

**Ref: 490 MODELLING POTENTIAL REPETITION OF A VISIT TO VALUE  
ENVIRONMENTAL QUALITY CHANGE OF A SINGLE SITE.**

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**Abstract**

The purpose of this paper is to find out how much visitors in Ventanilla, Oaxaca, Mexico value an environmental quality change. Ventanilla is a rural community using a coastal lagoon ecosystem service for ecotourism. In the region, land regime is communal and the main source of income are agriculture and fishery. Direct or indirect effects are generated between activities during the production of goods. For instance, the effects on the incoming of tourists and visitors to the region given by an environmental quality change is motivated by an increase or decrease in the intensity of the production in other sectors, such as agriculture.

The interest of this paper is to know the willingness to accept an environmental change in order to repeat a visit to Ventanilla.

Most common environmental valuation techniques employ contingent valuation or travel cost method. A drawback of these techniques is due to the lack of information that interviewees usually have about the site concerned in the study. This lack of knowledge becomes even more relevant when assessing changes in the current environmental quality of the site. Our paper proposes the use of an alternative contingent behavior model combined with experimental techniques. The methodology is focused on the potentiality that current visitors may repeat or not their visit in the future.

Within a microeconomic framework we show how willingness to pay or willingness to accept will be obtained with respect to environmental quality changes under our contingent behavior model. Furthermore we model the repetition of visits employing the well-known probit model. The three main attributes assessed in this model are the number of crocodiles, birds and the mangrove area. We conduct a survey on the site during Easter and Summer of 2003. Information concerning if visitors are willing to repeat the visit or not and acceptable or desirable changes in environmental quality to guarantee a repetition of the visit were collected.

From our model we obtain willingness to pay or accept for environmental quality changes, variations in probabilities of visiting the site after such changes and shift in total demand. The case study presents the results from the survey and the probit model. Changes on willingness to accept and total demand estimations are in process. Demand is divided into three components: a random component, conscious visitors (those who have previous information about the site, either via some research or via friends) and repeat visitors (those who have already experienced the site). Once we obtain the shift in demand we can associate the effect originated by the environmental quality change and the consequent effect on the incoming of tourists. This link is useful as a tool to assess land use alternative policies in common resources.

Keywords: Common resources, Repetition of a visit, Contingent behavior, Oaxaca

## **1. Introduction**

Ecosystem attributes and services valuation is recognized as an important strategy for biodiversity conservation, since it represents a tool for supporting environmental management stakeholders' decisions.

In developing countries, priority areas for biodiversity conservation are located in rural areas, generally with common property regimes, where poverty conditions are extreme and environmental impacts severe. Environmental valuation gives the opportunity to address a value to the impacts generated from one activity to the other, in order to support and promote communities or firms with sustainable practices. For instance, the effects on the incoming of tourists and visitors to one region given by an environmental quality change is motivated by an increase or decrease in the intensity of agriculture. That is, an increase on fertilizers, used as an input for agriculture upland, could be an impact for a mangrove ecosystem where a community is doing a sustainable activity such as, ecotourism.

Inputs for production of goods, assimilation of wastes, amenity, and life support are the categories for identifying ecosystem services. Within each category we can distinguish different values; use values, existence values and option values. Contingent valuation and travel costs has been the most common methods for valuing natural resources, the first one, measures state

preferences and the second, revealed preferences. A review on contingent valuation has been recently published highlighting the main criticism of the technique (validity, reliability of results as well bias and errors) and some precautions for facing the problems [1]. A drawback of contingent valuation and travel cost techniques is due to the lack of information that interviewees usually have about the site concerned in the study. This lack of knowledge becomes even more relevant when assessing changes in the current environmental quality of the site. Contingent behavior is commonly used to measure revealed and stated preferences under hypothetical scenarios, such as changes in environmental quality; the intended behavior could be compared to an actual preference [2]. The interviewee generally had visited the site when assessing for example, the behavior after an environment change.

Ecosystem service valuation for ecotourism, need to be assessed for promoting sustainable activities, as part of an integrated use of natural resource in a catchment or a region.

In the last two decades the tourism industry has shown significant growth worldwide [3]. The World Travel and Tourism Council (WTC) estimated that 10.9% of the world GDP would be generated by tourism. In 1998, tourism in developing countries rose 23%, showing the importance of those countries in the market supply [4]. The World Tourism Organization, has estimated that between 2000 and 2010 tourism growth rate in America will be 3.9%. Moreover, in 2020 tourist will represent 1.6 billion with one billion of tourists [5].

Environmental impacts due to tourism growth are several such as, pollution, sedimentation, and erosion. Therefore, Agenda 21, recognized the need of new forms of tourism as a potential tool for sustainable development for certain communities, particularly in fragile environments through conservation of nature generating social benefit [6]. Therefore, new forms of tourism such as ecotourism, have arisen as a need for “understanding and appreciating the natural environment including the respect for host cultures” and generating local benefits [7]. Ecotourism criteria are conservation of the environment, and minimization of impacts upon it, respect for local culture and welfare benefits for the communities involved.

Ecotourism is growing as an option for sustainability in local communities, especially in developing countries. The World Trade Organisation estimates that 7% of international expenses are related to ecotourism [8]. Ecotourism has shown a growth rate of 10-15% a year, where tourism is coming principally from developed countries such as Germany, the United States, the United Kingdom, Canada, France, Australia, Netherlands, Sweden, Austria, New Zealand,

Norway and Denmark [9] [8, 10]. Developing countries with high biodiversity represent the main source of supply [10]. Kenya earns \$350 million annually in tourism receipts, which are almost entirely due to wildlife tourism [11]. However, the industry is facing challenges related to the determination of minimum impacts, contribution to local welfare, and integration within a regional integrated management process. In order to confront these problems, it has been recognised that community participation and local knowledge are nodule points to consider for building sustainable ecotourism projects.

The rationale that Renard (1991) proposes for developing Community based ecotourism management (CBEM) is the fact that it provides an opportunity for equity and democracy, could be economically and technically efficient, it promotes a responsibility, stability and commitment to management and permits an adaptive management towards local social and environmental conditions [11]. Therefore, CBEM ideally involves local benefits, local sovereignty, and facilitation of local conservation of natural resources. In that sense, valuation of ecosystem services where CBEM projects are based is an important tool for supporting CBEM, regional development, and policies for common property resources.

The aim of this paper is to value an environmental quality change of a single site, in particular the willingness to accept an environmental change in order to repeat a visit. The paper presents a case study in Ventanilla community located in the State of Oaxaca, on the South Pacific coast of Mexico.

## **2.- Modelling a potential repetition of a visit**

The model is based on Ventanilla visitors utility function related to the environmental quality of the place. That is, if the utility of visitors increase when the ecosystem is conserved. The consumer surplus is associated to a better or worst environmental quality. In order to assess the consumer surplus, the willingness to accept an environmental change to assure repetition of a visit is studied.

The study presents a new methodology, since it uses a contingent behavior method for a single site. Ecological attributes of different destinations have been considered for analysing variations on tourism demand; the model presented is innovative since demand of a single site depends on ecological attributes changes. In this particular case, ecotourism is in a mangrove ecosystem.

The methodology is focused on the potentiality that current visitors may repeat or not the visit in the future, depending on ecological attributes changes.

Willingness to pay or willingness to accept will be obtained with respect to environmental quality changes under our contingent behavior model. Furthermore we model the repetition of visits employing a probit model.

We consider that the decision to visit the site again, is a binary choice, denoted by  $T_i$ , such that,  $T_i = 1$  if household or individual decides to visit the site again and  $T_i = 0$  otherwise. We want to model the probability that  $T_i = 1$ , i.e.  $\Pr(T_i = 1)$ . We assume  $\Pr(T_i = 1)$  is linked to a set of exogenous variables.

More precisely, for some appropriate function  $g(\cdot)$ ,  $\Pr(T_i = 1) = g\left(\alpha + \sum_{j=1}^k \beta_j SE_{ji}\right)$ , where

$0 \leq g(\cdot) \leq 1$ ,  $\alpha$  denotes a constant,  $SE_{ji}$  denotes  $j^{\text{th}}$  socio-economic variable of household for individual  $i$  and  $\beta_j$  denotes an associated parameter to  $j^{\text{th}}$ . Traditional linear probability model is not recommended to be used to estimate the probability function because it would present non normal errors, heteroskedasticity and logical inconsistency, since the prediction of probabilities may lie out of range (0,1). It is well-known that the suggested model for binary choice estimations is a latent variable model. This model considers the existence of a latent variable  $T_i^*$ . Since this latent variable is unobserved by the researcher we can consider it is composed by two parts: one observed by the researcher, which includes all the socioeconomic variables and another part that it is unobserved by the researcher and that corresponds to heterogeneity reasons among tourists. Thus the model can be represented as:  $T_i^* = \alpha + \sum_{j=1}^k \beta_j SE_{ji} + \varepsilon_i$ , where  $\varepsilon_i$  denotes unobserved part or error term. For our purposes, the latent variable will work as an index function, such that we will set  $T_i^* = 1$  if  $T_i^* > 0$  and  $T_i^* = 0$  if  $T_i^* \leq 0$ .

Let  $S_i = \alpha + \sum_{j=1}^k \beta_j SE_{ji}$ , such that  $T_i^* = S_i + \varepsilon_i$ .

Then,  $\Pr(T_i = 1) = \Pr(S_i + \varepsilon_i > 0) = \Pr(\varepsilon_i > S_i) = 1 - \Pr(\varepsilon_i \leq S_i) = 1 - F_\varepsilon(-S_i)$ , where  $F_\varepsilon$  denotes cumulative density function of unobserved part. Due to a problem of identification of location and scale of  $T_i^*$ , researcher needs to choose a distribution and a value for the variance of  $\varepsilon_i$ . In

our case, we assume  $\varepsilon_i$  is independently and identically distributed, following a normal distribution with zero mean and variance of one.

Finally, maximum likelihood estimation is applied to the model in order to estimate parameters of interest. Under correct specification, these estimates are consistent and asymptotically normal.

The three main attributes we assess from this model are the number of crocodiles, birds and mangrove area. From our model we obtain willingness to pay or accept for environmental quality changes, variations in probabilities of visiting the site after such changes and shift in total demand.

Concerning the demand, we consider this is divided into three components: a random component, conscious visitors (those who have previous information about the site, either via some research or via friends) and repeat visitors (those who have already experienced the site). Once we obtain the shift in demand we can associate the effect that originated the environmental quality change and the consequent effect on the incoming of tourists. This link is useful as a tool to assess land use alternative policies in common resources. The case study presents the results from the survey and the probit model. Changes on willingness to accept and total demand estimations are in process.

### **3.-Case study: Ventanilla, Oaxaca, México**

#### **3.1 Ventanilla: environmental pressures and history**

Ventanilla community is located in the State of Oaxaca, on the South Pacific coast of Mexico. The village is situated in Tonameca watershed particularly in Santa Maria Tonameca municipality.

Tonameca catchment covers 49 800 hectares with a total population of 28 000 habitants, around 52 habitants per km<sup>2</sup> within six municipalities. Only Tonameca municipality has 15 546 habitants, where 96 % are zapotecs, and 5000 individuals speak the ethnic language zapotec [12]. Land regime is 99% communal and welfare conditions are critical showing for the catchment, 41% of household with electricity, and 31 % with water supply [13]. Health reports show that 45% of death are caused by malaria and 30% by stomach diseases. The percent of illiteracy in the Tonameca municipality is 35 % of adults and 20% of children [12].

Land use is dominated by shadow coffee exploitation, and agriculture for household consumption with around 16 000 ha in the catchment. Tonameca municipality land use is 77% for agriculture, 20% livestock, and 3% forestry. The crops cultivated are maize, chili, tomato and

nuts. Maize crops in the Tonameca municipality covers around 8 500 has producing 1 ton/ha. [12]. Ecotourism is only an important source of revenue for Ventanilla, but other communities in the region produce organic coffee and nuts.

Environmental pressures from upland and local activities are due to agriculture expansion and fertilizers. Tropical forest has been deforested due to the coffee market crisis. Coffee producers prefer to cut the forest for agriculture instead of protecting the forest for growing shadow coffee. Deforestation in the dry forest for agriculture is also an enormous pressure.

Urbanization is also an important issue, there are 219 localities, being Pochutla with 12 000 habitants one of the biggest. Land use for household construction, water extraction and waste water represent severe pressures [13]. Another important pressure is the tourism resort expansion coming from the coastal line to the Tonameca watershed coastal area. Tonameca is located between Puerto Escondido and Huatulco resorts. Huatulco is after Cancun the most important coastal resort receiving from 1993 to 2000, 170 000 tourists a year, and generating 530 million of pesos a year. In 2002, Huatulco received 273 777 persons providing 38.6% of tourism income for the state and Puerto Escondido only 7.5% [14, 15].

Finally, illegal wildlife trade exist in the region where marine turtles and iguana commerce represent two of the most common species.

In sum, socio-economic driving forces are agriculture, urbanization and tourism causing deforestation, sedimentation, water pollution, and geo-morphological impacts in the coast.

Ventanilla community is organized in an ecotourism cooperative since 1995, following the marine turtle exploitation ban. Marine turtle exploitation was the main source of revenue for many rural communities in the coast. Nowadays, for Ventanilla community ecotourism is the main source of revenue and includes 90 % of the families [16]. The Mexican Center for Marine Turtles is a government institutions located very closed to Ventanilla, that was created for research on marine turtles and its conservation and receives many tourists each year for visiting the aquarium. Visitors arrive for one day, for wildlife watching in the lagoon boat trip and sometimes for tasting the traditional food prepared in the women's community restaurant. During the boat trip, the main ecological attributes watched are the mangrove forest, birds, crocodiles, and iguanas. In captivity, mangrove small plants, turtle eggs and juvenile crocodiles conservation areas are shown as part of the conservation program. Adult crocodiles, deer, and raccoons, are also animals in captivity that were captured by the Federal Mexican Agency for

Environmental Protection (PROFEPA) and given to the community for its conservation. Ventanilla has been registered since 2001, as a Unit of Management and Wildlife Conservation (UMA). The UMA is a strategy of the Minister of Environment and Natural Resources to identify and support communities with wildlife sustainable use.

The community has showed social cohesion for a common sustainable project, as well as conservation commitment, for example, the mangrove reforestation and crocodile monitoring programs. Equity on benefit sharing, sovereignty of the cooperative and co-ordination with national, international and regional organizations and communities has been also demonstrated [16].

Ventanilla community represents for the region a successful example of community organization for ecosystem services use and sustainable wildlife exploitation. Ventanilla is a replicable case study specially for the south Pacific coast of Mexico and for Central American countries where 80% of the population live in the Pacific side rather than in the Caribbean coast, and where rural communities with similar conditions and ecological attributes are located.

### **3.2 -Survey method**

A pilot and a final structured survey was carried on to Ventanilla visitors.

The pilot survey goal was to know the environmental attributes attracting tourism, and their attitude towards social congestion and environmental changes due to upland activities. The purpose was to obtain the correct ecological variables to include in the final survey in order to avoid the assumption such as, that tourists go to Ventanilla mainly because of mangroves, or that tourists are concerned about the number of boats as a measure of congestion. Moreover, the pilot survey was done to determine how homogeneous is the perception of the number of birds or crocodiles, in order to know if a decrease of 20% of crocodiles will be perceived in the same way. Pilot focus groups were carried out in Ventanilla, during and after the boat trip, in the last week of December 2002 and the first week of January 2003, with a total of nine groups and 84 persons. Results confirmed that ecotourism is attracted by the number of crocodiles, bird species, mangrove forest and secondly on the number of iguanas, and that they are concerned about environmental problems. A measure of congestion was solid wastes and waiting time for boarding the boat.

Final structured questionnaires were applied in-situ after the boat trip, on April, during a holiday week when national tourism is important and during the summer on July, August and September.

A total of 424 questionnaires were obtained on April and 128 for the summer giving a total of 552 questionnaires. The goal was to know tourism socioeconomic profile, and changes on demand due to environmental changes. Origin, accommodation, previous knowledge about the place, trip days, if they were traveling in a tour, previous environmental course were asked using a dichotomous method. The reason for traveling (sun, hotel, nature, adventure) and preferences (mangrove, crocodiles, birds, community) were asked to be ranked from extremely, very, moderately, slightly and not important. Willingness to accept a change on the environment was divided in 20%, 50% and 70% of an increase or decrease of mangrove area, crocodiles and birds number. Other information was obtained such as infrastructure opinion, willingness to pay more for the same service, travel expenses and income.

### **3.3- Results**

#### **3.3.1 Visitors description**

Ventanilla visitors are 50.2 % women and 49.7 % men; students represent 28% and professionals 66%. The mean age is 28.9 years old. Visitors' origin is mainly from Mexico, with 86% compared to 6.5 % coming from Europe. Moreover, 48% comes from Mexico city and 13% from Oaxaca city.

Tourism accommodation is mainly located in Huatulco resort (48%) (table 1). Tours to Ventanilla are promoted in hotels (41 % with 30% from Huatulco) or by agencies.

**Table 1. Percent of persons per destination**

<b>Accommodation location</b>	<b>%</b>
Huatulco	48.6
Puerto Escondido	12.25
Mazunte	12.25
Ventanilla	1.46
Other (Puerto Angel, Zipolite, Pochutla)	25.41

Tourists are traveling for less than a week or a week (90%), visiting by recommendation (47%) for the first time Ventanilla (88%). It is interesting to note that 30% of the interviewers had visited another coastal lagoon and 141 persons new about Ventanilla before living their place of origin (124 persons new specifically about the crocodiles). Moreover, it is surprising that 41% had attended an ecological course.

Ventanilla visitors are not strict ecotourists since the majority are coming from Huatulco resort, however, tourism is interested, susceptible and looking to have contact with nature (Table 2).

Two type of visitors can be distinguished, one with hotel enjoyment preferences and a second with nature preferences (Table 2). Travel motivation very or extremely important are presented in Table 3, where 79 % is coming for nature and only 10% for enjoying a hotel. The table shows that persons with interest in nature and any other reason for traveling is always major than the interest of hotel entertainment. It is important to mention that 90% of tourists are staying in a hotel, the previous might be due to a lack of publicity for other type of accommodation, or that all included tours represent the cheapest option, or that people answer that nature was important due to the experience of visiting Ventanilla.

**Table 2. Tourist preferences**

Sun	Hotel	Nature	People	Adventure
40 % Very important	48% Not important	41.7 % Extremely important	32.4% Very important	38% Extremely important

**Table 3. Travel motivation show two type of tourists: nature and hotel**

Very or extremely important for visitors	Total of persons	Total %	% related to 436	Very or extremely important for visitors	Total	Total %	% related to 57
Nature	436	78.9		Hotel	57	10.3	
Interest on	177	32	40.5	Interest on	33	5.9	57.8

nature				Hotel entertainment			
Nature and contact with local people	147	26	33.7	Hotel and contact with local people	19	3.4	33.3
Nature and sun	171	31	39.2	Hotel and sun	36	6.5	63.15
Nature and adventure	199	36	45.6	Hotel and adventure	24	4.3	42.1

Travel expenses are mainly for arriving to the coast, probably because the majority travels by plane. Accommodation and food expenses are representative of Huatulco prices. Income is for 38% less than 5000 pesos and for 33% between 5000 and 10 000 pesos (Table 4).

**Table 4. Average expenses (pesos) per travel or per day.**

	Transport to the coast	Transport to Ventanilla	Expenses on food per day	Entertainment expenses per day	Accommodation expenses per day
Mean	508	106	193.75	139.75	304.19
Standard deviation	1301	252	486	317	550
Maximum	18000	2500	10000	5000	5100

### 3.3.2 Statistical results and probit model

#### a.- Statistical results

General statistics are presented and many of the results are confirmed in the probit model. Crocodiles is an important attribute in terms of tourism preferences, that is, crocodiles represent the aim of the visit (Table 5).

**Table 5. Ecological attributes preferred by tourists**

<b>Mangrove</b>	<b>Crocodiles</b>	<b>Birds diversity</b>	<b>Community</b>
38% Very important	50% Very important	30% Very important	34% Not important

Congestion was not a relevant aspect since the parameters chosen as measure of congestion (time for take the boat and waste) were not a problem for visitors and even if it was expressed as a problem visitors would repeat their visit (Table 6).

**Table 6. Visitors congestion opinion**

<b>Congestion opinion</b>	<b>Percent (%)</b>
the time for boarding is long	19.27
the time for boarding is not long	80.4
wastes are a problem	9
wastes are not a problem	91
the time for boarding is long and I would not repeat my visit	42
the time for boarding is long and I would repeat my visit	88

Infrastructure indicators were the boat, the road, toilets and restaurant conditions. In general terms, visitors opinion was that conditions are good expect for toilets. The community has installed a new ecological system for toilets, dry toilets that visitors are not used to.

**Table 7. Visitors opinion about infrastructure**

<b>Boat</b>	<b>Road</b>	<b>Toilet</b>	<b>Restaurant</b>
54.37 good	52.9 good	41.8 regular	47.8 good

### b. Probit model

The probit model shows the variables that are relevant for repeating a visit. Amongst them we find out four main issues: heterogeneity of visitors with respect to their main motivations, main attribute of attraction, recreation as an inferior good and finally, the matter of the place of residence.

From the results of table 8, we can distinguish two kinds of visitors with different willingness to repeat the visit. On the one hand, those whose main motif was enjoying the nature and on the other hand, those who mainly wanted to enjoy the facilities and amenities of the hotel. In this sense, we can argue that these are extreme market segments such that the former are very likely to repeat visits whereas the latter is very unlikely to do so. It shows the existence of heterogeneity in the preferences of the visitors.

Amongst the main attributes that define the site, crocodiles were the only aspect that becomes relevant when assessing the willingness to repeat a visit. Such that, those visitors whose most valuable attribute is the presence of crocodiles over other aspects as birds or vegetation, they are more likely to revisit the site. However those who prefer birds or vegetation are not necessarily so enthusiastic in repeating a visit. It proves that the presence of the crocodiles in the site is the main attraction for the visitors and that special emphasis needs to be put on their conservation and sustainability.

Another interesting aspect of the study is that it shows that recreation in the site is an inferior good. In this sense, for those visitors where the price of the visit with respect to their income is high it is likely they will repeat the visit. However, those visitors with higher income (with respect to the price) are not so keen in repeating the visit. The characterization of the visit as an inferior good is a relevant finding for Ventanilla since it shows that demand is very inelastic with respect to changes in prices (at current level of prices).

Finally, the study shows that the place of residence of the visitors is conditioning, as expected, the probabilities in coming back to visit the site. Those visitors that live in Mexico are more likely to come again to the site, than those whose this is their first visit or come from a different country.

This last finding combined with the insensitivity of demand to changes in the price to access the site (with respect to income) and the inverse relationship of repeating a visit and income may

help for a better understanding and the implications of a charging system in the site. For this purpose, price discrimination seems to be advisable.

**Table 8- Probit model results**

Significance at 1% ***	Sign	Coefficient (Std. Error)	Variable
	-	2.17 (0.55)	Months trip
	+	1.11 (0.38)	Turtles previous knowledge
	-	0.72 (0.25)	A week trip
	+	0.49 (0.14)	Nature motif of trip
	-	0.31 (0.11)	Hotel motif of trip
	+	0.28 (0.7E-01)	Preference on Crocodiles
	+	0.13E-01 (0.47E-02)	Attribute crocodiles
	+	0.3E-02 (0.11E-02)	Price/income
Significance at 5% **			
	+	0.76 (0.38)	Pt. Escondido accommodation
	+	0.9E-02 (0.4E-02)	Attribute mangroves
Significance at 10%			

*			
	+	1.39 (0.77)	Mexico origin
	-	0.46 (0.26)	First trip to Oaxaca
	+	0.41 (0.45)	Ecological course
	-	0.2E-04 (0.11E-04)	Income
	-	0.14 (0.8E-01)	Preference on Community

### 3.4 Discussion

Oaxaca coast is an important region for marine turtles nesting, therefore many persons are interested in visiting the Mexican Center of Marine Turtles. Tours are promoted for visiting Ventanilla, the Mexican center of Marine Turtles and Puerto Angel. Therefore, the fact that previous knowledge of the presence of marine turtles is an important variable for repeating a visit is explained due to the promotion of the Mexican Center of Marine Turtles as part of the tour. An important issue is that even if in the statistics we can observe that many of the visitors are staying in Huatulco and coming in an organized tour, those two variables are not relevant for repeating a visit. However, the fact that many people are staying in a resort and arrives with a tour is very important for characterizing the demand and to show that there is a need for diversifying it.

Statistical and probit results show that visitors have an interest on nature and is an important variable for repeating a visit. Crocodiles is the major attraction to Ventanilla, because it is the main publicity given to the site but also because it is the most exotic specie. Given the importance of crocodiles it is crucial to conserve the specie and the habitat, that is, the mangrove forest and the lagoon quality. Ventanilla community has a monitoring program for crocodiles do not permit the exploitation of the specie. However, as far as the habitat is concerned it receives pressures from upland agriculture. The analysis of the mangrove food web

and impacts from upland activities analyses are not included of this paper but will be linked to the willingness to accept a change to observe the shift in demand.

Visitors with certain awareness of the relevance of the environmental conservation is a positive issue for repeating a visit. Congestion is not a variable of matter, meaning that Ventanilla has not arrived to its maximum social carrying capacity, but further analysis is recommended in order to avoid social and environmental impacts. Infrastructure opinion is good except for the toilets, but it is not a relevant variable for repeating a visit.

Demand is characterized by person coming mainly from Mexico staying in a resort, but with an interest for having contact with nature, specifically mangrove forest and crocodiles. Visitors are not willing to accept a deterioration of the place. Ventanilla represents an important case study of community based management but visitors are not really interested on knowing the community project history. It seems that visitors are not aware of the role of community sustainable projects for the conservation of nature. Moreover, results show the insensitivity of demand to changes in the price to access the site (with respect to income) and the inverse relationship of repeating a visit and income suggest that price discrimination could be advisable.

Tourism policy in Mexico has been oriented to the creation of resorts, such as Puerto Escondido and Huatulco, independently of a regional planning. Oaxaca tourism ministry has been recently interested in ecotourism planning using criteria proposed by the World Tourism Organization [17]. Environmental impact, codes of conduct, infrastructure and administration are some aspects of concern. Community participation is promoted, but it is not as community based management where the communities own the companies or cooperatives. Ecotourism planning is not oriented to community management, it is a state policy where tourism is controlled by the state and private resorts. The case study presented is showing the value that visitors can address to ecotourism and the importance to promote community based management. Moreover, it has been demonstrated that visitors are concerned about environmental changes, and a state preference or value is shown to the environment quality. Shifts in demand due to changes on willingness to accept a change due to environmental impacts from upland, would affect the consumer surplus of visitors decreasing their utility function.

#### **4.- Conclusions**

The first part of modeling potential repetition of a visit to value environmental quality change of a single site has been presented for Ventanilla community. The case study shows that contingent

behavior method combined with a probit model is revealing the state preference or value for environmental quality change. Results show the relevance of ecological attributes such as crocodiles and mangroves for visitors. It is clear that repeating a visit depends on the conservation of the ecosystem. Therefore, it is important to promote the conservation of natural resources, and community based ecotourism as part of an integrated regional planning.

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