9.8	29.9

**Figure 5.1: Probability of Rejection at Different Fee Levels by Tourists' Origin**

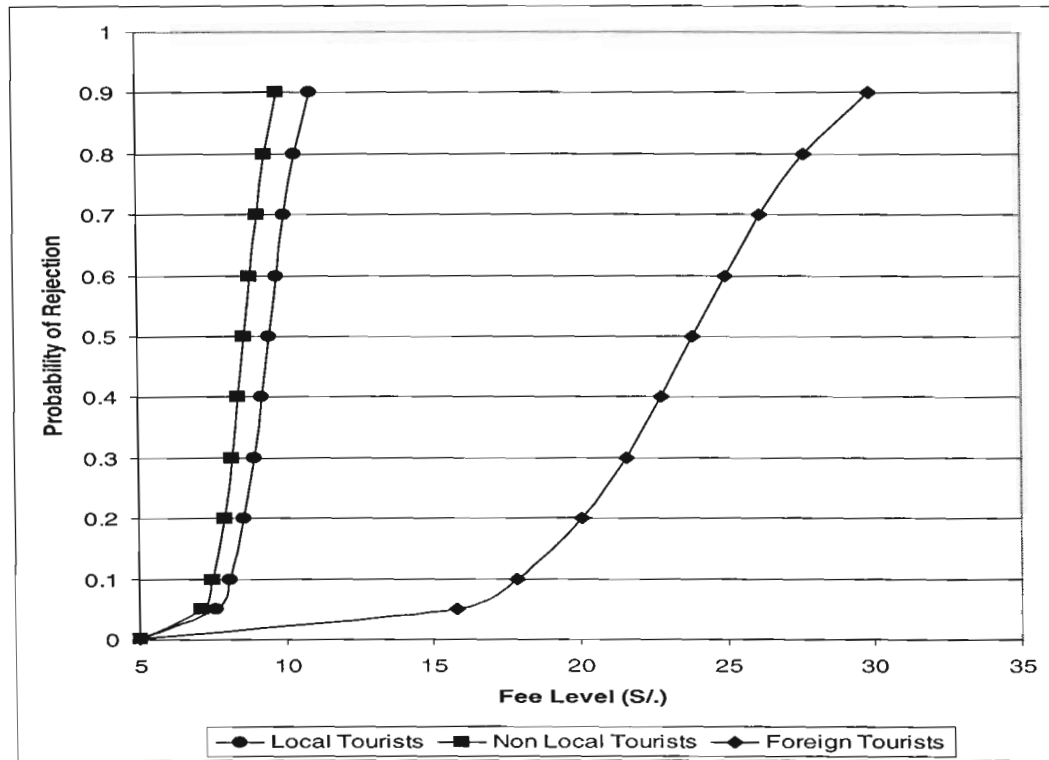


Figure 5.1 indicates that national local and national non local tourists are highly sensitive to fee increases. National non local tourists are slightly more sensitive than national local tourists. On the other hand, foreign tourists are much less sensitive than the two national groups. That means that the same increase in fee would cause a higher proportional drop in the number of national tourists than in the number of foreign tourists, and in the number of national non local tourists compared to the number of national local tourists.

### **5.1.2 Results According to Primary Activity**

The analysis of the data shows that there are differences in WTP preferences not only according to the tourists' origin but also according to tourists' primary reason for visiting PNR. However, national tourists' data proved to be not long enough to run independent models for local and non local wildlife recreation and local and non local beach recreation tourists. The average bids of the four cited data sets were not statistically equal; thus, it would be difficult to prove that the reason of the different preferences not only depends on the differences on the bid amounts given to the respondents. Besides, there was no variation in non local beach recreation tourists (all of the 48 the responses were "no" responses) (See Tables from D.1 to D.3 in Appendix D). Therefore, first national tourists' responses were analyzed using the origin criteria (local and non local tourists), and then the same national tourists' responses were evaluated using the primary activity criteria (beach and wildlife recreation tourists).

The WTP responses according to the primary activity are shown in Table 5.5. The percentage of "yes" and "I do not know" responses was higher for wildlife recreation (29 and 10.7%, respectively) than for beach recreation tourists (9.5 and 5.3%, respectively). The average bids for wildlife and beach recreation are significantly equivalent when tested using the ANOVA test at 0.05 confidence level (Appendix C, Table C.1).



**Table 5.5: Willingness to Pay Responses Distribution by Primary Activity**

WTP Responses	Percentage (%)	
	Wildlife Recreation	Beach Recreation
Yes	29.0	9.5
Do not know	10.7	5.3
Average Bid (S/.)	20.4	20.5
Number of Responses	256	95

This evaluation allows the assessment of potential seasonal fee differentiation policies. It could be assumed that most of national tourists have as a primary activity beach recreation during the summer and mainly wildlife recreation during the winter. The LRST results support having two constrained models for beach recreation and wildlife recreation. The WTP values are presented in Table 5.6 and the LRST results in Table 5.7.

**Table 5.6: Willingness to Pay Values by Primary Activity**

Variable	Wildlife Recreation	Beach Recreation
Price	-0.153921* (0.0260348)	-0.760281* (0.264516)
Constant	1.663743* (0.414181)	6.002676* (2.264223)
Log Likelihood function	-123.6091	-12.26003
Chi-Squared	58.83371	35.01878
Number of Observations	256	95
WTP (S/.)	<b>10.8</b>	<b>7.9</b>

\* Significant at 0.01 level of confidence  
Standard Errors are in parenthesis

**Table 5.7: LRST by Primary Activity**

<b>Group of Tourists</b>	<b>LRST Results</b>
<b>Camping and Day in Beach*</b>	2.261844
<b>Beach Recreation and Others</b>	24.72436
<b>Beach Recreation and Wildlife</b>	28.40784
<b>Wildlife and Others**</b>	1.09092
<b>Beach Recreation and Wildlife Recreation</b>	30.79450

\* Camping and Day in the Beach were joined in the variable called Beach Recreation.

\*\* Wildlife and Others (eating in restaurants inside the area, recreational fishing, archaeological visiting, and appreciating the way of life of fishing community) were joined in the variable called Wildlife Recreation.

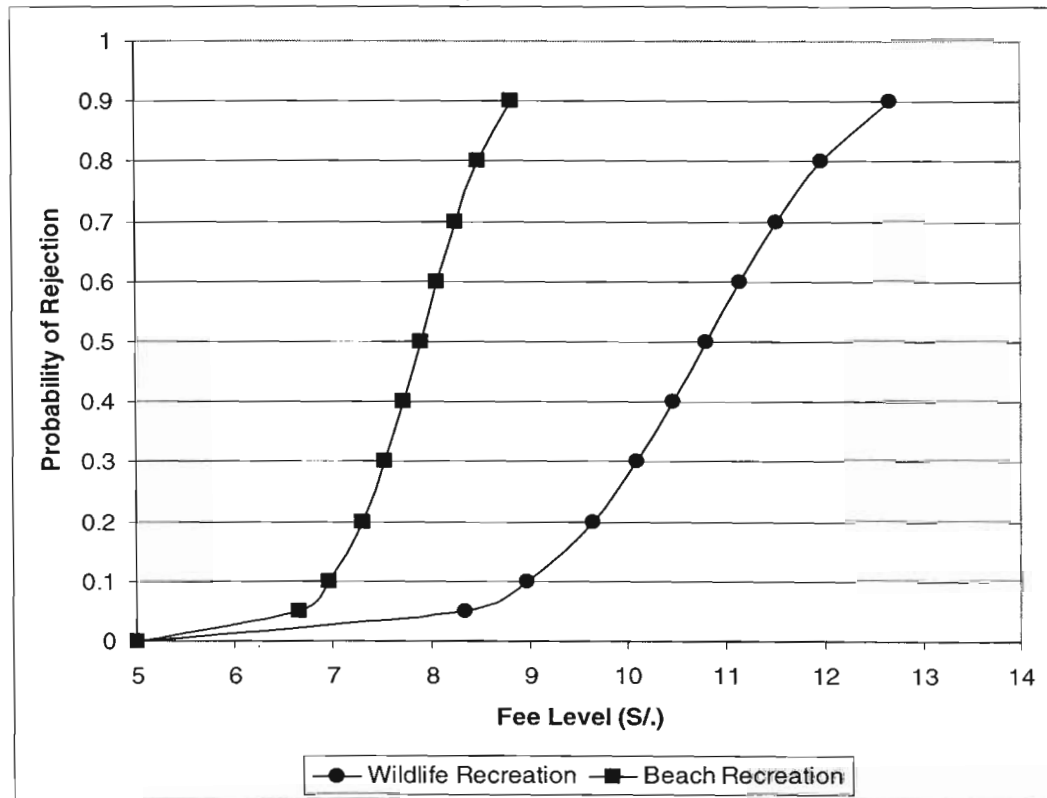
Chi-Square Probability at 0.05 = 5.99

The probability of rejection at different fee levels by primary activity and their respective graphs are presented in Table 5.8 and Figure 5.2.

**Table 5.8: Probability of Rejection at Different Fee Levels by Primary Activity**

<b>Probability of Rejection</b>	<b>Fee Levels (S/.)</b>	
	<b>Wildlife Recreation</b>	<b>Beach Recreation</b>
0.1	9.0	7.0
0.2	9.6	7.3
0.3	10.1	7.5
0.4	10.5	7.7
0.5	10.8	7.9
0.6	11.2	8.1
0.7	11.5	8.3
0.8	12.0	8.5
0.9	12.7	8.8

**Figure 5.2: Probability of Rejection at Different Fee Levels by Primary Activity**



Beach recreation tourists are more sensitive to fee increases than wildlife recreation tourists. This could be related to the fact that there are more substitutes available for the former than for the latter type of tourists.

The differences in the main socio-economic characteristics such as age, gender, educational level, income, employment status of national local, national non local and foreign tourists, and of wildlife recreation and beach recreation tourists were evaluated using ANOVA and chi-square tests at 0.05.

There were statistical differences in age between wildlife recreation and beach recreation tourists. In addition, national local and national non local; and wildlife recreation and beach recreation have a statistically significant different percentage of

female respondents. No differences were found in the percentage of respondents with technical or university degrees and the percentage of respondents employed full time among the different groups. In relation to income, national local, national non local and foreign tourists have significant different average incomes. That is not the case for wildlife recreation and beach recreation tourists who have a statistically equal average income.

The differences cited above could have influenced the WTP values. The results of the ANOVA and chi – square tests are included in Tables from C.3 to C.5 (Appendix C). It is important to mention that the specific statistics are slightly different from the ones in Chapter 4 and Appendix B because the ones in the tables indicated above do not include the responses of the tourists who strongly disagree with the fact that PNR’s administration charges fees.

### **5.1.3 Impact of Fees on Different Income Groups**

In the previous analysis, the individual WTP was aggregated without considering income differences within the respondents. Equal marginal utility of income for all individuals was assumed in the same group (national local, national non local, wildlife recreation, beach recreation, and foreign tourists). One of the main concerns that the governmental agency in charge of PNR has is that a change in fee could cause higher impact on lower income tourists than higher income tourists. To evaluate the effect of income in national tourists’ WTP values, independent models were analyzed according to the Peruvian socio-economic classes division (for reference see Apoyo Opinion y Mercado S.A. and INEI, 2003), stratified by mean monthly income values as shown in Table 5.9.

**Table 5.9: Peruvian Mean Income by Socio – Economic Class**

Socio-Economics Class	Monthly Mean Income (S/.)
A	11,361
B	2,739
C	1,083
D	607
E	424

Source: Apoyo Opinion y Mercado S.A. and INEI (2003)

The characteristics of responses by socio-economic class are presented in Table 5.10. It is observed that the percentage of “yes” responses increases when the income range increases for all type of tourists.

**Table 5.10: Characteristics of Responses by Socio-Economic Class**

Characteristics	A-B				C				D-E			
	L	NL	WR	BR	L	NL	WR	BR	L	NL	WR	BR
Percentage of Yes Responses (%)	26.5	29.6	35.7	11.6	21.7	22.4	26.8	8.0	12.2	16.7	18.0	7.7
Average Bid (S/.)	15.4	21.6	19.3	21.9	20.3	22.3	21.8	18.8	21.2	18.0	19.7	19.4
Number of Responses	34	125	112	43	60	67	97	25	41	36	50	26

L = National Local; N = National Non Local; WR = Wildlife Recreation; BR = Beach Recreation

The WTP values for national non local and wildlife recreation A-B and C-D-E tourists are shown in Table 5.11. The reason for such income aggregation is supported by the LRST results shown in Table 5.12: independent models for national non local and wildlife recreation A-B and C-D-E tourists, and an unconstrained model for national local tourists are preferred at a confidence level of 0.05. In the case of beach recreation tourists, there was not enough variation in the responses to calculate independent logit models according to income range. The average bids of A-B, C and D-E of national non local tourists and of A-B, C and D-E of wildlife recreation

tourists were statistically equal when tested by the ANOVA test. This is not the case for national local tourists (See Table C.2 in Appendix C). It is important to mention that the relatively low number of responses and the differences in the average bids in the national local tourists' income groups (A-B and C, and C and D-E) could have influenced the fact that no differences were found among their WTP preferences.

**Table 5.11: Willingness to Pay Values by Income Groups**

Variable	National Non Local		Wildlife Recreation	
	A-B	C-D-E	A-B	C-D-E
Price	-0.083639* (0.027421)	-0.235737* (0.059291)	-0.079637* (0.027550)	-0.271005* (0.052235)
Constant	0.686731 0.513455	2.315296* (0.841346)	0.827744*** (0.498362)	2.969734* (0.714255)
Log Likelihood function	-68.03141	-37.87722	-67.18231	-52.22890
Chi-Squared	14.02498	28.42784	11.62884	56.91128
Number of Observations	125	103	112	147
WTP (S/.)	8.2	9.8	10.4	11.0

\* Significant at 0.01 level of confidence

\*\* Significant at 0.05 level of confidence

\*\*\* Significant at 0.10 level of confidence

Standard Errors are in parenthesis

**Table 5.12: LRST by Income Groups**

Income Groups	LRST Results
<b>National Local Tourists</b>	
A-B and C	4.490354
C and D-E	1.576686
A-B and D-E	0.594220
A-B and C-D-E	3.466674
<b>National Non Local Tourists</b>	
A-B and C D-E	9.59054
<b>Wildlife Recreation</b>	
A-B and C-D-E	21.28114

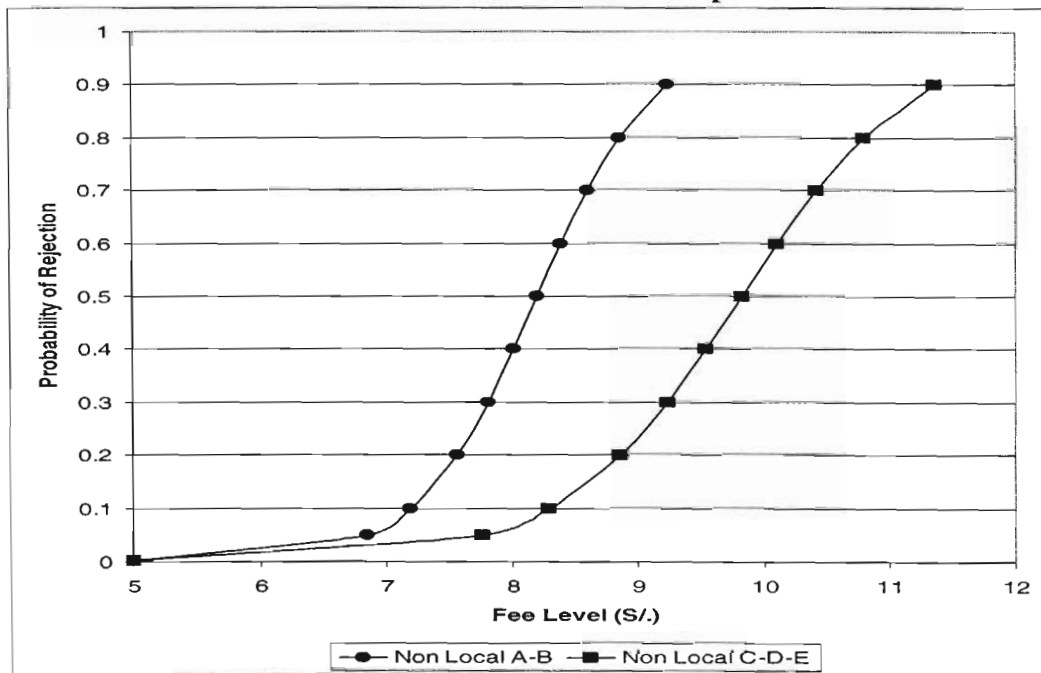
Chi-Square Probability at 0.05 = 5.99

The probability of rejection at different fee levels for national non local and wildlife recreation A-B and C-D-E tourists and their respective graphs are presented in Table 5.13 and Figures 5.3 and 5.4.

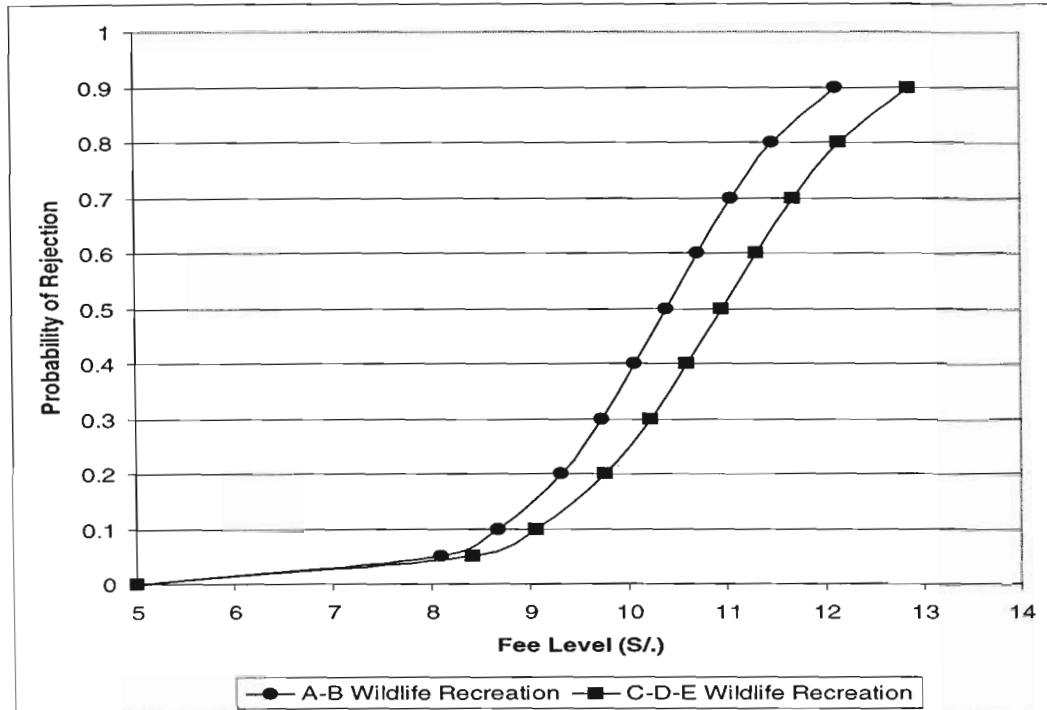
**Table 5.13: Probability of Rejection at Different Fee Levels by Income Groups**

Probability of Rejection	Fee Levels (S/.)			
	National Non Local		Wildlife Recreation	
	A-B	C-D-E	A-B	C-D-E
0.1	7.2	8.3	8.7	9.1
0.2	7.6	8.9	9.3	9.8
0.3	7.8	9.2	9.7	10.2
0.4	8.0	9.5	10.1	10.6
0.5	8.2	9.8	10.4	11.0
0.6	8.4	10.1	10.7	11.3
0.7	8.6	10.4	11.1	11.7
0.8	8.9	10.8	11.5	12.2
0.9	9.2	11.4	12.1	12.9

**Figure 5.3: Probability of Rejection at Different Fee Levels by National Non Local Income Groups**



**Figure 5.4: Probability of Rejection at Different Fee Levels by Wildlife Recreation Income Groups**



The results support the hypothesis that a fee increase would reduce a higher proportion of the number of A-B than C-D-E national non local and wildlife recreation tourists. An intuitive explanation of why A-B tourists have different WTP preferences than the C-D-E groups is the fact that the A-B tourists have more substitutes available (for example recreational beach clubs, protected areas located further away, etc.). It seems that in the case of A-B tourists, PNR could be more easily substituted which is supported by the fact that there is a lack of infrastructure and facilities inside the protected area. The results suggest that PNR is an inferior good for national non local tourists and wildlife tourists.

This would not be the case for national local tourists. The reasons for that could be that A-B national local tourists could have summer houses surrounding the



protected area, which is consider a wealthy neighborhood. In addition, one of the yacht clubs of Peru is located in PNR's buffer zone. Therefore, A-B national local tourists have reasons to stay in the area and potentially visit PNR, although, as stated above, the low number of responses that belong to this group and the significant difference in the average bid with respect to other income categories does provide strong statistical evidence to definitely conclude whether or not PNR is an inferior good for national local tourists too.

#### **5.1.4 Financial Analysis**

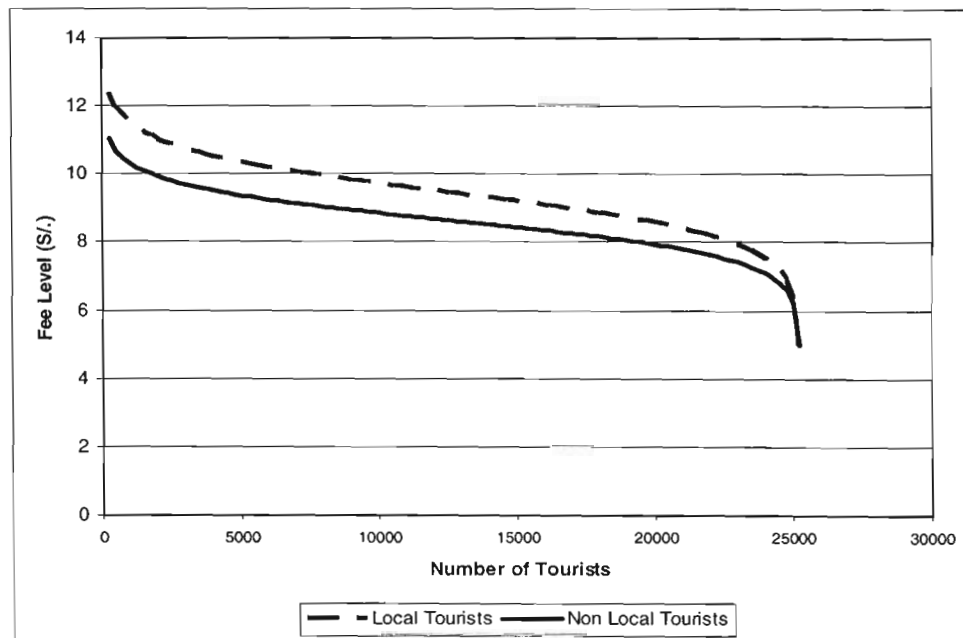
The financial analysis was done independently for national local, national non local, wildlife recreation, beach recreation, national, and foreign tourists. The financial analysis does not include revenues that could be collected from children's fees. It is important to mention that the statistical data that PNR's administration collects considers only the number of national and foreign tourists. Therefore, there is no information available about the percentage of national local and national non local tourists within the national tourists group. Our sample of national tourists consisted of 41.3% national local tourists and 58.7% national non local tourists. On the other hand, INRENA (2002) indicates that national tourists represent 68.5% of the number of total tourists. In our sample, 49.5% were national tourists because the survey was conducting during the Southern hemisphere winter, and during that period of time there is a higher proportion of foreign tourists in relation to national tourists (INRENA, 2002).

In the analysis done according to tourists' primary reason for visiting PNR, once more, due to lack of specific data, it was assumed that during the summer

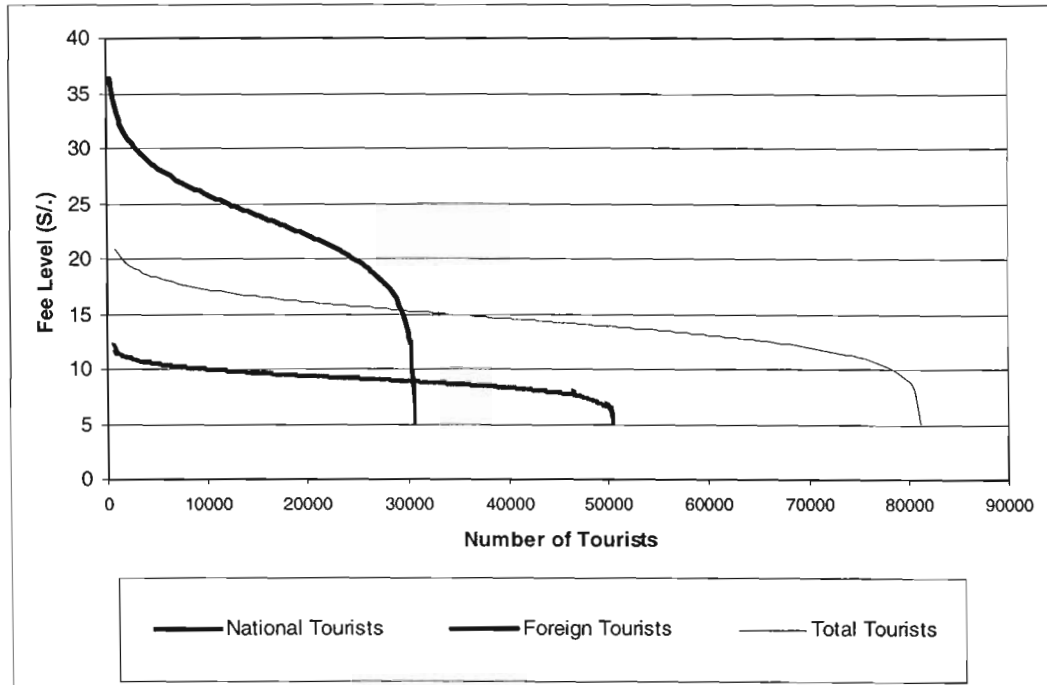
months (December to April), most of the national tourists visit PNR for beach recreation purposes; and during the winter months (May to November), the main primary reason for visiting is wildlife recreation. According to the responses obtained from our survey, 37.8% and 22.2% of national local and national non local tourists, respectively visited PNR for beach recreation purposes during the last 12 months. INRENA (2002) states that 64.1% of national tourists visit PNR during the summer months. Therefore, it could be inferred that wildlife recreation tourists are oversampled.

Figure 5.5 and 5.6 shows the simulated demand functions by tourists' origin and Figure 5.7 presents the simulated demand functions by primary activity. The number of tourists used in the simulated demand functions correspond to the number of visitors to PNR in 2002 (INRENA, 2002).

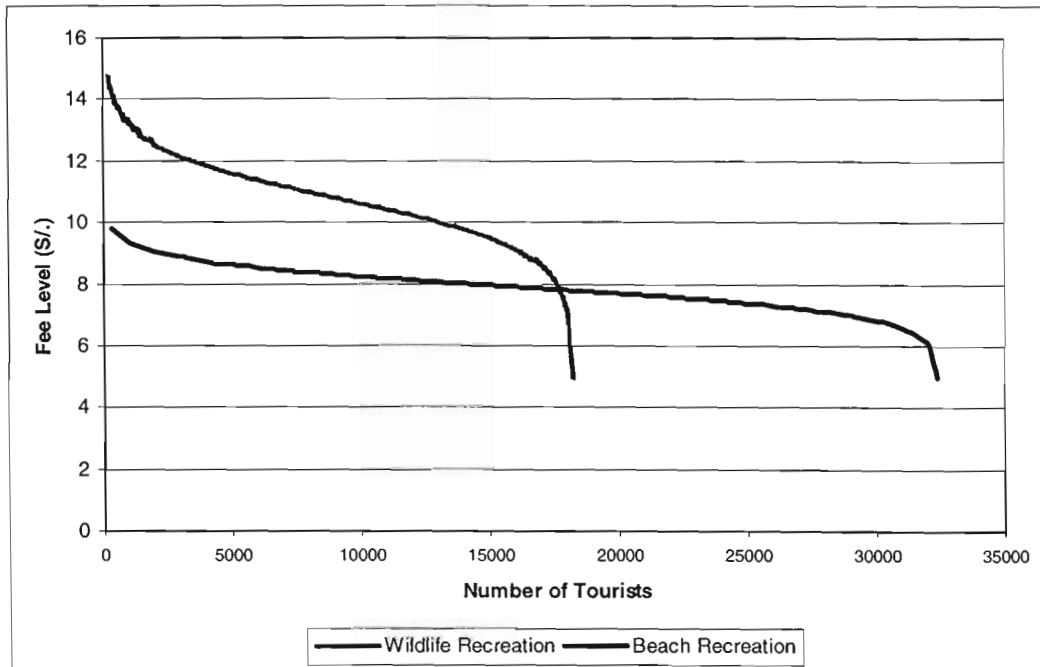
**Figure 5.5: Simulated Demand Functions for National Local and National Non Local Tourists**



**Figure 5.6: Simulated Demand Functions for National, Foreign and Total Tourists**



**Figure 5.7: Simulated Demand Functions by Primary Activity**



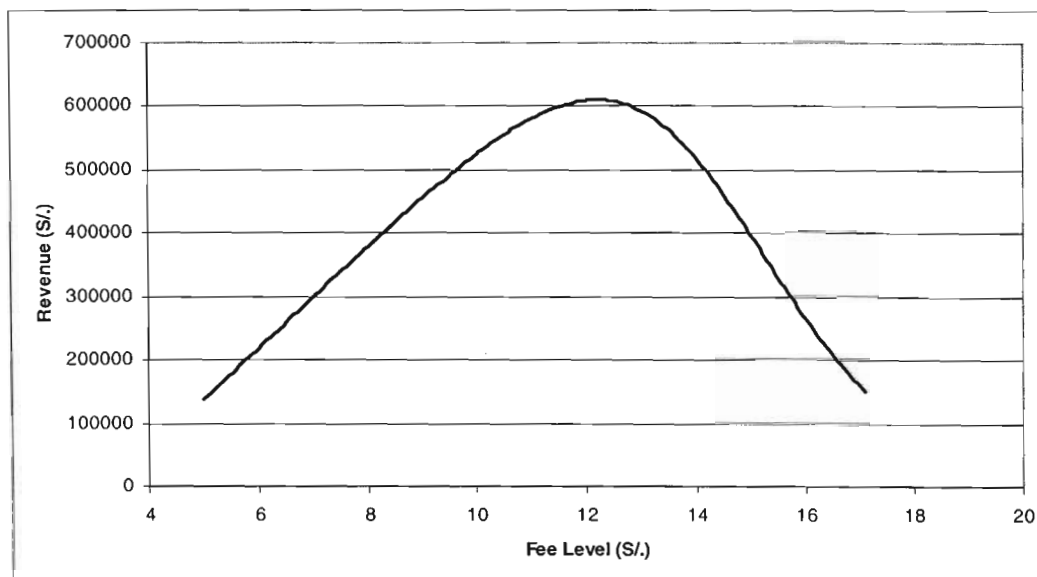
#### **5.1.4.1 Profit Maximization – No Price Differentiation**

This first fee policy analysis involves the establishment of a fee that maximizes profits without considering differences among the different types of tourists. This follows the current Peruvian fee policy of establishing the same fee for all types of tourists. This profit maximization analysis is an illustration and does not advocate profit maximization as the primary goal of any governmental agency. The setting of entrance fees is a matter subject to many factors, not just revenue generation (Chase *et al*, 1998). These other factors include the perceived unfairness of increases in fees, the negative local economic impact of high fees which decrease PNR's visitation (and thus the demand for restaurants, and other associated services), and the effects on other attractions such as possible substitute areas (Aylward *et al*, 1996, cited in Chase *et al*, 1998).

To calculate the profits, specific data about the costs were needed. There were no data available about the PNR's fixed costs, therefore it was assumed not fixed cost and the unitary cost was calculated by dividing the total cost by the total number of tourists (including children) using the information in INRENA (2004b).

Figure 5.8 presents the profit function and Table 5.14 shows the profit maximization admission fee, the number of visitors and the expected profits.

**Figure 5.8: Profit Function – No Price Differentiation**



**Table 5.14: Evaluation of Profit Maximization with No Price Differentiation**

Type of Tourists	Percentage Current Number of Tourists (%)	Admission Fee (S/.)	Percentage Current Profit (%)
National Local	1.5	12.2	442.7
National Non Local	0.1		
Wildlife Recreation	16.1		
Beach Recreation	0.003		
National Total	0.7		
Foreign	98.7		
Total Tourists	84.6		

An increase in S/7.2 on the current fee would cause an optimized collection of profits without price differentiation, but a significant reduction in the number of national tourists. It could be expected that only 0.7% of national tourists would visit PNR. Around 98.7% of foreign tourists would pay the entrance fee. In addition, 84.6% of the current number of total tourists would visit PNR. In the evaluation of total tourists, it is important to consider the percentage and composition of national local, national non local and foreign tourists in our survey sample as indicated above.

Therefore the total tourists' percentage indicated in Table 5.14 applies for a month as July 2002, where almost half of total tourists are national and the other half foreign tourists (INRENA, 2002).

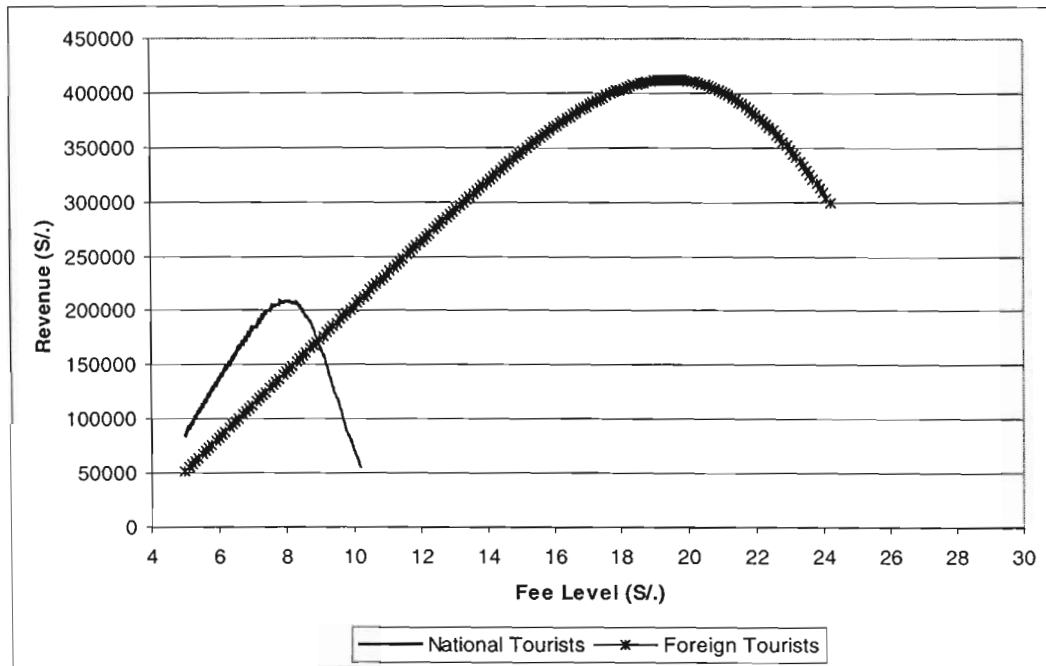
The national group that would be less affected would be the wildlife recreation tourists (16.1% would visit the protected area). Almost any beach recreation tourists would still visit the protected area (0.003%).

#### **5.1.4.2 Profit Maximization – Price Differentiation**

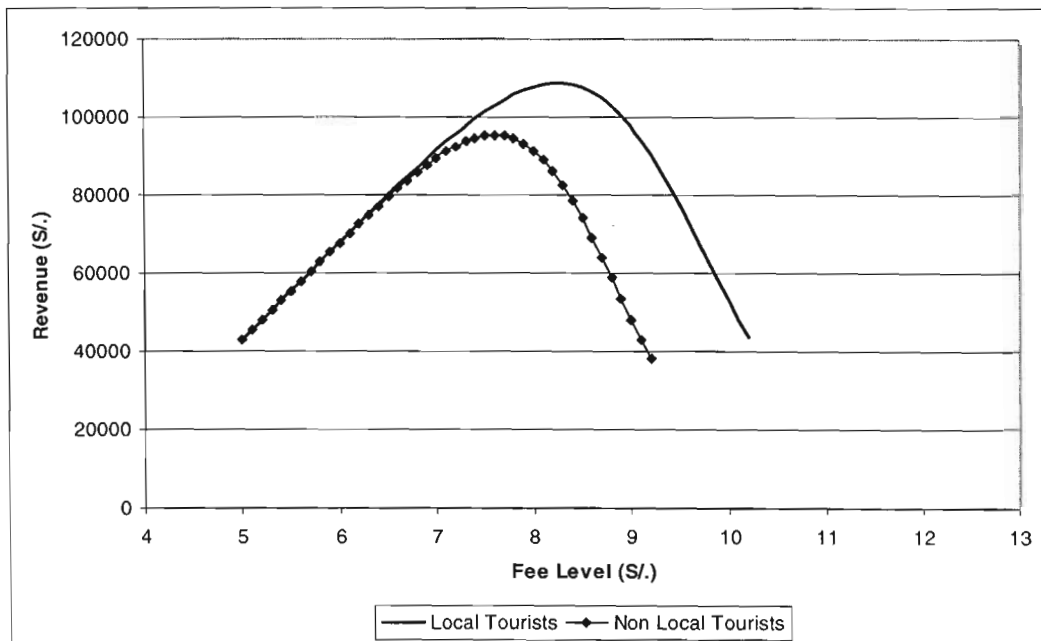
The practice of price differentiation can successfully raise profits and achieve a more optimal fee policy (Alpizar, 2003). According to Chase *et al* (1998), many of the visitors to protected areas in developing countries are foreign tourists who incur few of the costs but enjoy many of the benefits from governmental natural resources conservation efforts. Under these circumstances, the potential benefits from differentially pricing access for national and international tourists to protected areas are significant.

In this fee policy option, differential fees for national local, national non local tourists and primary activity were also evaluated. Figures 5.9, 5.10 and 5.11 present the profit functions by tourists' origins and primary reasons for visiting PNR and Table 5.15 shows the admission fee, the number of visitors and the expected profits.

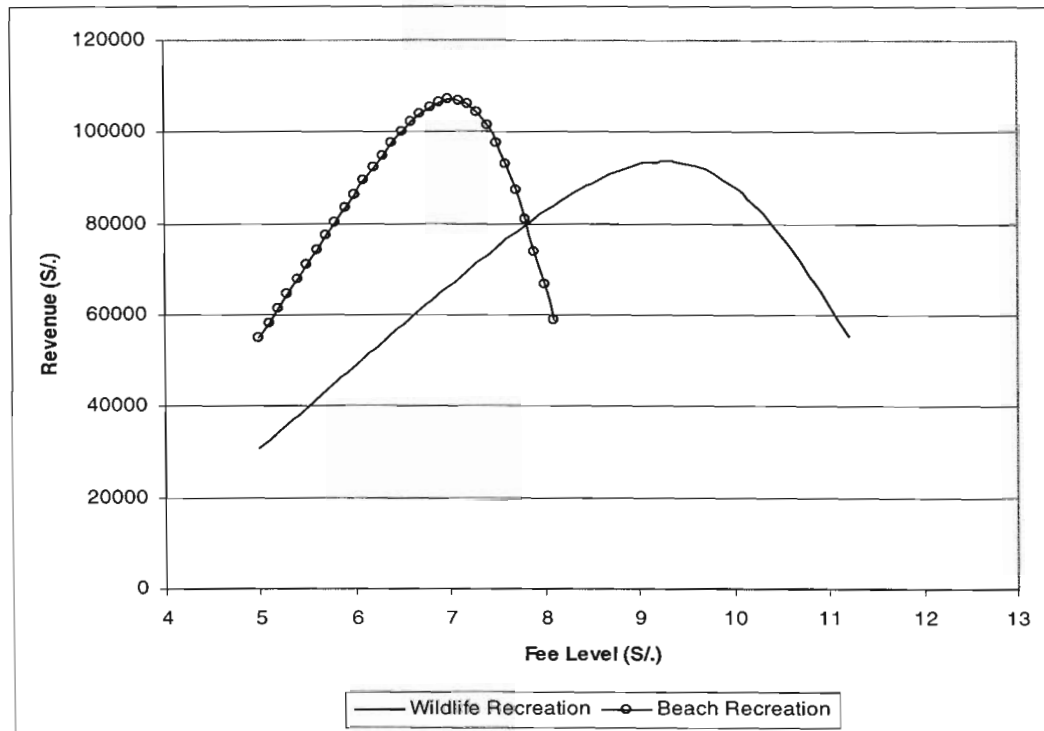
**Figure 5.9: Profit Functions – National and Foreign Tourists**



**Figure 5.10: Profit Functions – National Local and National Non Local Tourists**



**Figure 5.11: Profit Functions – Primary Reason of Visiting PNR**



**Table 5.15: Evaluation of Profit Maximization - Price Differentiation Policy**

Type Tourists	Percentage Current Number of Tourists (%)	Admission Fee (S/.)	Percentage Current Profit (%)
National Local	86.2	8.3	253.5
National Non Local	87.8	7.6	222.2
Wildlife Recreation	85.8	9.3	302.9
Beach Recreation	89.5	7.0	194.9
National	87.8	8.0	242.8
Foreign	83.2	19.5	793.1

For national tourists groups (national local, national non local, wildlife recreation and beach recreation), the additional amount for a profit maximization fee is in the range of S/.2 and S/.4.3. The profit maximization fee for foreign tourists is S/.14.5 higher than the current fee. All the profit maximization fees would cause a



decrease in the number of visitors ranging from 10.5% for beach recreation tourists to 14.2% for wildlife recreation tourists, and of 16.8% for foreign tourists.

It is important to note that the fee amounts are only referential. In practical terms it would not be possible to charge higher fees for national local tourists than for national non local tourists or amounts that are not round values (for example: S/.8.3).

## 5.2 Estimating Fees using Conjoint Analysis

This analysis had the purpose of identifying the preferences of the tourists in relation to potential improvements in infrastructure and services inside PNR and evaluating their marginal WTP for each of these potential improvements. Different models were evaluated for national and international tourists. The empirical model was the following:

$$Utility = \alpha Roads + \gamma Information + \phi Evaluation + \delta Restrooms + \beta Price$$

The attributes and attribute levels were described in Table 3.1.

### 5.2.1 Implicit Prices by Tourists' Origin

The multinomial logit model estimates are shown in Table 5.16 and the LRST results in Table 5.17. The LRST results support having an unconstrained model for national tourists, but independent models for national and foreign tourists at 0.05 confidence level. The only significant attributes were information, evaluation and restrooms for both national and foreign tourists. Roads was not a significant attribute for any type of tourists. Moreover, the negative sign of the estimate in the national

tourists case indicates that they would experience a decrease in their willingness to pay for visiting the protected area if the fees charged are directly used for road repair and maintenance. The marginal WTP for every attribute was higher for foreign tourists than for national tourists, which is related to the higher income of the former in relation to the latter.

National tourists would be willing to pay slightly more for availability of interpretative information at PNR's wildlife and landscape points of interests in comparison with the other attributes (implementation of monitoring activities of endemic endangered species and availability of operative and well-maintained rustic toilets). On the other hand, foreign tourists would be willing to pay more for implementation of monitoring activities than for the other attributes (75% more than for availability of information and operative and 36% more than for well-maintained rustic toilets).

**Table 5.16: Estimates and Implicit Prices by Tourists' Origin**

<b>Variable</b>	<b>National Tourists</b>	<b>Foreign Tourists</b>
<b>Price</b>	-0.108871* (0.013715757)	-0.062793* (0.008895)
<b>Roads</b>	-0.000213 (0.003038)	0.003307 (0.002812)
<b>Information</b>	0.676981* (0.168005)	0.627655* (0.153732)
<b>Evaluation</b>	0.612806* (0.169686)	1.099945* (0.158514)
<b>Restrooms</b>	0.551226* (0.164219)	0.853551* (0.157600)
<b>Number of Observations</b>	357	363
<b>Log Likelihood function</b>	-326.3235	-340.4999
<b>Implicit Prices (S/.)</b>		
<b>Roads</b>	-0.002	0.05
<b>Information</b>	<b>6.2</b>	<b>10.0</b>
<b>Evaluation</b>	<b>5.6</b>	<b>17.5</b>
<b>Restrooms</b>	<b>5.1</b>	<b>13.6</b>

\* Significant at 0.01 level of confidence / Standard Errors are in parenthesis

**Table 5.17: Conjoint Analysis LRST**

<b>Group of Tourists</b>	<b>LRST Results</b>
<b>National Local and National Non Local</b>	2.2552
<b>National and Foreign</b>	57.8238

Chi-Square Probability at 0.05 = 11.07

### **5.2.2. Implicit Prices by Primary Activity**

There was no statistical support for having constrained models by primary activity at 0.05 confidence level. The LRST results are shown in Table 5.18.

**Table 5.18: Conjoint Analysis LRST by Primary Activity**

<b>Group of Tourists</b>	<b>LRST Results</b>
<b>Camping and Day in Beach</b>	5.391
<b>Beach Recreation* and Others</b>	7.15092
<b>Beach Recreation and Wildlife</b>	5.0587
<b>Wildlife and Others</b>	5.86622

\* Camping and Day in the Beach were joined in the variable called Beach Recreation.

Chi-Square Probability at 0.05 = 11.07

### **5.2.3. Impact of Fees on Different Income Groups**

The LRST results indicated that an unconstrained model was preferred for national tourists. There is no statistical support for having constrained models by income groups at 0.05 confidence level. The LRST results are shown in Table 5.19.

**Table 5.19: Conjoint Analysis LRST by Income Groups**

<b>Group of Tourists</b>	<b>LRST Results</b>
<b>A – B vs. C</b>	8.4574
<b>A – B vs. D – E</b>	4.46026
<b>C vs. D – E</b>	3.66026

Chi-Square Probability at 0.05 = 11.07

#### 5.2.4. Evaluation of the IIA Assumption

The Irrelevance of Independent Alternatives (IIA) assumption was tested using the Hausman Test. The IIA is an assumption of the multinomial logit model and it presupposes that the ratio of probabilities between any two alternatives is unaffected by other alternatives in the choice set (Holmes and Adamowicz, 2003). The built-in procedure of the Hausman test in Limdep 7 was used. The results indicate that the IIA assumption holds and thus, the multinomial logit model is appropriate. The results are shown in Table 5.20.

**Table 5.20: Hausman Test Results**

Group of Tourists	Chi-Sqrd	Pr(C>c)
National	2.6936	0.747098
Foreign	4.3133	0.505247

Chi-Square Probability at 0.05 = 11.070

#### 5.3 Evaluation of Fee Policy Proposals

The economic efficiency criteria alone would support establishing profit maximizing fees, although the results indicate a decrease in the number of tourists, especially if this profit maximization without price differentiation type of policy was implemented (see Table 5.14).

According to Alpizar (2003), there is some evidence that the local communities surrounding protected areas depend more and more on tourism, and one can expect that an increase in price might have a negative impact on the surrounding areas' economies. Therefore the inclusion of external effects might have an impact on the estimated optimal prices.

Mixed criteria policies could be implemented in PNR, such as the following:

**Continuing with the Current Policy for National Tourists and Increasing the Fee with Minimum Decrease in Number of Foreign Tourists**

It could be expected that this policy would generate minimum opposition from national visitors and the tourism industry. National tourists are highly sensitive to fee increases and most of the tourism companies rely on foreign tourists' tours. The effects of this type of policy are showed in Table 5.22.

**Table 5.21: Evaluation of Fee Mixed Policy**

Type Tourists	Percentage Current Number of Tourists (%)	Admission Fee (S/.)	Percentage Current Profit (%)
National	100	5	100
Foreign	96.3	15	663.1

In the case that foreign tourists represent 31.5% of the total tourists (INRENA, 2002), it could be expected to have an increase in the profits of 277.4% at the end of the year. Other mixed fee policies could be evaluated including gradual increase of fee for foreign tourists (in two steps: to S/.10 in the first year and S/.15 in the second year). Laarman and Gregersen (1996) suggest that there is less resistance if the fee increases in small amounts instead of a large jump. In addition, seasonal fee policies could be implemented using the calculated probability of rejection curves from beach and wildlife recreation tourists. Moreover, beach recreation results could be evaluated to establish fees that avoid congestion problems during the summer period.

## 5.4 Summary

National local, national non local, beach recreation, wildlife recreation and foreign tourists have different WTP preferences. Independent models were evaluated for each one of the cited type of tourists. The type of tourists ranked by increasing mean WTP are: beach recreation, national local, wildlife recreation, national non local and foreign tourists. There is no statistical evidence that lower income tourists would be affected by potential fee increases in higher proportion than higher income tourists.

In relation to the evaluation of fee policies, a profit maximization policy without price differentiation fee policies would generate a significant drop in the number of national tourists. National tourists are highly sensitive to fee increases.

A better option would be a mixed fee policy such as continuing with the current fee policy for national tourists and an increased fee with minimum decrease in the number of foreign tourists. In addition, the evaluation of selected attributes indicates that national tourists are slightly more willing to pay for information than for evaluation or restrooms. In the case of foreign tourists, the willingness to pay for evaluation was higher than for restrooms and information.

## CHAPTER 6

### POLICY IMPLICATIONS AND LIMITATIONS OF THE RESEARCH

#### 6.1 Policy Implications

The results of this research provide information about the effects in the number of visitors and percentage of profits collected of different fee options for all the potential type of tourists who visit the protected area (national local, national non local, wildlife recreation, beach recreation and foreign tourists).

Although it is not the current fee policy in Peru, the evaluation of WTP values and probability of rejection curves strongly support the enforcement of differential fees for national and foreign tourists. Differential fee policies have been successfully implemented in other Latin American countries such as Ecuador and Costa Rica (Benitez, 2001; and Chase *et al*, 1998).

On the other hand, it is important to notice that in the case of PNR, there are two main types of national tourists according to their primary reason for visiting the protected area: wildlife recreation and beach recreation tourists. They present significantly different WTP preferences, which are not related to differences in income range.

Generally, there is reluctance from policymakers to increase entrance fees due to the fear of a negative impact on the tourism industry. The ultimate result is the degradation of the protected areas on which tourism itself depends (Dharmaratne *et al*, 2000). The probabilities of rejection curves calculated in this research allow estimating the percentage of tourists that will visit the protected area at different fee levels. Thus, the impact on the direct tourism industry could be evaluated.

Another governmental concern related to the increase of fees is that fact that increments could exclude lower income tourists of having recreation at the protected area. In this research no statistical evidence was found that lower income tourists would be affected in a larger proportion than higher income tourists due to potential fee increases. Moreover, the results suggest that PNR is an inferior good for certain type of national tourists.

Currently, PNR operates with minimum personnel, equipment and infrastructure. The required monetary amount to attain all the protected area conservation goals even if all the fee revenues were invested in the area could exceed the potential income generated by tourists' fees. Thus, although revenue generation from entrance fees can be substantial, it is important to recognize that the evidence as to whether or not protected areas can fund themselves solely through the financial benefits accruing from tourists' fees is mixed (Chase *et al*, 1998).

This research also provides information about the relative importance that national and foreign tourists place in PNR's potential improvements and the changes in fees that could be established by INRENA if these changes were implemented. The results indicates that the attribute national tourists appreciate the most is information, and in the case of foreign tourists is evaluation. This could be considered for future services improvements in the protected area.

In addition to financial and resource management goals, increasing tourism profits for example through fee collection has a further dimension in developing countries – that of legitimizing conservation as an sustainable alternative form of land use which may provide public benefits comparable to (or in excess of) the private benefits engendered from competing land uses (Chase *et al*, 1998).



## **6.2 Limitations of the Research**

The WTP values and probability of rejection curves were estimated with aggregated data. Therefore, it would be expected to have representative results. The data collected should be representative as well for each type of tourists for which the analysis was performed. Without specific information about the main characteristics of the different type of tourists, this hypothesis could not be tested.

The higher WTP values for national local tourists in comparison with national non local tourists could be related to the fact that national local tourists have less available substitutes or local visitors' ownership feeling, but it also could have been related to higher percentage of yea-saying responses. In the data analysis, the reasons were not clearly identified and evaluated.

The description of PNR given to the tourists previous to the CA question was concise. A more complete description of the protected area could have influenced the CA estimates. In addition, the results of the CA should be mainly considered as referential because a full description of the attributes potential improvements was not provided. Therefore, the attribute level "availability of interpretative signs at PNR's wildlife and landscape points of interest" and "operative and well-maintained rustic toilets at the Mine, Lagunillas and Yumaque beaches" could be perceived in different manner by different type of tourists. As well, different marginal WTP values could have been obtained if other potential relevant attributes were included in the evaluation such as higher percentage of garbage collection inside the protected area.

Other limitations of the research could be related to: interviewer bias, language limitations among the respondents whose first language was not Spanish or English, and oversampling of tourists who visited the protected area by tourism

agencies because most of the responses were obtained from Lagunillas Beach, which is the last stop in the tourism circuit for most of the travel agencies operators. Additionally, the same bids for the CB and CA questions were selected for both national and foreign tourists to allow comparison in responses; therefore, the bids for national tourists have been slightly placed in one of the tail of this type of tourist's WTP distribution.

Finally, the evaluation only included the responses of tourists who already paid the fee. Thus, the opinion of those who currently do not visit PNR because of the current fee was not captured.

### **6.3 Issues for Future Research**

If any change in the current fee is implemented PNR's managers would need to examine the role of new entrance fees in accomplishing public purposes and to establish a method of recording public responses to changes in fees. Chase (1996, cited in Chase *et al*, 1998) found that current entrance fees are a factor biasing WTP for protected area entrance fees. The entrance fee paid is an "anchor" from which judgments of WTP are based. This suggests that as fees are increased, reference points will shift and WTP will increase. Thus, the continuing monitoring of the fees and the WTP values could allow recovering the true WTP.

Further, it would be important to identify and compare the costs generated by tourism with its profits to identify its net economic impact in the protected area. Unfortunately, many of the costs associated with tourism, such as the negative ecological or social impact are difficult to assess in financial terms (Lindberg, 1996) and most of the time, are not included in the total costs.

In addition, it would be important to determine the effects of potential increases in the current fee in PNR in the number of visitors of substitute and complementary sites such as the Ballestas' Islands.

Other relevant issues that could be evaluated is the public perception about the agency in charge of PNR (INRENA) and the type of communication channels that need to be opened to transmit the results of fee policies to the public. The findings of research implemented in Southern California by Winter *et al* (1999) stated that "Trust was the most important and only significant contributor to explaining the variance in anticipated impact and general opinions about fees. Communication may be central in the establishment and maintenance of trust. Specifically, as a program is implemented its effects and outcomes should be monitored and reported back to the publics served". Currently, INRENA is not identified by most of the tourists as the institution in charge of PNR. In an open question in the pre-pilot survey results, the tourists were asked to indicate what institution was in charge of PNR. Only 21.4% of national tourists responded correctly (or answered Ministry of Agriculture - INRENA is a sub unit of that Ministry). In addition, it is not the present agency policy to share fee revenue related information with the interested public.

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**APPENDIX A**  
**PNR'S FINAL SURVEY**

Survey Identification Number \_\_\_\_\_

**PARACAS NATIONAL RESERVE SURVEY**

Date: \_\_\_\_\_

Hour of the survey: \_\_\_\_\_

Started \_\_\_\_\_

Ended \_\_\_\_\_

Location of the interview: 1) Lagunillas  
2) El Chaco  
3) Pisco Square  
4) Others. Specify \_\_\_\_\_

Name of the interviewer: \_\_\_\_\_

**PRESENTATION:**

Good morning/afternoon/night. My name is \_\_\_\_\_. I am doing a survey for tourists who have visited Paracas National Reserve in the last 12 months to assist a University of Maine's research in U.S. Paracas National Reserve DOES NOT INCLUDE EL CHACO OR BALLESTAS' ISLANDS. The survey is anonymous. You may skip any questions or withdraw from this study at any time without any type of penalty. The estimated time for completing the survey is 12 min. Your opinion is important for us. The results of the survey will help us to design the best tourist service options and management improvements in Paracas National Reserve's area. Would you be prepared to answer some questions?

1) Yes (proceed)

2) No (thank to the respondent and withdraw the survey)

**GENERAL QUESTIONS**

The questions we are going to ask correspond ONLY TO YOUR MOST RECENT VISIT to Paracas National Reserve:

**1. What activities did you do INSIDE the area?**

Wildlife and landscape viewing	1
Spending only the day at a recreational beach	2
Camping (spending the day and night at the recreational beach)	3
Eating in restaurants inside the area	4
Recreational fishing	5
Archaeological visiting	6
Appreciating the way of life of the fishing community	7
Other (specify) _____	8

2. What was your **PRIMARY** reason for your visit to Paracas National Reserve? (please, choose only one)

Wildlife and landscape viewing	1
Spending only the day at a recreational beach	2
Camping (spending the day and night at the recreational beach)	3
Eating in restaurants inside the area	4
Recreational fishing	5
Archaeological visiting	6
Appreciating the way of life of the fishing community	7
Other (specify) _____	8

3. Based on your **MOST RECENT VISIT** to Paracas National Reserve, which areas did you visit?

<b>Tourist's circuit:</b>	
Paracas National Reserve interpretation center	1
Julio C. Tello Archaeological museum	2
Lagunillas Beach (area of restaurants and marine port)	3
La Catedral (the Cathedral)	4
La Aguada (birdwatching area next to Paracas National Reserve interpretation center)	5
Punta Arquillo (sea lion watching area)	6
La Casita (the Little House)	7
La Bóveda (the Cave) at Supay beach (or Supay beach)	8
<b>Recreational beaches/ others:</b>	
La Mina (the Mine) Beach	9
Atenas Beach	10
Raspón Beach	11
Yumaque Beach	12
Mendieta Beach	13
I do not remember any of the areas I have visited	14
Other (specify) _____	15

4. Overall, on a scale from 1 to 5, where 1 is "Not at all satisfied" and 5 is "Extremely satisfied", how satisfied were you with your visit to Paracas National Reserve area?

Not at all satisfied				Extremely satisfied
1	2	3	4	5

5. How many days did you spend at Paracas National Reserve?

\_\_\_\_\_ number of days



6. On a scale from 1 to 5, where 1 is “Strongly Disagree” and 5 is “Strongly Agree”, please tell us how much you AGREE or DISAGREE with each of the following statements.

	Strongly Disagree				Strongly Agree	No Opinion
Paracas National Reserve should charge tourist entrance fees for visiting the area	1	2	3	4	5	<input type="checkbox"/>
Paracas National Reserve should charge different entrance fees for national and international tourists	1	2	3	4	5	<input type="checkbox"/>
Paracas National Reserve should charge reduced tourist entrance fees for local people (from Paracas and Pisco)	1	2	3	4	5	<input type="checkbox"/>
I would pay a little extra on my entrance fee if there were natural resources conservation programs improvements for Paracas National Reserve	1	2	3	4	5	<input type="checkbox"/>
I would pay a little extra on my entrance fee if there were infrastructure and service improvements on Paracas National Reserve	1	2	3	4	5	<input type="checkbox"/>

7. How many times do you plan to visit Paracas National Reserve in the next 12 months?

# of times

8. Currently, the entrance fee is S/5 (US \$ 1.4) for one day visit at Paracas National Reserve. On a scale from 1 to 5, where 1 is “Very Unreasonable” and 5 is “Very Reasonable”. How do you consider this amount?

Very Unreasonable					Very Reasonable	No Opinion
1	2	3	4	5		<input type="checkbox"/>

## VALUATION QUESTIONS

9. Please imagine the following situation. Suppose that, while you were planning your trip to Paracas National Reserve, you learned that the entrance fee had been raised and was now S/. \_\_\_\_\_. This means that your trip to Paracas National Reserve would become more expensive. Would you still have decided to visit Paracas National Reserve?

- 1) Yes (Go to question 11)
- 2) No
- 3) I do not know (Go to question 11)

10. If you thought that the entrance fee to Paracas National Reserve was too high and you were not prepared to pay it, what would you have done instead?

- 1) Visit only Ballestas' islands
- 2) Visit other places. Which one? \_\_\_\_\_
- 3) Stay at home
- 4) I do not know

**11. Paracas National Reserve is considering changing the entrance fee to improve the management conditions in the area. Your opinion is important for us in order to understand your preferences and to help us design the best options for the tourists who visit the area. First, we would like to present a brief description of the area:**

Paracas National Reserve is a Peruvian Natural Protected Area. It includes marine (65%) and land territory (35%). A high diversity of species has been registered inside Paracas National Reserve's area (more than 1,500), including endangered species. Paracas National Reserve has been internationally recognized by Wetlands for the Americas' Program, Ramsar Convention, and the International Marine Organization.

Currently, Paracas National Reserve has 18 employees, which considering the extent of the area (335,000 Ha) is equivalent to having 1 employee for 17,000 soccer fields. They do all the management activities required inside the area including supervision against law violators, maintenance of infrastructure, information services, cleaning, evaluation of wildlife species, environmental education, among others.

**Now, we would like to ask some questions to be sure that the information was clearly presented. Please, answer true or false to the following statements (remember we are not testing you but the information we have presented):**

- |    |  |   |   |
|----|--|---|---|
| 1) | Paracas National Reserve is a Natural Protected Area   | T | F |
| 2) | Paracas National Reserve has NOT international recognition   | T | F |
| 3) | The number of employees inside Paracas National Reserve's area is equivalent to having 1 employee for 17,000 soccer fields | T | F |

**12. The change proposals are the following:**

FEATURES	CURRENT CONDITIONS	OPTION A	OPTION B
ENTRANCE FEE	S/. 5 (US \$ 1.4)		
Roads	5% of the roads are repaired and permanently maintained		
Interpretative Signs	There are no interpretative signs at Paracas National Reserve wildlife and landscape points of interest		
Endemic (wildlife animals that only exist in this region) endangered species evaluations	There are no monitoring activities of Peruvian potoyunco birds. There are no monitoring activities of Humboldt's penguins in islands.		
Toilets at recreational beaches	3 inoperative rustic toilets (isolated cabins that do not include running water) at the Mine, Lagunillas, and Yumaque beaches		

**1) On a scale from 1 to 5, where 1 is "Not at all desirable" and 5 is "Very desirable", how desirable is Option A to you?**

Not at all desirable				Very desirable
1	2	3	4	5

Not at all desirable		Very desirable
1                  2                      3                      4                  5		

a) Option A  
b) Option B  
c) Any alternative / keep the current conditions (go to question 15)

\_\_\_\_\_ # of trips

14. In which state/city and country do you live? \_\_\_\_\_  
State/ city Country

- 1) Incomplete elementary school
- 2) Complete elementary school
- 3) Incomplete high school
- 4) Complete high school
- 5) Incomplete university, college or technical degree
- 6) Complete university, college or technical degree
- 7) Postgraduate studies
- 8) No formal education

1) Less than S/.450	5) S/. 2 001 – S/. 2 500	9) S/. 4 001 – S/. 5 000
2) S/.450 – S/.1 000	6) S/. 2 501 – S/. 3 000	10) More than S/. 5 000
3) S/.1 001 – S/.1 500	7) S/. 3 001 – S/. 3 500	11) I do not have income
4) S/. 1 501 – S/. 2 000	8) S/. 3 501 – S/. 4 000	

**INTERNATIONAL TOURIST. Which of the following salary range describes your total annually household income before taxes at last calendar year? (US \$)**

- |                        |                          |                          |
|------------------------|--------------------------|--------------------------|
| 1) Less than \$10,000  | 5) \$70,001 - \$90,000   | 9) \$150,001 - \$170,000 |
| 2) \$10,000 - \$30,000 | 6) \$90,001 - \$110,000  | 10) More than \$170,000  |
| 3) \$30,001 - \$50,000 | 7) \$110,001 - \$130,000 | 11) I do not have income |
| 4) \$50,001 - \$70,000 | 8) \$130,001 - \$150,000 |                          |

**19. Do you work for or are you a member of an ecological, environmental, or natural resources conservation organization?**

- 1) Yes
- 2) No

**20. Which of the following best describes your employment status during the past year?**

- 1) Student
- 2) Employed part-time
- 3) Employed full time
- 4) Unemployed
- 5) Homemaker/caregiver
- 6) Retired
- 7) Other (specify) \_\_\_\_\_

**21. Including yourself and your dependents, how many people live in your household? \_\_\_\_\_**

***Is there anything else you would like to share with us?***

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**This is the end of the survey!**

**Thank you a lot for your help.**

### **Paracas National Reserve's Survey Contact Information**

The conduction of Paracas National Reserve's survey is being coordinated by **Jaqueline Garcia-Yi**, a master's student in Ecology and Environmental Science, Department of Resource Economics and Policy, at the University of Maine in U.S., as part of her thesis research.

If you have any questions about the survey and/or the thesis research, please feel free to contact her at:

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If you have participated in the survey and you have any questions about your rights as a study participant, please contact **Gayle Anderson**, assistant to the Protection of Human Subjects Review Board of the University of Maine at:

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**Thank you for your participation!!!**

The conduction of this research study has been approved by the  
National Institute of Natural Resources in Peru and the University of Maine in U.S.

**APPENDIX B**  
**STATISTICS OF THE SURVEY'S RESPONSES**

**Table B.1: Question 1 - Activities Done Inside PNR**

Activities	Number of Responses <sup>1</sup>					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign Tourists	Total <sup>1</sup>
Wildlife and landscape viewing	138 (81.2)	203 (83.9)	270 (92.8)	68 (58.1)	409 (97.6)	750 (90.3)
Day at a recreational beach	93 (54.7)	116 (47.9)	134 (46.0)	73 (62.4)	96 (22.9)	305 (36.7)
Camping	46 (27.1)	20 (8.3)	18 (6.2)	48 (41.0)	3 (0.7)	69 (8.3)
Eating in restaurants inside the area	54 (31.8)	125 (51.7)	152 (52.2)	25 (21.4)	309 (72.7)	488 (58.7)
Recreational fishing	30 (17.6)	17 (7.0)	18 (6.2)	28 (23.9)	7 (1.7)	54 (6.5)
Archaeological visiting	79 (46.5)	130 (53.7)	166 (57.0)	40 (34.2)	135 (32.2)	344 (41.4)
Appreciating the way of life of the fishing community	51 (30.0)	68 (28.1)	97 (33.3)	21 (17.9)	91 (21.7)	210 (25.3)
Others	1 (0.6)	1 (0.4)	1 (0.3)	0 (0.0)	4 (1.0)	6 (0.7)
<b>Total</b>	<b>170</b>	<b>242</b>	<b>291</b>	<b>117</b>	<b>419</b>	<b>831</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.2: Question 2 - Primary Reason for Visiting PNR**

Activities	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign Tourists	Total <sup>1</sup>
Wildlife and landscape viewing	72 (42.6)	147 (60.3)	216 (74.2)	-	361 (90.0)	580 (71.0)
Day at a recreational beach	31 (18.3)	41 (16.3)	-	70 (59.8)	11 (2.7)	83 (10.2)
Camping	33 (19.5)	13 (5.9)	-	47 (40.2)	0 (0.0)	46 (5.6)
Eating in restaurants inside the area	1 (0.6)	3 (0.4)	2 (0.7)	-	2 (0.5)	6 (0.7)
Recreational fishing	3 (1.8)	2 (0.8)	5 (1.7)	-	0 (0.0)	5 (0.6)
Archaeological visiting	21 (12.4)	35 (14.2)	55 (18.9)	-	21 (5.2)	77 (9.4)
Appreciating the way of life of the fishing community	6 (3.6)	5 (2.1)	11 (3.8)	-	4 (1.0)	15 (1.8)
Others	2 (1.2)	1 (0.0)	2 (0.7)	-	2 (0.5)	5 (0.6)
<b>Total</b>	<b>169</b>	<b>247</b>	<b>291</b>	<b>117</b>	<b>401</b>	<b>817</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.3: Question 3 - Areas Visited by Tourists**

Activities	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
PNR Interpretation Center	46 (27.1)	121 (50.0)	154 (52.9)	11 (9.4)	291 (69.5)	458 (55.1)
Julio C. Tello Archaeological museum	89 (52.4)	145 (59.9)	193 (66.3)	38 (32.5)	206 (49.2)	440 (52.9)
Lagunillas Beach	109 (64.1)	194 (80.2)	241 (82.8)	59 (50.4)	374 (89.3)	677 (81.5)
La Catedral (the Cathedral)	109 (64.1)	166 (68.6)	215 (73.9)	59 (50.4)	360 (85.9)	635 (76.4)
La Aguada (birdwatching area)	4 (2.4)	36 (14.9)	38 (13.1)	2 (1.7)	173 (41.3)	213 (25.6)
Punta Arquillo (sea lion watching area)	16 (9.4)	37 (15.3)	43 (14.8)	6 (5.1)	91 (21.7)	144 (17.3)
La Casita (the Little House)	3 (1.8)	6 (2.5)	8 (2.7)	1 (0.9)	5 (1.2)	14 (1.7)
La Bóveda (the Cave) at Supay Beach (or Supay Beach)	27 (15.9)	52 (21.5)	66 (22.7)	13 (11.1)	93 (22.2)	172 (20.7)
La Mina (the Mine) Beach	89 (52.4)	74 (30.6)	95 (32.6)	67 (57.3)	61 (14.6)	224 (27.0)
Atenas Beach	15 (8.8)	11 (4.5)	8 (2.7)	17 (14.5)	4 (1.0)	30 (3.6)
Raspón Beach	17 (10.0)	5 (2.1)	11 (3.8)	10 (8.5)	5 (1.2)	27 (3.2)
Yumaque Beach	35 (20.6)	48 (19.8)	66 (22.7)	16 (13.7)	42 (10.0)	125 (15.0)
Mendieta Beach	7 (4.1)	6 (2.5)	7 (2.4)	6 (5.1)	8 (1.9)	21 (2.5)
I do not remember any of the areas I have visited	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.2)	1 (0.1)
Others	1 (0.6)	1 (0.4)	1 (0.3)	1 (0.9)	1 (0.2)	3 (0.4)
<b>Total</b>	<b>170</b>	<b>242</b>	<b>291</b>	<b>117</b>	<b>419</b>	<b>831</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis



**Table B.4: Question 4 - Overall Level of Satisfaction with Visit to PNR**

Level of Satisfaction	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
Not at all Satisfied	1 (0.6)	4 (1.7)	3 (1.0)	2 (1.7)	5 (1.2)	10 (1.2)
Not Satisfied	7 (4.1)	3 (1.2)	7 (2.4)	3 (2.6)	15 (3.6)	25 (3.0)
Neutral	42 (24.9)	56 (23.2)	68 (23.5)	29 (24.8)	76 (18.4)	174 (21.1)
Satisfied	60 (35.5)	93 (38.6)	115 (39.8)	36 (30.8)	179 (43.2)	332 (40.3)
Extremely Satisfied	59 (34.9)	85 (35.3)	96 (33.2)	47 (40.2)	139 (33.6)	283 (34.3)
<b>Total</b>	<b>169</b>	<b>241</b>	<b>289</b>	<b>117</b>	<b>414</b>	<b>824</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.5: Question 5 - Number of Days Spent in PNR**

Number of Days	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
One	126 (74.6)	213 (89.1)	267 (92.4)	68 (59.1)	400 (96.2)	739 (89.7)
Two	21 (12.4)	19 (7.9)	16 (5.5)	24 (20.9)	12 (2.9)	52 (6.3)
Three	16 (9.5)	6 (2.5)	4 (1.4)	18 (15.7)	3 (0.7)	25 (3.0)
More than Three	6 (3.6)	1 (0.4)	2 (0.7)	5 (4.3)	1 (0.2)	8 (1.0)
<b>Total</b>	<b>169</b>	<b>239</b>	<b>289</b>	<b>115</b>	<b>416</b>	<b>824</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.6: Question 6 - Tourists' Opinions**

Opinion	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
<b>The fact that PNR charges tourist entrance fees for visiting the protected area</b>						
Strongly Disagree	33 (19.6)	13 (5.4)	27 (9.4)	19 (16.4)	12 (2.9)	58 (7.0)
Disagree	40 (23.8)	22 (9.2)	39 (13.6)	22 (19.0)	22 (5.3)	84 (10.2)
Neutral	38 (22.6)	52 (21.8)	65 (22.6)	25 (21.6)	54 (13.0)	144 (17.5)
Agree	35 (20.8)	69 (28.9)	79 (27.5)	23 (19.8)	121 (29.1)	225 (27.3)
Strongly Agree	21 (12.5)	81 (33.9)	74 (25.8)	27 (23.3)	194 (46.6)	296 (36.0)
No Opinion	1 (0.6)	2 (0.8)	3 (1.0)	0 (0.0)	13 (3.1)	16 (1.9)
<b>Total</b>	<b>168</b>	<b>239</b>	<b>287</b>	<b>116</b>	<b>416</b>	<b>823</b>
<b>PNR should charge different entrance fees for national and international tourists</b>						
Strongly Disagree	11 (6.5)	36 (15.2)	38 (13.3)	8 (6.9)	102 (24.6)	149 (18.2)
Disagree	14 (8.3)	11 (4.6)	17 (6.0)	7 (6.0)	44 (10.6)	69 (8.4)
Neutral	23 (13.7)	28 (11.8)	34 (11.9)	17 (14.7)	54 (13.0)	105 (12.8)
Agree	37 (22.0)	45 (19.0)	53 (18.6)	29 (25.0)	113 (27.3)	195 (23.8)
Strongly Agree	81 (48.2)	114 (48.1)	139 (48.8)	54 (46.6)	87 (21.0)	282 (34.4)
No Opinion	2 (1.2)	3 (1.3)	4 (1.4)	1 (0.9)	14 (3.4)	19 (2.3)
<b>Total</b>	<b>168</b>	<b>237</b>	<b>285</b>	<b>116</b>	<b>414</b>	<b>819</b>
<b>PNR should charge reduced tourist entrance fees for local people</b>						
Strongly Disagree	8 (4.8)	25 (10.5)	27 (9.4)	5 (4.3)	47 (11.4)	80 (9.8)
Disagree	13 (7.8)	11 (4.6)	17 (5.9)	6 (5.2)	25 (6.1)	49 (6.0)
Neutral	14 (8.4)	24 (10.1)	29 (10.1)	8 (7.0)	51 (12.4)	89 (10.9)
Agree	31 (18.6)	34 (14.3)	47 (16.4)	18 (15.7)	103 (25.1)	168 (20.6)
Strongly Agree	100 (59.9)	139 (58.4)	161 (56.3)	77 (67.0)	161 (39.2)	400 (49.0)
No Opinion	1 (0.6)	5 (2.1)	5 (1.7)	1 (0.9)	24 (5.8)	30 (3.7)
<b>Total</b>	<b>167</b>	<b>238</b>	<b>286</b>	<b>115</b>	<b>411</b>	<b>816</b>

Opinion	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
<b>I would pay a little extra on my entrance fee if there were natural resources conservation programs improvements for PNR</b>						
Strongly Disagree	24 (14.4)	12 (5.1)	23 (8.1)	13 (11.3)	12 (2.9)	48 (5.9)
Disagree	32 (19.2)	16 (6.8)	28 (9.8)	20 (17.4)	18 (4.4)	66 (8.1)
Neutral	45 (26.9)	56 (23.6)	68 (23.9)	31 (27.0)	59 (14.3)	160 (19.6)
Agree	41 (24.6)	63 (26.6)	79 (27.7)	25 (21.7)	131 (31.7)	235 (28.8)
Strongly Agree	25 (15.0)	87 (36.7)	85 (29.8)	25 (21.7)	180 (43.6)	292 (35.7)
No Opinion	0 (0.0)	3 (1.3)	2 (0.7)	1 (0.9)	13 (3.1)	16 (2.0)
<b>Total</b>	<b>167</b>	<b>237</b>	<b>285</b>	<b>115</b>	<b>413</b>	<b>817</b>
<b>I would pay a little extra on my entrance fee if there were infrastructure and service improvements on PNR</b>						
Strongly Disagree	22 (13.2)	14 (5.9)	25 (8.8)	11 (9.6)	42 (10.2)	78 (9.6)
Disagree	27 (16.2)	15 (6.3)	23 (8.1)	19 (16.5)	50 (12.2)	92 (11.3)
Neutral	48 (28.7)	43 (18.1)	60 (21.1)	29 (25.2)	66 (16.1)	157 (19.3)
Agree	42 (25.1)	67 (28.3)	81 (28.4)	28 (24.3)	105 (25.5)	214 (26.3)
Strongly Agree	27 (16.2)	96 (40.5)	94 (33.0)	27 (23.5)	128 (31.1)	251 (30.8)
No Opinion	1 (0.6)	2 (0.8)	2 (0.7)	1 (0.9)	20 (4.9)	23 (2.8)
<b>Total</b>	<b>167</b>	<b>237</b>	<b>285</b>	<b>115</b>	<b>411</b>	<b>815</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.7: Question 7 - Number of Future Visits to PNR in the Next 12 Months**

Number of Visits	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
Zero	39 (23.1)	59 (25.4)	72 (25.4)	24 (21.1)	365 (88.4)	463 (56.9)
One	74 (43.8)	111 (47.8)	137 (48.4)	47 (41.2)	42 (10.2)	227 (27.9)
Two	41 (24.3)	47 (20.3)	52 (18.4)	35 (30.7)	4 (1.0)	92 (11.3)
Three	6 (3.6)	11 (4.7)	11 (3.9)	6 (5.3)	1 (0.2)	18 (2.2)
More than Three	9 (5.3)	4 (1.7)	11 (3.9)	2 (1.8)	1 (0.2)	14 (1.7)
<b>Total</b>	<b>169</b>	<b>232</b>	<b>283</b>	<b>114</b>	<b>413</b>	<b>814</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.8: Question 8 - Tourists' Opinion about Current fee**

Opinion	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
Very Unreasonable	32 (18.8)	17 (7.1)	35 (12.1)	13 (11.1)	5 (1.2)	54 (6.5)
Unreasonable	44 (25.9)	13 (5.4)	38 (13.1)	19 (16.2)	10 (2.4)	67 (8.1)
Neutral	28 (16.5)	52 (21.7)	51 (17.6)	28 (23.9)	43 (10.4)	123 (14.9)
Reasonable	21 (12.4)	52 (21.7)	51 (17.6)	21 (17.9)	92 (22.2)	165 (20.0)
Very Reasonable	43 (25.3)	104 (43.3)	110 (38.1)	36 (30.8)	261 (62.9)	408 (49.5)
No Opinion	2 (1.2)	2 (0.8)	4 (1.4)	0 (0.0)	4 (1.0)	8 (1.0)
<b>Total</b>	<b>170</b>	<b>240</b>	<b>289</b>	<b>117</b>	<b>415</b>	<b>825</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B. 9: Question 10 - Alternative Activity if Decide not to Pay the Fee for Visiting PNR**

Alternative Activity	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
Visit only Ballestas' islands	27 (23.3)	63 (42.9)	70 (37.0)	19 (26.8)	74 (79.6)	164 (46.1)
Visit other places.	17 (14.7)	36 (24.5)	38 (20.1)	13 (18.3)	4 (4.3)	57 (16.0)
Stay at home	69 (59.5)	37 (25.2)	74 (39.2)	32 (45.1)	4 (4.3)	110 (30.9)
I do not know	3 (2.6)	11 (7.5)	7 (3.7)	7 (9.9)	11 (11.8)	25 (7.0)
<b>Total</b>	<b>116</b>	<b>147</b>	<b>189</b>	<b>71</b>	<b>93</b>	<b>356</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.10: Question 13 - Tourists' Origin**

Tourists' Origin	Number of Responses
National Tourists	412 (49.6)
Foreign Tourists	419 (50.4)
<b>Total</b>	<b>831</b>

Percentages in parenthesis

**Table B.11: Question 14 Foreign Tourists - Country of Residence**

Country of Residence	Number of Responses
U.S.	49 (11.7)
France	46 (11.0)
Spain	45 (10.7)
Italy	44 (10.5)
England	38 (9.1)
Holland	33 (7.9)
Germany	31 (7.4)

Country of Residence	Number of Responses
Argentina	22 (5.3)
Switzerland	16 (3.8)
Belgium	14 (3.3)
Israel	13 (3.1)
Australia	11 (2.6)
Colombia	11 (2.6)
Canada	7 (1.7)
Chile	6 (1.4)
Austria	5 (1.2)
Mexico	4 (1.0)
Ireland	4 (1.0)
Ecuador	3 (0.7)
French Guyana	2 (0.5)
Paraguay	2 (0.5)
Portugal	2 (0.5)
South Africa	2 (0.5)
Venezuela	2 (0.5)
Aruba	1 (0.2)
Brazil	1 (0.2)
Czech Republic	1 (0.2)
Finland	1 (0.2)
Jamaica	1 (0.2)
Korea	1 (0.2)
Poland	1 (0.2)
<b>Total</b>	<b>419</b>

Percentages in parenthesis

**Table B.12: Question 14 National Tourists - Department of Residence**

<b>Department</b>	<b>Number of Responses</b>
Ica	170 (41.3)
Lima	158 (38.3)
Arequipa	18 (4.4)
La Libertad	13 (3.2)
Lambayeque	8 (1.9)
Cajamarca	7 (1.7)
Piura	6 (1.5)
Tacna	6 (1.5)
Junin	5 (1.2)
Apurimac	4 (1.0)
Ayacucho	4 (1.0)
Ancash	2 (0.5)
Huancavelica	2 (0.5)
Huanuco	2 (0.5)
Loreto	2 (0.5)
Moquegua	2 (0.5)
Cuzco	1 (0.2)
Tumbes	1 (0.2)
Ucayali	1 (0.2)
<b>Total</b>	<b>412</b>

Percentages in parenthesis

**Table B.13: Question 15 - Tourists' Gender**

Gender	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
Female	71 (42.5)	83 (34.6)	110 (38.3)	41 (35.3)	190 (45.9)	344 (41.9)
<b>Total</b>	<b>167</b>	<b>240</b>	<b>287</b>	<b>116</b>	<b>414</b>	<b>821</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.14: Question 16 - Tourists' Age**

Age	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
Mean	33.3	33.5	33.7	32.4	32.4	32.9
Median	31	32	32	30	30	31
Range	18-70	18-60	18-70	18-63	18-68	18-70
Standard Deviation	9.5	8.0	8.4	8.9	9.6	9.1
<b>Total</b>	<b>166</b>	<b>240</b>	<b>286</b>	<b>116</b>	<b>414</b>	<b>820</b>

1. Total calculated from National Local, National Non Local and Foreign responses



**Table B.15: Question 17 - Tourists' Level of Education**

Level of Education	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
Incomplete elementary school	1 (0.6)	0 (0.0)	1 (0.4)	0 (0.0)	0 (0.0)	1 (0.1)
Complete elementary school	1 (0.6)	0 (0.0)	0 (0.0)	1 (0.9)	0 (0.0)	1 (0.1)
Incomplete high school	6 (3.7)	3 (1.3)	8 (2.8)	1 (0.9)	3 (0.7)	12 (1.5)
Complete high school	18 (11.0)	12 (5.0)	19 (6.7)	10 (8.8)	30 (7.2)	60 (7.3)
Incomplete university, college or technical degree	29 (17.8)	30 (12.6)	39 (13.7)	19 (16.8)	65 (15.6)	124 (15.2)
Complete university, college or technical degree	106 (65.0)	179 (75.2)	203 (71.5)	80 (70.8)	239 (57.5)	524 (64.1)
Postgraduate studies	1 (0.6)	14 (5.9)	13 (4.6)	2 (1.8)	79 (19.0)	94 (11.5)
No formal education	1 (0.6)	0 (0.0)	1 (0.4)	0 (0.0)	0 (0.0)	1 (0.1)
<b>Total</b>	<b>163</b>	<b>238</b>	<b>284</b>	<b>113</b>	<b>416</b>	<b>817</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.16: Question 18 National Tourists - Monthly household income before taxes at last calendar year (S/.)**

Monthly Income	Number of Responses				
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Total <sup>1</sup>
Less than S/.450	11 (6.6)	8 (3.3)	11 (3.8)	8 (7.0)	19 (4.7)
S/.450 – S/.1 000	34 (20.4)	29 (12.1)	46 (15.9)	15 (13.2)	63 (15.5)
S/.1 001 – S/.1 500	35 (21.0)	31 (12.9)	50 (17.3)	16 (14.0)	66 (16.2)
S/. 1 501 – S/. 2 000	38 (22.8)	38 (15.8)	56 (19.4)	20 (17.5)	76 (18.7)
S/. 2 001 – S/. 2 500	22 (13.2)	33 (13.8)	42 (14.5)	13 (11.4)	55 (13.5)
S/. 2 501 – S/. 3 000	8 (4.8)	23 (9.6)	19 (6.6)	11 (9.6)	31 (7.6)
S/. 3 001 – S/. 3 500	1 (0.6)	24 (10.0)	17 (5.9)	7 (6.1)	25 (6.1)
S/. 3 501 – S/. 4 000	3 (1.8)	16 (6.7)	14 (4.8)	5 (4.4)	19 (4.7)
S/. 4 001 – S/. 5 000	3 (1.8)	13 (5.4)	10 (3.5)	6 (5.3)	16 (3.9)
More than S/. 5 000	1 (0.6)	21 (8.8)	17 (5.9)	5 (4.4)	22 (5.4)
I do not have income	11 (6.6)	4 (1.7)	7 (2.4)	8 (7.0)	15 (3.7)
<b>Total</b>	<b>167</b>	<b>240</b>	<b>289</b>	<b>114</b>	<b>407</b>

1. Total calculated from National Local and National Non Local  
Percentages for columns in parenthesis

**Table B.17: Question 18 Foreign Tourists – Annual Household Income before Taxes at Last Calendar Year (US \$)**

<b>Annual Income</b>	<b>Number of Responses</b>
Less than \$10,000	60 (15.4)
\$10,000 - \$30,000	92 (23.6)
\$30,001 - \$50,000	80 (20.5)
\$50,001 - \$70,000	60 (15.4)
\$70,001 - \$90,000	24 (6.2)
\$90,001 - \$110,000	8 (2.1)
\$110,001 - \$130,000	10 (2.6)
\$130,001 - \$150,000	8 (2.1)
\$150,001 - \$170,000	7 (1.8)
More than \$170,000	10 (2.6)
I do not have income	31 (7.9)
<b>Total</b>	<b>390</b>

Percentages for columns in parenthesis

**Table B.18: Question 19 - Tourists who are Worker or Member of Environmental Organization**

<b>Worker or Member</b>	<b>Number of Responses</b>					
	<b>National Local</b>	<b>National Non Local</b>	<b>Wildlife Recreation</b>	<b>Beach Recreation</b>	<b>Foreign</b>	<b>Total<sup>1</sup></b>
Worker or Member of Environmental Organization	13 (7.8)	17 (7.1)	23 (8.0)	6 (5.3)	49 (12.1)	79 (9.7)
<b>Total</b>	<b>167</b>	<b>240</b>	<b>289</b>	<b>114</b>	<b>405</b>	<b>812</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.19: Question 20 - Employment Status during the Past Year**

Employment Status	Number of Responses					
	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
Student	21 (12.5)	19 (8.0)	21 (7.3)	19 (16.5)	68 (16.5)	108 (13.2)
Employed part-time	7 (4.2)	20 (8.4)	21 (7.3)	6 (5.2)	21 (5.1)	48 (5.9)
Employed full-time	128 (76.2)	188 (79.0)	230 (80.1)	83 (72.2)	287 (69.5)	603 (73.6)
Unemployed	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	7 (1.7)	7 (0.9)
Homemaker/caregiver	7 (4.2)	5 (2.1)	6 (2.1)	5 (4.3)	0 (0.0)	12 (1.5)
Retired	2 (1.2)	1 (0.4)	3 (1.0)	0 (0.0)	9 (2.2)	12 (1.5)
Others	3 (1.8)	5 (2.1)	6 (2.1)	2 (1.7)	21 (5.1)	29 (3.5)
<b>Total</b>	<b>168</b>	<b>238</b>	<b>287</b>	<b>115</b>	<b>413</b>	<b>819</b>

1. Total calculated from National Local, National Non Local and Foreign responses  
Percentages for columns in parenthesis

**Table B.20: Question 21 - Number of People Living in the Household**

Number People	National Local	National Non Local	Wildlife Recreation	Beach Recreation	Foreign	Total <sup>1</sup>
Mean	2.8	2.9	2.9	2.7	2.1	2.5
Median	3.0	3.0	3.0	2.0	2.0	2.0
Range	1-8	1-10	1-10	1-7	1-7	1-10
Standard Deviation	1.6	1.6	1.6	1.6	1.2	1.5
<b>Total</b>	<b>168</b>	<b>239</b>	<b>288</b>	<b>115</b>	<b>394</b>	<b>801</b>

1. Total calculated from National Local, National Non Local and Foreign responses

**APPENDIX C**

**RESULTS OF THE ANOVA AND CHI – SQUARE TESTS**

**Table C.1: ANOVA Test Results for Average Bids according to Origin and Primary Activity**

ANOVA Statistics	L and NL	L and F	NL and F	WR and BR	L and WR	L and BR	NL and WR	NL and BR	F and WR	F and BR
P-Value	0.149423	0.088082	0.804264	0.957166	0.384193	0.446483	0.483834	0.636307	0.28989	0.496401
F Critical	3.867342	3.858901	3.856314	3.868237	3.865466	3.882576	3.860833	3.870582	3.855675	3.860322
Specific Statistics	L		NL		F		WR		BR	
Average	19.32593		21.22368		21.55037		20.43750		20.51579	
Variance	132.9228		154.2361		183.2973		149.6667		139.7630	
Number of Observations	135		228		407		256		95	

L = National Local, NL = National Non Local, F = Foreign, WR = Wildlife Recreation, and BR = Beach Recreation

**Table C.2: ANOVA Test Results for Average Bids according to Income Groups**

ANOVA Statistics	National Local Tourists			National Non Local Tourists			Wildlife Recreation		
	A-B and C	A-B and D-E	C and D-E	A-B and C	A-B and D-E	C and D-E	A-B and C	A-B and D-E	C and D-E
<b>P-Value</b>	0.051296	0.008032	0.723815	0.734425	0.10065	0.095206	0.169773	0.853156	0.34970
<b>F Critical</b>	3.944535	3.972048	3.937117	3.890875	3.90061	3.935185	3.886782	3.900226	3.906393
Specific Statistics	National Local Tourists			National Non Local Tourists			Wildlife Recreation		
	A-B	C	D-E	A-B	C	D-E	A-B	C	D-E
<b>Average</b>	15.35294	20.300	21.19512	21.592	22.26866	18.0000	19.34821	21.80412	19.6800
<b>Variance</b>	51.20499	183.739	113.611	156.0983	204.8358	47.77143	123.3461	213.5341	82.09959
<b>Number of Observations</b>	34	60	41	125	67	36	112	97	50

**Table C.3: Chi-Square Test Results**

<b>ANOVA Statistics</b>	<b>National Local and National Non Local</b>	<b>National Local and Foreign</b>	<b>National Non Local and Foreign</b>	<b>Wildlife Recreation and Beach Recreation</b>
<b>Percentage of Female Respondents</b>				
<b>Value</b>	9.2318	2.3244	4.0082	6.5037
<b>Prob.</b>	0.0099	0.3128	0.1348	0.0387
<b>Sample Size</b>	228	402	402	259
<b>Percentage of Respondents with Technical or University Degree</b>				
<b>Value</b>	1.8803	0.2188	0.2436	0.5722
<b>Prob.</b>	0.3906	0.8964	0.8853	0.7512
<b>Sample Size</b>	253	404	404	253
<b>Percentage of Respondents Employed Full Time</b>				
<b>Value</b>	1.9610	1.9759	3.9884	4.5947
<b>Prob.</b>	0.3751	0.3723	0.1361	0.1005
<b>Sample Size</b>	226	401	401	261

**Table C.4: ANOVA Test Results for Age**

<b>ANOVA Statistics</b>	<b>National Local and National Non Local</b>	<b>National Local and Foreign</b>	<b>National Non Local and Foreign</b>	<b>Wildlife Recreation and Beach Recreation</b>	
<b>P-Value</b>	0.836474	0.453816	0.229621	0.030703	
<b>F Critical</b>	3.867342	3.858901	3.856314	3.868081	
<b>Specific Statistics</b>	<b>National Local</b>	<b>National Non Local</b>	<b>Foreign</b>	<b>Wildlife Recreation</b>	<b>Beach Recreation</b>
<b>Average</b>	33.01481	33.20175	32.31095	33.56923	31.41935
<b>Variance</b>	84.34306	60.66396	90.6936	70.81758	57.2244
<b>Number of Observations</b>	135	228	402	260	93



**Table C.5: ANOVA Test Results for Income**

<b>ANOVA Statistics</b>	<b>National Local and National Non Local</b>	<b>National Local and Foreign</b>	<b>National Non Local and Foreign</b>	<b>Wildlife Recreation and Beach Recreation</b>	
<b>P-Value</b>	2.38E-10	1.64E-47	2.3E-35	0.47784	
<b>F Critical</b>	3.867342	3.856883	3.856883	3.868081	
<b>Specific Statistics</b>	<b>National Local</b>	<b>National Non Local</b>	<b>Foreign</b>	<b>Wildlife Recreation</b>	<b>Beach Recreation</b>
<b>Average</b>	5305.636	8256.674	43641.16	7025.684	7401.48
<b>Variance</b>	10192138	21611934	1.61E+09	16924376	25860253
<b>Number of Observations</b>	135	228	379	259	94

**APPENDIX D**

**DATA ANALYSIS ACCORDING TO ORIGIN AND PRIMARY ACTIVITY**

**Table D.1: WTP Responses Distribution by Tourists' Origin and  
Primary Activity**

WTP Responses	Percentage (%)			
	National Local Tourists		National Non Local Tourists	
	Wildlife Recreation	Beach Recreation	Wildlife Recreation	Beach Recreation
Yes	20.7	18.4	33.1	0
Do not know	5.7	10.2	13.1	0
Average Bid (S/.)	20.8	16.4	20.3	24.8
Number of Responses	87	49	175	48

**Table D.2: LRST by Tourists' Origin and Primary Activity**

Group of Tourists	LRST Results
<b>National Local</b>	
Day in the Beach and Camping	0.385806
Wildlife and Others	2.165506
Wildlife Recreation* and Beach Recreation**	6.134057
<b>National Non Local***</b>	
Wildlife and Others	0.34604
<b>National Local and National Non Local</b>	
Local Wildlife Recreation and Non Local Wildlife Recreation	19.75384
Local Beach Recreation and Non Local Wildlife Recreation	25.50075

\* Wildlife and Others were joined in the variable called Wildlife Recreation

\*\* Camping and Day in the Beach were joined in the variable called Beach Recreation

\*\*\* There was not variation in the data of Day in the Beach and Camping

Chi-Square Probability at 0.05 = 5.99

**Table D.3: ANOVA Test Results for Average Bids by Tourists' Origin and  
Primary Activity**

Type of Tourists	P-value	F Critical
Local Wildlife Recreation and Local Beach Recreation	0.031593	3.911794
Non Local Beach Recreation and Non Local Wildlife Recreation	0.027715	3.883883
Local Beach Recreation and Non Local Beach Recreation	0.000281	3.941224
Local Wildlife Recreation and Non Local Wildlife Recreation	0.773463	3.877474
Local Beach Recreation and Non Local Wildlife Recreation	0.037957	3.883684

## **BIOGRAPHY OF THE AUTHOR**

Jaqueline Garcia-Yi was born in Lima, Peru on September 8, 1975. She graduated from Juan XXIII High School, Lima, Peru in December, 1992. She enrolled at La Molina National Agricultural University, Lima, Peru in 1993, and graduated as a Bachelor of Science in 1997, and Engineer in Food Science in 1998.

Jaqueline has worked as environmental specialist in private environmental consulting companies and lately in the National Institute of Natural Resources of Peru (INRENA). Her area of expertise is environmental impact evaluations and environmental management of agricultural and agri-business activities. She has taken postgraduate courses in water treatment at the University of Valladolid in Spain in 1998, and solid waste management at the Technical University of Dresden in Germany in 2001. She enrolled to the graduate school at The University of Maine in 2002.

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